Is Tunisian Trade Policy Pro-poor?[1]

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1. Introduction

Trade liberalization policies affect the domestic economy through their impact on prices of goods and services. Consequently, these policies also can affect average productivity and lead to industrial restructuring. The main goal of this research is to estimate the distributional effects of trade policy at the micro level using household survey data, and to determine whether trade liberalization affected different groups of poor people differently. To our knowledge this question has not yet been addressed for Tunisia.

Trade policy in Tunisia has been evolving over time through a progressive reduction of tariff protection that has narrowed the gap between most favored nation (MFN) tariffs and preferential tariffs and increased the number of free trade agreements (FTAs) signed with its main trading partners. Most FTAs involve a gradual elimination of tariffs, at least for non-agricultural products (WTO, 2005). The maximum tariff rate in 1995 was 43% for non-agricultural products and 150% for agricultural products. Tariff reductions to bring the MFN rate close to the tariff applied to preferential imports have reduced the average rate from 45% in 2006 to 14% in 2016; and the maximum rate of 150% was reduced to 36% in 2009. By 2016, Tunisia had concluded trade agreements with about 60 countries.

Several other key policy changes in Tunisia's liberalization also took place in the 1990s and the 2000s. In particular, the reform of external trade, established by the law of 1994, launched a first program (2000-2004) that resulted in an integrated system of electronic management of external trade procedures, which reduced the time needed to complete foreign trade operations. The second program, launched in 2005, put in place a custom risk management system and more transparent standards and technical regulations. However, from 2005 to 2015 there were no other significant modernization steps, and trade policy remained almost unchanged, with only one FTA signed (with Iran in 2008--WTO, 2016). Since 2015, all technical import control documents can be transmitted electronically, but the processing of the numerous tax incentives still relies on paper documents.

While the reduction in tariff rates and the simplification of the tariff regime (there are only three tariff rates: zero, 20 and 36 %) have reduced distortions, trade remains subject to extensive controls. State-owned enterprises and a number of boards (Trade Board, Cereals Board and Oil Board) exercise considerable control over international trade. Imports are still subject to many controls and permits, although the development plan launched in 2016 is supposed to review the role played by these entities in the development process.

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The structure of the economy experienced some significant changes in the 1990s and 2000s. Tunisia remains an open economy, with trade in goods and services equaling 90% of GDP in 2015. However, a loss of competitiveness of Tunisian firms since 2005 has been reflected in a rise in the import share of GDP from 45 to 50% and a fall in the export share from 45 to 39%. Exports of machinery and transport equipment have increased sharply, while the share of agricultural products and of clothing in total exports has dropped (the latter fell from 30 to 16% of total exports in the second half of the 2000s). Participation in trade is dominated by enterprises in the coastal regions and in urban areas, with the main exported products being olive oil, sea food, "harissa", dates and olive oil. Tunisia's main trading partner remains the European Union (EU-28), which in 2014 received almost 75% of Tunisian exports and sourced 53% of its imports. However, the EU shares have fallen with imports from China increased from 3% of Tunisian imports in 2005 to 7% in 2014.

According to the World Bank (2016) the overall level of poverty in Tunisia has fallen since the mid-1980s (in particular, extreme and moderate poverty fell in urban and rural areas from 2000 to 2012), due to increasing economic growth and several program interventions, including social assistance programs (e.g. social investment funds, energy subsidies, rural development programs, microcredit programs, etc). However, inequality and social inclusion remain an issue. Given the importance of international trade for the Tunisian economy, it is of great interest to determine whether the decline in poverty is related to the fall in protectionism.

The main question to be answered is how trade reforms affect domestic prices and to what extent these changes translate in turn into changes in household welfare. There are a number of channels through which households are affected by trade reform. Declines in tariffs will reduce goods prices, and households that are net consumers of these goods will benefit, while net producers will be hurt. In addition, changes in prices can also affect employment and wages. Households, as income earners, may benefit as higher prices in competitive exporting sectors attract more producers into a given industry and increase employment and subsequently also wages. Conversely, declining prices for imports will put pressure on employment and wages in import competing sectors.

The main result is that household welfare improves due to the reduction in tariffs. This effect is greater among low-income groups, since the decline in consumer goods prices benefited poor more than rich households. Labor income effects are sizable, but statistically significant only for the skilled. The rest of the paper is organized as follows. Section 2 reviews the related literature and presents some stylized facts. Section 3 outlines the methodology and describes the data sources, variables and the model specification. Section 4 presents and discusses the results, and Section 5 concludes.

2. Review of the literature

Most empirical evidence at the macro level indicates that trade openness has a positive impact on economic development in general (Doyle and Martínez-Zarzoso, 2011). However, the benefits are usually unevenly distributed across households. Recent literature shows that the impact of tariff liberalization on households, both as consumers and factor owners, is positive overall. However, the distribution of gains differs significantly across income levels and geographic regions within countries.

Porto (2006) develops a method to estimate the distributional effects of trade policies using household survey data and applies it to the case of Argentina. He finds that the average poor and middle-income family benefited from the Mercosur agreement. More specifically, Porto (2006) assumes a unitary pass-through rate from tariffs to prices, and uses intra-Mercosur and common external tariffs and import shares to compute the price changes. Next, he obtains the consumption effects by multiplying budget shares by the computed price changes, and uses locally weighted regressions (Fan, 1992) to analyze the relationship between those changes along the distribution of per capita household expenditure. He finds that the resulting welfare impact increases with income per capita expenditure, indicating a greater gain for higher-income than low-income households.

However, when taking into account the positive labor income effect on household welfare, estimated using a wage equation and calculating wage-price elasticities, a net pro-poor effect of the reduction in tariffs due to Mercosur is observed. The intuition behind this result is that the reduction in tariffs on traded goods raised the relative price of goods intensive in unskilled labor (increase in the price of food and beverages and decline in price of household equipment), which reduced the wages of more-skilled workers relative to those of less-skilled workers. The estimated effects are small, around 6 percent of initial expenditure. The main policy conclusion is that poverty in Argentina would have been higher without the Mercosur agreement.

Several recent studies, including Nicita (2009), Ural Marchand (2012), Borraz et al. (2013) and Nicita et al. (2014), have applied a similar methodology, relaxing some of the strong assumptions made in Porto (2006). Nicita (2009) allow for less than full pass-through from changes in border prices of traded goods domestic prices by using an econometric model proposed by Goldberg and Knetter (1997). It is estimated that in Mexico only 33 percent of the tariff reduction for agricultural products and 27 percent for manufactures were reflected in domestic prices. Contrary to Porto (2006), richer households gained more from trade liberalization in Mexico than poor households.

Ural Marchand (2012) estimates similar pass-through equations and finds that Indian households experienced gains at all per capita expenditure levels as a result of trade liberalization, while the average effect was generally greater for poor households, and varied significantly across the per capita expenditure spectrum. The main novelty of Nicita (2009) and Ural Marchand (2012) was to estimate the extent to which the impact of trade reforms on prices differed in rural versus urban areas. Indeed, market imperfections partially isolate households from the effects of tariff changes, and this isolation is more severe in rural areas. Ural Marchand (2012) estimates that the pass-through of tariff reductions to domestic prices was only around 40 percent in rural areas, compared to around 66 percent in urban areas.

Borraz et al. (2013) also find that trade liberalization had a pro-poor effect in Brazil, as poverty fell and inequality remained unchanged. This result is mainly explained by the decrease in consumer prices after Brazil entered Mercosur, as the net impact on household welfare due to changes in wages was almost zero.

Finally, Nicita et al. (2014) examines the impact of the structure of trade protection on income distribution at the household level in six Sub-Saharan African (SSA) countries. They find that trade policies in SSA tend to redistribute income from rich to poor households. The main novelty of this research is that they present a method to indirectly estimate wages, which are not available in many countries.

