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Firms as Drivers of Growth and (In-)Equality*

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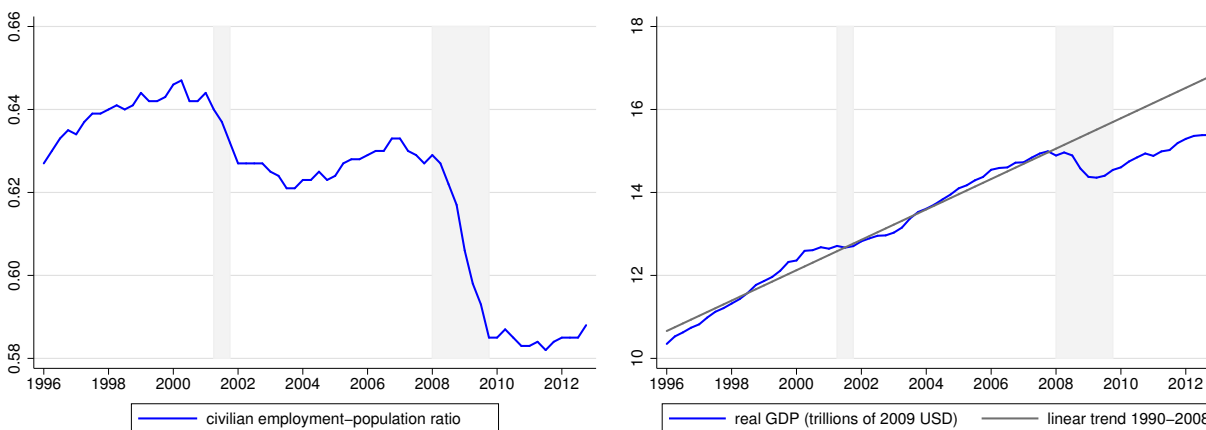
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1 A trade-off between growth and equality?

The consequences for the U.S. economy of the financial crisis from 2007–08 have proven to be prominent and persistent. Employment dropped precipitously to a 30-year low while aggregate output took a hit in excess of 600 billion dollars. The two panels of Figure 1 illustrate that at present these measures show little sign of recovery, with both employment and GDP lagging behind pre-crisis trends. Yet these aggregate trends mask significant heterogeneity.

Figure 1. Left: civilian employment-population ratio; right: real GDP versus pre-recession trend; shaded areas mark U.S. recessions. Source: Author's own calculations using [US. Bureau of Labor Statistics \(2015\)](#) and [US. Bureau of Economic Analysis \(2015\)](#)



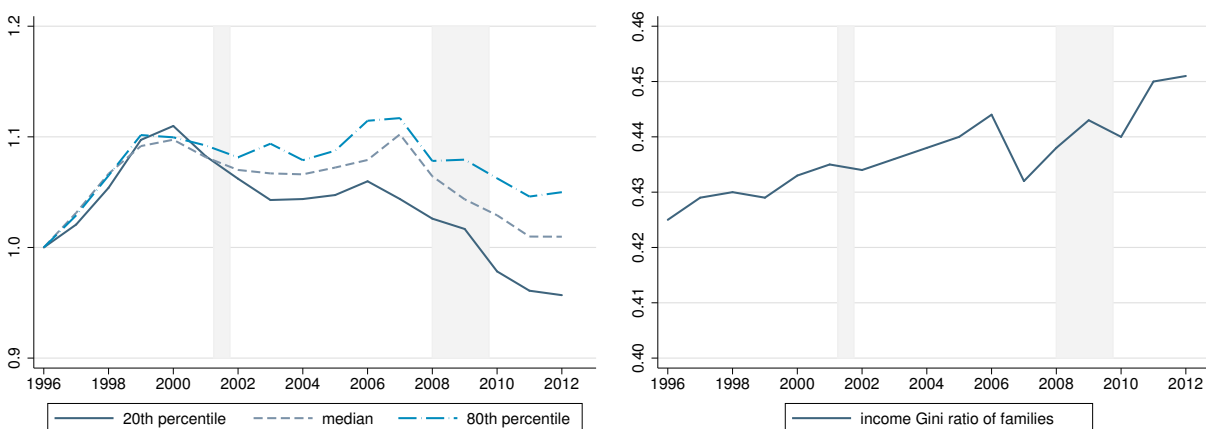
Take as an example the nation's median household income, which fell by 7.4% between the onset of the Great Recession in 2007 and 2012. Real earnings of households at the twentieth percentile of the income distribution in 2012 are lower than they were in 1996. Meanwhile, earnings

