

# Trade Opening, Enforcement and Informality: Evidence from Brazil

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## Abstract

In this paper we analyze the effects of a major trade liberalization episode on labor market informality. We exploit the Brazilian trade opening reform that took place in early 1990's, when import tariffs and overall trade restrictions were drastically reduced across industries. Our results indicate that regions more exposed to the trade liberalization shock had a greater increase in informality, which was accompanied by a reduction in the formal-informal wage gap and a decrease in wages for both low and high-skill workers, the former effect being twice as strong. We also investigate whether different levels of enforcement of labor regulations lead to heterogenous impact of trade liberalization on informality. We find that regions adversely affected by the tariff shock that had more intense labor enforcement observed a lower informality increase relatively to regions that were also negatively affected but had lower levels of enforcement intensity.

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# 1 Introduction

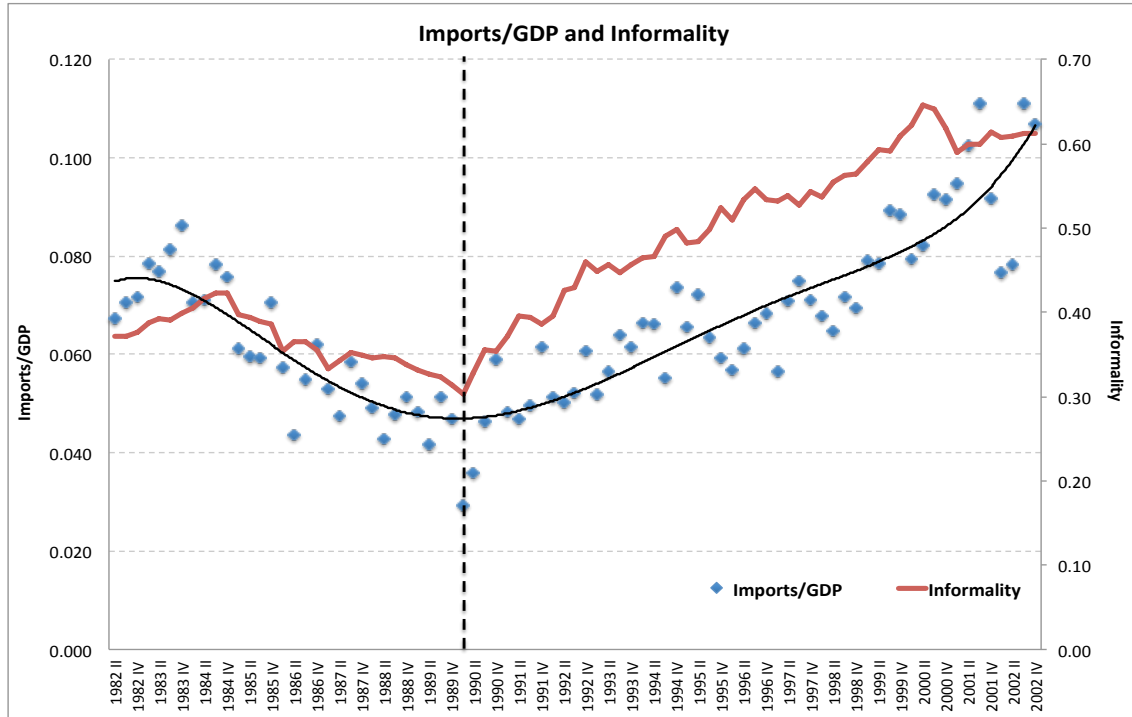
Most Latin American labor markets are characterized by substantial informality. On average, more than 50 percent of the labor force in Latin American countries is informal, with this number varying from 35 percent in Chile to 80 percent in Peru. Moreover, during the 1990's labor informality increased substantially in many Latin American countries [Perry et al. (2007)]. This increase in informality took place concomitantly, or in the aftermath of, major trade reforms in different countries of the region, which drastically cut tariff and non-tariff barriers, and opened markets to foreign competition (see Figure 1 for the case of Brazil). Indeed, there is a long standing concern about the labor market consequences of trade liberalization and one major concern in developing countries is that it could induce substantial reallocation of workers from the formal to the informal sector [Goldberg and Pavcnik (2003)].

Given that informal jobs are typically seen as inferior occupations relatively to formal ones, if trade opening indeed led to an increase in informality, this could be a potentially important adverse effect of trade reforms. In fact, informal workers are not covered by the labor legislation (e.g. minimum wages), are not entitled to government mandate benefits (social security network), and receive substantially lower wages when compared to observably equal formal workers. Thus, if trade liberalization indeed caused labor informality to increase, this could constitute a potentially large welfare loss from it.

In this paper we seek to identify the effects of a major trade liberalization episode on local labor market conditions, in particular informality, wages and non-employment. For that, we exploit the Brazilian trade opening reform that took place in early 1990's, when import tariffs and overall trade restrictions were drastically reduced across industries. As Figure 1 shows, Brazil is a potentially interesting case, as the timing of the substantial increase in informality perfectly coincides with the start of the trade opening process. Moreover, it offers great cross-industry variation in tariff cuts and substantial variation in employment composition across regions. These two variations constitute the basis of our identification approach, which follows a growing literature that seeks to identify trade effects on labor market outcomes using within-country regional variation in exposure to trade shocks [e.g. Kovak (2013), David et al. (2013) Dix-Carneiro and Kovak (2014)].

The connection of trade liberalization and informality increases relies on the idea that once domestic firms are exposed to greater competition from foreign firms, they would respond by trying to reduce labor costs through greater use of informal labor, which is not subject to labor regulations. This argument, however, without further elaboration is not consistent with basic micro theory, as profit-optimizing firms should have shifted to informal labor even prior to the reforms, otherwise this could not be considered the

Figure 1: Informality and Trade



Notes: Employment data comes from the Monthly Employment Survey (PME). Imports data comes from Ipeadata, available at [www.ipeadata.gov.br](http://www.ipeadata.gov.br).

optimal behavior [Goldberg and Pavcnik (2003)]. However, if one considers an unilateral trade opening as a negative price shock for domestic firms, then the richer environment considered in Ulyssea (2014) would predict an increase in *labor* informality through two channels. First, more firms would decide to enter the informal sector as opposed to the formal one; as these firms hire only informal workers, this would increase the amount of informal labor in the economy. This is the *extensive margin of informality*. Second, *formal firms* would now be pressured by greater competition (lower prices), which would induce them to hire a greater share of *informal workers*. This is the *intensive margin of informality*. We discuss with more detail these mechanisms in Section 3.

Our results indicate that regions more exposed to the trade liberalization shock had a greater increase in informality, which was accompanied by a reduction in the formal-informal wage gap and a decrease in wages for both low and high-skill workers, the former effect being twice as strong. We also find a negative impact on employment consistent with the idea of an increase in competition brought by the trade opening.

Moreover, we explore how heterogenous where these impacts across regions with different levels of enforcement of labor regulations. We use data from the Brazilian Ministry

of Labor on inspections and distance to auditing offices across municipalities. Our approach is similar to [Almeida and Carneiro \(2012\)](#) and instrument the number of labor audits in a given region by the distance to the nearest labor ministry office within the region state. We find that regions adversely affected by the tariff shock that had more intense labor enforcement observed a lower informality increase relatively to regions that were also negatively affected but had lower levels of enforcement intensity.