We extend this literature to the case of Tunisia and take on board the novelties incorporated by recent studies. For instance, we take the estimated pass-through from a companion paper (Baghdadi et al. 2016) and estimate wage equations and welfare effects along the lines proposed above. We also estimate different average welfare effects by region, between rural and urban households, and by gender. We do not expect to find substantial differences among regions, since Tunisia is a small country.

This study is the first investigation of the effects of trade policy on income distribution in Tunisia. Minot et al. (2010) are to our knowledge the only authors who estimate the poverty effects of trade policy in Tunisia for given scenarios, using a computable general equilibrium model (CGE) calibrated with household data for 1995. Their main results indicate that poverty will decline slightly, from 8.1 to 7.6 percent, if all tariffs on imports from all countries are eliminated. In contrast, we aim to estimate the effect of trade policy on the entire distribution of income taking into tariffs.

3. Model specification, data and variables

We apply the methodology proposed in Porto (2006) to recently available household-level data for Tunisia in order to assess the effect of trade on income distribution. The model is used to simulate the effects of trade policy changes on household wellbeing along the entire distribution of expenditure per capita by extending the techniques used in Deaton (1989). The latter provides a non-parametric, empirical methodology to explore the impact of small changes in prices following trade reform on household welfare.

The model focuses on the effect of changes in domestic prices and wages that could be attributed to changes in trade policy. A change in a tariff translates into a change in the border price of traded goods which is passed through to domestic prices (retail and factor prices) to a variable extent. The magnitude of the pass-through is determined by country-specific or region-specific factors, which in turn influence the extent to which trade policies can affect domestic prices. These factors are, among others, domestic policies, institutions, geography, market competitiveness and infrastructures. In Baghdadi et al (2016) we show that market concentration and market power are also crucial factors affecting pass-through for different sectors in Tunisia.

Based on our estimate of the pass-through, we calculate the inverse of so-called "compensating variation", which measures how much money households would have to be given in order to be compensated for hypothetical changes in prices and can be interpreted as a measure of the change in welfare. Wages are analysed using Mincerian equations, which link wages to skills, age (where typically an inverse U-shaped relationship is found), regions and gender. We augment this framework to include trade policy variables interacted with the level of skill. The econometric methodology adopted in this chapter is presented in detail in Appendix A.

3.1 Data and variables

The estimation of the impact of trade policy changes on welfare requires the use of various sources of data and a number of steps to consolidate and merge the data at the same level of disaggregation. Moreover, concordances between the different classifications have to be manually constructed to match the various datasets[2]. The main sources for the data are national surveys, and trade and protection statistics from national and international sources (INS, COMTRADE and WITS).

[2] These industry conversion are available from the authors on request

Expenditure shares along the distribution of income are obtained from the national survey on household consumption and expenditures compiled periodically by the National Institute of Statistics and harmonized by the Economic Research Forum (ERF), which kindly provided us with the data. The 2005 survey, used in this paper, is the eighth of its kind. The survey was launched in early May 2005 and lasted until the end of April 2006, to take into account seasonal changes in household consumption. This survey aims to identify the current standard of living of families through an accurate estimation of expenditure and food consumption, and to compare these findings with what it was in previous years. The survey collects information on aspects related to the expenditures and living conditions of families, such as their access to education and health services.

The 2005 survey includes a representative sample of 13,400 households, distributed among 1116 county (villages, campaigns and cities) of Tunisia. The survey consists of three axes, (i) household expenditures, (ii) nutrition and (iii) social and collective services. The household expenditure axis includes the whole sample, whereas the nutrition axis only includes half the number of households present in the first axis (6700 households). The final axis includes one-third of the household spending axis (4450 households).

From this survey we derive information on broad expenditure shares, educational attainment, literacy, marital status, household size, educational status of head and spouse, and industry of occupation for head and spouse, and other individual characteristics such as age, household head's sex and geographic indicators (urban or rural). Information on years of schooling is not included, but the information on educational attainment reports whether respondents have completed primary or lower secondary, secondary, post-secondary or equivalent, university, or post-graduate education. We use different definitions of skilled versus unskilled labor. In fact, there is a trade-off in choosing the minimum standard for skilled labor. Although the vast majority of respondents report no education at all (or no graduation), having a meaningful indicator requires that the bar should not be set too low. As a benchmark, we define a person as skilled if he or she had secondary or higher education. Summary statistics and expenditure shares are reported in Tables B.1 and B.2 in the Appendix.

Unfortunately, individual wages are not recorded in these surveys. Instead, industry-specific wage indices were obtained from the INS. They were linked to the household data using the industry of occupation of household members. Industry is reported following the 2-digit ISIC classification (Rev. 3 for 2005 and Rev. 4 for 2010). That leaves us with 61 industries for 2005 and 67 industries in 2010. Using industry-level data precludes studying inequality within industries, which is a major drawback of the dataset. Tariffs are from the WITS database. Another limitation of the dataset is that there is no information on whether households depend on the sale of agricultural or other goods for their income. For this reason, we can only study the labor income channel, and not the producer income channel when investigating how trade policy could affect households' income.

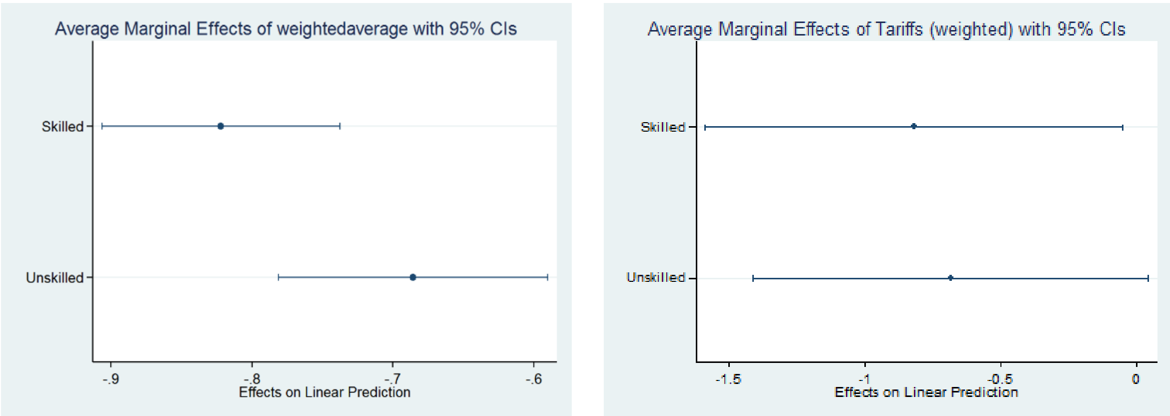
Main Results

4.1. Wage estimations

The results obtained from estimating Mincerian equations (model 3 in Appendix A) are shown in Table C.1 in the appendix. Our findings show that wages increase with education (the skill dummy represents literacy) and are higher for male than for female workers. Concerning the effect of trade policy, Figure 1 plots point estimates and confidence intervals for changes in tariffs differentiated by skill level. It displays a negative correlation between tariffs and wages, indicating that a reduction in tariffs will tend to increase wages. Apparently, higher educated households are affected more by changes in tariffs. The plot on the right-hand side of Figure 1 uses more conservative industry-clustered standard errors for the calculation of confidence intervals. The effect of trade policy is still significant at the five percent level for skilled

