The Impacts of Import Tariff Reduction on Income Growth and Distribution in Urban China*

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Abstract

Combining a comprehensive household survey and an industrial firm survey, we investigate the impacts of import tariff reduction after China's entry into WTO on urban income growth and distribution. Our identification strategy exploits the variation in the degree of tariff reduction across industries and the variation in the pre-WTO industry composition of local employment across Chinese cities. We find that those cities with larger tariff reduction after WTO entry experienced lower income growth for manufacturing workers. Our estimation results suggest that such impacts occurred mainly through wage income and property income. We also find that tariff reduction reduced income inequality at the city level.

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1. Introduction

The relationship between globalization and income inequality in China has received considerable attention among economists and policy makers (e.g., Wei and Wu, 2001). One the one hand, China's integration into the world economy has accelerated since it entered WTO in December 2001. China aggressively cut the tariff rates to meet its WTO obligations.[1] As a result, the weighted average tariff rate went down from 15% in 2001 to 4% in 2007. This was accompanied by a sharp reduction in the share of imports regulated by non-tariff barriers through licenses and import quotas (Branstetter and Lardy, 2008). On the other hand, China has also experienced explosive economic growth since the WTO entry. Consequently, the household income has grown rapidly. Nominal individual income in urban area increased nearly 80% between 2002 and 2007 (see Table 1). Meanwhile, China's poverty rate has decreased drastically, but the distribution of poverty reduction was uneven across different regions. Despite the tremendous success in income growth and poverty reduction, China has transformed itself from an egalitarian country before reform into one of the most unequal countries in the world. According to a recent influential study (Xie and Zhou, 2014), China's Gini coefficient has risen to 0.55 in 2012, which is among world's highest.

To better understand the profound impacts of trade liberalization (particularly China's entry into WTO) on household income, this paper examines the effect of import tariff reduction on urban income growth and income distribution. We focus on import tariff reduction for two reasons. First, tariff reduction provides accurate measures of trade liberalization. Second, compared to actual imports, tariff reduction is a policy variable under the discretion of the government.

We take advantage of a comprehensive individual-level survey dataset and industrial firm survey dataset. Our identification strategy relies on the heterogeneity of tariff cut across industries and city-level variation of initial industry composition. Since the industrial composition is predetermined, it is possible to interpret the correlation between income growth and inequality and

[1] In fact, China experienced significant tariff reduction in the 1990s, perhaps in preparation for the WTO entry.

trade exposure as a causal relationship. To deal with the endogeneity of tariff, we use initial year tariff rate as an instrument for the tariff reduction in later period.

Our estimation suggests that those cities with larger tariff reduction after WTO entry were associated lower manufacturing income growth. The main channel of the tariff reduction effect is through wage income and property income. We find no evidence that tariff reduction affected unemployment. In addition, when we instrument tariff cut with initial tariff, we find that tariff liberalization actually reduced within-city income inequality.

Our findings should be interpreted with caution for two reasons. First, globalization has many dimensions, including import, export, FDI, etc. Our paper only focuses on one particular aspect of globalization - import tariff reduction. We do not address the questions of general globalization effects or WTO effects. Second, our study only captures the relative effect of tariff liberalization on those cities with more or less exposure to trade. We do not answer the question of whether tariff reduction decreased urban income growth or inequality. Rather, we focus on the question of whether certain cities with greater tariff reduction are affected more than other cities with smaller tariff reduction.

Our study is related to a large literature on trade and growth. For a long time, economists have found only weak causal link between these two. Some authors demonstrate that open economies tend to grow faster than the close ones. (e.g., Sachs and Warner, 1995; Romer and Frankel, 1999). Others are skeptical about the methodology and conclusions of these studies (e.g., Rodrik and Rodriguez, 2001). Even if we understand how trade liberalization promotes growth, it is not clear whether it can produce beneficial results across all households and individuals. If the benefit is unequally distributed, the effects of trade liberalization on income growth will lead to greater (smaller) income inequality depending on whether the income of the poor grow by less (more) than the average (Deaton, 2005). Goldberg and Pavcnick (2007a) survey the literature on trade liberalization and inequality. They find that the results are inconclusive. The debate remains unsolved despite large number of studies on this topic.

Recent empirical literature on trade and growth has shifted away from cross-country studies to within-country studies, and focuses more on income growth using household survey data. Cross-country studies typically find no relationship between trade liberalization and income growth.

Within country studies have advantages that significantly increase sample size and allow regions comparable in main aspects. Major empirical studies on tariff reduction have examined topics such as return to education, income inequality, poverty and migration. These include Goldberg and Pavcnik (2007b) on Colombia, Topolova (2007, 2010) on India, Kovak (2013), and Carneiro and Kovak (2015) on Brazil. Generally, the evidence is mixed across countries regarding the effects of trade liberalization. For example, Kovak (2013) finds a strong negative impact of trade liberalization on wage income in Brazil. In contrast, Goldberg and Pavcnik (2007b) find no significant impact of trade liberalization on poverty in Colombia. For India, Topolova (2010) argues that trade liberalization increased poverty only in rural areas.

In the case of China, a seminal paper by Han, Liu and Zhang (2012) finds that globalization increased urban wage inequality through the mechanism of higher returns to education. A major difference between their paper and our study is that they measure globalization by dividing six provinces in their sample into "high" and "low" globalization exposure regions. They rely on export and FDI to measure globalization exposure. In our paper, we use HS 6-digit import tariff reduction as a measure for trade liberalization. In another paper, Brandt, Van Biesebroeck and Zhang (2015) study the impacts of China's tariff reduction after WTO entry on manufacturing firms. They find that tariff cut increases firm productivity but reduces price and markup, probably due to more intense competition from imports.

Methodologically, our paper is also related to the emerging literature on the regional impacts of trade liberalization. These include Kovak (2013), Carneiro and Kovak (2015), Topolova (2007, 2010), Hasan et al.(2007), Edmond et al.(2010), McLaren and Hakobyan (2012). These studies examine the effects of trade liberalization on labor market outcomes at the sub-national level. They measure trade policy at the regional level as a weighted average of industry level trade policy, with weights reflecting the initial industrial composition of the region. In this paper, we adopt this local labor market approach and apply the methodology to the Chinese data.

The remainder of the paper is organized as following. Section 2 outlines our empirical strategy. Section 3 describes the data. We report estimation results in Section 4. Section 5 concludes.