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of families in the highest quintile have experienced robust growth over the past decades, with little turbulence during the most recent recession. The left panel of Figure 2 illustrates the evolution of family income percentiles for three groups: 20th percentile, median and 80th percentile (with 1996 income levels normalized to 1.0 for ease of comparison). Real incomes of these groups grew in roughly equal proportions during the late 1990s but started to diverge with the onset of the 2001 recession, with lower income groups lagging behind throughout later years. The right panel summarizes the rise in income inequality by a common measure, the Gini coefficient over family income. By this measure, the U.S. ranks among the most unequal of all developed countries in the world.¹

Figure 2. Left: normalized percentiles of real family income distribution; right: income Gini ratio of families; shaded areas mark U.S. recessions. Source: Author's own calculations using U.S. Census Bureau (2015), US. Bureau of the Census (2015), and Federal Reserve Bank of St. Louis (2015)



The trend of increasing income inequality presents a predicament for policy makers: whether to pursue policies that are pro-growth or pro-equality? The implicit assumption is that there exists a trade-off between growth and equality such that improvements in one will necessarily exacerbate the other. While the U.S. experience over recent decades supports this claim, effective policy design requires an understanding of the microeconomic drivers behind both inequality and growth.

Recent research has underscored the relevance of firms for determining both aggregate productivity and pay. Work in this area has found that firms played a notable role in driving inequality in the U.S. over the past decades (Barth et al., 2014; Song et al., 2015). These studies show that conditional on worker characteristics such as educational attainment and work experience, the place of employment is a significant predictor of workers' pay. Studies of other countries (see Card et al., 2013 for Germany and Mueller et al., 2015 for the UK) confirm that increasing disparities between firms are associated with rising income inequality. Yet three important questions remain unanswered: First, to what extent are income differences causally attributable to differences across firms? Second, what attributes lead firms to pay more or less generously than the average? Third,

¹See for example the OECD Income Distribution Database (IDD).

what feasible policies could lead to a reversal of the inequality trajectory followed by the U.S. while also promoting productivity growth?

The goal of this short paper is to address the third question and propose an answer by drawing on the experience of a large upper-middle income country, namely Brazil. By comparing and contrasting the link between firms and inequality in Brazil with what we know about the U.S., some general lessons on the micro-foundations of inequality and growth emerge. While a holistic treatment of the first two questions is beyond the scope of this paper, references to recent research findings shed some light on these related issues.

The rest of the paper is structured as follows: [Section 2](#) summarizes stylized facts about income inequality in the U.S. and then discusses sources behind its rapid increase. [Section 3](#) draws on the Brazilian case to explore parallels and differences with the U.S. experience. Finally, [Section 4](#) concludes by suggesting three ways in which policies targeted at firms can aim to reduce income inequality while also enhancing aggregate productivity.

2 Firms as drivers of rising income inequality in the U.S.

Using administrative tax records, [Kopczuk et al. \(2010\)](#) document that income inequality in the U.S. has risen precipitously since the early 1970s.² Dissecting the rise in inequality, the authors show that a large part is driven by rising inequality in the top half of the distribution. Research on the sources behind the rapid increase in inequality has explored many possible explanations, including skill-biased technological change ([Autor et al., 2008](#)) and the related rise in the college premium ([Pew Research Center, 2014](#)), the decline of labor unions ([Card, 2001](#)), and a continued decrease in the real minimum wage ([Lee, 1999](#)). Yet these works have limited ability to speak to the relative importance of individual- versus employer- versus institution-specific wage components. While imperative for diagnosing the root causes of rising inequality, the distinction between these three levels of wage determination remains an under-researched topic.