These results contribute to a relatively new literature that seeks to identify the impacts of trade opening on the size of the informal sector and overall labor market outcomes. Opponents of trade opening and liberalization argue that it may induce noncompliance of firms with labor regulations and may increase informality [e.g. [Goldberg and Pavcnik \(2007\)](#)]. However, most papers in this literature found little or no effect of trade liberalization on informality [[Goldberg and Pavcnik \(2003\)](#), [Menezes-Filho and Muendler \(2011\)](#) and [Bosch et al. \(2012\)](#)]. In contrast, [Kovak \(2013\)](#) and [Dix-Carneiro and Kovak \(2014\)](#) find significant effects of trade liberalization on informality and wages in Brazil. We contribute to this most recent set of papers and document additional effects of trade opening on informality and labor market outcomes, including important heterogeneous effects across workers with different skills. More importantly, we highlight an important mechanism that interacts with trade opening to determine the its effects on local labor markets, namely, the level of enforcement of labor regulations.

The remaining of the paper is structured as follows. Section 2 briefly describes the data and the measure of trade shock used. Section 3 describes the empirical strategy, while Section 4 presents the empirical results. Section 5 concludes and points to future steps.

## 2 Data

We make use of three datasets in this project. We use three rounds of the Decennial Population Census (1980, 1991 and 2000), which contains detailed labor market information for the whole population. From the census, we gauge information on the wages, educational levels, employment and informality status, industry, marital status, race, age and several other socioeconomic characteristics of each worker in each municipality in Brazil.

We also use administrative data on labor inspections conducted by the Brazilian Ministry of Labor and Employment. It contains yearly information on the number of inspected firms by municipalities from 1995 to 2013; number of inspectors responsible for the auditing process in each state of the country; and distance from from the nearest local labor ministry office within each state in 2002. Our variable of interest is the ratio

between the total number of firms inspected within this period by the total number of firms in all municipalities encompassed by the MMC.

The data from tariff changes comes from [Kovak \(2013\)](#) that uses data of nominal tariffs ( $\tau_i$ ) at industrial level  $i$  (similar to two-digit SIC) from Kume, Piani, and de Souza (2003). [Kovak \(2013\)](#) builds regional (microregion) level tariff changes using the following aggregation:

$$RTC_j = \sum_i \beta_{ji} d \ln(1 + \tau_i)$$

where

$$\beta_{ji} = \frac{\frac{\lambda_{ji}}{\theta_i}}{\sum_i \frac{\lambda_{ji}}{\theta_i}}$$

$\lambda_{ri} = \frac{L_{ri}}{L_r}$  is the fraction of regional labor allocated to industry  $i$  at region  $j$ ; and  $\theta_i$  is equal to one minus wagebill share of industry  $i$ .

We also aggregate the Census and the Ministry of Labor administrative data at the regional level. We calculated weighted average by the municipality labor force.

Since we further investigate heterogenous effects of trade liberalization on skilled and unskilled workers separately, we calculated different  $RTC_{jl}$  (for  $l =$  skilled or unskilled) based on the workers education. We defined skilled workers as those with at least secondary schooling. We adapted  $RTC_{rl}$  by calculating different  $\lambda_{jil} = \frac{L_{jil}}{L_{jl}}$  by workers' schooling levels.

### 3 Empirical Strategy

In this section we describe our empirical strategy to identify the impacts of trade opening on labor informality and wage evolution across local labor markets. We also describe how we exploit the data on labor inspections and distance to auditing offices to assess the heterogeneous effects in the presence of different levels of enforcement across regions. Before proceeding to the empirical specifications, however, it is useful to describe the economic mechanisms that guide our empirical exercise.

#### 3.1 Theoretical framework

This section is based on [Ulyssea \(2014\)](#) and is used merely to illustrate the mechanisms we have in mind. The interested reader is referred to this paper, while the reader only interested in the empirical exercise can skip directly to section 3.2. In the model developed by Ulyssea firms can exploit two margins of informality. The first is the *extensive margin*, when firms do not register and pay entry fees to achieve a formal status. In this case all of its workers are informal,

as a non-registered firm cannot hire formal workers. The second is the *intensive margin*, when firms that are formal in the first sense hire workers without a formal contract.

In the model, firms sort between sectors upon entry based on their expected productivity. Sector membership is defined by the extensive margin, and the formal and informal sectors are constituted by registered and non-registered firms, respectively. If a firm decides to enter the formal sector, it faces fixed registration costs and higher variable costs due to revenue and labor taxes. The latter can be avoided by hiring informal workers, even though there is an expected cost of being audited by the government, in which case it must pay fines on top of all evaded labor costs and taxes. Because this probability of detections is assumed to be increasing and convex in the number of informal workers, smaller formal firms will hire a larger fraction of their labor force informally and this share is decrease in firms' size. If a firm enters the informal sector, it avoids registrations costs and taxes altogether, but also faces an expected cost of being caught that is increasing in firm's size.<sup>1</sup> Since productivity and size are one-to-one in the model, more productive firms (in expectation) self-select into the formal sector and less productive firms enter the informal sector. Conditional on being formal, less productive formal firms hire a larger fraction of informal workers.

A greater level of enforcement can be interpreted in this model as a greater probability of detection, which *de facto* works as an increasing and convex tax schedule for informal firms. It decreases the value of being informal for every level of productivity but more so for more productive informal firms. As for an unilateral trade opening – as it was the case of Brazil's trade liberalization episode – in this model it would translate into a negative shock on the price faced by domestic firms (both formal and informal). In order to illustrate the mechanism we have in mind, we take the estimated model in [Ulyssea \(2014\)](#) and simulate the value functions of being formal before and after the trade opening shock, which is parameterized as a permanent decline in the equilibrium price. For the sake of expositional simplicity, we assume that the negative price shock only affects formal firms, even though all that is needed is that formal firms are more adversely affected. Moreover, we consider two scenarios for informal firms: low and high enforcement. [Figure 2](#) shows these four curves.

