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School of Economics

Working Papers

ISSN 2203-6024

Geographic Politics, Loss Aversion, and Trade Policy: The Case of Cotton and China

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Working Paper No. 2016-15

November 2016

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The case of cotton and China

(JOB MARKET PAPER)

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Abstract

This paper seeks to explain how governments response to world market price fluctuations. It develops a theoretical model of trade policy incorporating loss aversion and reference dependence. Like Freund and Özden (2008), this paper assumes only trade policy instruments are available to the government, but it goes beyond their model by adding a spatial dimension to interest-group politics. The model suggests that: (1) politically sensitive products receive more trade protection; (2) the government's changing trade distortions insulate the domestic market from international price fluctuations by setting trade protection lower (higher) when the world price is higher (lower) than a targeted domestic reference price; and (3) variations in market intervention help producers at the expense of consumers in periods when the international price is well below trend, and help consumers at the expense of producers in high-price periods. These predictions from theory are shown to still hold when the model is extended to a large country case involving terms of trade effects. The model is tested empirically and found to offer a plausible explanation of the puzzling changes in cotton protection in China.

JEL classification: F13, F14, F59, Q17, Q18

Key words: Political economy, Geographic politics, Loss aversion, Reference dependency, Political sensitive product, Price volatility

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* A special thanks to my supervisors Professor Kym Anderson, Dr Florian Ploeckl and Dr Nicholas Sim for their guidance, insightful discussion and comments. I have also benefited from discussions with and comments from Professor James R. Markusen and Dr Benedikt Heid. Any errors are my own.

1 Introduction

China's cotton policy attracts attention internationally due to its cotton industry's substantial role in the world cotton market, and domestically because of where it is produced in China. Since 2005, the share of China's cotton production in the politically sensitive Xinjiang area has been continuously increasing and now exceeds 50%. China's cotton trade protection, measured by Nominal Rates of Assistance (NRA)[1], fluctuates at a higher degree between 2005 and 2015 (Figure 1). This paper seeks to explain that change, drawing on the approach used by Freund and Özden (2008) who extend the Grossman and Helpman model (1994) (G-H model hereafter) incorporating agents' preferences characterising loss aversion and reference dependence in a small open economy. More specifically, we seek to understand the Chinese government's trade policy responses to international price fluctuations by taking cotton as a case study.

In addition to shedding light on the specific case of cotton in China, this paper contributes to the literature in two other ways. Firstly, it specifies the government's objective function as the sum of political support and the aggregrate social welfare for a non-democracy characterised with sensitive geographic dimensions to interest-group politics. It thus goes beyond the monetary contribution model of Grossman and Helpman (1994). And secondly, it considers two cases (when the world price is higher, as well as when it is lower, than a reference price), which therefore goes beyond Freund and Özden (2008) who only consider a world price slump.

[1] It is expressed as $NRA = \frac{P_t - P_t^*}{P_t^*}$ where P_t is the domestic price and P_t^* is the border price at time t.