2. Empirical Methodology

In our study, we take advantage of China's geographic diversity in how urban households are affected by tariff cut. Excluding Hong Kong, Macau and Taiwan, China has 31 provincial level regions which are further divided into about 340 prefecture level cities. These cities differ in their industrial composition before China entered WTO. Our identification strategy utilizes this within-China city level heterogeneity in exposure to tariff protection. Following Topalova (2007, 2010), we define a city's tariff reduction between 2001 and 2006 as the weighted average of the tariff cut in all industries of the city. We use the industry's employment share in 2001, the WTO entry year, as the weights when constructing this measure. In other words, we calculate the weighted average tariff of city *j* in year *t* as follows:

$$Tariff_{jt} = \frac{\sum_i employment_{ij,2001} * Tariff_{it}}{Total\ Employment_{jt}} \quad (1)$$

Then the log difference of tariff rates between 2001 and 2006 for city *j* becomes

$$\Delta \ln(Tariff)_j = \ln(Tariff_{j,2006}) - \ln(Tariff_{j,2001}) \quad (2)$$

To study the impacts of trade reform on income growth and distribution, we estimate various forms of the following model:

$$\Delta Z_j = \alpha + \beta \Delta \ln(Tariff)_j + \gamma' X + \{FE\} + \varepsilon_j, \quad (3)$$

where Z is a local labor market outcome variable such as individual income, unemployment rate or inequality measures. X is a vector of city level control variables, including initial year share of skilled labor, initial year share of manufacturing employment in total employment and initial year unemployment rate. We also include provincial fixed effect in the regressions.

One concern of our empirical approach is the migration between cities, resulting from tariff liberalization. If there were large scale migration across cities in response to tariff reduction, our analysis comparing cities over time would not give the full estimate of the impact of tariff reduction. However, even after many years' reform of household registration (*hukou*) system, internal migration in China is still constrained by government policy. Zhu and Tombe (2015) show that

high migration cost still significantly limited internal migration in China. Therefore, our analysis can still properly address the questions of the impacts of tariff liberalization on income growth and inequality.

Another concern is the endogeneity of tariff reduction. As shown by Grossman and Helpman (2002), tariff liberalization is often an outcome of political economy process. We take the following measures to deal with the endogeneity of tariff reduction:

First, our measure of tariff change alleviates the reverse causality since our city specific employment weights are based on initial year industrial employment composition. Our measure is not affected by the change in employment in later years that may be the result of tariff changes.

Second, we lag all independent variables by one year. While we study labor market outcomes between 2002 and 2007, the tariff change variable is calculated with 2001 and 2006 data, and the initial city level control variables use 2001 data.

Third, over the sample period there was very little policy discretion in the extent of trade liberalization in each industry. Figure 1 plots the change in city-level tariffs on the vertical axis against the initial level (2001) of protection on the horizontal axis. We find that the relationship between tariff reduction between 2001 and 2006 and initial tariff in 2001 is almost one-to-one. Those industries with initial high tariff level experienced greater reduction in tariffs. Regardless of the initial level of tariff, after the WTO entry, post-WTO tariffs converged to a uniform level of protection in 2006. As a robustness check, to deal with possible endogeneity concerns, we take advantage of the uniform tariff cut in WTO agreement and use initial tariff (in year 2001) as an instrumental variable for tariff reduction over 2001 - 2006.[2]

3. Data

3.1 Urban household survey and industrial firm survey

[2] Using initial tariff as instrument for tariff cut is common in the literature. See Amiti and Konings (2007) and Kovak (2013).

Our empirical work exploits several comprehensive datasets. Chinese Urban Household Survey (UHS) is conducted annually by National Bureau of Statistics (NBS). Using sampling techniques and daily accounting method, NBS collects data from non-agricultural households in all prefecture level cities of all 31 provinces. It records household information about income and consumption expenditure, demographic characteristics, work and employment, accommodation and other family related matters (Ge and Yang, 2014). We have access to 18 provinces of the UHS data for 2002-2007, among which Beijing, Liaoning, Shanghai, Jiangsu, Zhejiang, Shandong and Guangdong are coastal provinces, and Shanxi, Heilongjiang, Anhui, Jiangxi, Henan, Hubei, Chongqing, Sichuan, Yunnan, Gansu and Xinjiang are located in the inland region. In 2007, our UHS sample covers 131,000 individuals in 191 cities. Since household samples for UHS were drawn from a large sampling frame of households having an urban *Hukou*, migrant workers were not included in the sample. The UHS gives education information for all individuals. Here our definition of skilled labor includes all workers with education level of senior high school or above.

The UHS data does not provide detailed industry information of the individuals. As a result, we do not have individual level tariff exposure measure. Instead, we rely on city-level measure. Since we need detailed information for city industrial employment composition, we use 2001 NBS annual survey of above-scale industrial firms for this purpose. It covers all state-owned firms and all non-state firms above sales revenue 5 million Yuan.

Table 1 reports summary statistics of our urban household survey data. The UHS classifies individual income in four categories:

(1) wage income: salaries and other labor compensation.
(2) operational income: income from household business.
(3) property income: income from the ownership of properties such as interests, rents and dividends.
(4) transfer income: income from government transfer payments.

As can be seen from Table 1, total income increased substantially from 10,480 Yuan in 2002 to 18,671 Yuan in 2007. Throughout the sample period, the share of wage income in total income stayed relatively constant at around 95%.

Regarding the city level variables, for all four inequality measures that we will discuss soon, income inequality increased gradually from 2002 to 2005, then declined slightly between 2005 and 2007. Return to schooling dropped first in 2003 but increased slowly afterwards. Share of unemployed workers and share of manufacturing sector in total employment decreased significantly between 2002 and 2007.

3.2 Tariff, non-tariff barriers and FDI policy

The tariff data at 6-digit HS level for 2001-2006 come from Chinese Customs. Since the industrial firm data from the NBS uses its own industry classification, we create a concordance table to merge the 6-digit HS code with 4-digit Chinese industry classification (CIC) code. The city-level tariffs are computed as weighted average of tariffs of all industries, using initial year's (2001) employment share as weights. Average tariff across all cities declined from 16.4% in 2001 to 9.7% in 2007. We divide all cities into three groups based on the size of tariff cut between 2001 and 2007. Figure 2 shows the evolution of average tariff rate over 2001-2007 by these three city groups. Appendix Table 1 presents the tariff cut of the two-digit industries (from largest to smallest). It seems that heavy industries such as steel, non-ferrous metal and petroleum had the largest tariff cut. Appendix Table 2 lists five cities with largest tariff cut and five cities with smallest tariff cut. There is no clear geographic patterns of tariff cut across cities.