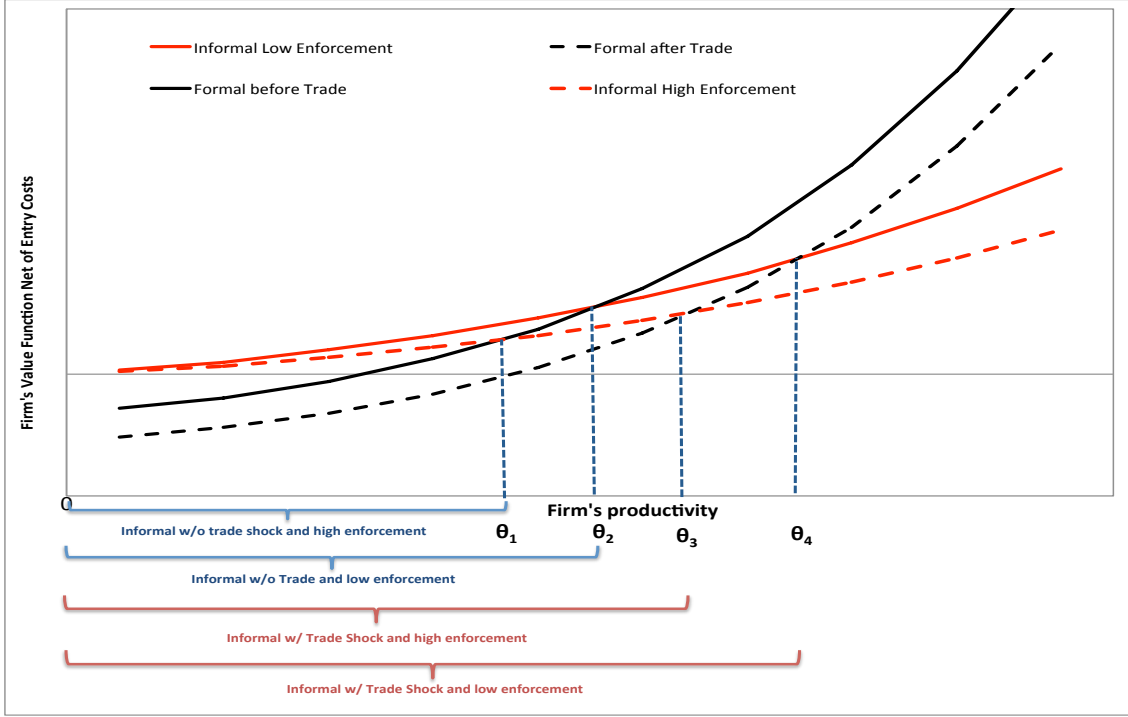
Consider the first the situation prior to the trade shock, where there are two markets, one with low and another with high levels of enforcement (dashed red line, solid black and red lines). In the market with high levels of enforcement, all firms with productivity  $\theta < \theta_1$  will optimally choose to be informal. In the market with low levels of informality, firms with productivity  $\theta < \theta_2$  will choose to be informal, which shows that for a given distribution of firm productivity in, the market with low levels of enforcement will have a larger share of informal firms, as expected.

When the trade shock hits, both the market of low and high enforcement observe an increase in the informality thresholds from  $\theta_1$  to  $\theta_3$  and  $\theta_2$  to  $\theta_4$ . However, the greatest impact on

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<sup>1</sup>This is a common formulation in the literature, see for example [de Paula and Scheinkman \(2010\)](#) and [Leal Ordonez \(2014\)](#), among others.

Figure 2: Trade Opening under Low and High Enforcement



informality comes from the market with low levels of informality, as displayed in the figure. In what follows, we will exploit these heterogeneous effects using the data described in the previous section.

### 3.2 Empirical Strategy

Our empirical strategy is similar to the one used by Kovak (2013) and we use the measure of trade opening shock proposed by this author. We run our estimation in two stages. In the first stage, we capture the changes in the outcome of interest at the MMC level, controlling for observable heterogeneity at the individual level. More concretely, we run regressions at the individual level within each MMC  $j$  of the form

$$Y_i = \alpha_0 + \gamma_j D_{2000} + \mathbf{x}'_{i,t} \beta_j + \delta_c + \epsilon_{i,t} \quad (1)$$

where  $i$  indexes individuals,  $D_{2000}$  is a dummy for year 2000,  $\mathbf{x}'_{i,t}$  is a vector of individual characteristics that includes age, squared age, schooling, gender, rural/urban dummy, race and civil status.

The outcomes include a dummy for whether the individual is informal, a dummy if she is employed and the log-wage. For the evolution of the formal-informal wage gap the dependent variable is also the log-wage, but we include an interaction term between the trend,  $D_{2000}$ , and

a dummy of formal worker, as well as the formal dummy without the interaction. With this specification, we are able to estimate the change in the formal-informal wage gap within MMCs.

Once we compute these different coefficients  $\hat{\gamma}_j$ , we move to the second stage regression. This is a simple MMC-level regression that identifies the relative effect of greater exposure to the trade opening shock and the outcomes of interest:

$$\hat{\gamma}_j = \zeta_0 + \zeta_1 RTC_j + \zeta_2 D_{state} + u_j \quad (2)$$

where  $D_{state}$  denote state dummies and  $\zeta_1$  identifies the relative effect of greater exposure to the trade shock and the change in a given outcome between 1991 and 2000 at the MMC level. Since we are using an estimated variable as dependent variable in the second stage and we are using aggregated data at the MMC level, we weight the second-stage regressions by the standard-errors of the first-stage regressions. Standard errors are also clustered at state level.

We further replicate the above system for skilled and unskilled workers separately. In this case, we use the appropriate definition of  $RTC$  discussed in the previous section.

Finally, to exploit the heterogeneity across different levels of enforcement, we run the following specifications:

$$\hat{\gamma}_j = \zeta_0 + \zeta_1 RTC_j + \zeta_2 RTC_j \times Inspections_j + \zeta_3 Inspections_j + \zeta_4 D_{state} + u_j \quad (3)$$

where  $Inspections_j$  are the total number of inspections per firm conducted by the labor offices divided by the number of firms at MMC  $j$ . Due to potential endogeneity of  $Inspections_j$  we follow a similar approach of Almeida and Carneiro (2012) and instrumentalize both  $Inspections_j$  and  $RTC_j \times Inspections_j$  by the distance of the MMC to the nearest labor office<sup>2</sup>, squared distance and distance interacted with the number of inspector working at the MMC state.

## 4 Results

In this section we present the results based on the regressions discussed in the previous section.

Graphs 3 and 4 show scatter plots between tariff reduction measured by  $RTC$  and informality and non-employment, respectively.

As expected, the graphs depicts a negative relation between tariffs change and both outcome variables. Theses results illustrate that regions that were more affected by tariff reductions experienced more informality and less employment.

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<sup>2</sup>The data has the distance of the centroid of each municipality to the nearest labor auditing office. We aggregate it at the MMC level by taking the maximum distance within the municipalities that form each MMC. We also tried specifications using the median and minimum distances. The results remain qualitatively similar.