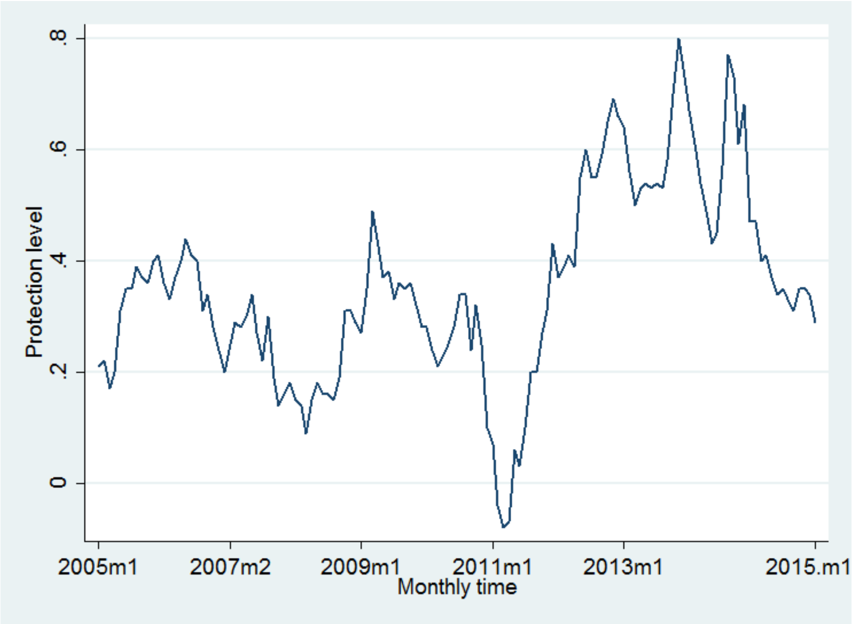

Figure 1: Cotton trade protection in China, January 2005 to January 2015

The structure of this paper is as follows. Section 2 summaries the pertinent literature. Factual background information on China's cotton production, Xinjiang's geographic position, and cotton trade policies are summarized in section 3. Section 4 develops the theoretical model and extends it from a small country to a large country. China's cotton trade policy is used to empirically test the model in section 5, and section 6 concludes.

2 Literature review

2.1 Political incentives driving inefficient and suboptimal policies

The perspective of political economy provides a framework for politicians and economists to uncover the formation of and variations over time in policy interventions. Various branches of thought, dating back to the 1960s, have given insight into the interactions of economic and political forces among different interest groups affecting the policy equilibrium. Among the important contributions, Olson (1965) pioneered the role of collective actions to overcome freerider problem to influence policy outcomes of government. Numerous other traditional political models, including regulation theory (Stigler, 1971), pressure group theory (Becker, 1983 and 1985), policy preference functions (Rausser and Freebairn, 1974), political support functions (Hillman, 1982), political preference functions (Bullock, 1994) and the conservative social welfare function (Corden, 1997) seek to explain the reasons why governments implement inefficient distorted policies in different sectors. In the case of agricultural policies, the arable land endowment per worker, the employment share in the agricultural sector, terms of trade for agriculture, the share of agriculture in GNP, and the share of food in total expenditure are discussed based on collective action by different interest groups (Anderson & Hayami, 1986; Rausser, 1982). Other factors including low farm incomes, slow farm productivity growth, and low supply and demand elasticities are also emphasized (Gardner, 1987).

Grossman and Helpman (1994) improved the interest group model by providing microeconomic foundations, such that it became the workhorse tool to explain trade policy formation. Based on the G-H model, a preference for inequality aversion is introduced into individual's utility function (lü *et al.,* 2012). This comparative static model was followed by a dynamic political economy model with overlapping generations, heterogeneous agents, endogenous human capital investment, and costly worker adjustment (Blanchard and Willmann, 2013), and used to analyse the protectionist overshooting phenomenon. Specifically, when politically influenced workers are 'stuck' in adversely affected import-competing sectors, they are more likely to get short-term policy remediation in the form of higher tariffs. The more unequal the initial distribution of gains and losses from the magnitude of potential overshooting will be, the longer the induced policy distortion will persist.

In parallel with the political contribution model, the tariff-formation-function model (Findlay & Wellisz, 1982), campaign-contribution model (Magee *et al*., 1989), political support model (Rodrick, 1995) and median-voter model (Mayer, 1984) were developed and adopted to analyse agricultural policy formation. Other contributions to policy making that have been emphasized more recently are institutions (Acemoglu and Robinson, 2006 and 2012), limited access orders (North, Wallis and Weingast, 2009), the role of constitutions (Persson and Tabellini, 2000), and electoral institutions (Besley and Persson, 2011).

2.2 Loss aversion and trade policy interventions

The G-H model hypothesizes that an individual's utility only depends on his or her consumption bundle, which meant it could not explain behavioral elements associated with political economy dynamics behind trade protection (Dissanayake, 2014). Agents' preferences toward loss aversion and reference dependence are now being built into political contribution models (Freund and Özden, 2008; Tovar, 2009). Loss aversion refers to people's tendency to feel stronger about avoiding losses than acquiring gains, and losses reflect particular reference points. Freund and Özden (2008) explain why trade protection is given when the world price falls below a given reference price. Tovar (2009) incorporates individual preferences exhibiting loss aversion into the political objective function, and points out that an industry is more likely to organize and lobby the government if it suffers a loss.