Figure 1: Effect of trade policy on wages. Confidence intervals

Robust SE Clustered SE



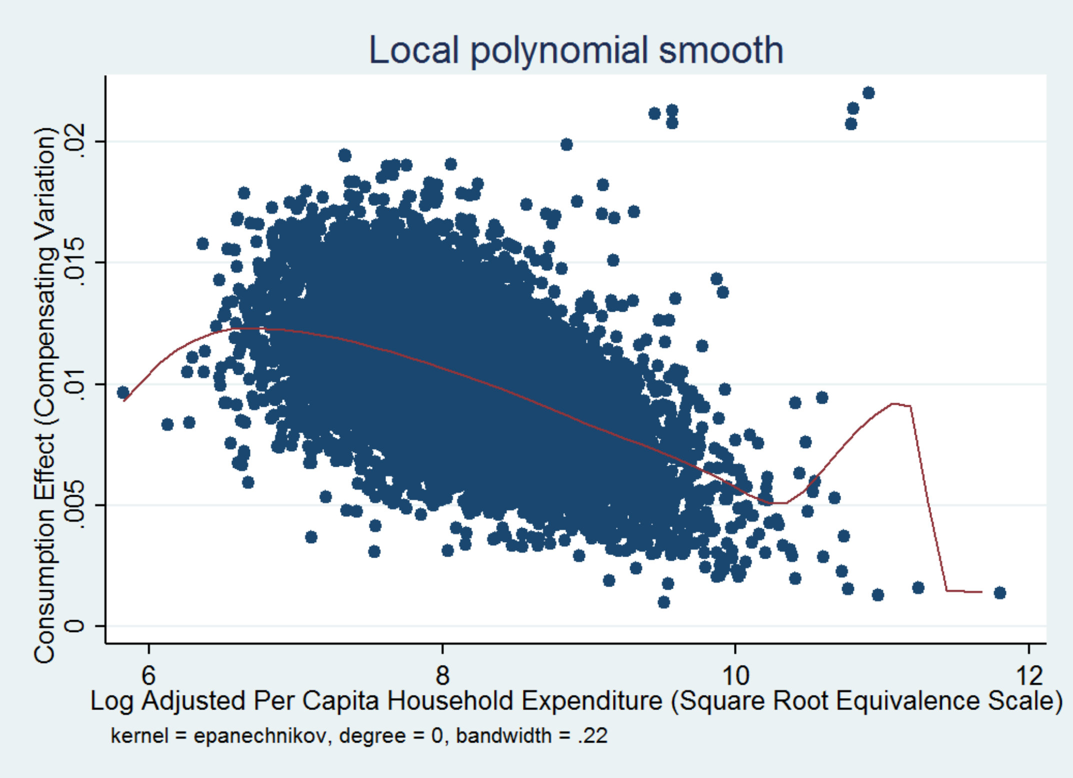
workers and at the ten percent level for unskilled workers. At the same time, the difference between the two effects is no longer significant.

These results, however, should be treated with caution. As mentioned above, the variation reflects merely 61 sectors for 2005 and 67 sectors for 2010 for which data were available. Monte Carlo simulations are used as a robustness check. They support our previous results as shown in Figure C.1.

4.2 Welfare effects

Figures 2-4 show the consumption, earnings and total welfare effects along the income distribution of households, in the scenario of full elimination of tariffs. The main assumptions used to construct the figures are: skill level is defined in terms of literacy; the tariff pass-through is 0.10 (from Baghdadi et al, 2016); the elimination of tariffs leads to a 1.025% increase in wages, and the interaction coefficient between weighted tariffs and skill groups is -0.335 (both from the results in Table C1).Finally, the squared root of the equivalence scale is used to calculate household size. Results using household expenditure per head and the OECD modified equivalence scale are very similar, as shown below.

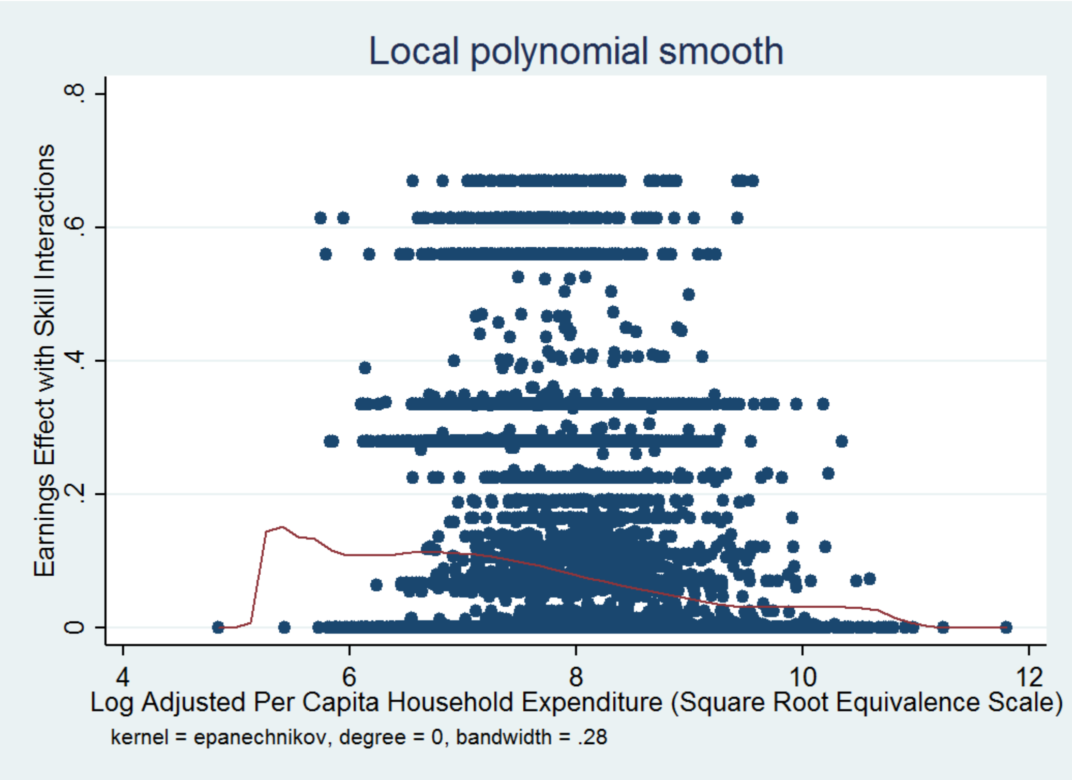
Figure 2. Consumption Effects



Note: Authors' elaboration using wage elasticities in Table C1 and incomplete pass-through.

Figure 2 shows the total consumption effect due to the change in the prices of the traded goods. The solid curve shows the estimated inverse compensating variation (explained in Section 3 above), which is downward sloping, indicating a pro-poor effect of liberalization. The average consumption effect is positive and significantly different from zero. The gains extend to 1% of initial household expenditure for low-income households and are close to zero for rich households, with the exception of a few outliers that also obtain higher gains.