Figure 3: Regional Informality and Tariff Changes

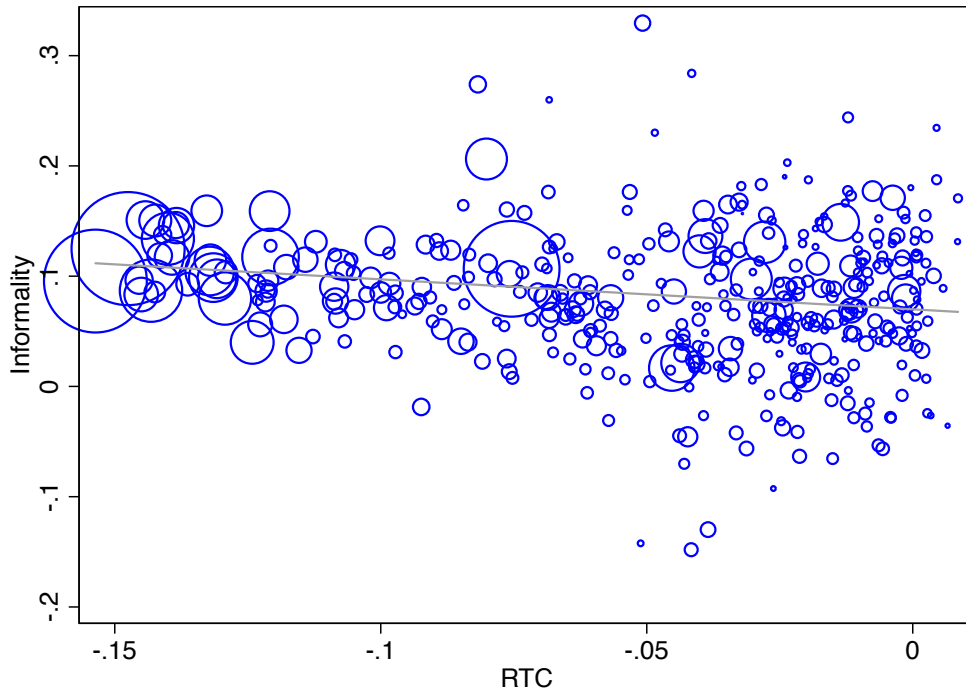


Figure 4: Non-Employment and Tariff Changes

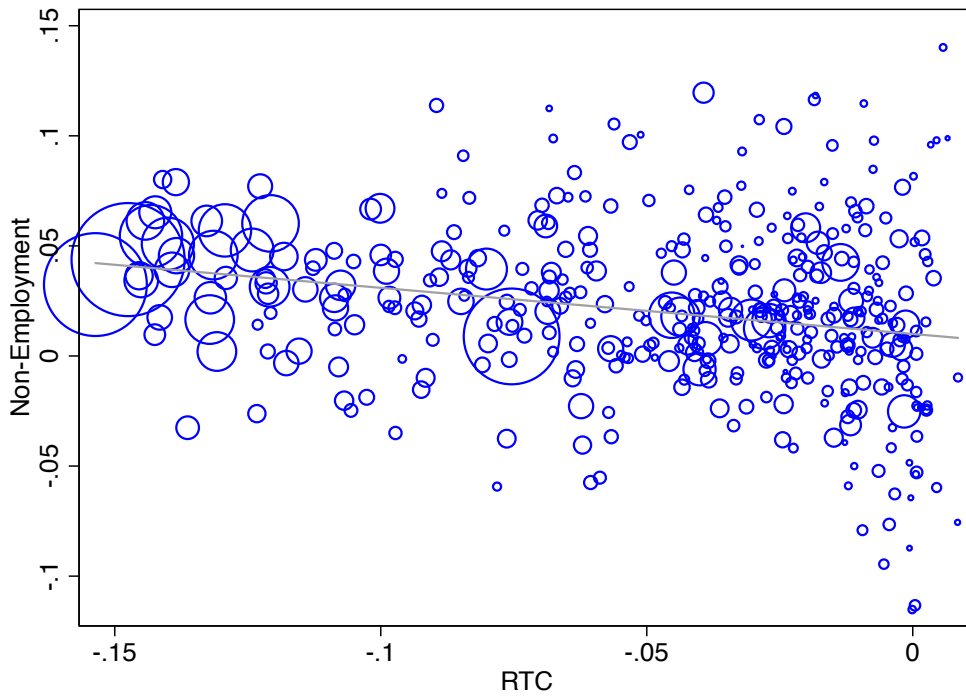


Table 1 shows the results of the regressions of equation (2) for informality and non-employment while table 2 shows the results of the regressions for wages by skill level and formal-informal wage gap. The estimated coefficients corroborate the idea that trade liberalization induced an increase on informality, a decrease on employment and on wages, specially for low-skill workers. We did not find significant impacts on formal-informal wage gaps. The magnitude of the effects is sizeable. For instance, an one standard deviation decrease on *RTC* increases informality by more than half of a standard deviation of the informality change in the period. The average increase in informality was 7.7% (6.2% s.d.) in the period and the average variation in *RTC* was -4.5% (4% s.d.)

Table 1: Effects of Regional Tariff Changes on: Informality and Non-Employment

|               | Dep. Var.: Informality |                      |                  | Dep. Var.: Non-employment |                      |                  |
|---------------|------------------------|----------------------|------------------|---------------------------|----------------------|------------------|
|               | All Workers            | Unskilled            | Skilled          | All Workers               | Unskilled            | Skilled          |
| RTC           | -0.359***<br>(0.128)   |                      |                  | -0.214***<br>(0.038)      |                      |                  |
| RTC-Unskilled |                        | -0.792***<br>(0.116) |                  |                           | -0.341***<br>(0.031) |                  |
| RTC-Skilled   |                        |                      | 0.169<br>(0.354) |                           |                      | 0.004<br>(0.152) |
| Observations  | 413                    | 413                  | 413              | 413                       | 413                  | 413              |
| R-squared     | 0.812                  | 0.898                | 0.714            | 0.826                     | 0.862                | 0.840            |

Notes: Robust standard errors in parentheses. Significant at the \*\*\* 1 percent, \*\* 5 percent, and \* 10 percent level.

## 4.1 Heterogenous effects

Moving to the heterogeneous effects across regions with different levels of enforcement, we check whether regions where enforcement is stricter the tariff reduction effect of increasing informality was attenuated. Our measure of enforcement is the total number of inspections (1995 to 2000) by the total number of firms in each MMC. Since this measure is potentially endogenous we also test an IV specification where we instrument the level of enforcement by the distance to the nearest labor auditing office, the squared distance and the distance interacted with the number of inspector working at the MMC state. The idea behind the instrument is straightforward: firms closer to auditing offices are more likely to be inspected by labor ministry officials and therefore enforcement is stricter in these regions. Table 3 corroborates this idea and shows that the closer the region is from a labor office, the sticker the enforcement is.

Table 2: Regional Tariff Changes on: Wages by Skill Level and Formal-Informal Wage Gap

|               | Dep. Var.: Formal-Informal Wage Gap |                  |                   | Dep. Var.: Wages    |                  |
|---------------|-------------------------------------|------------------|-------------------|---------------------|------------------|
|               | All Workers                         | Unskilled        | Skilled           | Unskilled           | Skilled          |
| RTC           | 0.105<br>(0.245)                    |                  |                   |                     |                  |
| RTC-Unskilled |                                     | 0.002<br>(0.259) |                   | 1.193***<br>(0.328) |                  |
| RTC-Skilled   |                                     |                  | -0.117<br>(0.226) |                     | 0.825<br>(0.631) |
| Observations  | 413                                 | 413              | 413               | 413                 | 413              |
| R-squared     | 0.610                               | 0.522            | 0.918             | 0.958               | 0.965            |

Notes: Robust standard errors in parentheses. Significant at the \*\*\* 1 percent, \*\* 5 percent, and \* 10 percent level.

Table 3: Production function of enforcement

| Dep. Var.: log (Inspections per Firms)                    |                      |
|---|----------------------|
| Dist. Labor Office <sub>r</sub>                           | -0.105***<br>(0.027) |
| Dist. Labor Office <sub>r</sub> Sq.                       | 0.002<br>(0.001)     |
| Dist. Labor Office <sub>r</sub> × Inspectors <sub>s</sub> | 0.016***<br>(0.004)  |
| Observations  | 397                  |
| R-squared   | 0.658                |

Notes: Robust standard errors in parentheses. Significant at the \*\*\* 1 percent, \*\* 5 percent, and \* 10 percent level.