In addition to tariff reduction, China also substantially reduced the non-tariff barriers (NTBs). One potential confounding factor in our analysis is the relaxation of import license control. We assembled information on the licensing of imports at HS 8-digit level, drawing on annual circulars of the Ministry of Foreign Trade and Economic Cooperation and the Ministry of Commerce. We calculate the share of HS8 products under import license control for each 4-digit CIC industry, and then calculate city level import license control as employment weighted average of the share across all 4-digit CIC manufacturing industries.[3] The average city level measure of import license declined by 6.5 percentage points during 2001-2006.

Another major form of liberalization accompanying the WTO entry is FDI liberalization policies. Although China has started to liberalize FDI before its WTO accession, FDI were still

[3] Similar to the construction of city-level tariffs, the employment data is obtained from the Annual Survey of Industrial Firms. We use the 2001 employment share as weights to avoid endogeneity.

restricted in a wide range of industries, in both manufacturing and the service sectors. The restrictions took various forms, such as higher initial capital requirements, less favorable tax treatment, more complicated business registry and approval procedures, and in the case of joint ventures, requirement of majority shareholding by a Chinese party. These restrictions were largely removed right after China's WTO accession. Our data on FDI restrictions is from the Catalogue for the Guidance of Foreign Investment Industries issued by the Ministry of Commerce of China. The Catalogue is a major source of reference for the government in approving foreign investment projects. The Catalogue lists the industries in which FDI to China is "encouraged", "restricted" or "prohibited". The unlisted industries are considered "allowed". Investments are completely banned in "prohibited" industries while are subject to various forms of restrictions mentioned above in "restricted" industries. The Catalogue is amended every 3 to 5 years. For our sample period, we use the list issued in 1997, 2002 and 2004.

We construct city-level FDI restriction measures as follows. First, based on the industry descriptions listed in the Catalogue, we map them to CIC 4-digit. We categorize a CIC industry as subject to an FDI restrictions if it is either restricted or prohibited. We then further map 4-digit CIC to the 1-digit industry classification in the UHS data and calculate the share of 4-digit CIC industries that are restricted within each 1-digit industry. Finally, we construct city-level FDI restriction as the employment weighted average of the share across all 1-digit industries, where the 1-digit employment data is obtained from the UHS.[4] Note that the restricted industries covers manufacturing and service sectors, so our city-level FDI restriction measure captures the FDI liberalization not only in manufacturing, but also services. The average city-level FDI restriction declined by 2 percentage points during 2001-2006.

4. Estimation Results

4.1 Income growth

Figure 3 plots the change of ln(income) against the change of ln(tariff) at the city level. We observe a clear positive relationship between tariff change and income growth, which implies that

[4] We use 2002 data to alleviate endogeneity problem.

tariff reduction (or negative tariff change) led to lower income growth at the city level. Table 2 presents the estimation results of Equation (3) with the dependent variable of log difference in city average individual income between 2002 and 2007. Panels A, B and C show the regression results for all workers, manufacturing workers and non-manufacturing workers, respectively. Although our tariff data mainly cover manufacturing goods, tariff cut may also affect non-manufacturing industries through economic linkages. Throughout the paper, we report robust standard errors in parentheses.

Column (1) of Table 2 shows the regression results without provincial fixed effects and city level control variables. We add these controls in columns (2) and (3). Controlling provincial fixed effects is important as the R-Sq jumps from 0.013 to 0.326. In column (1), we find positive coefficient of tariff change. However, such effect is statistically significant only for manufacturing workers. The results are similar in columns (2) and (3), although the size of the effect is smaller. The tariff cut effect estimated in Table 2 is also quantitatively significant. If we use the estimates of column (3) for manufacturing workers, a tariff cut of 7 percentage points (i.e., average tariff cut across all cities) is associated with 0.07*0.299 = 0.021 or 2.1 percentage points decrease of income growth during the period between 2002 and 2007.

To understand how tariff change affects different sources of urban income, in the new regressions we replace the total income with the four components of the income as dependent variables. In Table 3, we only report the estimation results with provincial fixed effects and city-level initial characteristics. Consistent with Table 2, tariff changes only affect manufacturing workers. But only wage income and property income are statistically significant. We find no evidence that income from household business or government transfer payment is affected by trade reform.

Although long difference models are less sensitive to measurement error, they are less efficient than panel data models. As a robustness check, instead of long difference model, we also estimate a city fixed effect model by utilizing every year's data in our sample period. Table 4 presents the regression results with city fixed effects, year fixed effects and city characteristics. We find that trade liberalization affects only manufacturing workers and only through wage and property income.

China's tariff liberalization is accompanied by the reduction of non-trade barriers and relaxation of FDI policy at the same time. To further check the robustness of our results, as control variables we include in the regressions the share of products under import license and the share of the FDI "restricted/prohibited" industries. The calculation of these two variables is discussed in a greater detail in Section 3.2. We report the regression results in Table 5. Column (1) only includes the change of NTBs and column (2) only includes the change of FDI policy. We can see that the tariff change variable remains positive and statistically significant for the manufacturing workers. The results vary little if we include both NTBs and FDI variables in column (3). In fact, these two new control variables are never statistically significant across all specifications.

To deal with the endogeneity problem, using initial tariff as an IV for tariff change, we estimate the baseline model and report the IV regression results in Table 6. In Panel A, when manufacturing workers and non-manufacturing workers are grouped together, we observe a negative and statistically significant impact of tariff reduction on wage income and property income. Further inspection in Panel B and Panel C reveals that tariff reduction only affected manufacturing workers. Although our IV estimation results are qualitatively similar to those reported in Tale 3, the coefficients of the tariff change variable are generally larger.

Our finding that tariff reduction reduces manufacturing workers' wage income growth at the city level should not be surprising. Brandt, Van Biesebroeck and Zhang (2015) show that Chinese manufacturing firms cut their prices in response to the import tariff reduction after China's WTO entry. Import competition resulting from tariff reduction could adversely affect wages of manufacturing firms.

