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Abstract

The main aim of this paper is to investigate the effects of Tunisian trade policy on household welfare. We use the recently released household survey data in combination with estimated tariff pass-through elasticities and wage elasticities obtained from Mincerian equations. Changes in tariffs affect both local prices and wages and those changes are transmitted into changes in household expenditure. Using the methodology proposed by Porto (2006), the main results show that the changes in household welfare are positive and have a greater effect for the lower quantiles of the expenditure distribution. This result is largely explained by the fact that the decrease in consumer goods prices benefits poor more than rich households, while labor income effects are close to zero.

JEL Classifications: D1, F1, J3, R2

Keywords: Tunisia, household welfare, trade and poverty, Mincerian equations

ملخص

الهدف الرئيسي من هذه الورقة هو دراسة الآثار المترتبة على السياسة التجارية التونسية على الرعاية المنزلية. نستخدم بيانات المسح الأســري الذي صــدر مؤخرا ف مع التعريفة التي تمرر من خلال المرونة المقدرة والمرونة في الأجور التي تم الحصــول عليها من معادلات منسيريان. التغييرات في الرسوم الجمركية تؤثر على كل من الأسعار المحلية والأجور وتنتقل تلك التغيرات إلى تغييرات في إنفاق الأسرة. باستخدام المنهجية التي اقترحها بورتو (2006)، تظهر النتائج أن التغييرات في الرعاية المنزلية إيجابية ولها تأثير أكبر للجزئيات الأدنى من توزيع النفقات. وتفسر هذه النتيجة إلى حد كبير من خلال حقيقة أن الانخفاض في أسعار السلع الاستهلاكية تحمل فوائد أكثر للفقراء عن الأسر الغنية، في حين أن آثار دخل العمل هي قريبة من الصفر.

1. Introduction

Trade liberalization policies linked to multilateral, regional or single-country initiatives affect the domestic economy by their impact on prices of goods and services. Consequently, these policies also affect average productivity and lead to industrial restructuring. The main aim of this paper is to estimate the distributional effects of trade policy at the micro level, using household survey data and provide an indication as to whether trade liberalization affected different types of poor differently. To our knowledge this has not yet been done for Tunisia.

The main approach consists on investigating 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. Firstly, as consumers, households benefit from lower prices when tariffs are reduced as a consequence of unilateral or regional trade liberalization, but as producers they might be hurt by lower prices if they are producing the goods for which prices decrease. Finally, as income earners prices can also affect employment and wages and benefit also from higher prices in competitive exporting sectors, which could attract more producers into a given industry and increase employment and subsequently also wages.

The outcome will be supportive for various highly relevant policy questions. In particular, the effects of trade liberalization or, more generally, falling trade costs on household wellbeing and poverty will be identified and compared for the analyzed sectors. The overall effects will be decomposed into a consumption and income effect on wages. In addition, this paper adds to the literature in considering the effect of Non-Tariff Measures (NTM).

The main results indicate that the changes in household welfare due to the reduction in tariffs are positive and have a greater effect for the lower quantiles of the expenditure distribution. This result is largely explained by the fact that the decrease in consumer goods prices benefited poor more than rich households, while labour income effects are close to zero. Similarly, while abolishment of NTMs would slightly hurt poor households the effect is much lower than the positive effect of changes in tariffs.

The rest of the paper is organized as follows. Section 2 reviews the related literature and presents some stylized facts. Section 3 outlines the main methodology, describes the main data and variables and the model specification. Section 4 presents and discusses the results and finally, Section 5 concludes.

2. Review of the Literature

Most empirical evidence at the macro level indicates that trade openness has in general a positive impact on economic development (Doyle and Martínez-Zarzoso, 2011). While this positive effect holds for the whole economy, the benefits are usually unevenly distributed across households. Recent literature shows that the effect of tariff liberalization from the perspective of households, both as consumers and factor owners, are overall positive but masks significant differences in the distribution of gains. These gains can be unevenly distributed both across income levels and across geographic regions. Porto (2006) developed a method to estimate the distributional effects of trade policies using household survey data and applied 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) assumed a unitary pass-through rate from tariff to prices and used intra-Mercosur and common external tariffs and import shares to compute the price changes. Next, he obtained the consumption effects of trade goods by multiplying budget shares by the computed price changes and used locally weighted regressions (Fan, 1992) to analyze the relationship between those changes along the distribution of per capita household expenditure. He found that the resulting compensating variation was upward sloping with income per capita expenditure, indicating a pro-rich bias. A similar effect was found when computing the effect of the changes of non-trade goods to

changes in the prices of trade goods and in turn on household welfare. Fortunately, the positive labor income effect on household welfare, estimated using a wage equation and calculating wage-price elasticities over compensates this bias and result in a net pro-poor effect of the reduction in tariffs due to Mercosur. The intuition behind this result is that the reduction in tariffs on traded goods generated an increase in the relative price of unskilled intensive goods (increase in the price of food and beverages and decline in price of household equipment) and this in turn had a negative impact on the wages of more skilled workers and a positive impact on the wages of less-skilled individuals. The impacts estimated are relatively small and around 6 percent of initial expenditures and the main policy conclusion is that without Mercosur poverty in Argentina would have been higher than with it.

Several recent studies have applied a similar methodology, relaxing some of the strong assumptions made in Porto (2006). Among them are Nicita (2009),Urald Marchand (2012) Borraz et al. (2013)and Nicita et al. (2014). Nicita's (2009) main novelty is that he relaxed the assumption of full pass-through and estimated the extent to which changes in border prices of traded goods are passed through to domestic prices by using an econometric model proposed by Goldberg and Knetter (1997). His findings are that for the Mexican case the pass-through differs for agricultural products and manufacturing and it is estimated at around 33 and 27 percent respectively. Contrary to Porto (2006), he finds that richer households gained relatively more from trade liberalization in Mexico than poor households. Urald Marchand (2012) applied a similar methodology to the Indian case, he also estimated pass-through equations and found that households experienced gains at all per capita expenditure levels as a result of the trade liberalization, while the average effect was generally pro-poor and varied significantly across the per capita expenditure spectrum. The main addition in Nicita (2009) and Urald Marchand (2012) was to distinguish between rural and urban areas to understand the extent to which trade reforms affect prices differently according to location. Indeed, market imperfections partially isolate household from the effects of tariff changes and this isolation is more severe in rural areas, for which the pass-through was estimated in Ural Marchand (2012) to be around 40 percent, whereas in urban areas it was around 66 percent.

Borraz et al. (2013) also find that trade liberalization had a pro-poor effect in Brazil. This result is mainly explained by the decrease in consumer prices after Brazil entered Mercosur and by the fact that the labor impact is almost zero. Poverty decreased in Brazil and inequality stayed the same after the trade reform.

Nicita et al. (2014) examined the impact of the existing protection structure in six Sub-Saharan African countries on income distribution at the household level. They find that there is a pro-poor bias in favor of poor households that suggest 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, when those are not available in the country statistics. More specifically, the method consists on estimating trade elasticities using highly disaggregated trade data (6 digits HS) using a trans-log GDP function which depend on a vector of prices for goods and endowments. The derivative of the GDP function with respect to prices should give the share of imported good "*n*" in GDP, whereas the derivative with respect to endowments captures the Rybziynsky effect of changes of factor endowments on imports. Using this second derivate in combination with data on the share of good "*n*" in GDP and data on the share of unskilled and skill labor in GDP it is possible to derive an estimate of the price of skill and unskilled wages for each of the different six-digits HS goods. However, for this estimation country variation is needed and for the Tunisian case we have data on wages at the sectoral level that can be used in the estimation of the required Mincerian equations.

We extend the abovementioned 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. 2016b) and estimate wage equations and welfare effects along the lines proposed above. We will also distinguish between regions and between rural and urban households and estimate the welfare effects also by gender. We do not expect to find substantial difference among regions since Tunisia is a small country.

In terms of novelty, ours is the first ex-post investigation of the effects of trade policy on income distribution in Tunisia. Minot et al. (2010) are to our knowledge the only authors that estimate the poverty effects of trade policy in Tunisia, but they do it ex-ante and for given scenarios using computable general equilibrium model (CGE) calibrated with household data for 1995. This is however an ex-ante exercise that does not take into account the specific trade liberalization policies in the 2000s, but assumes instead total elimination of tariffs on industrial and/or agricultural goods imported from different regions. 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.

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 and inequality. The model is used to simulate the effects of trade policy changes on household wellbeing along the entire distribution of expenditure per capita across households 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 households via household per capita expenditure distribution.

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. This change affects domestic prices (retail and factor prices) to a variable extent, generally referred to as *"pass-through"*. The magnitude of the pass-through is determined by country-specific or region-specific factors that 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. Although we do not introduce any theoretical novelty compared to Porto's approach, we consider relevant to present in what follows the most relevant aspects of the underlying theory, which are needed to derive the empirical equations tested in this paper.

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,

$$e^h(\mathbf{p_T}, \mathbf{p_N}, \bar{u}^h) = w^h + \varphi^h \qquad (1)$$

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 have an effect on consumption via domestic prices, and on 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. The exercise at hand is, thus, a counterfactual one that seeks to identify potential winners and losers of trade liberalization in Tunisia. In what follows, we distinguish between the effects of trade reforms on goods prices and the effect of price changes in factor prices, in particular wages. The first are called consumption effects and the second labor income effects.

3.1 Consumption Effect

Holding wages constant, the consumption effect for each household can be calculated as follows:

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

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 2015) 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.[1]

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. The benchmark figure for ξwill be taken from Baghdadi et al. (2016b) who find an average pass-through of around 10 percent for all sectors. However, it is important to remark that the pass-through obtained when also NTM and its interaction with tariffs was considered the estimated pass-through could reach around 50 to 60 percent.

