

THE IMPACT OF DIGITAL TECHNOLOGIES ON WORKER TASKS: DO LABOR POLICIES MATTER?**Carlos H. L. Corseuil**

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One of the most frequently expressed concerns by policymakers on labor related issues deals with how digital technologies influence the world of work. Also policymakers on education related issues are worried that schools are not adequately preparing students with the "right set of skills" for the future labor market, potentially constraining their employability and productivity. Since education and training policies typically take time to produce qualified graduates, there is a sense of urgency in this conversation.

Brazil offers an excellent setting to explore some of these concerns. The internet rollout in the country was gradual and impressive in scope. While only 15% of the over 5,000 Brazilian cities had local internet service in 1999, by 2006 over half of all municipalities had a local internet service provider. Also, the *de jure* labor regulations, defined in the 1988 Constitution, are among the most stringent in Latin America, significantly raising the cost of labor.

In this paper, we exploit the rollout of the internet across the country, following the liberalization of the telecommunications industry, to assess how digital technology adoption affected the use of different abilities and activities across a wide range of formal occupations. We also questioned whether existing "*de facto*" labor market regulations support workers, especially those most vulnerable to employment shocks, by offering them opportunities to retain their jobs and upgrade their skills, following technology adoption. We measure "*de facto*" stringency of labor regulations on the ground with its subnational enforcement as measured by the number of labor inspections per plant in that city.

Our main results show that with increased exposure to internet, technology-intensive industries have been reducing their relative reliance on manual

abilities and routine activities, shifting the composition of the workforce toward more cognitive abilities (such as "mathematical reasoning") and non-routine activities (such as "interacting with computers"). Following digital technological adoption, firms are making relatively greater use of more interactive, communication-based abilities, such as "oral expression" and "speech clarity". Despite the advances made by digital technology, it still has not yet fully mastered human interaction, suggesting that cognitive, interactive, and communications skills are critical individual skills in a technologically-advancing world.

And do these adjustments in the task content of occupations happen regardless of the stringency of labor market regulations that Brazilian employers face? Or are they taking place mostly in areas that face tighter/weaker controls? Our work also considers this. It shows that the observed shifts in the employment composition – toward cognitive abilities and non-routine activities – happen in cities where Brazilian employers face tighter enforcement of labor regulations. This fact aligns with the idea that in Brazil employers face a higher cost of adjustment for skilled workers and that stricter labor regulations stifle adjustment, and particularly so for the high-skilled workers. Furthermore, the shift toward communication-based cognitive skills is again more pronounced among cities with stricter labor regulations. This also suggests that employer-level costs of adjustment for interactive skills are particularly high, perhaps because of their still scarcity in the country. Hence, in contrast with the best policy intentions, the "*de facto*" set of Brazilian labor market regulations in this period differentially benefit the use of non-routine tasks and cognitive abilities, mostly typical of better-off workers.

Our work offers new insights for the design of effective education, skills, and labor policies to support the future Brazilian workforce. In an economy that is progressively with higher levels of technology adoption, and with increased automation, restrictive labor codes can hurt the poor (low skilled) more than the rich (high skilled). And, as the country embarks in a new reform for its labor code – towards increased flexibility in hiring procedures and reduced costs and uncertainty for labor disputes –, there is substantive room to mitigate these regressive impacts.

In the education front, for Brazilian graduates to reap the benefits of the digital revolution, policymakers should prioritize investments in higher-level cognitive abilities, especially interactive and communication abilities. Without these 21st century skills, Brazilian workers will simply find it much harder to find employment in the future, and the country is likely to miss the necessary condition to fully benefit from the higher productivity and welfare gains associated with digital technology adoption.

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