Addressing this gap, recent work has stressed the importance of firm-level wage determinants and their divergence over the past decades. Linking a panel of workers to their employers using the U.S. Longitudinal Employer-Household Dynamics (LEHD) data, [Barth et al. \(2014\)](#) find that the increase in income inequality between 1970 and 2010 is largely attributable to changes in the supply side of the labor market.³ To demonstrate this, the authors proceed in two steps: first, they show that in a Mincer regression framework almost two thirds of the overall increase was due to rising between-employer disparities in pay, and most of the between-employer changes are due to changes in estimated establishment fixed effects after controlling for worker characteristics. Second, they confirm that average real wage growth by income percentile between 1992–2007 closely tracks the shape of the growth in estimated effects attributed to establishments employing

²Comparable results obtain when using alternative inequality measures, including the Gini coefficient, income percentile ratios, and the variance of log incomes. The income concept used in their analysis is labor income and the income unit is the individual.

³Their analysis focuses on establishments, not firms, as the unit of analysis.

workers in the respective percentiles. The latter finding suggests that, absent selection issues, changes in establishment-specific pay components explain almost all of the increase in overall income inequality over this period.

In related research, [Song et al. \(2015\)](#) construct a matched employer-employee dataset using administrative data from the U.S. Social Security Administration in order to quantify how much of the overall income inequality increase is due to between-employer changes.⁴ In accordance with the results from the LEHD data, they find that almost all of the increase in wage dispersion between 1978 and 2012 is accounted for by the evolution of average wages across firms. Interestingly, the individual-specific income growth rates are matched closely by firm-level pay growth for workers up to and including the top income percentile, whereas within-firm inequality appears to account for a small fraction of the overall income inequality increase for this group. This finding suggests that firms have significant explanatory power for both overall inequality trends and also for inequality among the group of top earners. Similar findings obtain across regions, industries, sex, and age, thus corroborating the proposition that firms effected the observed rise in income inequality.

3 Firms as drivers of falling income inequality in Brazil

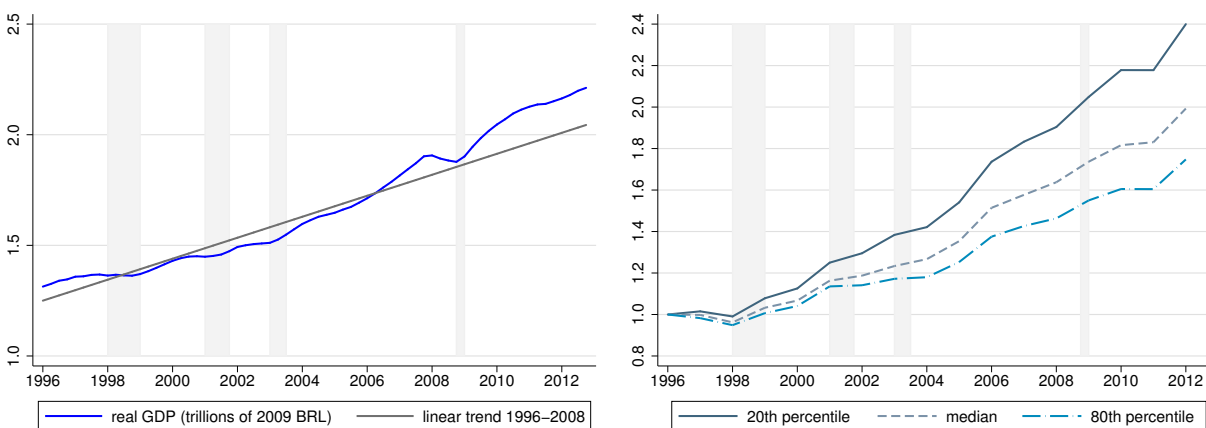
What general lessons does the U.S. experience teach us about the relation between firms and income inequality? One may hypothesize that something inherent about the evolution of firms over the past decades has led to greater income dispersion among workers at different types of employers. Instances of such firm characteristics may include their choice of production technologies, organizational structure, or remuneration policies. Yet it remains to be examined whether firm-level changes are causally related to changes in inequality. Taking a step in that direction, it would be informative to identify an example in which convergence of employer average pay resulted in decreased overall inequality.