Next, we study the impact of tariff reduction on income growth of skilled and unskilled workers. We would like to investigate the heterogeneous effect based on skill because it could contribute to income inequality. In columns (1) and (2) of Table 7, we regress the income growth of skilled and unskilled workers on tariff change and other control variables using the OLS estimation. The IV estimation results are reported in columns (3) and (4). It seems that tariff reduction affected both skilled workers and unskilled workers, but such effect is statistically significant only with the IV estimation in Panel A for the full sample - all workers.

Did the tariff reduction reduce the manufacturing employment? Did it increase the unemployment rate? To answer these questions, we investigate the effect of tariff change on employment and unemployment at the city level. As we can see from the first two columns of Table 8, tariff reduction tends to reduce the manufacturing's share in total employment. The coefficient of tariff change becomes statistically significant at the 10% level when we include the provincial fixed effects. This result may imply a substitution effect of manufacturing jobs and non-manufacturing jobs. Note that we cannot study the total employment since our sample is a random sample and sample size only reflects the survey design, not total employment.

The last two columns of Table 8 report the estimation results of unemployment rate. Tariff reduction seems to increase the unemployment rate, but the effect is not statistically significant. One caveat is that we observe the unemployed workers in the data, but we do not know their industry of employment before they were unemployed. Therefore, we can only study total unemployment rate. We do not know whether the impact of tariff reduction on the manufacturing unemployment rate will be statistically significant.

4.2 Income inequality

In the literature, there are many measures of income inequality within a region. The most popular measures are probably Gini coefficient and Theil index. In the studies of poverty and consumption inequality, some economists (e.g., Topolova, 2007) have proposed alternative measures such as mean log deviation of consumption and standard deviation of log consumption. Since our focus is income inequality rather than consumption inequality, we also calculate the mean log deviation of income and standard deviation of log income.

We compute all four measures for income inequality at the city level. In turns out that these four inequality measures are highly correlated. Tables 9 and 10 present the OLS estimation and IV estimation results of inequality regressions. Panels A, B and C study the inequality measures for all workers, manufacturing workers only and non-manufacturing workers only, respectively. From Table 9, with OLS results we find no evidence that tariff change affected income inequality at the city level. Among the manufacturing workers, tariff change bears a positive sign but only marginally significant for Theil index. However, when we estimate the same equations with the IV, the results are very different. This can be seen from Table 10. Tariff change is statistically

significant at the 10% or 5% level for Gini coefficient, Theil index and mean deviation of log income. Its positive sign also indicates that tariff cut tends to reduce income inequality at the city level.

There is not much theoretical guidance regarding why tariff liberalization reduces income inequality. As we have shown earlier, income growth is lower for those cities with larger tariff cut. Perhaps tariff reduction affected high income people more than the low income people. Or those cities with greater share of high-wage industries are more affected by tariff reduction. Unfortunately we cannot directly test these mechanisms with our data.

Did tariff reduction reduce the return to schooling? This is important because in the existing literature, rising return to schooling is often cited as a main source of income inequality. We adopt a two-stage approach to answer this question. In the first stage, we run the following Mincer type regressions for each city in 2002 and 2007 and obtain an estimate of β_2:

$$\ln(wage) = \beta_0 + \beta_1 female\_dummy + \beta_2 Schooling + \beta_3 Experience + \beta_4 Experience^2 + u \qquad (4)$$

In the second stage, we use the change of β_2 between 2002 and 2007 as dependent variable in Equation (3). Table 11 shows the estimation results of both OLS and IV regressions. Bootstrapped standard errors are reported in the parentheses. In Panel B and Panel C, the return to schooling is estimated using only the manufacturing workers and non-manufacturing workers. In all regressions, we find no statistically significant relationship between city-level tariff reduction and the change in return to schooling.

5. Conclusions and Policy Implications

In this paper, we examine the impact of import tariff reduction due to China's entry into WTO on urban household income growth and distribution. We take advantage of industry variation of tariff cut and regional variation of initial industry employment composition. To deal with the endogeneity of tariff reduction, we also use initial year tariff as an IV for tariff cut. Our findings suggest that cities with larger tariff reduction after WTO entry experienced slower income growth for the manufacturing workers. We find no such effect for non-manufacturing workers. Tariff

reduction affected the growth of wage income and property income, but not operation income and transfer income. Our results of income growth are robust to different estimation methods (OLS and IV) and different specifications (including non-trade barriers and FDI policy variables). We also calculate different measures of income inequality at the city level. Our IV estimation results indicate that tariff reduction actually helped reduce the income inequality.

The results in this paper have important policy implications. Developing countries often pursue trade openness as an engine for faster economic growth and higher living standards. Although it is mostly believed that in the long-run, open policies contribute to economic development, in the short-to-medium run, the process towards openness - trade liberalization - may negatively affect certain parts of the economy. Our estimation results show that in China, manufacturing workers in cities that are exposed to larger tariff reductions experienced slower income growth. We stress that these results do not make any conclusions on the impact of trade liberalization on aggregate income growth. Rather, they suggest that trade liberalization have heterogeneous effect across regions and sectors. In China, the adjustment costs of liberalization fall onto the manufacturing sector, and the regions where the industries are more exposed to tariff reductions. Based on this finding, it is the government's responsibility to help those individuals that are affected by trade reforms.

On the other hand, reducing China's disturbingly high level of income inequality is one of the most difficult but critical challenges facing the government. The income distribution reforms initiated by the Xi Jinping administration showed a strong desire to make fundamental changes to China's income distribution structure. Background factors of these reforms include the political need to achieve a "comprehensive well-off society" by 2020. Our paper argues that on the contrary to popular belief, there is evidence that tariff reductions actually reduced city-level income inequality after the WTO entry. Therefore, trade reforms should not be regarded as a major driver of the rising income inequality in China.