Table 4 shows the marginal effects ( $\zeta_1 + \zeta_2 \times \text{Inspections}_j$ ) of trade by different levels of enforcement (average, p10 and p90). As expected the higher the enforcement level the lower the impact the trade on informality. And the opposite occurs with non-employment. These results are more profound for low-skill workers. Graphs 5 depicts the marginal effects of tariff reduction for the whole distribution of enforcement levels. Graphs 7 and 6 show the results for high and low skilled workers separately. Graphs 8 to 8 depict the marginal effect on non-employment. As expected, enforcement increases the detrimental impact of the liberalization on employment, specially for low-skill workers. All in all, the findings suggest law enforcement

reduces the informal sector role as a buffer for unemployment after shock on the labor market<sup>3</sup>.

Indeed, this mechanism appears to be relevant according to the results in Table 4. In regions that were closer to labor inspection offices, the tariff reduction effect of increasing informality was attenuated. In other words, regions that were more severely hit by the tariff reduction reform but had more strict enforcement informality increased less than regions also severely affected but with lower levels of enforcement (i.e. further away from labor offices). The same is true when use a triple interaction of RTC with distance to labor offices and number of inspections per firm.

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<sup>3</sup>Tables 5 and 6 show the regression coefficients of equations 3 in the Appendix.

Table 4: Heterogeneous Effects by Enforcement

|                                    | Informality |           |           | Non-Employment |           |           | Formal-Informal Wage Gap |           |           | Wage Change by Skill |           |
|------------------------------------|-------------|-----------|-----------|----------------|-----------|-----------|--------------------------|-----------|-----------|----------------------|-----------|
|                                    | All         | Low       | High      | All            | Low       | High      | All                      | Low       | High      | Low                  | High      |
| Average Effect                     | -0.359      | -0.792    | 0.169     | -0.214         | -0.341    | 0.004     | 0.105                    | 0.002     | -0.117    | 1.193                | 0.825     |
|                                    | [ 0.128 ]   | [ 0.116 ] | [ 0.354 ] | [ 0.038 ]      | [ 0.031 ] | [ 0.152 ] | [ 0.245 ]                | [ 0.259 ] | [ 0.226 ] | [ 0.328 ]            | [ 0.631 ] |
| Avg. Marginal Effect at 10th ptile | -0.693      | -1.195    | -1.386    | -0.138         | -0.291    | 0.219     | -1.094                   | -1.851    | -0.926    | 2.954                | -0.191    |
|                                    | [ 0.226 ]   | [ 0.219 ] | [ 2.247 ] | [ 0.120 ]      | [ 0.106 ] | [ 0.333 ] | [ 1.203 ]                | [ 1.508 ] | [ 0.660 ] | [ 1.014 ]            | [ 1.296 ] |
| Avg. Marginal Effect at 90th ptile | -0.001      | -0.432    | 4.082     | -0.275         | -0.412    | -0.439    | 2.354                    | 3.865     | 1.898     | -1.769               | 2.861     |
|                                    | [ 0.304 ]   | [ 0.233 ] | [ 5.212 ] | [ 0.129 ]      | [ 0.130 ] | [ 0.896 ] | [ 2.405 ]                | [ 3.205 ] | [ 1.818 ] | [ 2.443 ]            | [ 2.951 ] |

Notes: "All" refers to all workers, "Low" to unskilled workers and "High" to skilled workers. The effects in the first line correspond to the coefficients of RTC, RTC-Unskilled and RTC-Skilled in Tables 1 and 2. The 10th and 90th percentiles correspond to the distribution of total inspections per number of firms. Standard errors in brackets.