Figure 3. Earnings Effects

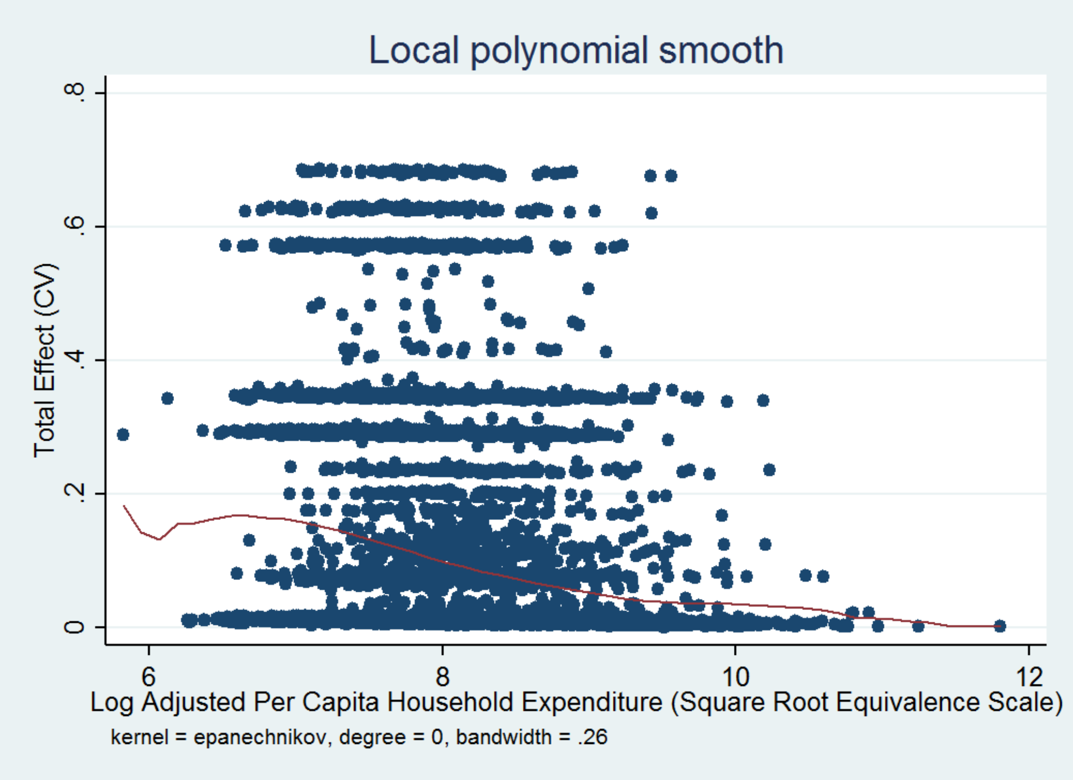


Note: Authors' elaboration using wage elasticities in Table C1 and incomplete pass-through.

Figure 3 shows that the earnings effect is sizable, in contrast to Borraz et al. (2013) for Brazil. It seems that poor households, again, benefit more. Results for the wage effect should in our case be treated with caution. As can be seen above there is very little variation, and it is due to intersectoral rather than inter-household variation, and should be thus mainly explained by composition effects.

Figure 4 shows the total welfare effect for all households, which has been computed by aggregating the consumption and earnings effects. The increase in the welfare of low-income households amounts to about 2.5% of initial household expenditure, while welfare increases for richer households are less.

Figure 4. Total Welfare Effect



Note: Authors' elaboration using wage elasticities in Table C1 and incomplete pass-through.

The analysis of differences across population groups (urban versus rural, gender, regions, and employment types) is based on the consumption effect, as the estimation of the wage effect has shown to be quite noisy and lacking important interpersonal variation. Poor people in rural areas would benefit slightly more than their counterparts in urban areas from trade policy changes in Tunisia (Figure 5), probably due to the higher share of food products in their expenditure. There is little systematic difference in the impact of trade policy by gender (Figure 6), and the distributional effects across regions seem to be rather similar (Figure B1 in the Appendix). Finally, the increase in welfare for self-employed, poor workers (in Tunisia, a useful proxy for informality) is only slightly higher than for other types of workers (Figure B2).

Figure 5. Consumption Effect for Urban and Rural Areas

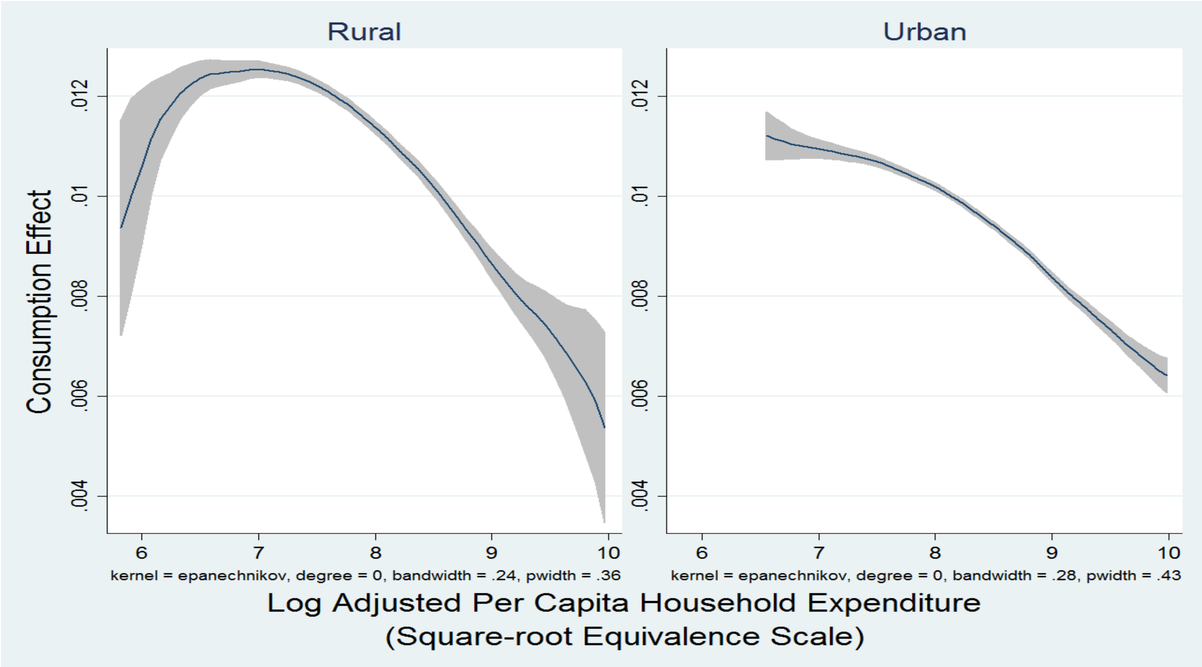
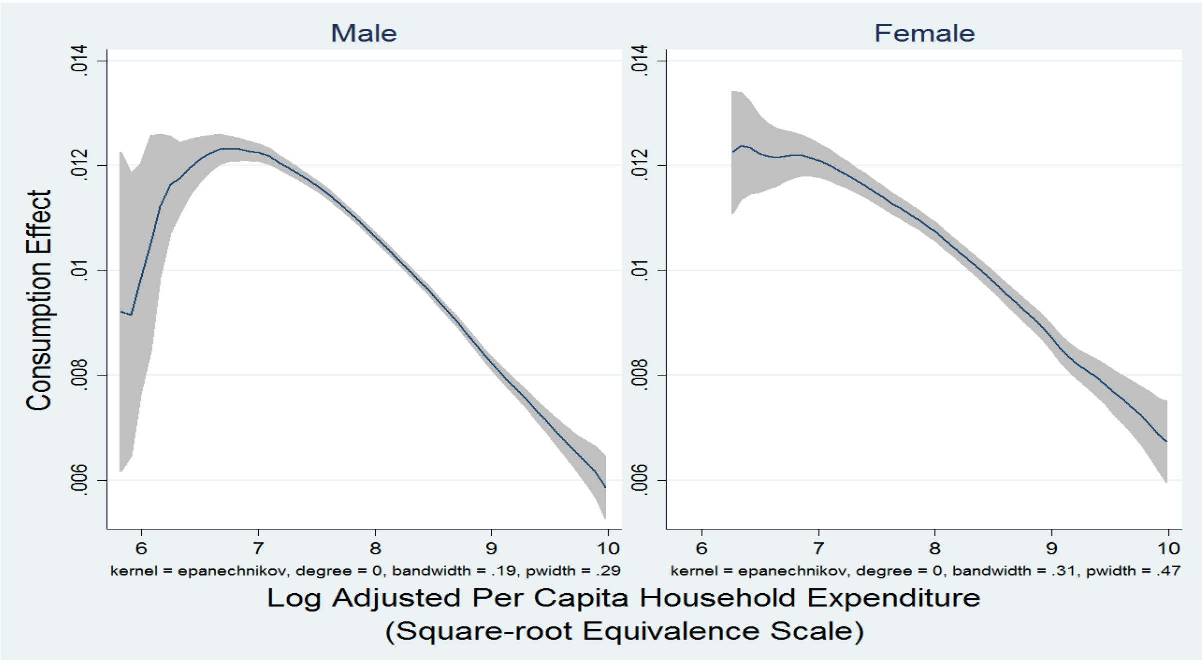


Figure 6. Consumption Effect by Gender



4.3 Robustness

The greater positive impact of trade reform for the poor in Tunisia remains if we change some of the underlying assumptions. A pass-through assumption of 0.5 (in line with the results in Baghdadi et al (2016) also results in the poor benefiting more from tariff reductions than the rich. Figure 7 provides the consumption effect and Figure 8 the total effect (the earnings effect does not change due to this alternative assumption). Similarly, using unadjusted per capita household expenditure to measure income also generates a pro-poor impact of tariff reduction (the fitted curve in Figure 9 is almost the same as in Figure 4, except that it looks smoother and less influenced by outliers).

