

Connect and Protect: The Role of Trade, Technology, and Labor Policies on Informality

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Proposal Abstract Several episodes of market-oriented reforms in developing countries have been accompanied by a significant rise in work outside of the formal economy. In addition, according to a large literature for the developed world, the rapid development of communications technologies is related to the polarization of the labor force. A growing body of literature has investigated whether these two effects on formal workers are mediated by the strength of labor enforcement. We propose to combine these three lines of research to consider the implications of rigid labor market policies on informality, in the aftermath of trade liberalization and technological progress. We hypothesize that strict labor policy may reinforce trends toward widening wage dispersion, job polarization, and contribute to rising informality, in part, as low-wage, low-skilled job opportunities in low-productivity formal establishments diminish. To do so, we employ an annual Brazilian household survey that provides a wealth of data on workers' demographic and employment characteristics, including job formality status. We also exploit quasi-exogenous changes in tariffs, industry-level real exchange rate changes, and advances in broadband internet to explore the likelihood of informality across Brazilian employers exposed to varying degrees of *de facto* labor regulations, as measured by Ministry of Labor inspections.

Motivation Recent market-oriented reforms, such as trade liberalization, have coincided with a substantive rise in work outside of the formal economy. In Brazil, for example, estimates suggest that approximately 30 percent of employment is informal—that is, the jobs do not pay into the tax system and the workers do not receive benefits. Much research has documented the relationship between trade policy and informality in the Brazilian context, with mixed results (Paz 2014). At the same time, the rapid development of communications technologies has radically changed the nature of work. A large body of research supports the empirical relationship between the expansion of technology and the coincident polarization of the labor force for the developed world (Acemoglu and Autor 2011). The findings in Almeida, Corseuil, and Poole (2019) reinforce this finding for the case of the Brazilian formal economy. However, to our knowledge, the literature on the impact of technology on employment has neglected to consider technology’s role in shaping informal labor markets in developing countries. This is unfortunate because, theoretically, technology may moderate the effects of trade policy.

Technology facilitates local firms’ access to new, distant markets that were previously not within reach. At the same time, it fosters local competition by increasing outsiders’ access to the local market. This is similar to a reciprocal trade liberalization, as in Paz (2014), which creates formal jobs in the expanding firms (usually large and more productive firms, less likely to hire informal workers) and destroys formal and informal jobs in smaller and less productive firms (which are more likely to employ informal workers). Similarly, the technology-induced skill upgrading, uncovered by Almeida, Corseuil, and Poole (2019), improves job opportunities for skilled workers and displaces unskilled workers. Trade and technology, therefore, are predicted to reduce the number of (higher-skilled) upper-tier informal jobs and expand the number of (lower-skilled) lower-tier informal jobs.

The ultimate impact of trade and technology on formal and informal employment opportunities, however, will be mediated by the flexibility that businesses face to adjust their workforces following shocks. While labor market institutions exist to protect workers, they may also hamper the firm’s incentives to adjust the workforce by raising the costs of labor. In fact, research has shown that labor regulations constrain firm size (Almeida and Carneiro 2009; Almeida and Carneiro 2012) and firm productivity (Almeida and Poole 2017). In addition, in stark contrast to the best policy intentions, evidence in

Almeida, Corseuil, and Poole (2019) points to the idea that labor market regulations differentially benefit the skilled workforce, at the expense of low-wage, low-skilled workers.

Question We propose to combine these three lines of research to consider the *implications of rigid labor market policies on informality, in the aftermath of trade liberalization and technological progress*. First, we investigate the impact of trade and technology on informality. Our work also extends much of the existing literature to consider the interplay between trade and technology on informality. As trade can be a conduit for technological advancement and communications technology can serve to lower trade costs, we hypothesize that the two economic forces have an interactive effect on formal and informal employment. Next, we study the role of labor policy in influencing these effects. Given the previous evidence, we hypothesize that strict labor policy may, in fact, reinforce trends toward widening wage dispersion, job polarization, and contribute to rising lower-tier informality, in part, as low-wage, low-skilled job opportunities in low-productivity formal establishments diminish. In this sense, our paper speaks to a growing public policy debate on the trade-off between economic growth and job security for workers. More flexible labor markets allow workers to reallocate to their most efficient use, enhancing the productivity gains associated with a globalizing and technologically-advancing world. The fact that rigid labor policy may unintentionally amplify the income inequality effects of these shocks, pushing workers into the informal economy, should give policymakers serious pause. Our research will offer insights for Brazil and other middle-income countries that face similar challenges in an increasingly technology-driven and integrated global economy.

Data and Methodology The Brazilian context is suitable to the question at hand in part due to the wealth and depth of available data sources. In addition, the country pursued a dramatic unilateral trade liberalization during the 1990s, suffered a substantive currency devaluation in 1999 allowing for increased export market access, and experienced strong growth in the provision of internet services in the early 2000s. Also, in 2010, the federal government launched the National Broadband Plan (*Programa Nacional de Banda Larga*) to provide broadband internet access to poorly served areas.

Our empirical strategy to identify the impact of labor market regulations on individual-level informal employment status relies on a number of data sets from Brazil exhibiting substantial variation across many different dimensions: municipal locations, industrial categories, and time. We rely on detailed household survey data from the *Pesquisa Nacional por Amostra de Domicílios* (PNAD). This survey covers the entire country and includes information on the worker's demographics and formal or informal employment status. With information on the individual worker's industry and location of employment, we match the PNAD employment outcomes with industry-specific tariff information and municipality-specific access to broadband internet.

Specifically, we exploit quasi-exogenous changes in tariffs, industry-level real exchange rate changes, and local technological change, as exemplified by new access to broadband internet, requiring significant labor market adjustment, and explore the effects on workers' informality across Brazilian employers exposed to varying degrees of *de facto* labor regulations, as measured by Ministry of Labor inspections. The *de jure* labor regulations in Brazil, established in the 1988 Federal Constitution, are effective throughout the country. However, as the Ministry of Labor is designated with enforcing compliance with regulations, there is significant heterogeneity both within the country and over time in terms of how binding is the labor law. Since informal workers are a very heterogeneous group, we also intend to explore these relationships across various demographic groups in order to examine whether these policies have different impacts on lower- and upper-tier informal workers.

Policy Implications Populist, protectionist policies are gaining influence in global politics, in large part because of the belief that globalization harms local labor market conditions. Meanwhile, the digital revolution has spread fear about robots and artificial intelligence replacing high-quality jobs and workers. Policymakers often position and propose labor market policies, such as firing restrictions and severance payments, to protect workers, vulnerable to such negative employment shocks. We hypothesize that policies designed to connect developing country firms with developed country markets—via access to export markets and supply of digital technologies—can promote higher-quality employment in less-developed countries, as workers shift from informal to formal employment. Moreover, flexible labor market policies may in fact protect workers and help the transition to the formal economy in the aftermath of employment shocks.

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