3.2 Mincerian wage equations and the income effect

Tariffs are not only affecting households as consumers, but also as workers. It is well known – for instance by the Stolper-Samuelson theorem – that trade in goods has an effect on factor rewards, namely on the wages earned by households. In particular, tariffs could exert an influence on the relative wages of skilled vis-à-vis unskilled labor (Feenstra and Hanson, 2003).

The usual framework to analyze the determinants of individual earnings at the micro-level is the so called Mincerian Earnings Equations due to Mincer (1958) and reviewed by Heckman et al (2003). Following Ural Marchand (2012), the Mincerian Equation is augmented with industry specific tariffs and an interaction term between tariffs and the skill level:

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

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. It would ideally be proxied by years of schooling, but due to lack of data the degree of educational achievement will be used instead. Unfortunately, wages were not available at the household level, and, hence, vary only across sectors and time.

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:

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

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*.

[1] P_{kt} can be interpreted as elements of the stacked vector $\mathbf{P} = \begin{pmatrix} \mathbf{p_T} \\ \mathbf{p_N} \end{pmatrix}$.

Finally, the total effect can be calculated as:

$$\frac{\Delta\varphi_{ht}}{e_t} = \frac{\Delta\varphi_{hpt}}{e_t} + \frac{\Delta\varphi_{hwt}}{e_t} \quad (5)$$

Note that in general we are going to consider the scenario in which all tariffs are abolished, i.e. $\frac{\Delta\tau_{jt}}{\tau_{jt}} = \frac{\Delta\tau_{kt}}{\tau_{kt}} = -1, \forall j \in \mathbf{J}, \forall k \in \mathbf{K}$.

In order to investigate the distributional effects of trade policy $\frac{\Delta\varphi_{ht}}{e_t}$ is plotted against logarithmized adjusted household expenditure. Similar to Fan (1992), different equivalence scales are used to adjust expenditure for household size.

3.3 Data and variables

The empirical estimation of the different models described in the previous section requires the use of different 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 (See Appendix). The main sources for the data are national surveys and trade and protection statistics from national and international sources (INS, COMTRADE and WITS). Ad-valorem equivalents (AVEs) of NTMs are taken from Baghdadi et al (2016b). Note that in the Tunisian case AVEs are mostly negative, indicating that they capture subsidies rather than trade barriers.

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) that kindly provided us with the data. The 2005 survey, used in this paper, is the eighth of its kind. This operation was launched in early May 2005 and lasted a full year until the end of April 2006. A second survey was launched in 2010.

This survey aims to identify the current standard of living of families through an accurate estimation of expenditure and food consumption and to compare it to 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. It took place throughout the year in order to take into account seasonal changes in household consumption. 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) and the final axis includes one-third of the household spending axis (4450 households).

The survey adopts the direct contact method with households being interviewed every day for a week, followed by two other visits after ten days. During this period, expenditures made by households are collected. In addition, expenses undertaken by households either periodically or for specific occasions (such as religious holidays, family events or emergency) are included in order to estimate accurately the annual expenditure of household.

From these surveys we use information on broad expenditure shares, educational attainment, 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). From these data industry-year specific shares and averages can be calculated. Unfortunately, we do not have information on years of schooling. Instead Literacy and a broad measure of educational attainment is included. The latter differentiates between the following levels of education: Primary or lower secondary,

secondary, post-secondary or equivalent, university, post-graduate. We used 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 reports no education at all (or no graduation), the bar should not be set to low in order to have a meaningful indicator. As a benchmark, we defined a person as skilled if he or she had secondary or higher education. Summary statistics and expenditure shares are reported in Tables A.1 and A2 in the Appendix.

Individual wages are unfortunately 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. Unfortunately, using industry level data precludes studying inequality within industries, which will be a major drawback of the dataset at hand. Tariffs are from the WITS database.

4. Main Results

4.1 Wage estimations

The results obtained from estimating Mincerian equations (model 3) are shown in Table (1). The control variables in the wage equations have the expected sign with the exception of the urban dummy, which is hardly significant. Wages increase with education (skill dummy represents literacy) and are higher for males. The results show a negative correlation between tariffs and wages, indicating that reduction in tariffs will tend to increase wages. The interaction between the tariff and the skill dummy is statistically significant in Table 1. NTMs seem to have a less strong and significant negative effect. The interaction with the skill dummy is significant albeit smaller in both cases. Apparently, more educated households are affected more by changes in NTMs and tariffs.

These results, however, should be treated with caution. As mentioned above, the variation above comes from variation across merely 61 sectors for 2005 and 67 sectors for 2010for which data were available. This explains the unreasonably high R-squared, and casts some doubt on the reliability of these results.

4.2 Welfare effects

Figures (1)-(3) show the consumption, earnings and total welfare effects along the income distribution of households, in the scenario of full abolishment of tariffs. The main assumptions used to construct the figures are that skill level is literacy; the tariff pass-through is 0.10 (from Baghdadi et al, 2016b) and the effect of a 100 percent decrease in 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 1). 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 (1) shows the total consumption effect due to the change in the prices of the traded goods. The solid curve shows the estimated compensating variation, which is downward sloping, indicating a pro-poor bias. 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 obtain also higher gains.

Figure 2 shows that the earning effect is comparably sizable, in contrast to other studies, namely in comparison to Borraz et al. (2013) for Brazil. It seems that poor households, again, benefit relatively 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 3 shows the total welfare effect for all households, which has been computing by aggregating consumption and earning effects. It indicates that the total welfare effect is also pro-poor with poor household showing an increase in welfare which is more pronounced than for richer households and amounts about 2.5% of initial household expenditure for low-income households.

In what follows we will specifically focus on the consumption effect to identify differences across different segments (urban versus rural, gender, regions, and employment types. The reason being that the estimation of the wage effect has shown to be quite noisy, and lacking important interpersonal variation.

First, we consider differences between rural and urban areas. In Figure 4 it becomes apparent that poor people in rural areas would benefit slightly more, than their counterparts in urban areas from trade policy changes in Tunisia. The reason for this is most probably the higher share of food products in the expenditure of poor households in rural areas.

When doing the analysis by gender of the household head we find little systematic difference as can be seen in Figure 5.

Also the distributional effects across regions of Tunisia seem to be rather similar as can be seen in Figure A1 in the Appendix.

Finally, in Figure A2 we present the differences in results by employment type. Since in the Tunisian case, it appears that self employment could be a good indicator of informality, we would like to determine whether the change in trade policy in Tunisia affects formal and informal workers differently. The graph in the bottom-left part of the Figure (Self-employed) indicates that the increase in welfare is slightly higher for this group for poorer households in comparison with the other types of workers, however the differences are rather small.

4.3 Robustness

A second set of results are obtained by slightly varying the underlying assumptions. Figures (6)-(7) show the result for Consumption and Total Effect using a pass-through of 0.50, which will be in line with the pass through estimated in Baghdadi et al (2016b) when adding NTMs and its interaction with tariffs to the pass through equation and also in line with was has been found in other studies for developing countries. The earnings effect is unaffected by this change and therefore will remain unchanged.

The figures show that the effect of the tariff reduction is inversely correlated with household expenditure. Hence, the reduction of the tariff would benefit the poor proportionally more. The figures are informative for poverty purposes.

Finally, Figure 8uses the same assumptions as in Figures (1)-(3), but a different measure of household income: unadjusted per capita household expenditure. The results are almost unchanged with respect to those in Figure (3). The fitted curve looks smoother and less influenced by outliers. Still, the result holds that poor households would benefit relatively more. The quantitative predictions are also roughly in line with Figure (3).

In comparison to other studies, the impacts estimated are relatively small and around one percent of initial household expenditure, when using the estimated pass-through for Tunisia. Those are comparable to the gains found in Borraz et al (2013) for Brazil, but lower than the welfare effects found in Urald Marchand for India and by Porto (2006) for Argentina. However, when using a pass-through of 50 percent instead of 10 percent, the benefits are very similar – around six percent of initial expenditure– to those estimated in Porto (2006)[2].

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

As a final exercise, we will look at the effect of a change in NTMs. According to Baghdadi et al (2016a) the number of NTBs has increase over time, especially in 2009/2010, due to the introduction of new sanitary and phytosanitary measures, pre-shipment inspections and other formalities. Hence we consider the hypothetical scenario of an increase in NTMs and evaluate the effect on consumer welfare.

Recall that Baghdadi et al (2016b) and Ghali et al (2013) find a positive impact of most types of NTMs on Tunisian imports. Accordingly, ad-valorem equivalents are negative, that is an increase in NTMs will have the equivalent effect as a reduction in tariffs. The counterfactual scenario that we consider will hence be the introduction of all types of NTMs for all products. In accordance with the above, in the Tunisian case this can be interpreted as an introduction of product standards. From Baghdadi et al (2016b) we have that the elasticity of prices with respect to AVEs of NTMs is about -0.21. The effect is calculated in the exact same manner as that for the tariff. The introduction of NTMs has an effect comparable in size to a tariff reduction as can be seen in Figure 7.[3] There seem to be no strong distributional effects, however, indicating that the present regime is not greatly discriminatory and quite extensive already (consider the coverage ratios in section 2).

Combining these results with those from coming from the tariff reduction, the increase in consumer welfare for the poor will be higher.

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.

5. Conclusions

This paper examines how Tunisian households have been affected by the tariff liberalization that took place in the country during the late 1990s and 2000s and by the change in NTMs. 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, falling trade costs 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 main results show that the consumption effect of the change in the prices of the trade goods is positive for all households along the distribution of income. Concerning distributional issues, the consumption gain steaming from a reduction in tariffs is lower for rich households than for poor, which is desirable from an equalitarian point of view. As for the wage effects, those are also positive, but are less accurately estimated than the consumption gains. The reason is that individual wages are not available and we have to use sectoral wages instead. These effects are positive and also smaller for rich households indicating that wages of high-income earners have being less affected by trade liberalization. When added 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. This is a conservative estimate, considering that the pass- through could be around 50 to 60 percent when considering not only tariffs but also NTM and other trade cost to estimate the pass through (Baghdadi et al, 2016b).