Figure 7. Consumption Effect with Alternative Pass-Through

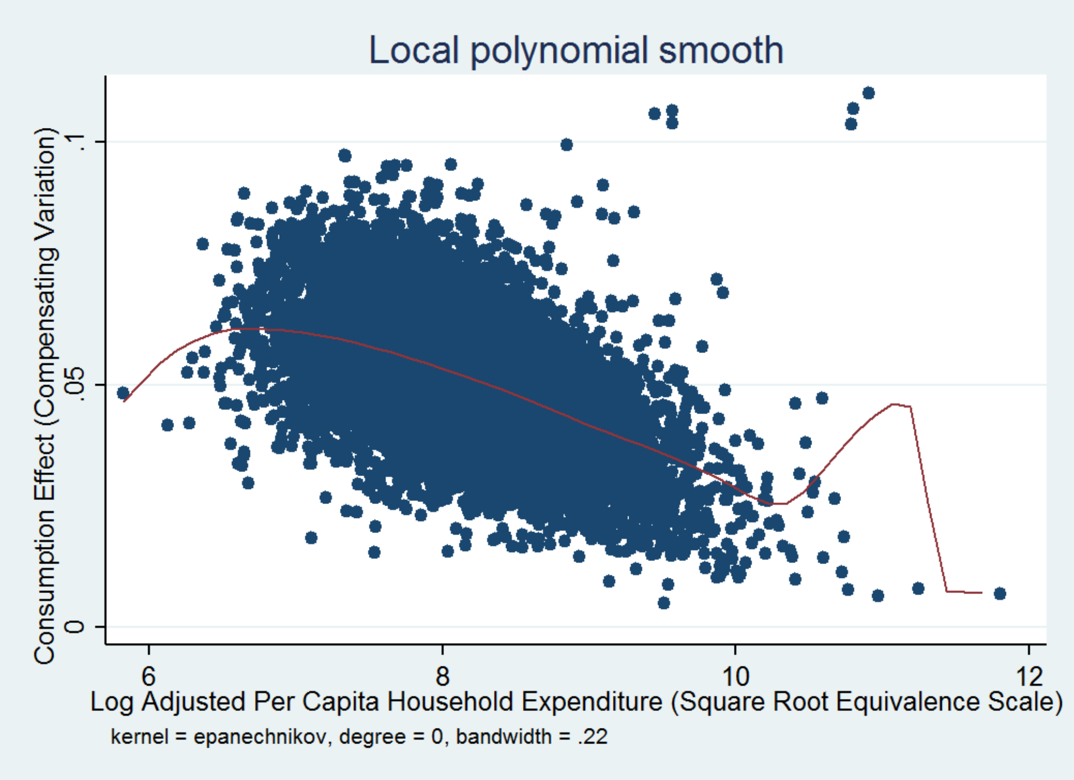


Figure 8. Total welfare effect with alternative tariff pass-through

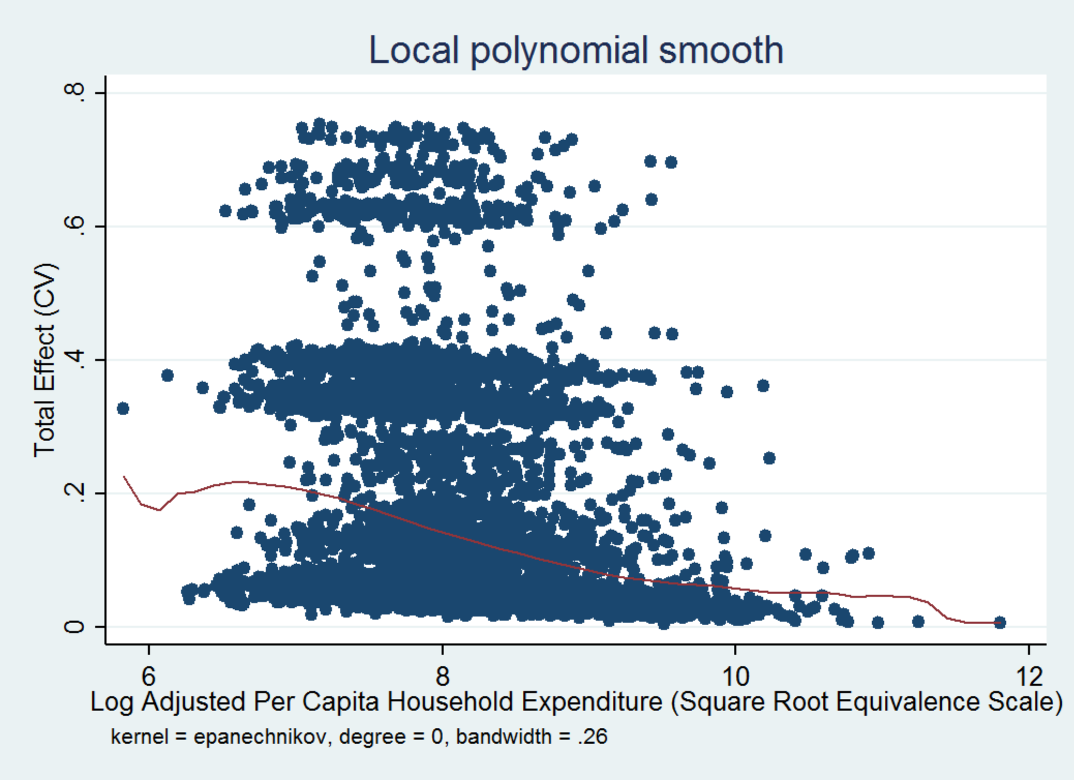
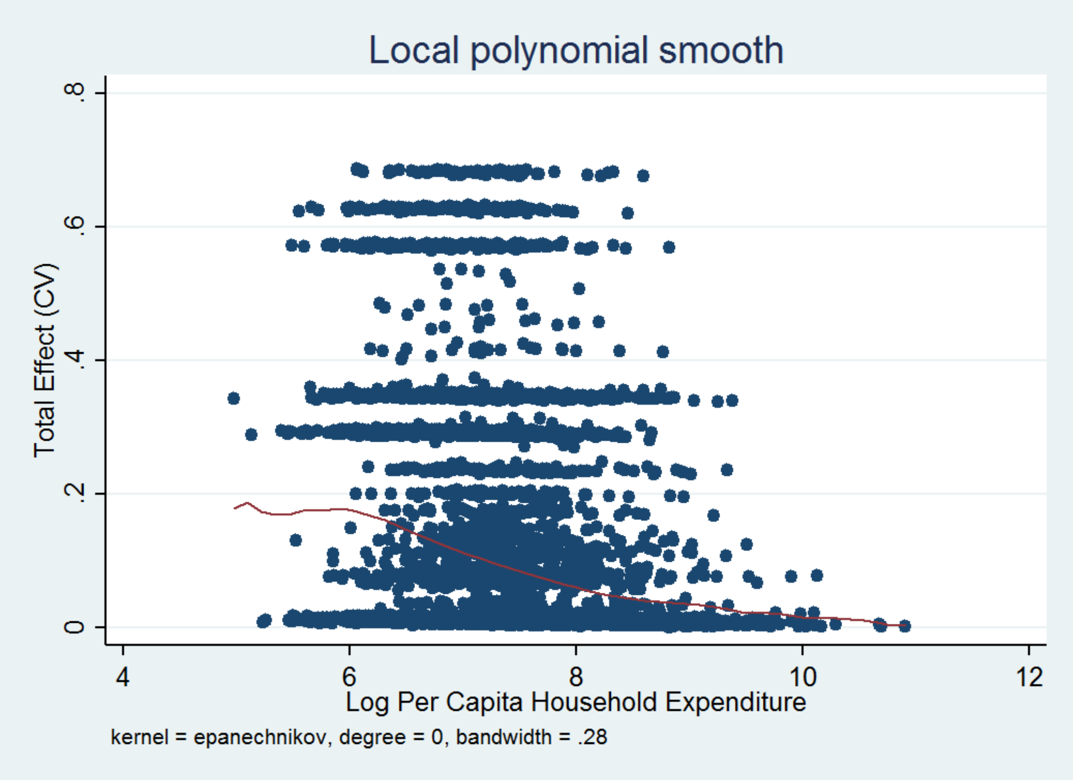