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Figure 1. Initial Tariff and Tariff Reduction

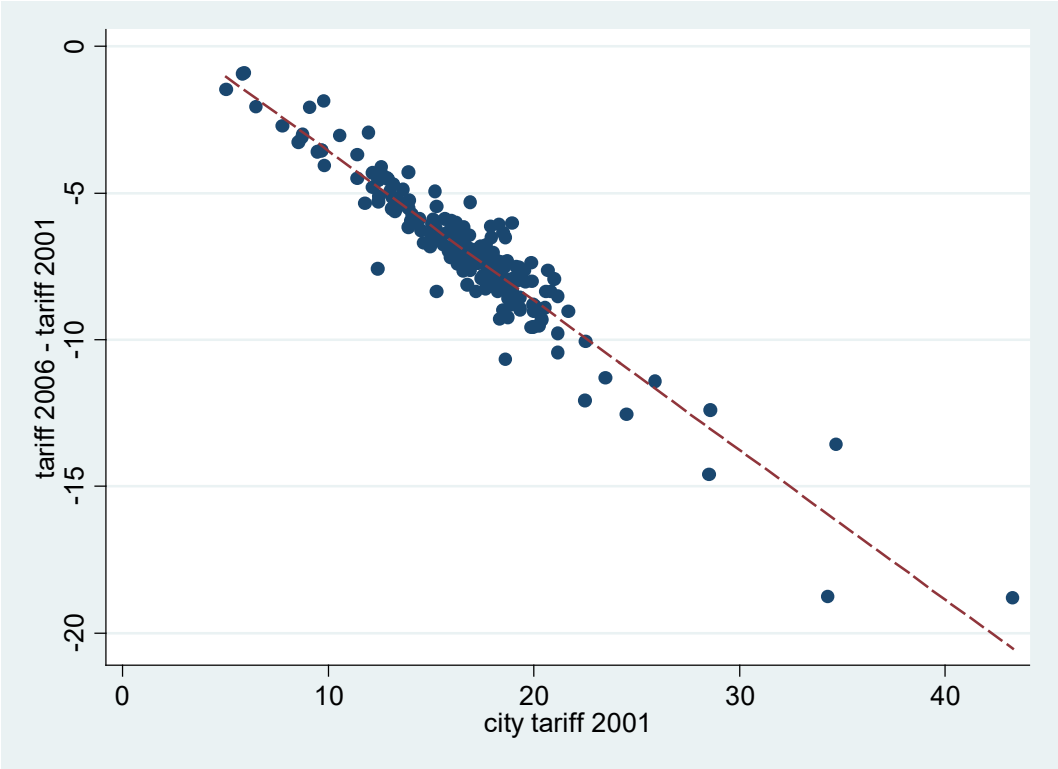
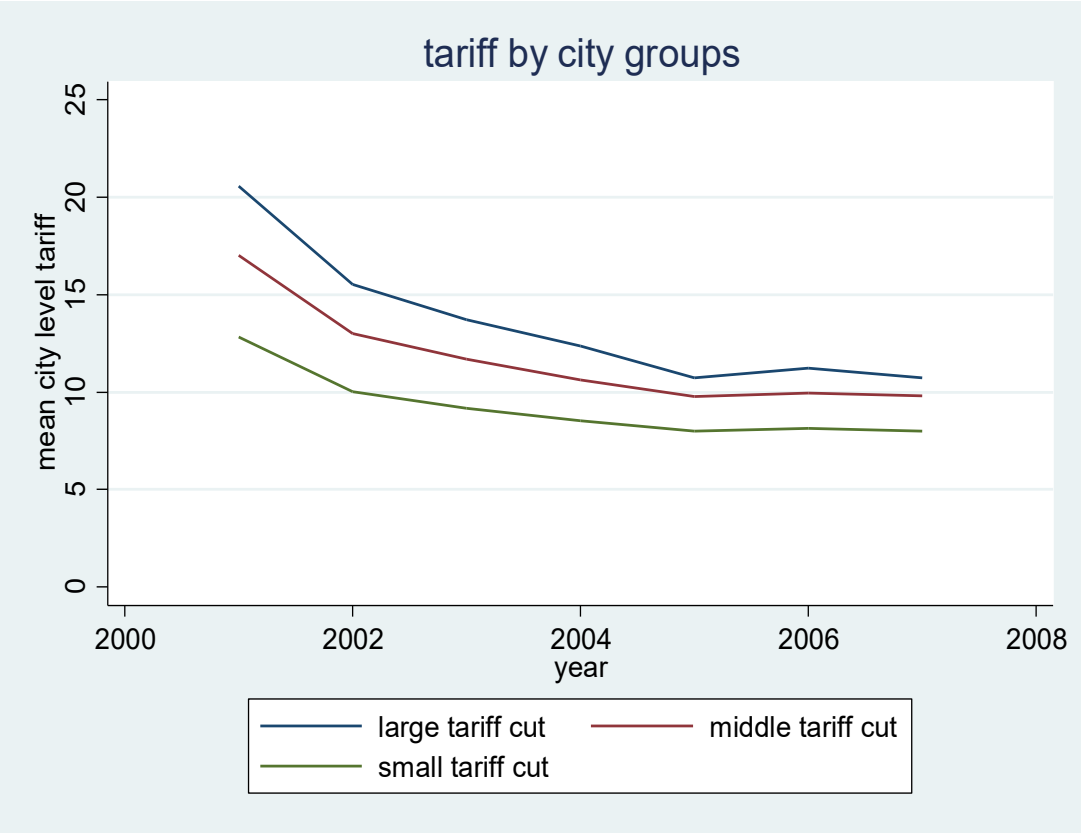


Figure 2. Tariff Reduction by City Groups 2001-2007



Note: we divide all cities into three groups with equal number of cities based on the size of tariff cut: large tariff cut, medium tariff cut and small tariff cut.