The history of Brazil presents such a case that can be used to shed light on the inherent link between firms and inequality. Over the past two decades, Brazil has experienced rapid growth and falling income inequality, spurred by a sequence of political and economic reforms such as opening to international trade and gradually increasing the minimum wage. The country's concurrent growth in aggregate output with declining inequality is summarized in [Figure 3](#). The left panel plots real GDP in trillions of real Brazilian Reais along with a linear trend from 1996–2008 for comparability to the U.S. growth experience. The right panel shows the evolution of various percentiles of the real income distribution for working age males employed in Brazil's formal sector.⁵

⁴In contrast to [Barth et al. \(2014\)](#), these authors conduct their analysis at the firm level.

⁵Details of the microdata, sample selection, and robustness to alternative income definitions are described in [Alvarez et al. \(2015\)](#).

Figure 3. Left: real GDP versus pre-recession trend; right: normalized percentiles of individual real labor income distribution; shaded areas mark Brazilian recessions. Source: Author's own calculations using OECD (2015) and RAIS data



Two striking facts emerge: First, Brazil grew faster on average than the U.S. during those years.⁶ Second, labor income growth has been particularly pronounced at the bottom of the distribution, with the 20th percentile of the income distribution growing by 140% between 1996–2012, while growth at the 80th percentile was significant but distinctly lower at approximately 75%. These differential growth rates imply a rapid decline in dispersion of the income distribution throughout this period. These trends are noteworthy also because the Brazilian experience of growth and falling inequality over the past two decades is representative of the Latin American region more broadly.

Motivated by the Brazilian experience, which stands in contrast to that of the U.S., Alvarez et al. (2015) investigate the sources of the decline in inequality. Using employment records from the *Relação Anual de Informações Sociais (RAIS)*, an administrative matched employer-employee dataset covering the universe of formal workers in Brazil, the authors conclude that firms were an important determinant of the country's inequality evolution from the late 1980s onwards, and particularly during the period of declining inequality from 1996–2012. To the extent that firms can be attributed the inequality decline in Brazil, this further strengthens the view that firms can drive inequality movements in either direction.

Figure 4 summarizes the correlation between worker income growth and firm average income growth across the income spectrum, following the method used by Barth et al. (2014) and Song et al. (2015). The graph is based on data on working age male employees in Brazil's formal sector⁷

⁶From the right panel of 1 it can be inferred that the U.S. grew by approximately $(15.2/10.5)^{1/16} - 1 = 2.3\%$ per year between 1996 and 2012. In comparison, 3 shows that Brazil grew by approximately $(2.2/1.3)^{1/16} - 1 = 3.3\%$ over the same period.

⁷Qualitatively similar trends are observed for different age classes as well as for female workers. The data do not comprise workers in Brazil's informal economy but similar inequality trends are observed in Brazilian household survey data such as the *Pesquisa Mensal de Emprego (PME)* or the *Pesquisa Nacional por Amostra de Domicílios (PNAD)*, which are representative of Brazil's entire economy. Unfortunately, these survey data contain no detailed information on workers' place of employment.

and is constructed as follows:

First, to focus on relative movements in the income distribution we normalize the earnings distribution in both 1996 and 2012 by the median earnings in that year. We then rank all formal sector workers by their normalized labor income in 1996 and compute average income values for each percentile group. We repeat this procedure for 2012 and compute the growth rate of average incomes for each percentile group. The resulting relative growth rates by income percentile are plotted as a solid blue line with circles. It is worth noting that this line is downward sloping almost throughout the entire income distribution. This downwards slope indicates that lower income groups grew faster than higher income groups, which implies that there was compression throughout the income distribution.