During recent years, loss aversion has been built into analyses of government responses to market shocks. Anderson and Nelgen (2012) set up loss aversion in quadratic rather than linear form, which is consistent with the conservative social welfare function in Corden (1997). They show that during price upward spike periods, developing countries alter their agricultural trade policies more than high-income countries, and vice versa during downward agricultural price shocks. Giordani *et al.* (2016) analyze the multiplier effect of food-exporting countries seeking to insulate the domestic market from the world market. Dissanayake (2014) presents a general equilibrium model that projects changes in trade restrictions irrespective of the lobbying behaviors of interested groups who make monetary contributions to the democratic government. Thennakoon (2015) follows Baldwin (1987) with a partial equilibrium model in which the government objective function is the weighted summation of consumer surplus, producer surplus, and tariff revenue, and uses loss aversion as in Freund and Özden (2008) and Tovar (2009) to analyze government responses to downward spikes in international prices. Loss aversion is also used by Fulton and Reynolds (2015) in considering the rice export system in a non-democratic country, Vietnam. They conclude that in such a setting, the elite could increase their political and economic power from restricting exports.

In this paper, we document the effects of sensitive political groups on the government's trade policy formation process in a one-party country characterised with geographic dimensions of interest-group politics. The government's objective function is set with behavior features including reference dependence and loss aversion not only from a producers' perspective but also from that of consumers. China's cotton policy is shown to be consistent with the predictions of that theoretical model.

3 Geography, politically sensitive products, and preference

3.1 Geography and politically sensitive products

Policy pressure arises from policy preferences of self-interested agents. Economic actors can organize to influence government policy to their advantage because of the spatial distribution of economic endowments (Chase, 2015). Geography can sometimes shape individual's preferences, collective action and aggregate preferences of the government if the endowment factor is located geographically in particular ways. Self-interest can be pursued by creating social unrest, sending petitions to the central government, or otherwise fighting for their rights. Regions with a high proportion of minorities in the total population can be highly sensitive politically, as can ones in which a product is concentrated in just one politically sensitive region. A formal definition of a politically sensitive product, drawing on Jean *et al.* (2011), could be:

A politically sensitive product is one whose output is produced using a specific endowment factor geographically located in a politically sensitive region, and the producers are vulnerable to changes in government policy affecting that product.

3.2 Politically sensitive regions: Xinjiang

The geographic location and the large share of Muslims in Xinjiang make it a politically sensitive region. The largest of China's administrative regions, Xinjiang borders eight countries - Mongolia, Russia, Kazakhstan, Kyrgyzstan, Tajikistan, Afghanistan, Pakistan and India. It is located in the far Northwest of China, and transportation links to the east through the central area of mainland China are weak. The shares of the total population of each province that is a minority are listed for 2014 in Table 1. Xinjiang ranks second only to Tibet out of the 26 provinces whose statistics are available, with 60% of its total population being Uyghur.

The higher the share of minorities in the province, the more they share common interests and preferences. The minorities are more likely to organize political groups to fight against local or central governments, or create social unrest to force the government to allocate benefits to them. Table A in the appendix depicts the cases of social unrest (conflicts between Han and Uyghur) from 2007 to 2015. In 2009, the biggest conflicts between Han and Uighur people occurred. In that social unrest, almost 200 people were killed, 1721 people were injured and 1000 people were arrested by the government. In 2014, there are 9 social unrests related to Xinjiang Uighur group whose number is much higher than other years.

Table 1: Share of minority in total population in each province in 2014

Ranking	Province	%	Ranking	Province	%
1	Tibet	94.07	17	Hubei	4.34
2	Xinjiang	***59.39***	18	Hebei	4.31
3	Qinghai	45.51	19	Beijing	4.26

4	Guangxi	38.34	20	Tianjin	2.64
5	Guizhou	37.85	21	Fujian	1.67
6	Ningxia	34.53	22	Guangdong	1.42
7	Yunnan	33.41	23	Henan	1.22
8	Neimenggu	20.74	24	Zhejiang	0.85
9	Hainan	17.29	25	Shandong	0.86
10	Liaoning	16.02	26	Anhui	0.63
11	Hunan	10.21	27	Shanghai	0.6
12	Jilin	9.03	28	Shaanxi	0.49
13	Gansu	8.69	29	Jiangsu	0.33
14	Chongqing	6.42	30	Shanxi	0.29
15	Heilongjiang	5.02	31	Jiangxi	0.27
16	Sichuan	4.98			

Notes: The unit of the value is percentage.