Figure 3. City-Level Manufacturing Income Growth and Tariff Change

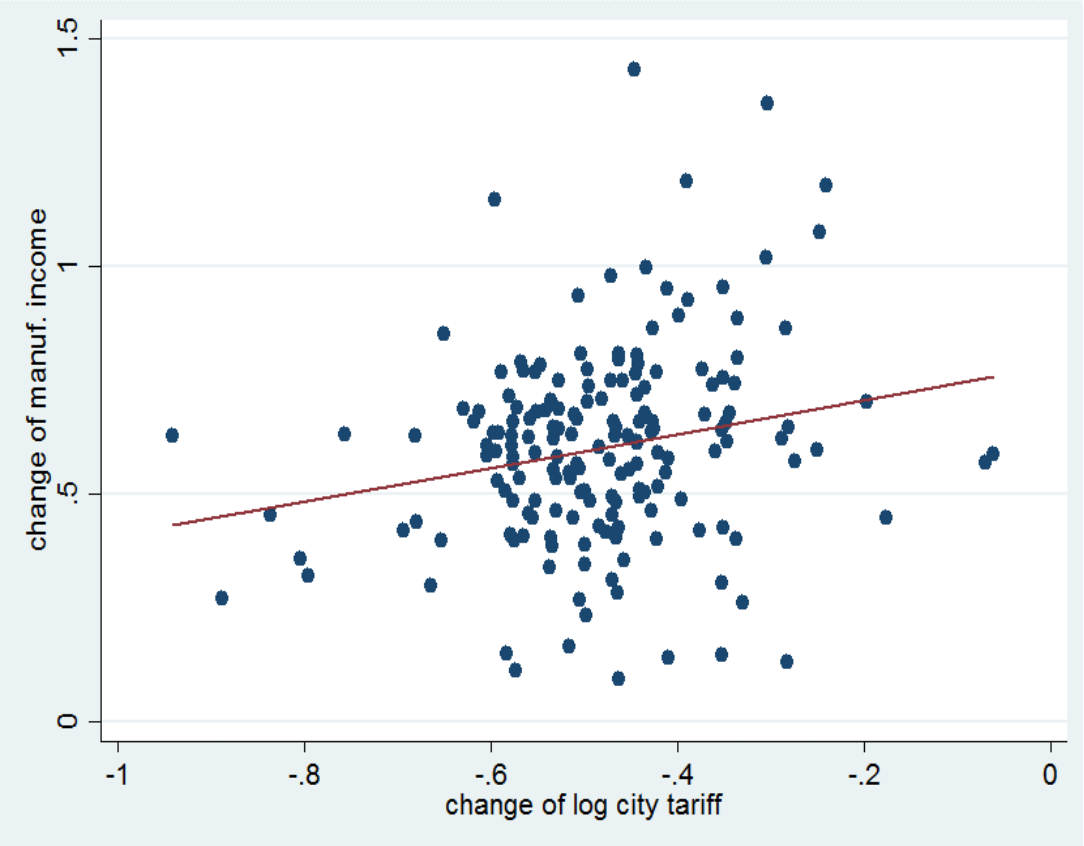


Table 1. Summary Statistics

year	2002	2003	2004	2005	2006	2007
Individual Income						
total income	10.480	11.148	12.897	14.275	16.028	18.671
	(3.620)	(3.888)	(4.635)	(5.164)	(5.702)	(6.107)
wage income	10.011	10.646	12.348	13.668	15.312	17.861
	(3.422)	(3.719)	(4.477)	(4.968)	(5.417)	(5.794)
operational income	0.015	0.019	0.015	0.032	0.026	0.109
	(0.024)	(0.043)	(0.036)	(0.075)	(0.055)	(0.150)
transfer income	0.387	0.388	0.421	0.446	0.504	0.514
	(0.443)	(0.339)	(0.340)	(0.346)	(0.399)	(0.415)
property income	0.069	0.095	0.113	0.130	0.186	0.187
	(0.074)	(0.121)	(0.133)	(0.167)	(0.253)	(0.286)
City-level variables						
mean log dev. of income	0.244	0.256	0.256	0.259	0.255	0.251
	(0.046)	(0.053)	(0.051)	(0.050)	(0.047)	(0.046)
s.d. of log income	0.749	0.786	0.778	0.787	0.769	0.750
	(0.172)	(0.189)	(0.170)	(0.180)	(0.160)	(0.163)
gini coefficient	0.341	0.358	0.357	0.362	0.357	0.349
	(0.060)	(0.070)	(0.067)	(0.066)	(0.062)	(0.060)
theil index	0.228	0.253	0.251	0.256	0.247	0.228
	(0.080)	(0.104)	(0.093)	(0.091)	(0.084)	(0.078)
returns to schooling	0.062	0.058	0.059	0.063	0.065	0.066
	(0.035)	(0.031)	(0.033)	(0.033)	(0.032)	(0.031)
share skilled	0.306	0.314	0.328	0.354	0.371	0.390
	(0.088)	(0.084)	(0.084)	(0.085)	(0.086)	(0.093)
share unemployed	0.084	0.088	0.085	0.087	0.078	0.057
	(0.055)	(0.055)	(0.055)	(0.054)	(0.048)	(0.040)
share manufacturing	0.261	0.237	0.229	0.215	0.212	0.206
	(0.132)	(0.124)	(0.117)	(0.110)	(0.112)	(0.105)
Number of cities	189	194	192	193	192	191

Note: standard deviation in parentheses.

Table 2. Income Regressions (Total Income Per Worker)

	(1)	(2)	(3)
Panel A: All Workers			
dlog(tariff)	0.114	0.078	0.071
	(0.078)	(0.093)	(0.092)
Province FE	No	Yes	Yes
City level controls	No	No	Yes
Observations	177	177	177
R-squared	0.013	0.326	0.460
Panel B: Manufacturing Workers			
dlog(tariff)	0.368***	0.308*	0.299*
	(0.129)	(0.160)	(0.153)
Province FE	No	Yes	Yes
City level controls	No	No	Yes
Observations	176	176	176
R-squared	0.047	0.179	0.221
Panel C: Non-Manufacturing Workers			
dlog(tariff)	0.076	0.063	0.067
	(0.088)	(0.095)	(0.090)
Province FE	No	Yes	Yes
City level controls	No	No	Yes
Observations	177	177	177
R-squared	0.005	0.305	0.369

Note: Robust standard errors in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Table 3. Income Regressions (By Income Source)

	(1)	(3)	(4)	(5)
Dep. Var. :	Wage income	Operational income	Property income	Transfer income
		Panel A: All Workers		
dlog(tariff)	0.102	1.276	0.784	-0.237
	(0.0885)	(1.896)	(1.290)	(0.780)
Province FE	Yes	Yes	Yes	Yes
City level controls	Yes	Yes	Yes	Yes
Observations	177	177	177	177
R-squared	0.490	0.200	0.190	0.174
		Panel B: Manufacturing Workers		
dlog(tariff)	0.399***	-1.730	3.150**	-1.834
	(0.148)	(1.744)	(1.394)	(2.321)
Province FE	Yes	Yes	Yes	Yes
City level controls	Yes	Yes	Yes	Yes
Observations	176	176	176	176
R-squared	0.231	0.189	0.173	0.073
		Panel C: Non-Manufacturing Workers		
dlog(tariff)	0.0522	2.268	1.297	0.420
	(0.0860)	(1.712)	(1.375)	(0.789)
Province FE	Yes	Yes	Yes	Yes
City level controls	Yes	Yes	Yes	Yes
Observations	177	177	177	177
R-squared	0.398	0.133	0.193	0.081

Note: Robust standard errors in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Table 4. Income Regressions (City Fixed Effects)