Figure 9. Total welfare effect using per capita household expenditure



In comparison to other studies, the impact of trade reform on welfare using the estimated 10 percent pass-through for Tunisia of around one percent of initial household expenditure, is similar to the gains found in Borraz et al (2013) for Brazil, but lower than the welfare effects found in Ural Marchand (2012) for India and Porto (2006) for Argentina. However, when using a pass-through of 50 percent, the benefits are very similar –around six percent of initial expenditure– to those estimated in Porto (2006).[3]

The main policy conclusion is that trade liberalization in Tunisia would in fact reduce poverty if it is made through a reduction of tariff barriers. This result is in line with the ex-ante analysis conducted by Minot et al. (2010) (see above). Similar to our findings, they also show that poverty will decline more in rural than in urban areas.

5. Conclusions

This paper examines how Tunisian households would be affected by further tariff liberalization. The distributive impacts from the perspective of both consumers and workers are considered, as well as the price transmission mechanism. In particular, the effects of trade liberalization or, more generally, trade policy reform on household wellbeing and poverty, are identified and compared for the analyzed sectors. The overall effect is decomposed into a consumption and income effect on wages, and separate results are shown for different groups of households. We distinguish between rural and urban households and also show the effects by region, by gender and by type of employment.

The reduction in the prices of traded goods is found to improve welfare for all households along the distribution of income. The increase in welfare due to lower prices on consumption goods is larger for poor than for rich households. The welfare increase due to wage effects is also positive, and greater for poor than for rich workers. However, wage effects are less accurately estimated than the consumption gains, because the lack of individual wage data means we rely on average sectoral wages. When added

[3] Porto (2006) assumed complete pass-through.

to the consumption effect, we find that the welfare of the poor increases by about 2.5 percent when assuming that the tariff pass-through is low (about 10 percent). This is a conservative estimate, given that the pass-through could be around 50 to 60 percent.

A limitation of this study is that the effect of the changes in the prices of traded goods on the prices of non-traded goods has been excluded from the analysis. Nevertheless, these effects are probably small for Tunisia, where non-traded services are highly regulated and could only weakly respond to general equilibrium effects. We leave this issue for further research. Also, the data required to analyse the income effect on households that sell specific goods – for instance agricultural – are not available. Another issue is that this framework only takes static effects into account. Trade policy could also change the production structure of the economy, and this in turn could have an effect on welfare.

Summarizing, the findings suggest that trade liberalization in Tunisia could have a net positive welfare effect on households and that the benefit is higher for poorer households. However, the magnitude of these effects is estimated to be small in economic terms.

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Appendix

Appendix A: Methods

A.1 Analytical Framework

We apply the methodology proposed in Porto (2006) to simulate the effects of trade policy changes on household wellbeing along the entire distribution of expenditure per capita across households.

The framework that Porto (2006) employs is based on the concept of compensating variations and on an expenditure income identity. By assumption for each household, expenditure equals factor earnings plus transfers:

$$e^h(\mathbf{p}_T, \mathbf{p}_N, \bar{u}^h) = w^h + \varphi^h \tag{1}$$

where the expenditure function of household *h* on the left-hand side at a given level of utility $\bar{u}$ depends on the vector of prices for traded goods $\mathbf{p}_T$ and non-traded goods $\mathbf{p}_N$. On the right-hand side, w denotes wages and φ is set to zero at the benchmark scenario with protection.

Changes in tariffs affect consumption via domestic prices, and income via wages. If prices and wages change while the composition of the consumption basket and the level of utility stay the same, φ has to change in order for the identity to hold. $\Delta\varphi$ can be interpreted as the compensating variation, or a measure of the change in welfare as a consequence of trade policy. It is defined as the amount of money a household would have to be given (or forfeit) in order to be able to afford the exact same basket of goods they consumed before the price change.

A.1.1 Consumption Effect

The consumption effect measures how much more expensive the given bundle of consumed goods gets because of the induced price change, and can be calculated as follows:

$$\frac{\Delta\varphi_{hpt}}{e_t} = \sum_k \left(s_{hkt}\zeta_{kt}\frac{\Delta\tau_{kt}}{\tau_{kt}} \right) \tag{2}$$

s_{hkt} is the share of good *k* in expenditure of household *h* at *t*. ζ_{kt} is the elasticity of prices *k* with respect to tariffs, and τ_{kt} is the tariff rate. ζ_{kt} is typically obtained from a tariff pass-through equation (see Bagdhadi et al 2016b) in which an elasticity of price with respect to the tariff *factor* is calculated. More specifically, let $\xi \equiv \frac{d \ln P_{kt}}{d \ln(1+\tau_{kt})}$ be the estimate obtained from the pass-through regression.[4]

Thus, $\zeta_{kt} \equiv \frac{d \ln P_{kt}}{d \ln \tau_{kt}} = \xi \frac{\tau_{kt}}{1+\tau_{kt}}$. Note, that $\zeta_{kt} = 0$ for all non-traded goods. This holds as long as cross-price elasticities are not considered.

A.1.2 Mincerian wage equations and the income effect

The effect of tariffs on the relative wages of skilled vis-à-vis unskilled labor is analyzed using the Mincerian Earnings Equations due to Mincer (1958). Following Ural Marchand (2012), the Mincerian

[4] P_{kt} can be interpreted as elements of the stacked vector $\mathbf{P} = \begin{pmatrix}\mathbf{p}_T \\ \mathbf{p}_N\end{pmatrix}$.

Equation is augmented with industry specific tariffs and an interaction term between tariffs and the skill level:

$$\ln w_{ijt} = \lambda_0 + \lambda_1 \tau_{jt} + \lambda_2 (\tau_{jt} * SKILL_{it}) + \lambda_3 SKILL_{it} + \beta_1 AGE_{it} + \beta_2 AGE_{it}^{\ 2} + \\ + \varepsilon_{ijt} \tag{3}$$

where w_{ijt} are wages,τ_{jt} is the tariff rate, $AGE_{it}$is age of individual *I* and $\mathbf{I}_{it}$is a vector with individual characteristics. i denotes individuals, j sector and t time. $SKILL_{it}$ denotes the skill level of worker i.

Unfortunately, wages are not available at the household level, and, hence, vary only across sectors and time. In order to check robustness of our point estimates, we run 1,000 Monte Carlo simulations assuming that wages are standard log-normally distributed around the average industry wage; i.e., $\ln w_{ijt} \sim N(\ln w_{jt}, 1)$. We then re-estimate (3) for each of these simulated sets of wages.[5]

In equation (3), the estimates obtained can be interpreted as semi-elasticities with respect to the tariff. Thus let $\mu_{1jt} \equiv \left.\frac{d \ln w_{ijt}}{d \ln \tau_{jt}}\right|_{SKILL_{it}=0} = \lambda_1 \tau_{jt}$, and $\mu_{2jt} \equiv \lambda_2 \tau_{jt}$ the additional effect for skilled workers.