Data source[2]: http://tieba.baidu.com/p/3622083537

3.3 The role of cotton in Xinjiang

Xinjiang's cotton sector in plays an important role in China. The cotton yield in Xinjiang in 2009 was 123 kilogram per acre (M), which is one-quarter above the national average. Xinjiang's share of total production of cotton[3] in China was 30% in 2002, but then it sharply increased to 62.5% by 2015. Figure 2 illustrates the cotton production geography in China in 2012, when Xinjiang's share was 52%.

Cotton production has become an important part of Xinjiang's economy. Cotton accounts for 65% of its crop sector and 1/3 of its total agricultural sector. More than 50% percent of people in Xinjiang are engaged in cotton production, and 35% of their income is from cotton on average – but that share was up to 60% in the cotton-intensive areas in 2009. For the local government, 15% of their fiscal income is from cotton production and related sectors. For some

[2] Original data sources: The sixth census of Chinese government and reports of the local government.

[3] The average annual cotton production in China between 1995 to 2004 was 22,319 [unit: thousand 480-pound bales], but it increased to a peak of 32,332 between 2005 and 2015.

cotton-intensive production counties, the proportion of fiscal income peaks at more than 50%. The cotton sector also accounted for more than 17% of Xinjiang's GDP in 2013.

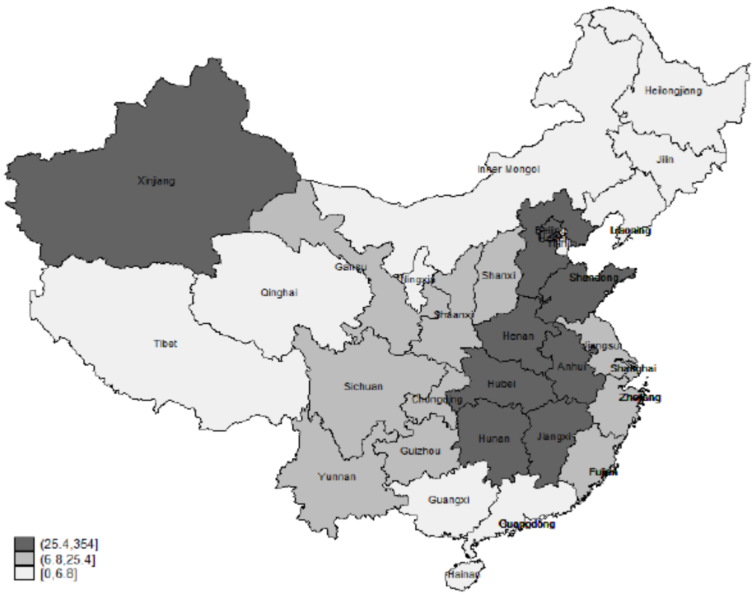

Figure 2: Geographic distribution of China’s cotton production in 2012

Source: Author’s calculation

> *"Cotton is intimately associated with land usage, ownership, employment, and Han immigration. It's all tied up".*
>
> ---*Tom Cliff, a scholar at the Australian National University (20 February 2015)*[4]

The Chinese government is more likely to protect cotton planters due to the important role of cotton in employment and income in Xinjiang. Social unrest and agricultural price shocks have a positive relationship which has been tested recently by Bellemare (2014) and Arezki and Bruckner (2011). If a product is geographically concentrated in its production,[5] the Chinese government tends to protect the sector when considering major employment. Besides, those working as cotton planters are relatively unskilled. If the government does not protect the

[4] See http://www.businessinsider.com/r-top-china-cotton-producer-resists-reforms-in-restive-xinjiang-2015-2/?r=AU&IR=T

[5] The coal sector in some European countries receives higher protection and government subsidy. The geographically concentrated industry is often a major employer in a town or city and involves a small number of towns or cities (Anderson, 1995b).

cotton sector, a higher unemployment rate may result and potentially lead to social and political unrest in Xinjiang. Maintaining social stability is an objective of China's cotton policies:

> *"China's cotton policy is cognizant of social stability. They want to control rioting in the Xinjiang province, where most of the cotton is grown".*
>
> ---------------*Elton Robinson (15. March 2013)*[6]

In short, cotton is a politically sensitive product whose production is geographically concentrated in Xinjiang province -- a politically sensitive region.