	(1)	(2)	(3)	(4)
Dep. Var. :	Wage income	Operational income	Property income	Transfer income
		Panel A: All Workers		
log(tariff)_t-1	0.101	0.384	1.078	-0.113
	(0.065)	(1.228)	(0.770)	(0.520)
City FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
City level controls	Yes	Yes	Yes	Yes
Observations	1,129	1,129	1,129	1,129
R-squared	0.957	0.501	0.713	0.730
		Panel B: Manufacturing Workers		
log(tariff)_t-1	0.336***	0.906	3.135***	-1.176
	(0.128)	(0.938)	(1.101)	(1.491)
City FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
City level controls	Yes	Yes	Yes	Yes
Observations	1,126	1,126	1,126	1,126
R-squared	0.874	0.381	0.621	0.635
		Panel C: Non-Manufacturing Workers		
log(tariff)_t-1	0.053	0.510	1.292	-0.232
	(0.071)	(1.223)	(0.821)	(0.505)
City FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
City level controls	Yes	Yes	Yes	Yes
Observations	1,129	1,129	1,129	1,129
R-squared	0.950	0.486	0.680	0.711

Note: Robust standard errors in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Table 5. Income Regressions Robustness Check (Total Income Per Worker)

	(1)	(2)	(3)
Panel A: All Workers			
dlog(tariff)	0.058	0.068	0.055
	(0.096)	(0.092)	(0.096)
dshare_license	0.133		0.132
	(0.165)		(0.165)
dFDIrestriction		-0.199	-0.194
		(0.395)	(0.398)
Province FE	Yes	Yes	Yes
City level controls	Yes	Yes	Yes
Observations	177	177	177
R-squared	0.462	0.461	0.463
Panel B: Manufacturing Workers			
dlog(tariff)	0.285*	0.298*	0.284*
	(0.151)	(0.155)	(0.152)
dshare_license	0.193		0.188
	(0.283)		(0.287)
dFDIrestriction		-0.314	-0.295
		(0.862)	(0.867)
Province FE	Yes	Yes	Yes
City level controls	Yes	Yes	Yes
Observations	176	176	176
R-squared	0.223	0.222	0.224
Panel C: Non-Manufacturing Workers			
dlog(tariff)	0.064	0.067	0.064
	(0.092)	(0.091)	(0.092)
dshare_license	0.046		0.047
	(0.189)		(0.189)
dFDIrestriction		0.030	0.038
		(0.427)	(0.428)
Province FE	Yes	Yes	Yes
City level controls	Yes	Yes	Yes
Observations	177	177	177
R-squared	0.369	0.369	0.369

Note: Robust standard errors in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Table 6. IV Estimation of Income

	(1)	(2)	(3)	(4)
Dep. Var. :	Wage income	Operational income	Property income	Transfer income
		Panel A: All Workers		
dlog(tariff)	0.231*	1.921	3.610*	-0.437
	(0.136)	(2.744)	(1.844)	(1.219)
Province FE	Yes	Yes	Yes	Yes
City level controls	Yes	Yes	Yes	Yes
Observations	177	177	177	177
R-squared	0.480	0.199	0.162	0.174
		Panel B: Manufacturing Workers		
dlog(tariff)	0.612**	-0.846	4.365*	-4.202
	(0.260)	(2.764)	(2.550)	(3.294)
Province FE	Yes	Yes	Yes	Yes
City level controls	Yes	Yes	Yes	Yes
Observations	176	176	176	176
R-squared	0.221	0.188	0.170	0.059
		Panel C: Non-Manufacturing Workers		
dlog(tariff)	0.128	4.258	2.412	0.837
	(0.132)	(2.623)	(1.910)	(1.232)
Province FE	Yes	Yes	Yes	Yes
City level controls	Yes	Yes	Yes	Yes
Observations	177	177	177	177
R-squared	0.394	0.125	0.189	0.080

Note: Robust standard errors in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Table 7. Income Regressions Skilled vs. Unskilled Workers

	(1)	(2)	(3)	(4)
Dep. Var. :	OLS skilled income	OLS unskilled income	IV skilled income	IV unskilled income
		Panel A: All Workers		
dlog(tariff)	0.142	0.062	0.280*	0.295*
	(0.102)	(0.107)	(0.146)	(0.154)
Province FE	Yes	Yes	Yes	Yes
City level controls	Yes	Yes	Yes	Yes
Observations	177	177	177	177
R-squared	0.266	0.491	0.256	0.469
		Panel B: Manufacturing Workers		
dlog(tariff)	0.458	0.289	0.331	0.530*
	(0.281)	(0.191)	(0.429)	(0.277)
Province FE	Yes	Yes	Yes	Yes
City level controls	Yes	Yes	Yes	Yes
Observations	160	175	160	175
R-squared	0.178	0.275	0.177	0.265
		Panel C: Non-Manufacturing Workers		
dlog(tariff)	0.138	-0.004	0.314**	0.144
	(0.106)	(0.108)	(0.146)	(0.157)
Province FE	Yes	Yes	Yes	Yes
City level controls	Yes	Yes	Yes	Yes
Observations	177	177	177	177
R-squared	0.273	0.405	0.258	0.396

Note: Robust standard errors in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Table 8. Manufacturing Employment Share and Unemployment Rate

	(1)	(2)	(3)	(4)
Dep. Var.	manuf. labor share	manuf. labor share	unemployment rate	unemployment rate
dlog(tariff)	0.050	0.097*	-0.010	-0.042
	(0.034)	(0.051)	(0.033)	(0.041)
Province FE	No	Yes	No	Yes
Observations	177	177	177	177
R-squared	0.007	0.162	0.001	0.118

Note: Robust standard errors in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Table 9. Income Inequality Regressions (OLS)

	(1)	(2)	(3)	(4)
Dep. Var.:	gini coefficient	theil index	mean deviation	S.D. of logs
		Panel A: All Workers		
dlog(tariff)	-0.018	-0.025	-0.008	-0.046
	(0.031)	(0.041)	(0.023)	(0.144)
Province FE	Yes	Yes	Yes	Yes
City level controls	Yes	Yes	Yes	Yes
Observations	177	177	177	177
R-squared	0.493	0.558	0.474	0.364
		Panel B: Manufacturing Workers		
dlog(tariff)	0.099	0.149*	0.071	0.235
	(0.074)	(0.090)	(0.059)	(0.169)
Province FE	Yes	Yes	Yes	Yes
City level controls	Yes	Yes	Yes	Yes
Observations	153	153	153	153
R-squared	0.166	0.149	0.165	0.204
		Panel C: Non-Manufacturing Workers		
dlog(tariff)	-0.014	-0.016	-0.006	-0.087
	(0.034)	(0.041)	(0.026)	(0.086)
Province FE	Yes	Yes	Yes	Yes
City level controls	Yes	Yes	Yes	Yes
Observations	177	177	177	177
R-squared	0.164	0.151	0.162	0.129