In addition we have also estimate the effect of changes in the number of NTMs. Considering that those have increased over time, a positive consumer welfare effect is found, which is however very uniform across the distribution of income.

[3] Only the consumption effect is reported. As discussed above the estimates of the wage effect are of little reliability. Given the coefficients obtained in the Mincerian equation, however, this unreliable effect would dominate the total effect, making it hard to interpret. Since the consumption effect is estimated more reliably this will be our focus here.

A limitation of this study is that the effect of the changes in the price of trade goods on the prices of non-trade goods has been excluded from the analysis. Nevertheless, we claim that these effects are probably small for Tunisia, where non-trade services are highly regulated and could only weakly respond to general equilibrium effects. We leave this issue for further research. Another issue could be that the current 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.

In summary, the findings suggest that trade liberalization could have a net positive welfare effect on households and that the benefit would be higher for the lower tail of the expenditure distribution. Hence, richer households seem to gain relatively less than poor household indicating that the structure of protection seems to have been pro-rich. It is worth to notice that the magnitude of the effects is estimated to be small in economic terms.

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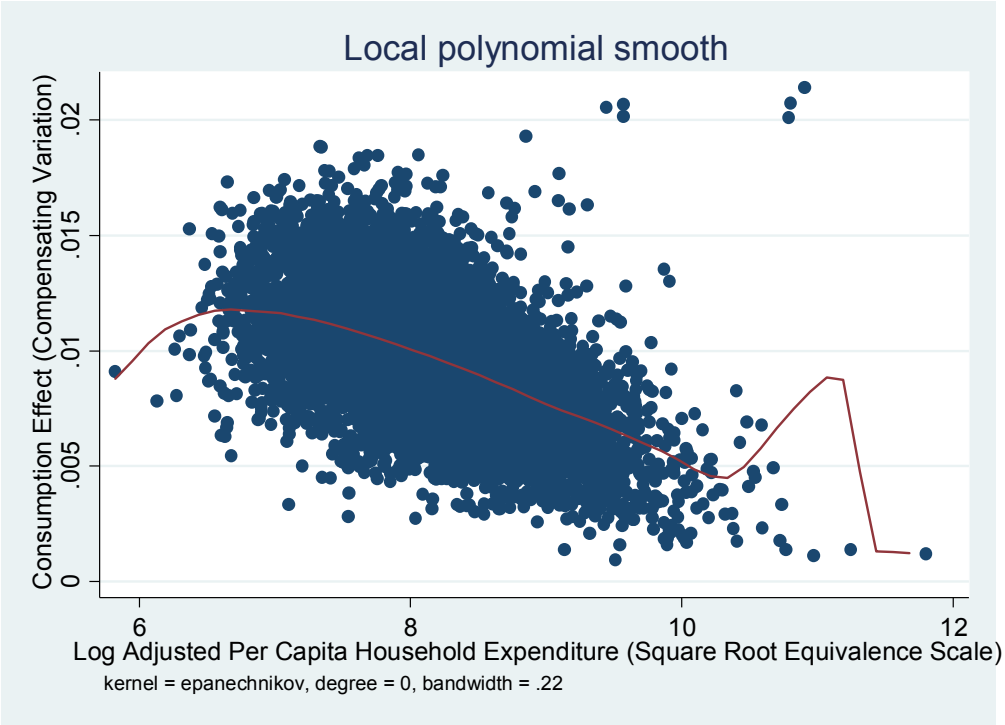
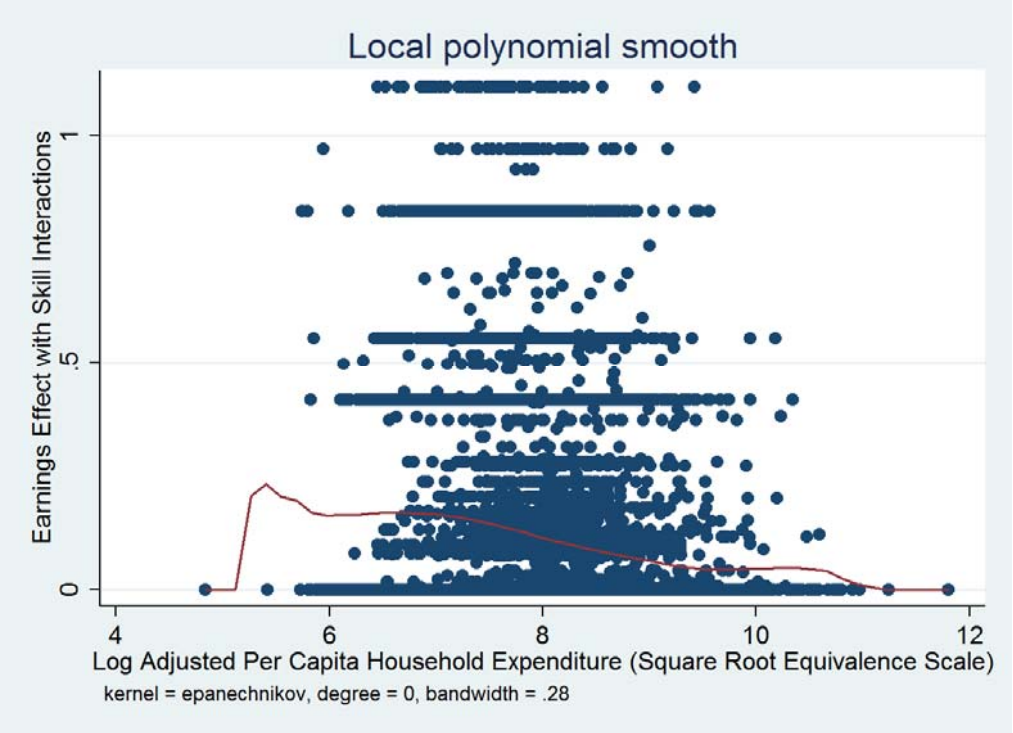
Figure 1: Consumption Effects



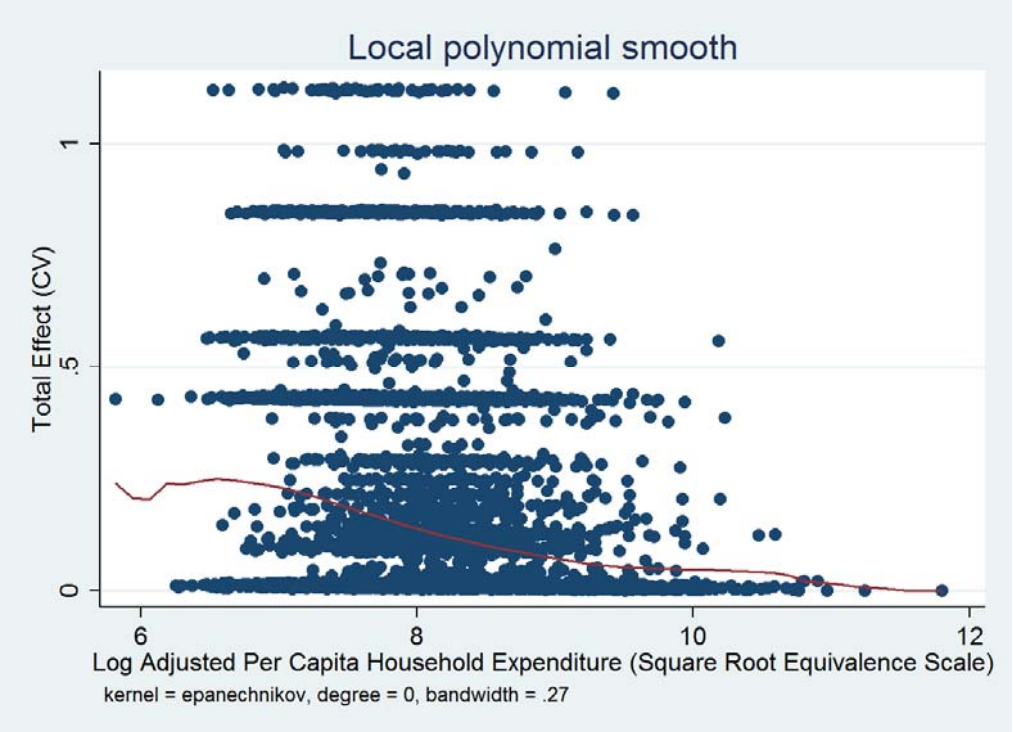
Note: Authors' elaboration using wage elasticities in Table 1 and incomplete pass-through.

Figure 2: Earning



Note: Authors' elaboration using wage elasticities in Table 1 and incomplete pass-through.

Figure 3: Total Welfare Effect



Note: Authors' elaboration using wage elasticities in Table 1 and incomplete pass-through.