Second, we go back to the percentile group classification of workers in 1996 and compute for every individual the average income that their current employer is paying all of its employees in that year. We then take the average by income percentile over these employer average incomes. Repeating the exercise for 2012, we can again compute growth rates of firm average incomes by percentile groups of the income distribution and plot the results as a dashed red line with squares.

Figure 4. Individual and firm average log normalized real income ratio by income percentile, 1996–2012. Source: Alvarez et al. (2015)



The most striking insight from Figure 4 is that worker income growth rates and their employer average income growth rates align closely throughout the income distribution. For example, average income of the 20th percentile of the income distribution grew by approximately 30% faster than the median growth rate, while average firm income of workers in that percentile grew by the

almost exactly the same amount.⁸ This is consistent with the view that changes between firms can account for a large share of the overall inequality decline in Brazil during this period.

To put these results into perspective, it is helpful to compare the evolution of growth and inequality in the U.S. with Brazil. Contrary to widely held views, the Brazilian experience suggests that there need not be a trade-off between growth and inequality. Further research on the microeconomic mechanisms behind observed changes in the U.S. and in Brazil is warranted in order to understand the determinants of firm-driven growth and inequality in both countries.

4 Implications for policies promoting growth and equality

Recent research findings emphasize the role of firms as determinants of aggregate productivity in the economy (Buera et al., 2015). The fact that changes in firm-level pay are an important driver of changes in inequality—growing in the U.S. and declining in Brazil—suggests that firms also have important distributional functions. An immediate question is: how can the link between firms, productivity, and the distribution of economic rents guide the design of policies to promote both growth and equality?

In order to deduce policy recommendations from the previous section's findings, it is crucial to determine to what extent income differences are causally attributable to differences across firms. To this end, it is worth noting that the explanatory power of firms remains high when controlling for differences in the composition of workers across firms along observable characteristics including education, work experience, race, and gender, as shown to be the case in the U.S. by Barth et al. (2014). Further controlling for workers sorting across firms along unobservable but time-invariant attributes, as Card et al., 2013 do for Germany and Alvarez et al. (2015) do for Brazil, suggests that firms are an important driver of inequality dynamics.

What firm attributes can policy feasibly influence in order to spur both growth and equality? To answer this question, our previous analysis suggests that firms should be viewed as dual drivers of both aggregate output and the distribution of economic rents. Three aspects of firm-level wage setting are central to both these ends:

First, firm characteristics such as productivity (Faggio et al., 2010) and export status (Schank et al., 2007) have been shown to be closely related to both total factor productivity and also to firm pay differences. Policies that help firms to adopt more productive technologies and access larger product markets are promising candidates to increase firm profits and at the same time boost workers' pay.

Second, conditional on firm characteristics, the allocation of workers across heterogeneous employers has important aggregate as well as distributional consequences (Davis and Haltiwanger, 2014; Blanchard and Katz, 1992). Policies aimed to reduce obstacles to worker mobility, which include stringent job protection laws and red tape costs from firm size-dependent policies, can help successful businesses grow while at the same time offering better job opportunities to workers.

⁸Taking the exponential of the log normalized real income ratio, we get $\exp(0.26) = 0.30$.

Third, wage setting policies determine how economic rents are split between a firm's stakeholders and its workers. In the presence of labor market frictions, which prevent the efficient allocation of workers across employers, firms can appropriate a larger share of the benefits from the employment relationship. In such an environment, institutional wage policies such as a minimum wage can act as a transfer of rents from firms to workers while also increasing overall productive efficiency (Card and Krueger, 1994).

Contrary to conventional wisdom, this short article argued that firms have the potential to spur both growth and equality. Carefully designed and implemented policies of the three classes discussed above have the potential to enhance aggregate productivity while also inducing a more equal distribution of economic rents.

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