Note: Robust standard errors in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Table 10. Income Inequality Regressions (IV)

	(1)	(2)	(3)	(4)
Dep. Var.:	gini coefficient	theil index	mean deviation	S.D. of logs
Panel A: All Workers				
dlog(tariff)	0.048	0.092	0.025	0.017
	(0.053)	(0.070)	(0.040)	(0.197)
Province FE	Yes	Yes	Yes	Yes
City level controls	Yes	Yes	Yes	Yes
Observations	177	177	177	177
R-squared	0.481	0.537	0.468	0.363
Panel B: Manufacturing Workers				
dlog(tariff)	0.185**	0.259**	0.128*	0.371
	(0.0908)	(0.120)	(0.0704)	(0.243)
Province FE	Yes	Yes	Yes	Yes
City level controls	Yes	Yes	Yes	Yes
Observations	153	153	153	153
R-squared	0.154	0.137	0.156	0.199
Panel C: Non-Manufacturing Workers				
dlog(tariff)	0.019	0.064	0.005	-0.018
	(0.056)	(0.062)	(0.043)	(0.148)
Province FE	Yes	Yes	Yes	Yes
City level controls	Yes	Yes	Yes	Yes
Observations	177	177	177	177
R-squared	0.160	0.128	0.161	0.126

Note: Robust standard errors in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Table 11. Return to Schooling Regressions

	(1)	(2)
	OLS	IV
Panel A: All Workers		
dlog(tariff)	-0.026	-0.046
	(0.024)	(0.086)
Province FE	Yes	Yes
City level controls	Yes	Yes
Observations	177	177
R-squared	0.123	0.121
Panel B: Manufacturing Workers		
dlog(tariff)	-0.023	0.147
	(0.295)	(0.516)
Province FE	Yes	Yes
City level controls	Yes	Yes
Observations	172	172
R-squared	0.099	0.094
Panel C: Non-Manufacturing Workers		
dlog(tariff)	-0.054	-0.108
	(0.052)	(0.067)
Province FE	Yes	Yes
City level controls	Yes	Yes
Observations	177	177
R-squared	0.132	0.121

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

Appendix Table 1. Tariff Cut by 2-Digit Industry

CIC code	Industry name	tariff 2001	tariff 2006	change of tariff
15	Manufacture of Beverages	42.71	23.34	-19.36
21	Manufacture of Furniture	20.50	1.52	-18.97
16	Manufacture of Tobacco	46.34	31.54	-14.80
13	Processing of Food	28.26	16.52	-11.73
14	Manufacture of Foods	26.53	16.57	-9.97
28	Manufacture of Chemical Fibers	14.09	4.27	-9.81
17	Manufacture of Textile	20.77	11.34	-9.44
40	Computers & Other Electronic Equipment	14.69	5.95	-8.74
37	Manufacture of Transport Equipment	19.44	11.02	-8.42
36	Manufacture of Special Purpose Machinery	13.69	5.48	-8.21
30	Manufacture of Plastics	17.46	10.26	-7.20
42	Manufacture of Artwork	20.40	13.45	-6.95
22	Manufacture of Paper and Paper Products	12.54	5.67	-6.86
24	Manufacture of Articles For Culture, Education and Sport Activities	19.41	12.67	-6.74
20	Processing of Timber, Manufacture of Wood, Bamboo, Rattan, Palm and Straw Products	11.43	4.70	-6.73
18	Manufacture of Textile Wearing Apparel, Footware & Caps	24.01	17.56	-6.46
41	Manufacture of Measuring Instruments & Machinery for Cultural Activity & Office Work	13.27	7.08	-6.19
39	Manufacture of Electrical Machinery and Equipment	17.04	11.38	-5.66
23	Printing, Reproduction of Recording Media	9.90	4.36	-5.54
19	Manufacture of Leather, Fur, Feather & Related Products	20.04	14.89	-5.15
35	Manufacture of General Purpose Machinery	13.42	8.50	-4.92
27	Manufacture of Medicines	9.72	5.23	-4.49
29	Manufacture of Rubber	17.63	13.78	-3.85
31	Manufacture of Non-metallic Mineral Products	15.23	11.41	-3.81
26	Manufacture of Raw Chemical Materials and Chemical Products	11.68	8.47	-3.21
34	Manufacture of Metal Products	13.39	10.88	-2.51
32	Smelting and Pressing of Ferrous Metals	4.88	3.46	-1.42
33	Smelting and Pressing of Non-ferrous Metals	4.48	3.21	-1.27
25	Processing of Petroleum, Coking, Processing of Nuclear Fuel	5.34	4.36	-0.99

Appendix Table 2. Cities with Largest and Smallest Tariff Cut

city name	province	tariff 2001	tariff 2006	change of tariff	major industry	major industry share
5 cities with largest cut						
Lin Cang	Yunan	43.27	24.46	-18.82	Processing of Food	0.55
Shiyan	Hubei	34.30	15.54	-18.76	Manufacture of Transport Equipment	0.73
Shuang Ya Shan	Heilongjiang	28.52	13.92	-14.60	Processing of Food	0.35
Bao shan	Yunan	34.72	21.14	-13.58	Processing of Food	0.42
He gang	Heilongjiang	24.51	11.96	-12.54	Manufacture of Non-metallic Mineral Products	0.15
5 cities with smallest cut						
Tongling	Anhui	6.50	4.44	-2.06	Smelting and Pressing of Non-ferrous Metals	0.36
Changzhi	Shanxi	9.80	7.93	-1.88	Smelting and Pressing of Ferrous Metals	0.31
Panzhihua	Sichuan	5.04	3.56	-1.48	Smelting and Pressing of Ferrous Metals	0.91
Jinchang	Gansu	5.84	4.91	-0.93	Smelting and Pressing of Non-ferrous Metals	0.79
Yingtan	Jiangxi	5.94	5.03	-0.91	Smelting and Pressing of Non-ferrous Metals	0.71