Figure 4: Consumption effect for Urban and Rural Areas

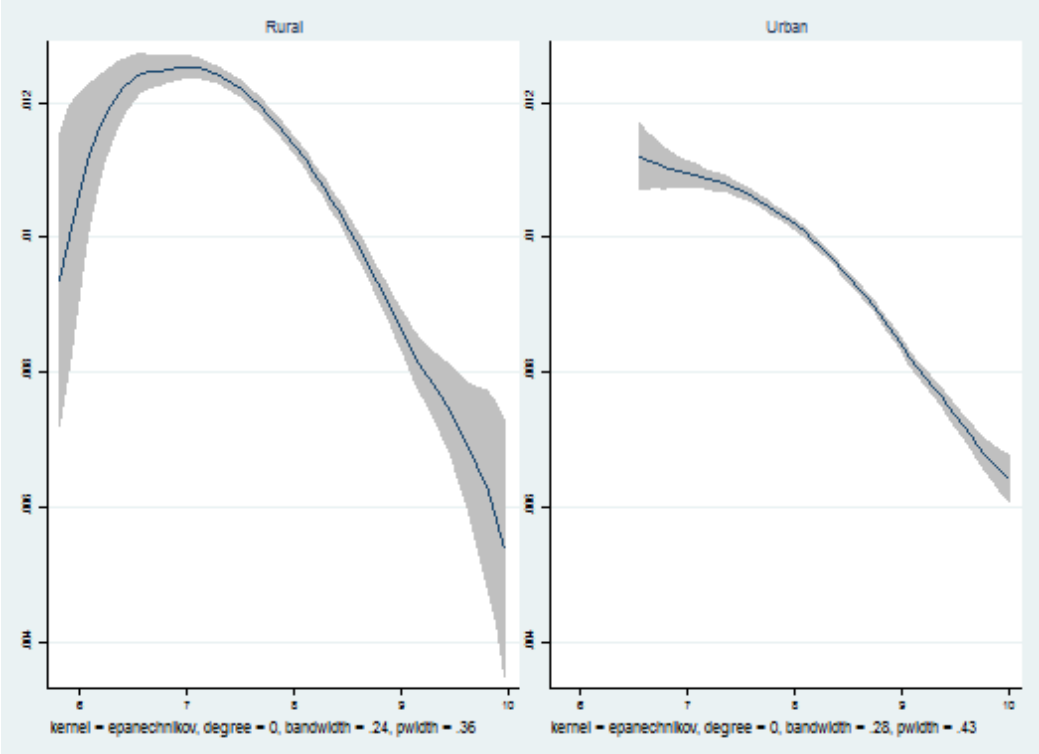


Figure 5: Consumption Effect by Gender

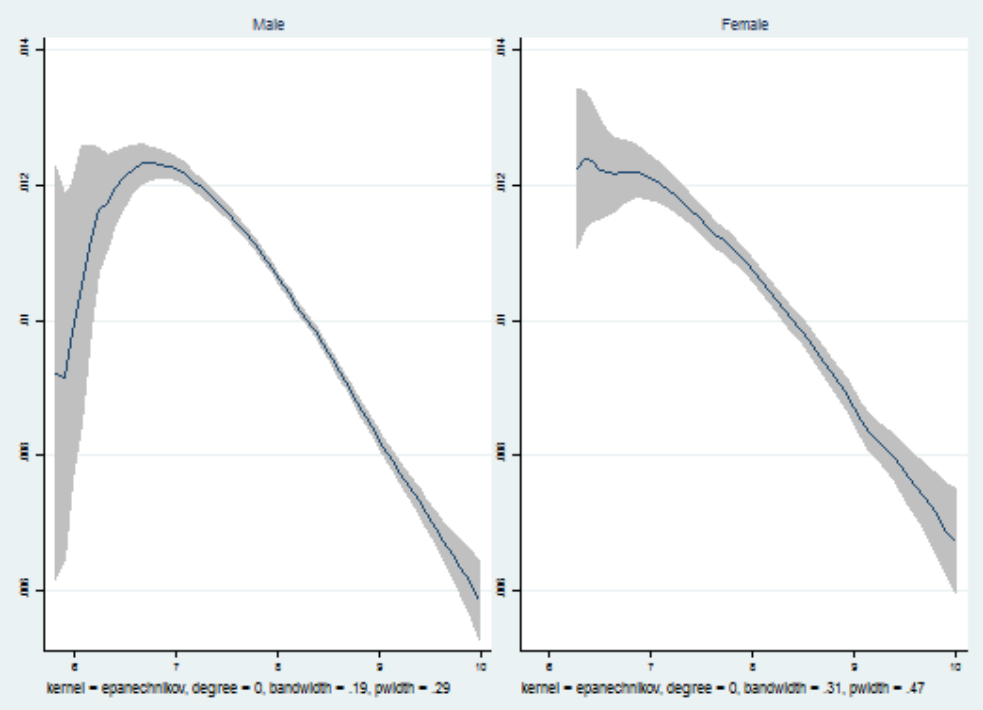


Figure 6: Consumption Effects with Alternative Pass-Through

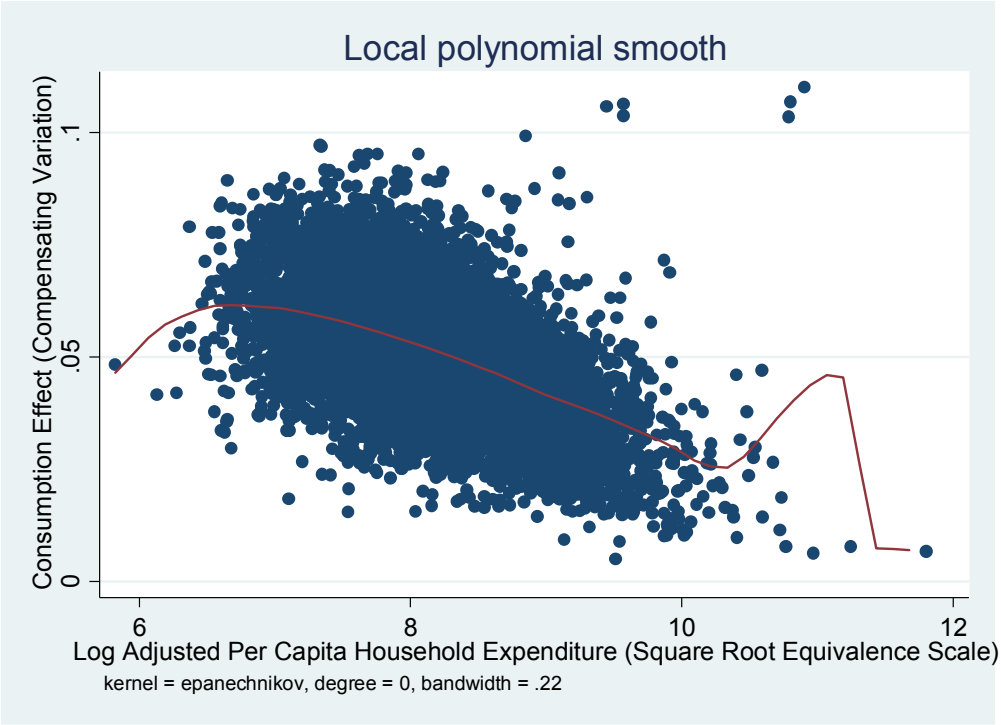


Figure 7: Total Welfare Effect with Alternative Tariff Pass-Through

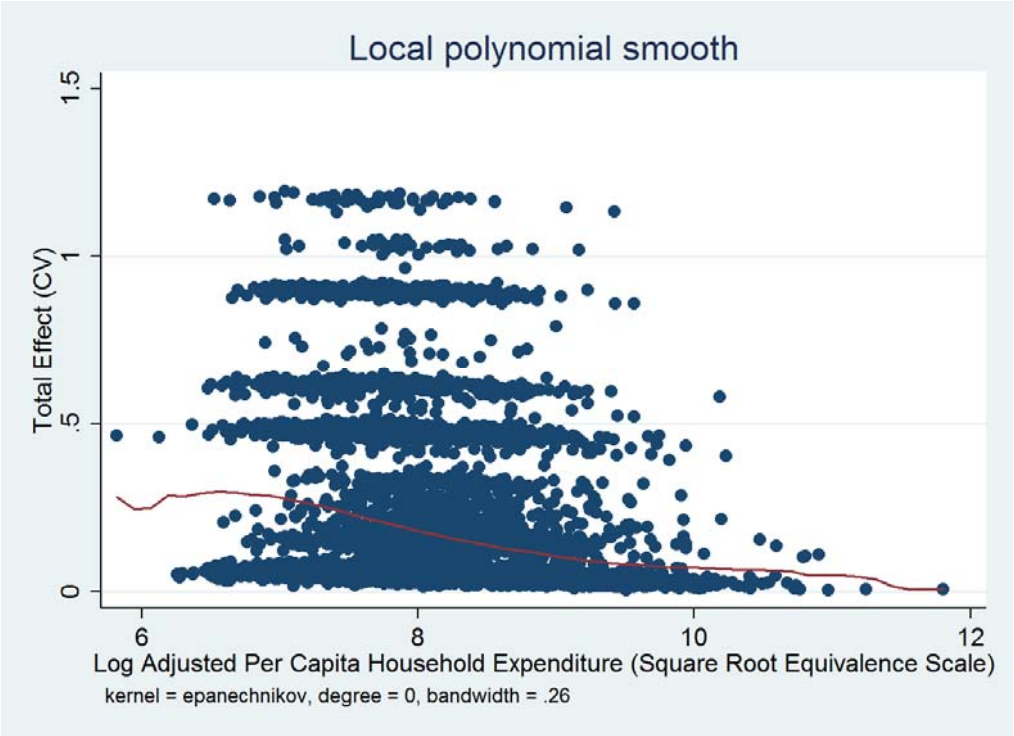


Figure 8: Total Welfare Effect Using Per Capita Household Expenditure

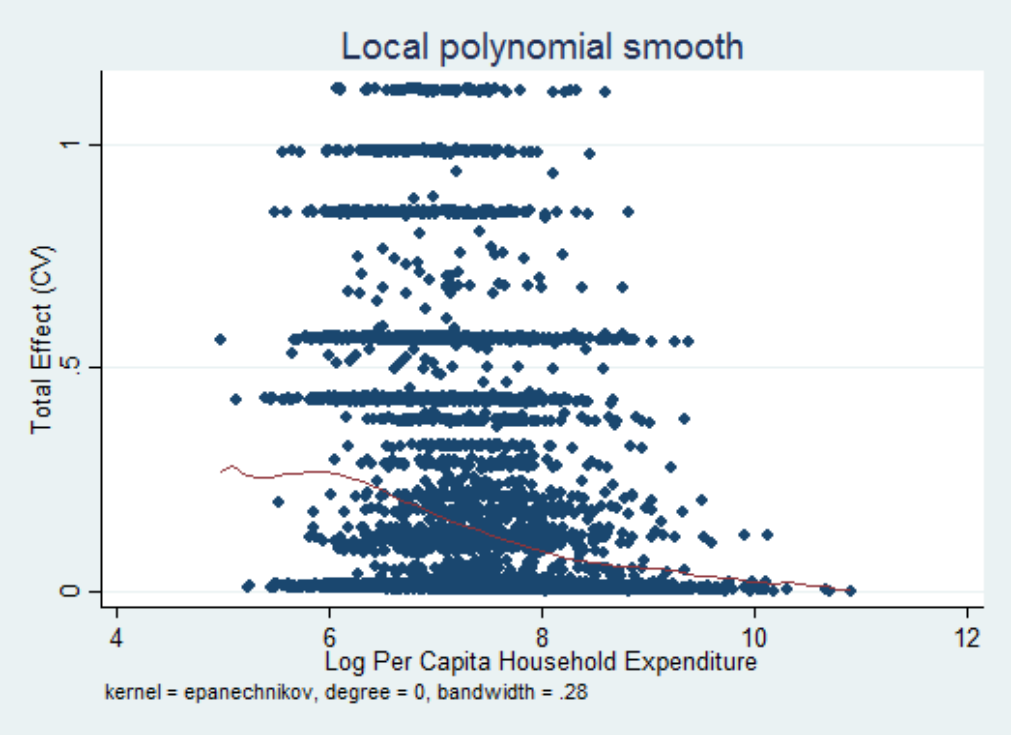


Figure 9. Consumption Effect for an Increase in NTM

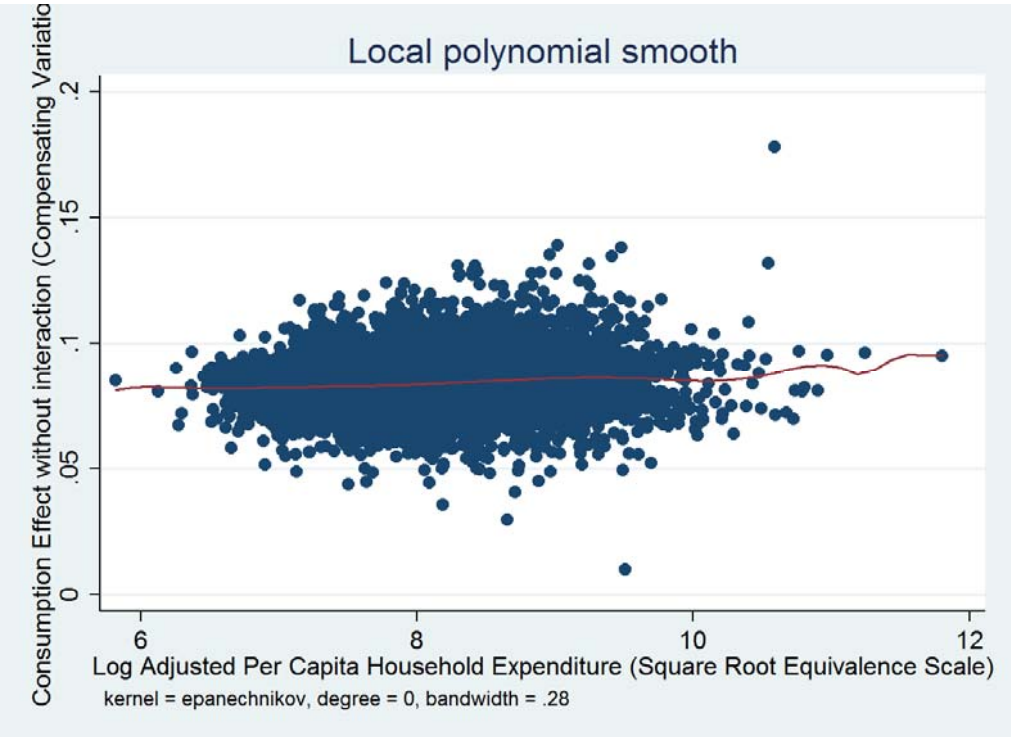


Table 1: Mincerian Earnings Equation

VARIABLES	Robust OLS
Weighted tariff	-1.025***
	[0.0920]
NTM (Ad-valorem equ.)	-0.529***
	[0.0619]
Weighted tariff*skill_dummy	-0.335***
	[0.0937]
NTM*Skill dummy	-0.157**
	-0.0625
Skill dummy	0.0348**
	[0.0136]
Age	0.00153*
	[0.000782]
Age squared	-1.10E-05
	[6.93e-06]
Urban dummy	-0.00799*
	[0.00472]
Male dummy	0.000951
	[0.00363]
Constant	7.827***
	[0.0282]
Observations	9,820
R-squared	0.891
Industry FE	Yes
Time FE	Yes

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

Appendix

A.1 HH Survey Summary Statistics

	2005			2010		
Variable	**Obs**	**Mean**	**Std. Dev.**	**Obs**	**Mean**	**Std. Dev.**
Ln wage	4390	5.44	0.34	3192	5.9	0.46
Weighted Average Tariff	4390	19.96	7.41	3192	26.1	6.57
Non-Tariff Barriers	4390	41.46	20.98	3192	48.86	20.66
Skilled_1: Literate	4390	0.54	0.5	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	0.02	3153	0	0.05
Age	4390	48.19	12.99	3192	48.87	12.4
Urban dummy	4390	0.37	0.48	3192	0.42	0.49
Male dummy	4390	0.64	0.48	3192	0.71	0.45

A.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%

Table A3: Conversion Table Between Sectoral Wage Classification and Household Survey Classification

Sectoral Wage Classification	HH05	HH05 Category description
Agriculture, Forestry and Fishing	1	agriculture, hunting and related service activities
Agriculture, Forestry and Fishing	2	forestry, logging and related service activities
Agriculture, Forestry and Fishing	5	fishing, operation of fish hatcheries and fish farms; service activities incidental to fishing
extractive industries	10	mining of coal and lignite; extraction of peat
extractive industries	11	extraction of crude petroleum & natural gas; service activities incidental to oil & gas extraction exluding surveying
extractive industries	12	mining of uranium and thorium ores
extractive industries	13	mining of metal ores
extractive industries	14	other mining and quarrying
Food and beverage industries	15	manufacture of food products and beverages
Food and beverage industries	16	manufacture of tobacco products
Textiles and Clothing Industry	17	manufacture of textiles
Textiles and Clothing Industry	18	manufacture of wearing apparel; dressing and dyeing of fur
Manufacture of leather and footwear	19	tanning and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear
Woodworking and manufacture of products of wood and cork, except furniture; manufacture of articles of straw and spaterie(??)	20	manufacture of wood/cork and its products, except furniture; and of articles of straw and plaiting materials
Manufacture of paper and paper products; Printing and reproduction of recorded media	21	manufacture of paper and paper products
Manufacture of paper and paper products; Printing and reproduction of recorded media	22	publishing, printing and reproduction of recorded media
Chemical and pharmaceutical industry	24	manufacture of chemicals and chemical products
Manufacture of rubber and plastic	25	manufacture of rubber and plastics products
Manufacture of other non-metallic mineral products	26	manufacture of other non-metallic mineral products
metallurgy; Fabricated metal products, except machinery and equipment	27	manufacture of basic metals