Figure 5: Heterogeneous effects - Informality - All Workers

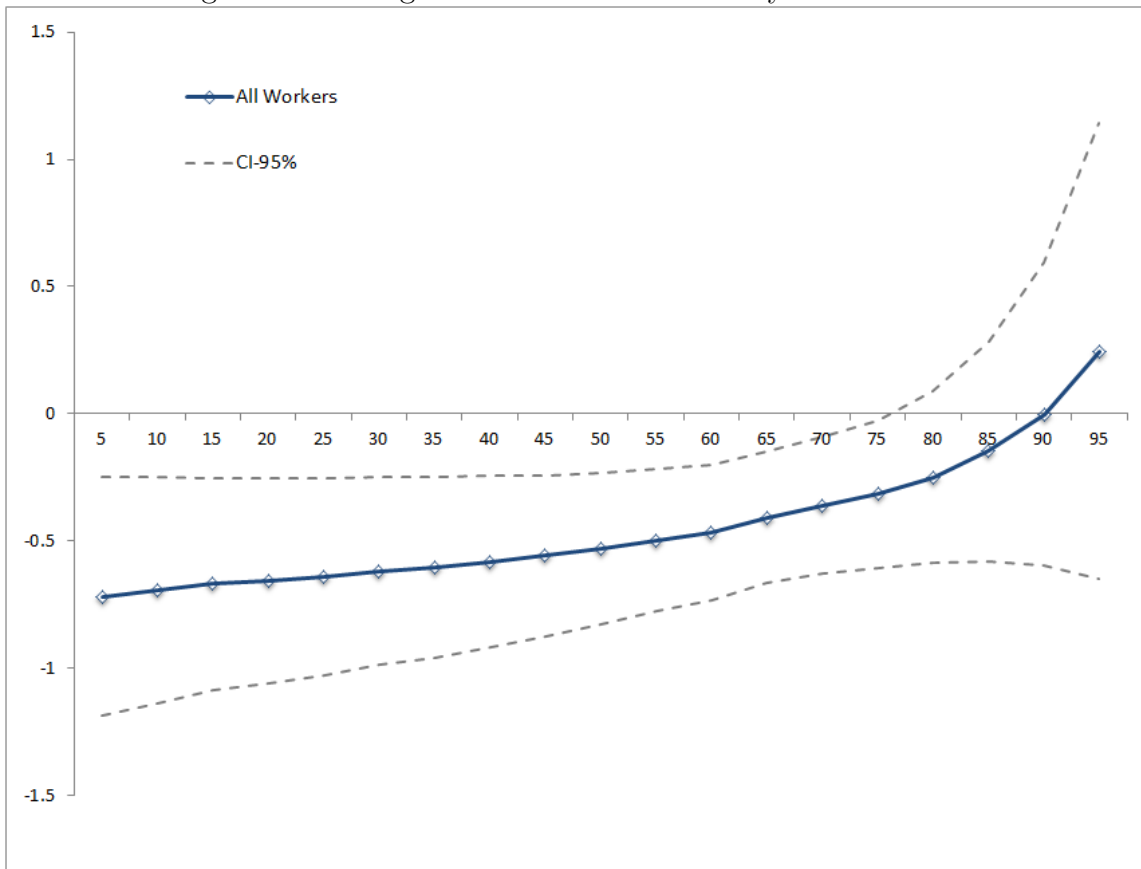


Figure 6: Heterogeneous effects - Informality - Low-Skill Workers

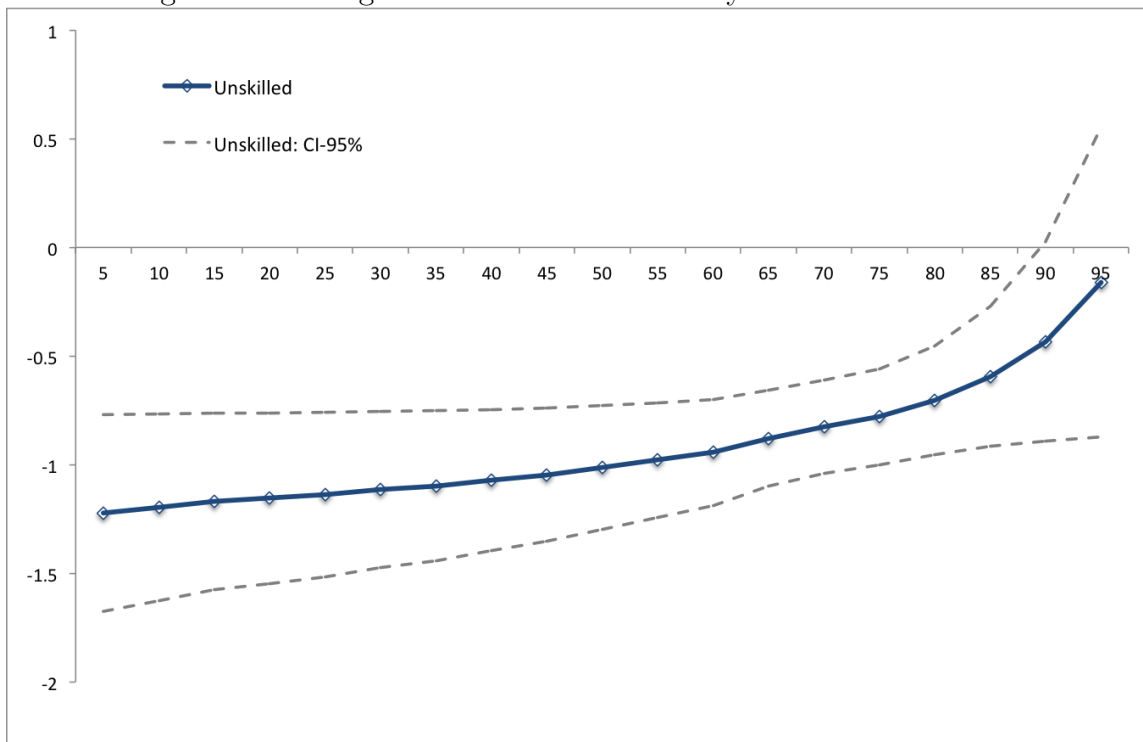


Figure 7: Heterogeneous effects - Informality - High-Skill Workers

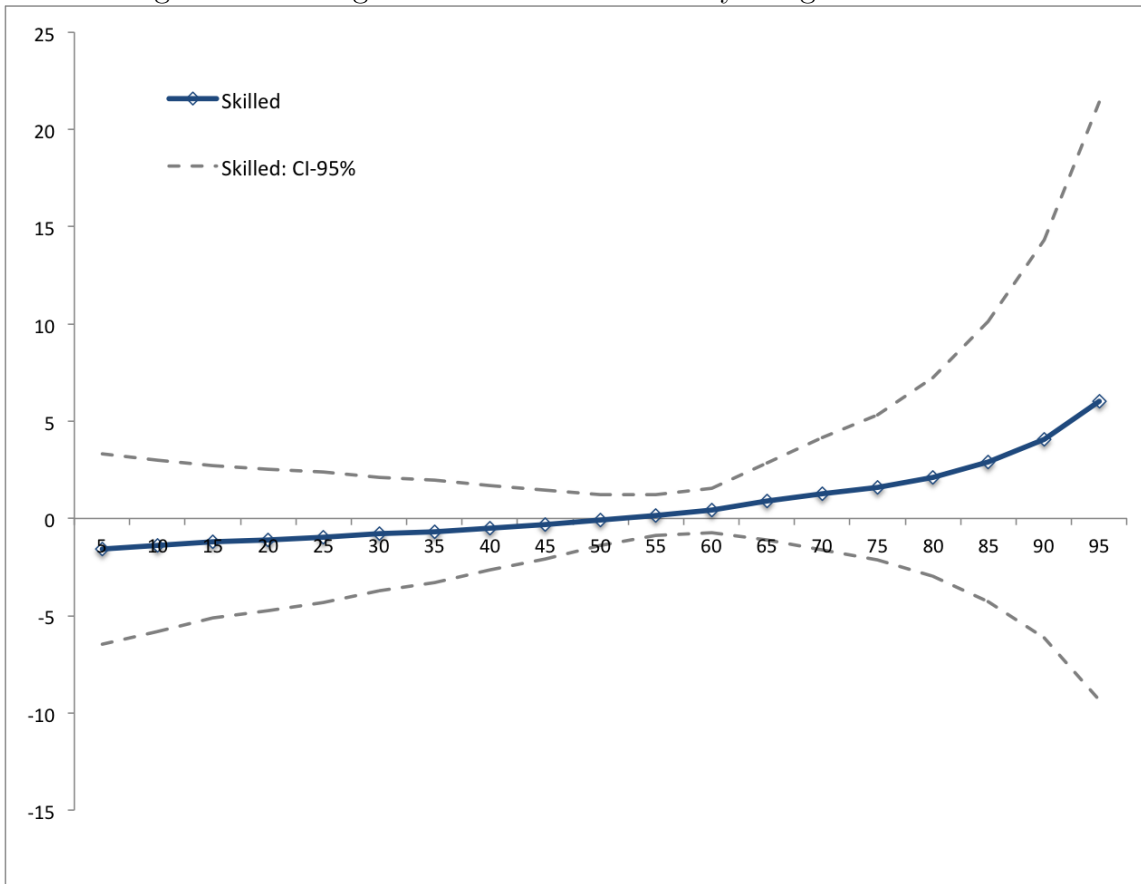




Figure 8: Heterogeneous effects - Non-employment - All Workers

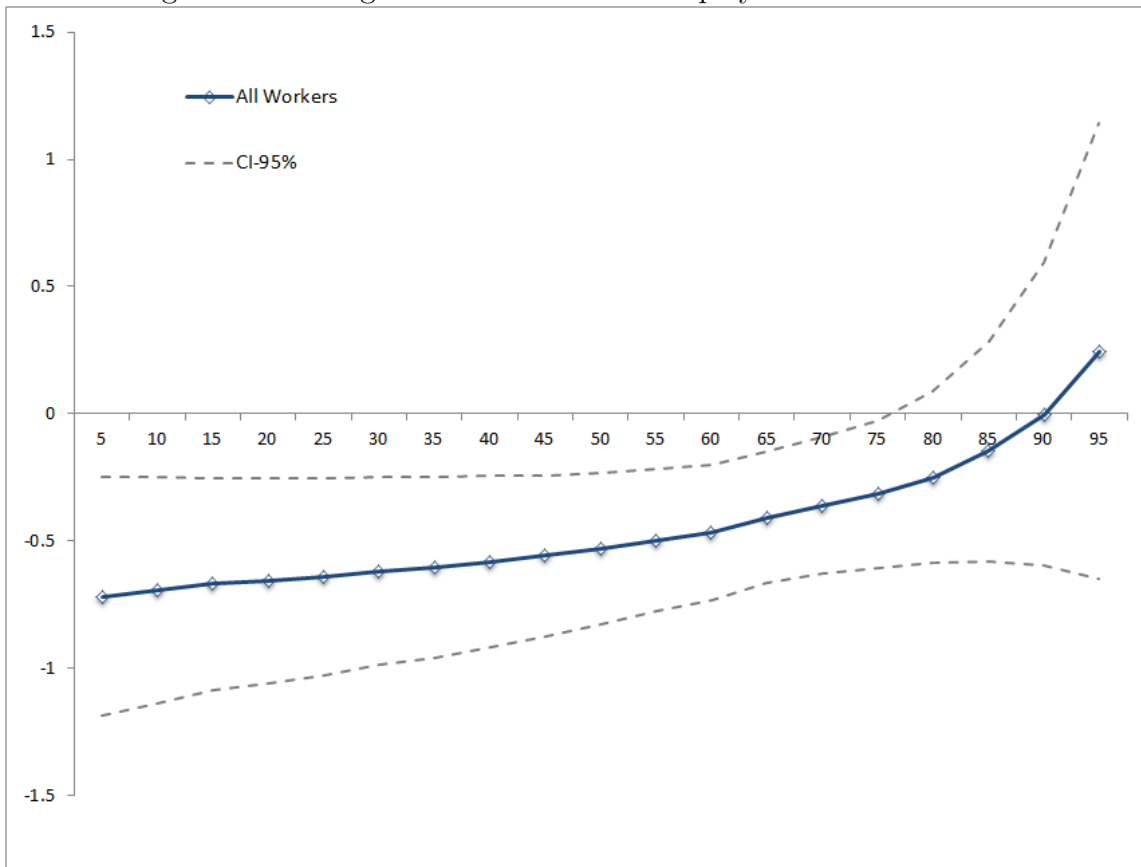