Then, the income effect at any given time for a full abolishment of taxes can be calculated as follows:

$$\frac{\Delta\varphi_{hwt}}{e_t} = -\sum_j (\mu_{1jt}\mathbf{EM}_{hjt} + \mu_{2jt}\mathbf{SK}_{hjt}) \frac{\Delta\tau_{jt}}{\tau_{jt}} \tag{4}$$

where $\mathbf{EM}_{hjt}$is the number of earners in household *h* working in sector *j*, and $\mathbf{SK}_{hjt}$is the number of skilled workers in household *h* working in sector *j*.

A.1.1Total Effect

The total effect can be calculated as:

$$\frac{\Delta\varphi_{ht}}{e_t} = \frac{\Delta\varphi_{hpt}}{e_t} + \frac{\Delta\varphi_{hwt}}{e_t} \tag{5}$$

In order to investigate the distributional effects of trade policy $\frac{\Delta\varphi_{ht}}{e_t}$ is plotted against logarithmized adjusted household expenditure. A kernel weighted local polynomial smooth is used to model the relation between expenditure and $\frac{\Delta\varphi_{ht}}{e_t}$.

[5] We thank Robert Teh for suggesting this approach.

Appendix B: Data description

Table B.1. HH survey summary statistics

	2005			2010		
Variable	**Obs**	**Mean**	**Std. Dev.**	**Obs**	**Mean**	**Std. Dev.**
Ln wage	4390	5.44	0.34	3192	5.90	0.46
Weighted Average Tariff	4390	19.96	7.41	3192	26.10	6.57
Skilled_1: Literate	4390	0.54	0.50	3192	0.67	0.47
Skilled_2:Primary	3847	0.11	0.31	3153	0.11	0.31
Skilled_3:Secondary	3847	0.02	0.14	3153	0.03	0.17
Skilled_4:Post-sec.	3847	0.01	0.09	3153	0.02	0.12
Skilled_5:University	3847	0.00	0.02	3153	0.00	0.05
Age	4390	48.19	12.99	3192	48.87	12.40
Urban dummy	4390	0.37	0.48	3192	0.42	0.49
Male dummy	4390	0.64	0.48	3192	0.71	0.45

Table B.2. Expenditure shares

	2005			2010		
Expenditure shares	**Obs**	**Mean**	**Std. Dev.**	**Obs**	**Mean**	**Std. Dev.**
Food	12315	41.93%	13.67%	11278	35.78%	12.05%
Clothes and footwear	11265	7.97%	6.88%	10440	8.41%	6.79%
Housing and utilities	12317	21.88%	11.94%	11281	25.53%	12.24%
Transport	9028	9.77%	9.92%	8404	8.98%	8.95%
Communication	9785	4.21%	3.01%	9816	5.61%	3.82%
Recreation	10217	6.18%	6.30%	7102	1.46%	2.97%
Education	7694	4.30%	4.24%	6502	3.40%	3.26%
Personal care	12275	10.17%	8.69%	11038	8.74%	8.21%

Figure B1. Consumption effect by region

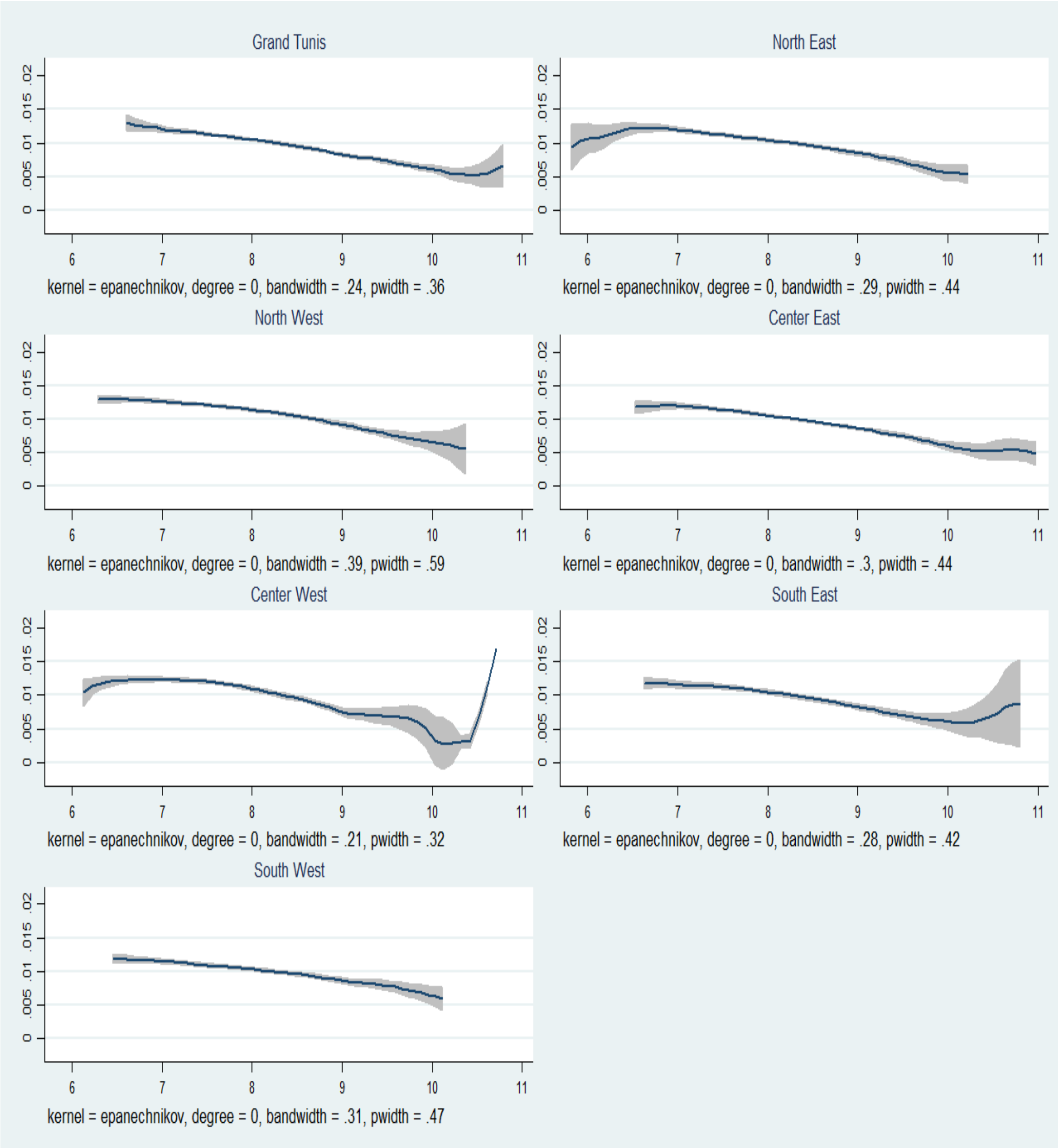
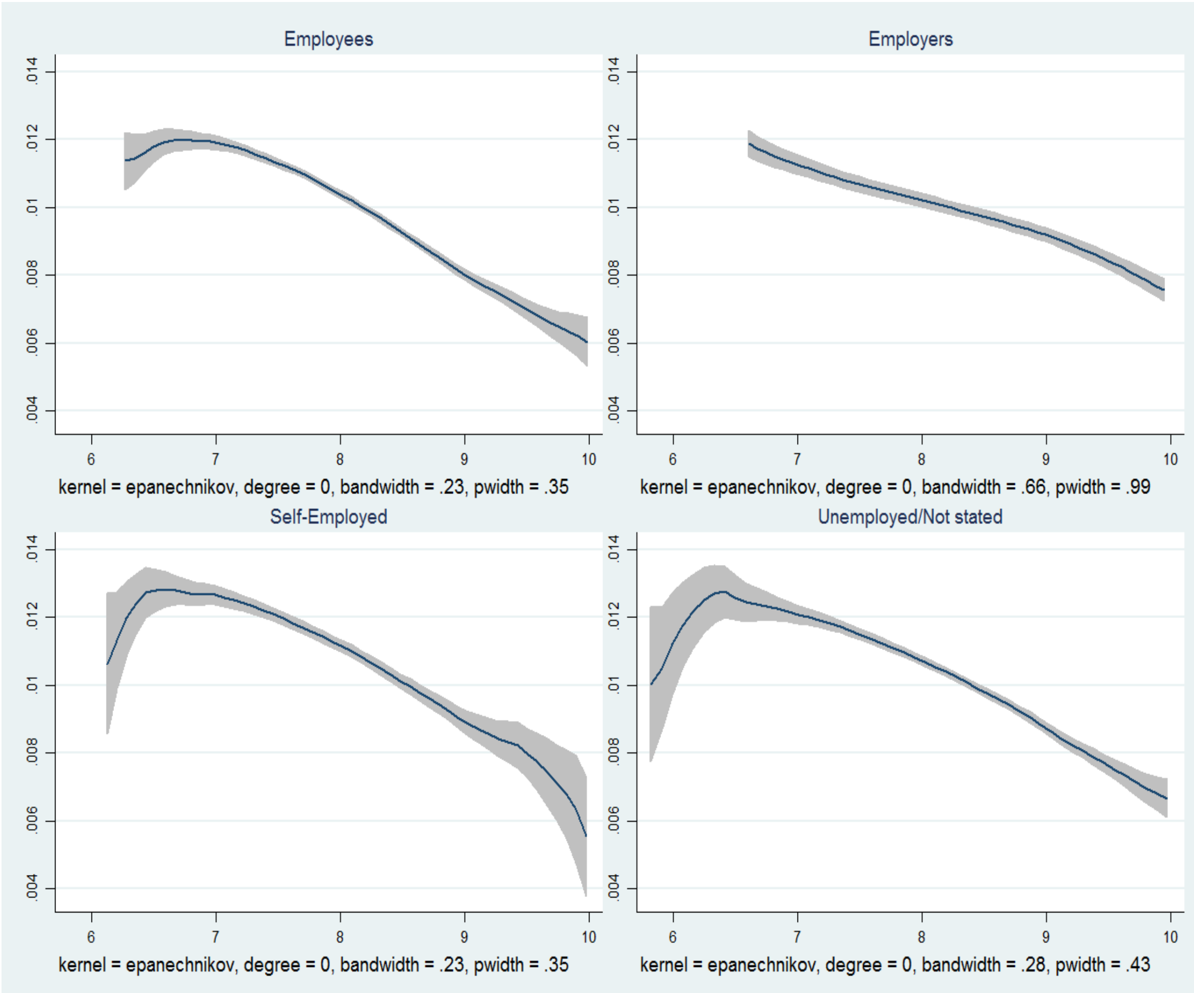