metallurgy; Fabricated metal products, except machinery and equipment	28	manufacture of fabricated metal products, except machinery and equipment
Manufacture of computer, electronic and optical products; Manufacture of electrical equipment, machinery and equipment nec	29	manufacture of machinery and equipment n.e.c.
Manufacture of computer, electronic and optical products; Manufacture of electrical equipment, machinery and equipment nec	30	manufacture of office, accounting and computing machinery
Manufacture of computer, electronic and optical products; Manufacture of electrical equipment, machinery and equipment nec	31	manufacture of electrical machinery and apparatus n.e.c.
Manufacture of computer, electronic and optical products; Manufacture of electrical equipment, machinery and equipment nec	32	manufacture of radio, television and communication equipment and apparatus
Manufacture of computer, electronic and optical products; Manufacture of electrical equipment, machinery and equipment nec	33	manufacture of medical, precision and optical instruments, watches and clocks
Automotive and other transport equipment	34	manufacture of motor vehicles, trailers and semi-trailers
Automotive and other transport equipment	35	manufacture of other transport equipment
Manufacture of furniture	36	manufacture of furniture; manufacturing n.e.c.
Other Manufacturing	23	manufacture of coke, refined petroleum products and nuclear fuel
Construction	45	construction

Trade and repair of motorcycles and automoblies	50	sale, maintenance and repair of motor vehicles and motorcycles; retail sale of automotive fuel
Wholesale trade, except of motor vehicles and motorcycles	51	wholesale trade and commission trade, except of motor vehicles and motorcycles
Retail trade, except of motor vehicles and motorcycles	52	retail trade, except of motor vehicles and motorcycles; repair of personal and household goods
Transportation and Warehousing	60	land transport; transport via pipelines
Transportation and Warehousing	61	water transport
Transportation and Warehousing	62	air transport
Transportation and Warehousing	63	supporting and auxiliary transport activities; activities of travel agencies
Information and communication	64	post and telecommunications
Financial and insurance activities	65	financial intermediation, except insurance and pension funding
Financial and insurance activities	66	insurance and pension funding, except compulsory social security
Financial and insurance activities	67	activities auxiliary to financial intermediation
real estate activities	70	real estate activities
Professional, technical and scientifiqes	73	research and development
Administrative services and support activities	75	public administration and defense; compulsory social security
education; Human health and social work	80	education
education; Human health and social work	85	health and social work
Repair of computers and personal and household goods	72	computer and related activities
Other Personal Services	40	electricity, gas, steam and hot water supply
Other Personal Services	41	collection, purification and distribution of water
Other Personal Services	71	renting of machinery and equipment without operator and of personal and household goods
Other Personal Services	90	sewage and refuse disposal, sanitation and similar activities
Other Personal Services	92	recreational, cultural and sporting activities
Other Personal Services	93	other service activities
Other Personal Services	37	recycling
other activities	74	other business activities
other activities	91	activities of membership organizations n.e.c.
other activities	95	private households with employed persons
other activities	99	extra-territorial organizations and bodies
other activities	9998	unspecified code
other activities	9999	not stated