Figure 9: Heterogeneous effects - Non-employment - Low-Skill Workers

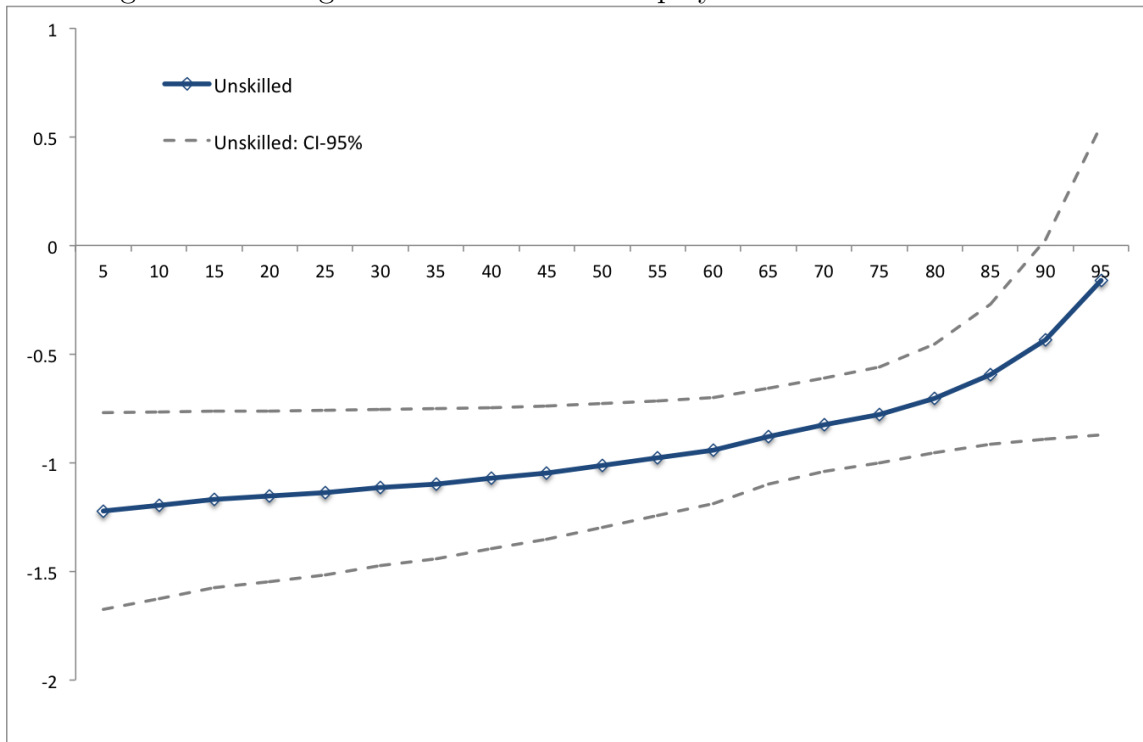
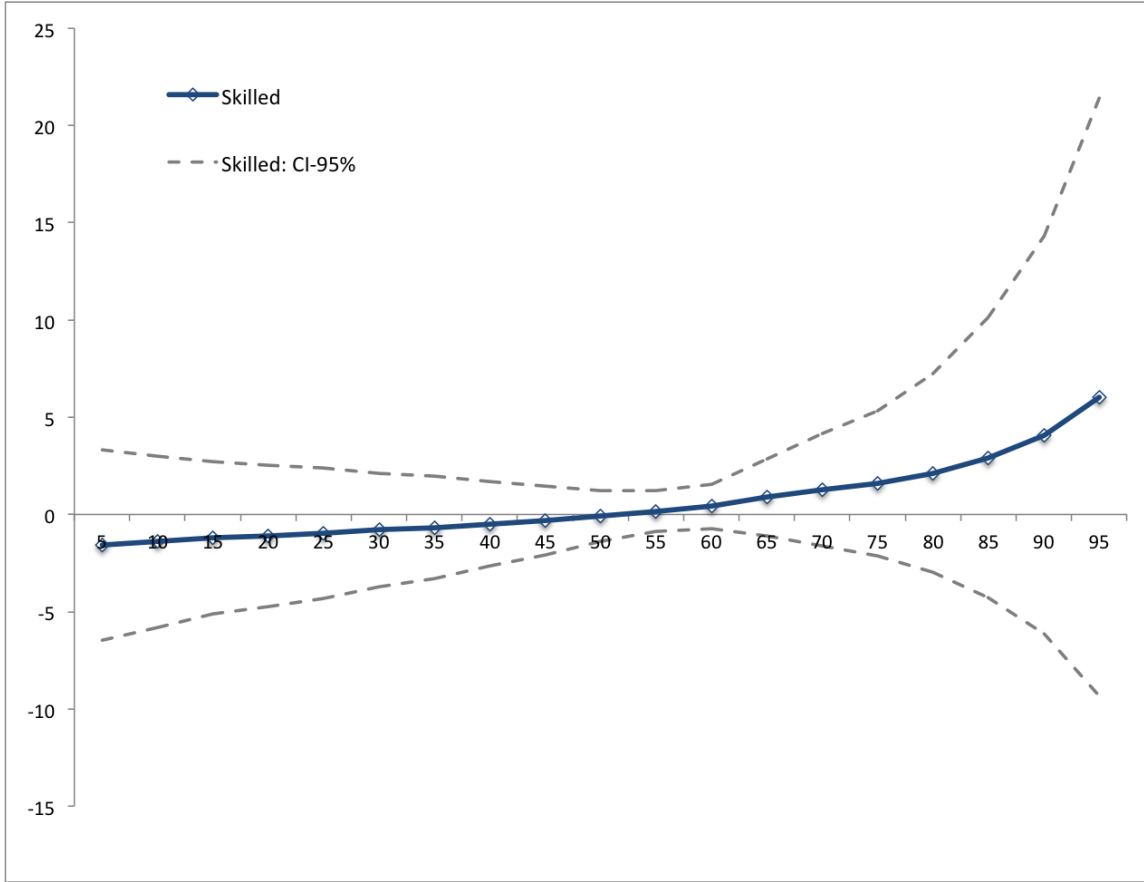


Figure 10: Heterogeneous effects - Non-employment - High-Skill Workers



## 5 Conclusions and Future Work

The goal of this paper is to estimate the effects of trade liberation on labor market outcomes, with emphasis on informality and with the interplay of the trade liberalization shock and enforcement of existing labor regulations.