Figure B.2. Consumption effect by employment type



Appendix C: Results for the Mincerian Equation

Table A.1 reports results for equation (3) using robust standard errors in column (1) and industry-clustered standard errors in column (2). There is a negative effect of tariffs on wages. The results are stronger for skilled workers. Introducing standard errors clustered at the industry levels renders our results by and large insignificant except for the main effect which remains significant at the 10 percent level. However, the effect of tariffs and the interaction between tariffs and skills are jointly significant.

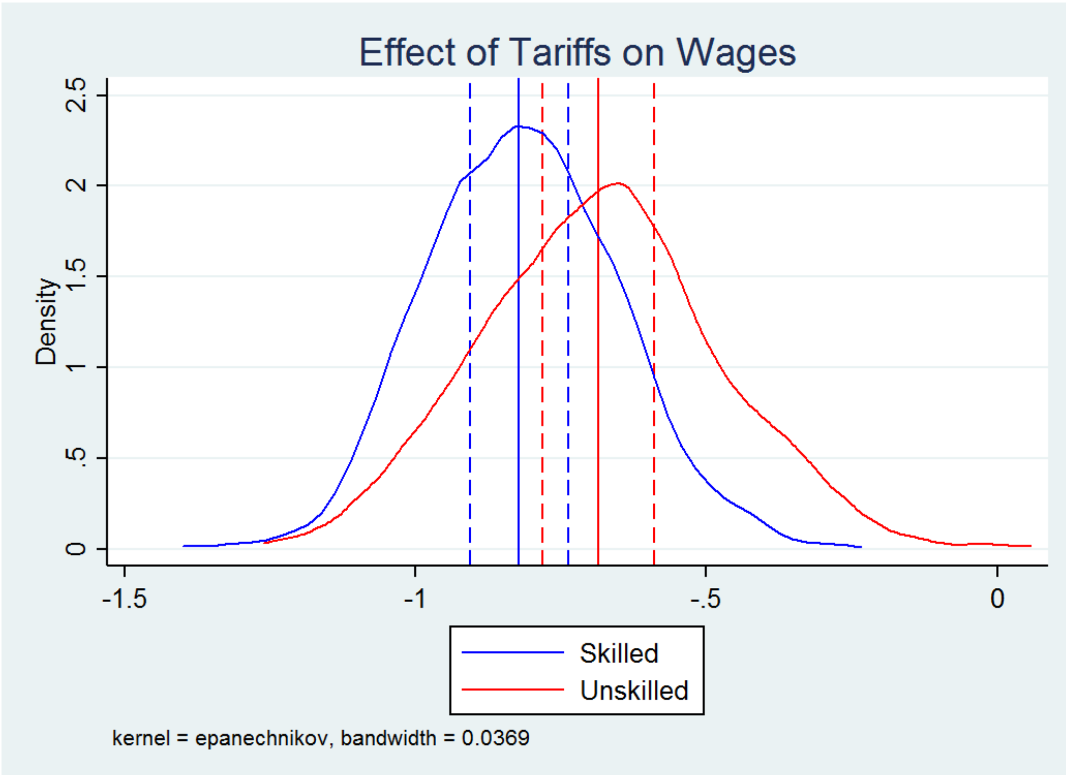
Table C.1: Results Mincerian Equation

VARIABLES	(1) Robust SE	(2) Clustered SE
Weighted tariff	-0.686***	-0.686*
	[0.0487]	[0.297]
Weighted tariff*skill_dummy	-0.136***	-0.136
	[0.0404]	[0.178]
Skill dummy	0.0345**	0.0345
	[0.0148]	[0.0645]
Age	0.00285***	0.00285
	(0.000835)	(0.00185)
Age squared	-2.30e-05***	-2.30e-05
	(7.42e-06)	(1.87e-05)
Urban dummy	-0.00886*	-0.00886
	(0.00508)	(0.00856)
Male dummy	0.0153***	0.0153
	(0.00388)	(0.0234)
Constant	7.938***	7.938***
	(0.0295)	(0.0970)
Observations	9,820	9,820
R-squared	0.877	0.877
Industry FE	Yes	Yes
Time FE	Yes	Yes

Note: standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1.

In Figure C.1 we report confidence intervals with robust standard errors (the dashed vertical lines) and point estimates (solid lines). In addition, we add the distribution of point estimates in our Monte Carlo distribution. Evidently, the peak is in all cases close to the original point estimate.

Figure C.1: Monte Carlo simulation results



Note: Vertical lines represent results from Table C.1 where solid lines represent point estimates ar dashed lines represent 95% confidence intervals. The densities are based on a kernel dens estimation for 1,000 regression with simulated wages.