Source: Authors elaboration

Table A4: Conversion Tables: Wage classification and Harmonized System

Sectorhd_wage_eng	HS	Product Description
Agriculture, Forestry and Fishing	1	Live animals
Agriculture, Forestry and Fishing	2	Meat and edible meat offal
Agriculture, Forestry and Fishing	3	Fish & crustacean, mollusc & other aquatic invertebrate
Agriculture, Forestry and Fishing	4	Dairy prod; birds' eggs; natural honey; edible prod nes
Agriculture, Forestry and Fishing	5	Products of animal origin, nes or included.
Agriculture, Forestry and Fishing	6	Live tree & other plant; bulb, root; cut flowers etc
Agriculture, Forestry and Fishing	7	Edible vegetables and certain roots and tubers.
Agriculture, Forestry and Fishing	8	Edible fruit and nuts; peel of citrus fruit or melons.
Agriculture, Forestry and Fishing	9	Coffee, tea, matï and spices.
Agriculture, Forestry and Fishing	10	Cereals
Food and beverage industries	11	Prod.mill.indust; malt; starches; inulin; wheat gluten
Agriculture, Forestry and Fishing	12	Oil seed, oleagi fruits; miscell grain, seed, fruit etc
Agriculture, Forestry and Fishing	13	Lac; gums, resins & other vegetable saps & extracts.
Agriculture, Forestry and Fishing	14	Vegetable plaiting materials; vegetable products nes
Agriculture, Forestry and Fishing	15	Animal/veg fats & oils & their cleavage products; etc
Food and beverage industries	16	Prep of meat, fish or crustaceans, molluscs etc
Food and beverage industries	17	Sugars and sugar confectionery.
Food and beverage industries	18	Cocoa and cocoa preparations.
Food and beverage industries	19	Prep.of cereal, flour, starch/milk; pastrycooks' prod
Food and beverage industries	20	Prep of vegetable, fruit, nuts or other parts of plants
Food and beverage industries	21	Miscellaneous edible preparations.
Food and beverage industries	22	Beverages, spirits and vinegar.
Food and beverage industries	23	Residues & waste from the food indust; prepr ani fodder
Food and beverage industries	24	Tobacco and manufactured tobacco substitutes
Extractive industries	25	Salt; sulphur; earth & ston; plastering mat; lime & cem
Extractive industries	26	Ores, slag and ash.
Extractive industries	27	Mineral fuels, oils & product of their distillation;etc
Chemical and pharmaceutical industry	28	Inorgn chem; compds of prec mtl, radioact elements etc
Chemical and pharmaceutical industry	29	Organic chemicals.
Chemical and pharmaceutical industry	30	Pharmaceutical products.
Chemical and pharmaceutical industry	31	Fertilisers.
Chemical and pharmaceutical industry	32	Tanning/dyeing extract; tannins & derivs; pigm etc
Chemical and pharmaceutical industry	33	Essential oils & resinoids; perf, cosmetic/toilet prep
Chemical and pharmaceutical industry	34	Soap, organic surface-active agents, washing prep, etc
Chemical and pharmaceutical industry	35	Albuminoidal subs; modified starches; glues; enzymes.
Chemical and pharmaceutical industry	36	Explosives; pyrotechnic prod; matches; pyrop alloy; etc
Chemical and pharmaceutical industry	37	Photographic or cinematographic goods.
Chemical and pharmaceutical industry	38	Miscellaneous chemical products.
Manufacture of rubber and plastic	39	Plastics and articles thereof.
Manufacture of rubber and plastic	40	Rubber and articles thereof.
Manufacture of leather and footwear	41	Raw hides and skins (other than furskins) and leather.
Manufacture of leather and footwear	42	Articles of leather; saddlery/harness; travel goods etc
Agriculture, Forestry and Fishing	43	Furskins and artificial fur; manufactures thereof.
Woodworking and manufacture of products of wood and cork, except furniture; manufacture of articles of straw and spaterie(??)	44	Wood and articles of wood; wood charcoal.

Woodworking and manufacture of products of wood and cork, except furniture; manufacture of articles of straw and spaterie(??)	45	Cork and articles of cork.
Woodworking and manufacture of products of wood and cork, except furniture; manufacture of articles of straw and spaterie(??)	46	Manufactures of straw, esparto/other plaiting mat; etc
Woodworking and manufacture of products of wood and cork, except furniture; manufacture of articles of straw and spaterie(??)	47	Pulp of wood/of other fibrous cellulosic mat; waste etc
Manufacture of paper and paper products; Printing and reproduction of recorded media	48	Paper & paperboard; art of paper pulp, paper/paperboard
Manufacture of paper and paper products; Printing and reproduction of recorded media	49	Printed books, newspapers, pictures & other product etc
Textiles and Clothing Industry	50	Silk.
Agriculture, Forestry and Fishing	51	Wool, fine/coarse animal hair, horsehair yarn & fabric
Agriculture, Forestry and Fishing	52	Cotton.
Textiles and Clothing Industry	53	Other vegetable textile fibres; paper yarn & woven fab
Textiles and Clothing Industry	54	Man-made filaments.
Textiles and Clothing Industry	55	Man-made staple fibres.
Textiles and Clothing Industry	56	Wadding, felt & nonwoven; yarns; twine, cordage, etc
Textiles and Clothing Industry	57	Carpets and other textile floor coverings.
Textiles and Clothing Industry	58	Special woven fab; tufted tex fab; lace; tapestries etc
Textiles and Clothing Industry	59	Impregnated, coated, cover/laminated textile fabric etc
Textiles and Clothing Industry	60	Knitted or crocheted fabrics.
Textiles and Clothing Industry	61	Art of apparel & clothing access, knitted or crocheted.
Textiles and Clothing Industry	62	Art of apparel & clothing access, not knitted/crocheted
Textiles and Clothing Industry	63	Other made up textile articles; sets; worn clothing etc
Manufacture of leather and footwear	64	Footwear, gaiters and the like; parts of such articles.
Textiles and Clothing Industry	65	Headgear and parts thereof.
	66	Umbrellas, walking-sticks, seat-sticks, whips, etc
	67	Prepr feathers & down; arti flower; articles human hair
Manufacture of other non-metallic mineral products	68	Art of stone, plaster, cement, asbestos, mica/sim mat
Manufacture of other non-metallic mineral products	69	Ceramic products.
Manufacture of other non-metallic mineral products	70	Glass and glassware.
Agriculture, Forestry and Fishing	7101	Pearls, natural or cultured, whether or not worked or graded but not strung, mounted or set; pearls, natural or cultured, temporarily strung for convenience of transport.
Extractive industries	7102	Diamonds, whether or not worked, but not mounted or set.
Extractive industries	7103	Precious stones (other than diamonds) and semi-precious stones, whether or not worked or graded but not strung, mounted or set; ungraded precious stones (other than diamonds) and semi-precious stones, temporarily stru
	710410	Piezo-electric quartz
	710420	Other, unworked or simply sawn or roughly shaped
	710490	Other
	7105	Dust and powder of natural or synthetic precious or semi-precious stones.
Extractive industries	710510	Of diamonds
	710590	Other
Extractive industries	7106	Silver (including silver plated with gold or platinum), unwrought or in semi-manufactured forms, or in powder form.

Extractive industries	7107	Base metals clad with silver, not further worked than semi-manufactured.
	7108	Gold (including gold plated with platinum) unwrought or in semi-manufactured forms, or in powder form.
Extractive industries	710811	Non-monetary :-- Powder
Extractive industries	710812	Non-monetary :-- Other unwrought forms
Extractive industries	710813	Non-monetary :-- Other semi-manufactured forms
Metallurgy; Fabricated metal products, except machinery and equipment	710820	Monetary
Extractive industries	7109	Base metals or silver, clad with gold, not further worked than semi-manufactured.
Extractive industries	7110	Platinum, unwrought or in semi-manufactured forms, or in powder form.
Extractive industries	7111	Base metals, silver or gold, clad with platinum, not further worked than semi-manufactured.
Extractive industries	7112	Waste and scrap of precious metal or of metal clad with precious metal; other waste and scrap containing precious metal or precious metal compounds, of a kind used principally for the recovery of precious metal.
Metallurgy; Fabricated metal products, except machinery and equipment	7113	Articles of jewellery and parts thereof, of precious metal or of metal clad with precious metal.
Metallurgy; Fabricated metal products, except machinery and equipment	7114	Articles of goldsmiths' or silversmiths' wares and parts thereof, of precious metal or of metal clad with precious metal.
Metallurgy; Fabricated metal products, except machinery and equipment	7115	Other articles of precious metal or of metal clad with precious metal.
	7116	Articles of natural or cultured pearls, precious or semi-precious stones (natural, synthetic or reconstructed).
Other manufacturing	711610	Of natural or cultured pearls
Metallurgy; Fabricated metal products, except machinery and equipment	711620	Of precious or semi-precious stones (natural, synthetic or reconstructed)
Metallurgy; Fabricated metal products, except machinery and equipment	7117	Imitation jewellery.
Metallurgy; Fabricated metal products, except machinery and equipment	7118	Coin.
Extractive industries	7201	Pig iron and spiegeleisen in pigs, blocks or other primary forms.
Metallurgy; Fabricated metal products, except machinery and equipment	7202	Ferro-alloys.
Metallurgy; Fabricated metal products, except machinery and equipment	7203	Ferrous products obtained by direct reduction of iron ore and other spongy ferrous products, in lumps, pellets or similar forms; iron having a minimum purity by weight of 99.94 %, in lumps, pellets or similar forms.
Metallurgy; Fabricated metal products, except machinery and equipment	7204	Ferrous waste and scrap; remelting scrap ingots of iron or steel.
Metallurgy; Fabricated metal products, except machinery and equipment	7205	Granules and powders, of pig iron, spiegeleisen, iron or steel.
Metallurgy; Fabricated metal products, except machinery and equipment	7206	Iron and non-alloy steel in ingots or other primary forms (excluding iron of heading No. 72.03).
Metallurgy; Fabricated metal products, except machinery and equipment	7207	Semi-finished products of iron or non-alloy steel.