Our preliminary results indicate that indeed trade opening induced greater informality and wage reductions in regions more adversely affected relatively to those less affected. We also uncover new potentially important relationships between these adverse effects and the levels of enforcement of labor regulations across regions. For example, we show that regions with stricter enforcement had less informality increase than other regions with equally bad trade shocks but with lower informality. We also find that enforcement exacerbates the impact of trade liberalization on non-employment suggesting that it diminishes the role of informal sector as a buffer for unemployment. Those effects seem to be more pervasive on low-skill workers.

These results are promising but there is much to be done. We intend to refine our measures of tariff reductions using, for instance, imports penetration as an additional proxy for trade liberalization. Additionally, we plan to incorporate data from the 1980 Census is important to

be able to control for pre-existing trends in different regions.

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# Appendix

Table 5: Regional Tariff Changes and Informality: Heterogeneous effects by enforcement levels

|                                    | (1)                  | (2)                  | (3)                  | (4)                  | (5)                  |
|------------------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| Dep. Var.: Informality             | OLS                  | OLS                  | OLS                  | 2SLS                 | 2SLS                 |
| Panel A: All Workers               |                      |                      |                      |                      |                      |
| RTC                                | -0.359***<br>(0.128) | -0.360**<br>(0.146)  | -0.492***<br>(0.166) | -0.443***<br>(0.147) | -0.731***<br>(0.247) |
| Inspections per Firm               |                      | -0.002<br>(0.084)    | 0.158<br>(0.142)     | -0.337<br>(0.257)    | 0.200<br>(0.305)     |
| RTC $\times$ Inspections           |                      |                      | 1.645<br>(1.114)     |                      | 4.234<br>(2.798)     |
| Observations                       | 413                  | 413                  | 413                  | 397                  | 397                  |
| R-squared                          | 0.812                | 0.812                | 0.816                | 0.769                | 0.792                |
| Panel B: Unskilled Workers         |                      |                      |                      |                      |                      |
| RTC-Unskilled                      | -0.792***<br>(0.116) | -0.782***<br>(0.144) | -0.964***<br>(0.157) | -0.896***<br>(0.153) | -1.237***<br>(0.238) |
| Inspections per Firm               |                      | 0.031<br>(0.115)     | 0.227<br>(0.175)     | -0.404<br>(0.310)    | 0.058<br>(0.170)     |
| RTC-Unskilled $\times$ Inspections |                      |                      | 2.253<br>(1.331)     |                      | 4.666*<br>(2.418)    |
| Observations                       | 413                  | 413                  | 413                  | 397                  | 397                  |
| R-squared                          | 0.898                | 0.898                | 0.902                | 0.873                | 0.887                |
| Panel C: Skilled Workers           |                      |                      |                      |                      |                      |
| RTC-Skilled                        | 0.169<br>(0.354)     | 0.169<br>(0.323)     | 0.083<br>(0.478)     | 0.103<br>(0.299)     | -1.684<br>(2.639)    |
| Inspections per Firm               |                      | -0.000<br>(0.180)    | 0.188<br>(0.561)     | -0.032<br>(0.384)    | 4.920<br>(6.974)     |
| RTC-Skilled $\times$ Inspections   |                      |                      | 1.456<br>(4.571)     |                      | 33.442<br>(45.075)   |
| Observations                       | 413                  | 413                  | 413                  | 397                  | 397                  |
| R-squared                          | 0.714                | 0.714                | 0.714                | 0.704                | 0.452                |

Notes: Robust standard errors in parentheses. Significant at the \*\*\* 1 percent, \*\* 5 percent, and \* 10 percent level.

Table 6: Regional Tariff Changes and Non-Employment: Heterogeneous effects by enforcement levels

|                                    | (1)                  | (2)                  | (3)                  | (4)                  | (5)                 |
|------------------------------------|----------------------|----------------------|----------------------|----------------------|---------------------|
| Dep. Var.: Non-Employment          | OLS                  | OLS                  | OLS                  | 2SLS                 | 2SLS                |
| Panel A: All Workers               |                      |                      |                      |                      |                     |
| RTC                                | -0.214***<br>(0.038) | -0.189***<br>(0.039) | -0.190***<br>(0.047) | -0.206***<br>(0.054) | -0.131<br>(0.132)   |
| Inspections per Firm               |                      | 0.058**<br>(0.023)   | 0.059<br>(0.046)     | 0.022<br>(0.083)     | -0.029<br>(0.087)   |
| RTC $\times$ Inspections           |                      |                      | 0.015<br>(0.451)     |                      | -0.838<br>(1.422)   |
| Observations                       | 413                  | 413                  | 413                  | 397                  | 397                 |
| R-squared                          | 0.826                | 0.829                | 0.829                | 0.827                | 0.827               |
| Panel B: Unskilled Workers         |                      |                      |                      |                      |                     |
| RTC-Unskilled                      | -0.341***<br>(0.031) | -0.319***<br>(0.033) | -0.326***<br>(0.033) | -0.353***<br>(0.035) | -0.284**<br>(0.118) |
| Inspections per Firm               |                      | 0.049**<br>(0.023)   | 0.055<br>(0.037)     | -0.030<br>(0.067)    | -0.067<br>(0.101)   |
| RTC-Unskilled $\times$ Inspections |                      |                      | 0.078<br>(0.410)     |                      | -0.740<br>(1.399)   |
| Observations                       | 413                  | 413                  | 413                  | 397                  | 397                 |
| R-squared                          | 0.862                | 0.864                | 0.864                | 0.858                | 0.858               |
| Panel C: Skilled Workers           |                      |                      |                      |                      |                     |
| RTC-Skilled                        | 0.004<br>(0.152)     | 0.018<br>(0.154)     | 0.092<br>(0.214)     | 0.047<br>(0.146)     | 0.255<br>(0.395)    |
| Inspections per Firm               |                      | 0.039<br>(0.043)     | -0.119<br>(0.250)    | 0.159<br>(0.138)     | -0.465<br>(1.189)   |
| RTC-Skilled $\times$ Inspections   |                      |                      | -1.212<br>(2.099)    |                      | -4.028<br>(7.344)   |
| Observations                       | 413                  | 413                  | 413                  | 397                  | 397                 |
| R-squared                          | 0.840                | 0.841                | 0.842                | 0.824                | 0.831               |

Notes: Robust standard errors in parentheses. Significant at the \*\*\* 1 percent, \*\* 5 percent, and \* 10 percent level.