Metallurgy; Fabricated metal products, except machinery and equipment	7208
Metallurgy; Fabricated metal products, except machinery and equipment	7209
Metallurgy; Fabricated metal products, except machinery and equipment	7210
Metallurgy; Fabricated metal products, except machinery and equipment	7211
Metallurgy; Fabricated metal products, except machinery and equipment	7212
Metallurgy; Fabricated metal products, except machinery and equipment	7213
Metallurgy; Fabricated metal products, except machinery and equipment	7214
Metallurgy; Fabricated metal products, except machinery and equipment	7215
Metallurgy; Fabricated metal products, except machinery and equipment	7216
Metallurgy; Fabricated metal products, except machinery and equipment	7217
Metallurgy; Fabricated metal products, except machinery and equipment	7218
Metallurgy; Fabricated metal products, except machinery and equipment	7219
Metallurgy; Fabricated metal products, except machinery and equipment	7220
Metallurgy; Fabricated metal products, except machinery and equipment	7221
Metallurgy; Fabricated metal products, except machinery and equipment	7222
Metallurgy; Fabricated metal products, except machinery and equipment	7223
Metallurgy; Fabricated metal products, except machinery and equipment	7224
Metallurgy; Fabricated metal products, except machinery and equipment	7225
Metallurgy; Fabricated metal products, except machinery and equipment	7226
Metallurgy; Fabricated metal products, except machinery and equipment	7227
Metallurgy; Fabricated metal products, except machinery and equipment	7228
Metallurgy; Fabricated metal products, except machinery and equipment	7229
Metallurgy; Fabricated metal products, except machinery and equipment	73
Extractive industries	7401

Flat-rolled products of iron or non-alloy steel, of a width of 600 mm or more, hot-rolled, not clad, plated or coated.	
Flat-rolled products of iron or non-alloy steel, of a width of 600 mm or more, cold-rolled (cold-reduced), not clad, plated or coated.	
Flat-rolled products of iron or non-alloy steel, of a width of 600 mm or more, clad, plated or coated.	
Flat-rolled products of iron or non-alloy steel, of a width of less than 600 mm, not clad, plated or coated.	
Flat-rolled products of iron or non-alloy steel, of a width of less than 600 mm, clad, plated or coated.	
Bars and rods, hot-rolled, in irregularly wound coils, of iron or non-alloy steel.	
Other bars and rods of iron or non-alloy steel, not further worked than forged, hot-rolled, hot-drawn or hot-extruded, but including those twisted after rolling.	
Other bars and rods of iron or non-alloy steel.	
Angles, shapes and sections of iron or non-alloy steel.	
Wire of iron or non-alloy steel.	
Stainless steel in ingots or other primary forms; semi-finished products of stainless steel.	
Flat-rolled products of stainless steel, of a width of 600 mm or more.	
Flat-rolled products of stainless steel, of a width of less than 600 mm.	
Bars and rods, hot-rolled, in irregularly wound coils, of stainless steel.	
Other bars and rods of stainless steel; angles, shapes and sections of stainless steel.	
Wire of stainless steel.	
Other alloy steel in ingots or other primary forms; semi-finished products of other alloy steel.	
Flat-rolled products of other alloy steel, of a width of 600 mm or more.	
Flat-rolled products of other alloy steel, of a width of less than 600 mm.	
Bars and rods, hot-rolled, in irregularly wound coils, of other alloy steel.	
Other bars and rods of other alloy steel; angles, shapes and sections, of other alloy steel; hollow drill bars and rods, of alloy or non-alloy steel.	
Wire of other alloy steel.	
Articles of iron or steel.	
Copper mattes; cement copper (precipitated copper).	

	Extractive industries	
	Extractive industries	
	Extractive industries	
	Metallurgy; Fabricated metal products, except machinery and equipment	
	Metallurgy; Fabricated metal products, except machinery and equipment	
	Metallurgy; Fabricated metal products, except machinery and equipment	
	Metallurgy; Fabricated metal products, except machinery and equipment	
	Metallurgy; Fabricated metal products, except machinery and equipment	
	Metallurgy; Fabricated metal products, except machinery and equipment	
	Metallurgy; Fabricated metal products, except machinery and equipment	
	Metallurgy; Fabricated metal products, except machinery and equipment	
	Metallurgy; Fabricated metal products, except machinery and equipment	
	Metallurgy; Fabricated metal products, except machinery and equipment	
	Metallurgy; Fabricated metal products, except machinery and equipment	
	Metallurgy; Fabricated metal products, except machinery and equipment	
	Extractive industries	
	Extractive industries	
	Extractive industries	
	Metallurgy; Fabricated metal products, except machinery and equipment	
	Metallurgy; Fabricated metal products, except machinery and equipment	
	Metallurgy; Fabricated metal products, except machinery and equipment	
	Metallurgy; Fabricated metal products, except machinery and equipment	
7402	Unrefined copper; copper anodes for electrolytic refining.	
7403	Refined copper and copper alloys, unwrought.	
7404	Copper waste and scrap.	
7405	Master alloys of copper.	
7406	Copper powders and flakes.	
7407	Copper bars, rods and profiles.	
7408	Copper wire.	
7409	Copper plates, sheets and strip, of a thickness exceeding 0.15 mm.	
7410	Copper foil (whether or not printed or backed with paper, paperboard, plastics or similar backing materials) of a thickness (excluding any backing) not exceeding 0.15 mm.	
7411	Copper tubes and pipes.	
7412	Copper tube or pipe fittings (for example, couplings, elbows, sleeves).	
7413	Stranded wire, cables, plaited bands and the like, of copper, not electrically insulated.	
7414	Cloth (including endless bands), grill and netting, of copper wire; expanded metal of copper.	
7415	Nails, tacks, drawing pins, staples (other than those of heading No.83.05) and similar articles, of copper or of iron or steel with heads of copper; screws, bolts, nuts, screw hooks, rivets, cotters, cotter-pins, washers (including spri	
7416	Copper springs.	
7417	Cooking or heating apparatus of a kind used for domestic purposes, non-electric, and parts thereof, of copper.	
7418	Table, kitchen or other household articles and parts thereof, of copper; pot scourers and scouring or polishing pads, gloves and the like, of copper; sanitary ware and parts thereof, of copper.	
7419	Other articles of copper.	
7501	Nickel mattes, nickel oxide sinters and other intermediate products of nickel metallurgy.	
7502	Unwrought nickel.	
7503	Nickel waste and scrap.	
7504	Nickel powders and flakes.	
7505	Nickel bars, rods, profiles and wire.	
7506	Nickel plates, sheets, strip and foil.	
7507	Nickel tubes, pipes and tube or pipe fittings (for example, couplings, elbows, sleeves).	

Metallurgy; Fabricated metal products, except machinery and equipment	7508	Other articles of nickel.
Extractive industries	7601	Unwrought aluminium.
Extractive industries	7602	Aluminium waste and scrap.
Metallurgy; Fabricated metal products, except machinery and equipment	7603	Aluminium powders and flakes.
Metallurgy; Fabricated metal products, except machinery and equipment	7604	Aluminium bars, rods and profiles.
Metallurgy; Fabricated metal products, except machinery and equipment	7605	Aluminium wire.
Metallurgy; Fabricated metal products, except machinery and equipment	7606	Aluminium plates, sheets and strip, of a thickness exceeding 0.2 mm.
Metallurgy; Fabricated metal products, except machinery and equipment	7607	Aluminium foil (whether or not printed or backed with paper, paperboard, plastics or similar backing materials) of a thickness (excluding any backing) not exceeding 0.2 mm.
Metallurgy; Fabricated metal products, except machinery and equipment	7608	Aluminium tubes and pipes.
Metallurgy; Fabricated metal products, except machinery and equipment	7609	Aluminium tube or pipe fittings (for example, couplings, elbows, sleeves).
Metallurgy; Fabricated metal products, except machinery and equipment	7610	Aluminium structures (excluding prefabricated buildings of heading No.94.06) and parts of structures (for example, bridges and bridge-sections, towers, lattice masts, roofs, roofing frameworks, doors and windows and their frames and thr
Metallurgy; Fabricated metal products, except machinery and equipment	7611	Aluminium reservoirs, tanks, vats and similar containers, for any material (other than compressed or liquefied gas), of a capacity exceeding 300 l, whether or not lined or heat-insulated, but not fitted with mechanica
Metallurgy; Fabricated metal products, except machinery and equipment	7612	Aluminium casks, drums, cans, boxes and similar containers (including rigid or collapsible tubular containers), for any material (other than compressed or liquefied gas), of a capacity not exceeding 300 l, whether or not lined or heat-i
Metallurgy; Fabricated metal products, except machinery and equipment	7613	Aluminium containers for compressed or liquefied gas.
Metallurgy; Fabricated metal products, except machinery and equipment	7614	Stranded wire, cables, plaited bands and the like, of aluminium, not electrically insulated.
Metallurgy; Fabricated metal products, except machinery and equipment	7615	Table, kitchen or other household articles and parts thereof, of aluminium; pot scourers and scouring or polishing pads, gloves and the like, of aluminium; sanitary ware and parts thereof, of aluminium.
Metallurgy; Fabricated metal products, except machinery and equipment	7616	Other articles of aluminium.
Extractive industries	7801	Unwrought lead.
Extractive industries	7802	Lead waste and scrap.
Metallurgy; Fabricated metal products, except machinery and equipment	7803	Lead bars, rods, profiles and wire.
Metallurgy; Fabricated metal products, except machinery and equipment	7804	Lead plates, sheets, strip and foil; lead powders and flakes.
Metallurgy; Fabricated metal products, except machinery and equipment	7805	Lead tubes, pipes and tube or pipe fittings (for example, couplings, elbows, sleeves).

	Metallurgy; Fabricated metal products, except machinery and equipment	Other articles of lead.
	Extractive industries	Unwrought zinc.
	Extractive industries	Zinc waste and scrap.
	Metallurgy; Fabricated metal products, except machinery and equipment	Zinc dust, powders and flakes.
	Metallurgy; Fabricated metal products, except machinery and equipment	Zinc bars, rods, profiles and wire.
	Metallurgy; Fabricated metal products, except machinery and equipment	Zinc plates, sheets, strip and foil.
	Metallurgy; Fabricated metal products, except machinery and equipment	Zinc tubes, pipes and tube or pipe fittings (for example, couplings, elbows, sleeves).
	Metallurgy; Fabricated metal products, except machinery and equipment	Other articles of zinc.
	Extractive industries	Unwrought tin.
	Extractive industries	Tin waste and scrap.
	Metallurgy; Fabricated metal products, except machinery and equipment	Tin bars, rods, profiles and wire.
	Metallurgy; Fabricated metal products, except machinery and equipment	Tin plates, sheets and strip, of a thickness exceeding 0.2 mm.
	Metallurgy; Fabricated metal products, except machinery and equipment	Tin foil (whether or not printed or backed with paper, paperboard, plastics or similar backing materials), of a thickness (excluding any backing) not exceeding 0.2 mm; tin powders and flakes.
	Metallurgy; Fabricated metal products, except machinery and equipment	Tin tubes, pipes and tube or pipe fittings (for example, couplings, elbows, sleeves).
	Metallurgy; Fabricated metal products, except machinery and equipment	Other articles of tin.
	Metallurgy; Fabricated metal products, except machinery and equipment	Tungsten (wolfram) and articles thereof, including waste and scrap.
	Extractive industries	Tungsten (wolfram) and articles thereof, including waste and scrap.
	Metallurgy; Fabricated metal products, except machinery and equipment	Molybdenum and articles thereof, including waste and scrap.
	Extractive industries	Molybdenum and articles thereof, including waste and scrap.
	Metallurgy; Fabricated metal products, except machinery and equipment	Tantalum and articles thereof, including waste and scrap.
	Extractive industries	Tantalum and articles thereof, including waste and scrap.
	Metallurgy; Fabricated metal products, except machinery and equipment	Magnesium and articles thereof, including waste and scrap.
	Extractive industries	Magnesium and articles thereof, including waste and scrap.
	Metallurgy; Fabricated metal products, except machinery and equipment	Cobalt mattes and other intermediate products of cobalt metallurgy; cobalt and articles thereof, including waste and scrap.
	Extractive industries	Cobalt mattes and other intermediate products of cobalt metallurgy; cobalt and articles thereof, including waste and scrap.
	Metallurgy; Fabricated metal products, except machinery and equipment	Bismuth and articles thereof, including waste and scrap.
	Extractive industries	Bismuth and articles thereof, including waste and scrap.
	Metallurgy; Fabricated metal products, except machinery and equipment	Cadmium and articles thereof, including waste and scrap.
	Extractive industries	Cadmium and articles thereof, including waste and scrap.

Metallurgy; Fabricated metal products, except machinery and equipment	8108	Titanium and articles thereof, including waste and scrap.
Extractive industries	8108	Titanium and articles thereof, including waste and scrap.
Metallurgy; Fabricated metal products, except machinery and equipment	8109	Zirconium and articles thereof, including waste and scrap.
Extractive industries	8109	Unwrought zirconium; waste and scrap; powders
Metallurgy; Fabricated metal products, except machinery and equipment	8110	Antimony and articles thereof, including waste and scrap.
Extractive industries	8110	Antimony and articles thereof, including waste and scrap.
Metallurgy; Fabricated metal products, except machinery and equipment	8111	Manganese and articles thereof, including waste and scrap.
Extractive industries	8111	Manganese and articles thereof, including waste and scrap.
Metallurgy; Fabricated metal products, except machinery and equipment	811211	Beryllium :-- Unwrought; waste and scrap; powders
Extractive industries	811219	Beryllium :-- Other
Extractive industries	811220	Chromium
Extractive industries	811230	Germanium
Extractive industries	811240	Vanadium
Metallurgy; Fabricated metal products, except machinery and equipment	811291	Other :-- Unwrought; waste and scrap; powders
Metallurgy; Fabricated metal products, except machinery and equipment	811299	Other
Metallurgy; Fabricated metal products, except machinery and equipment	8113	Cermets and articles thereof, including waste and scrap.
Metallurgy; Fabricated metal products, except machinery and equipment	82	Tool, implement, cutlery, spoon & fork, of base mtl etc
Metallurgy; Fabricated metal products, except machinery and equipment	83	Miscellaneous articles of base metal.
Manufacture of computer, electronic and optical products; Manufacture of electrical equipment, machinery and equipment nec	84	Nuclear reactors, boilers, mchy & mech appliance; parts
Manufacture of computer, electronic and optical products; Manufacture of electrical equipment, machinery and equipment nec	85	Electrical mchy equip parts thereof; sound recorder etc
Automotive and other transport equipment	86	Railw/tramw locom, rolling-stock & parts thereof; etc
Automotive and other transport equipment	87	Vehicles o/t railw/tramw roll-stock, pts & accessories
Automotive and other transport equipment	88	Aircraft, spacecraft, and parts thereof.
Automotive and other transport equipment	89	Ships, boats and floating structures.
Manufacture of computer, electronic and optical products; Manufacture of electrical equipment, machinery and equipment nec	90	Optical, photo, cine, meas, checking, precision, etc
Manufacture of computer, electronic and optical products; Manufacture of electrical equipment, machinery and equipment nec	91	Clocks and watches and parts thereof.
Other manufacturing	92	Musical instruments; parts and access of such articles
Other manufacturing	93	Arms and ammunition; parts and accessories thereof.
Manufacture of furniture	94	Furniture; bedding, mattress, matt support, cushion etc
Other manufacturing	95	Toys, games & sports requisites; parts & access thereof
Other manufacturing	96	Miscellaneous manufactured articles.

Source: Authors elaboration

Figure A1: Consumption Effect by Region

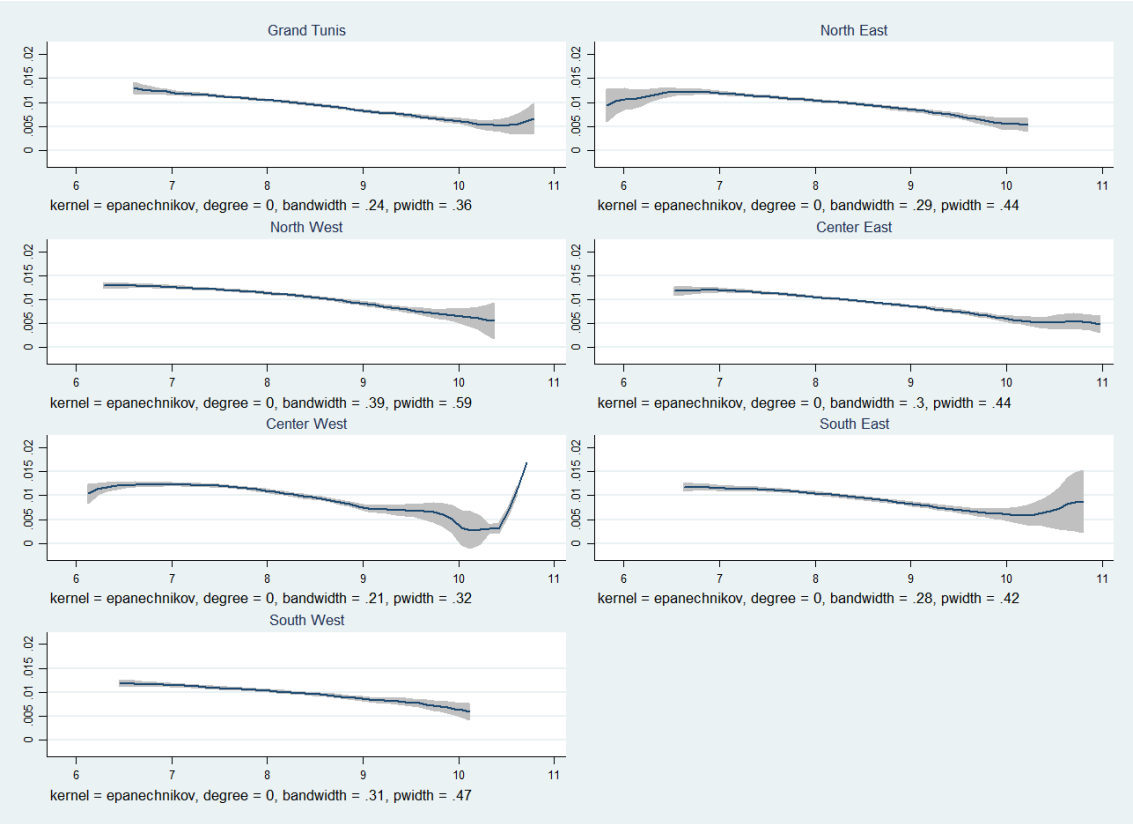


Figure A2: Consumption Effect by Employment Type