3.4 Cotton trade policy in China

China is the world's largest cotton producer, consumer and importer in the world. Table 2 shows China's net trade volumes between 2005 and 2015.

Table 2: Cotton net import volume, 2005-2015

Year	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Value	19,212	10,500	11,468	6,912	10,880	11,857	24,478	20,280	14,096	8,213	4,800

Notes: The unit of the value is (000) 480-pound bales.

Data source: USDA-Foreign Agriculture Service

The Chinese government's trade policy has been largely focused on managing import flows to competing interests of consumers[7] and cotton farmers. A Sliding Scale Duty (SSD) system has been in place since 2005.

[6] See "Chinese cotton policy- Social stability, not trade". *http://deltafarmpress.com/cotton/chinese-cotton-policy-social-stability-not-trade*

[7] Cotton consumers are mills in textile industry rather than citizens, because the raw cotton is the intermediate input to produce clothes.

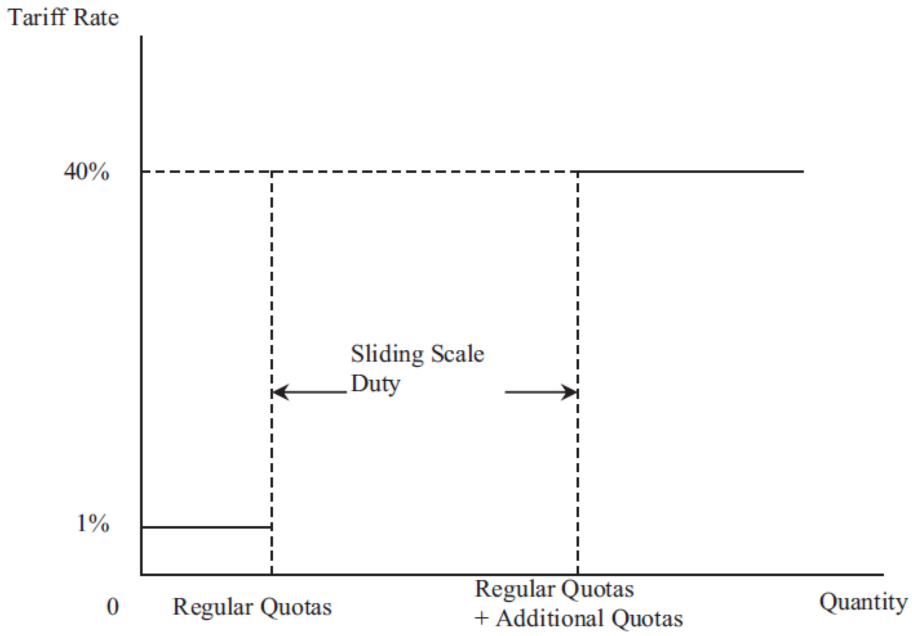

Figure 3: China's actual Tariff Rate Quota system

Source: Wang *et al.* (2014)

In China, its in-quota import volume includes regular quotas and additional quotas permitted by the Sliding Scale Duty system. As illustrated in Figure 3, within the regular import quota, the import tariff is very low at 1%. If the import exceeds the sum of the regular quota and additional quota, the tariff is taken to the highest level of 40%. If the import volume belongs to additional quota, the government will implement a Sliding Scale Duty to calculate the tariff rate under the Sliding Scale Duty system, which is not allowed to be higher than 40%.
China's actual Tariff Rate Quota (TRQ) system shows the tariff rate is fixed within the regular quotas. The fluctuations of tariff rates depend on the additional quotas' context.

Figure 4 gives the composition of cotton imports. The primary instruments determining China's cotton imports are import size, timing, and conditionality of quotas. Most of China's cotton imports are under the "Sliding Scale" quota (SSQ).

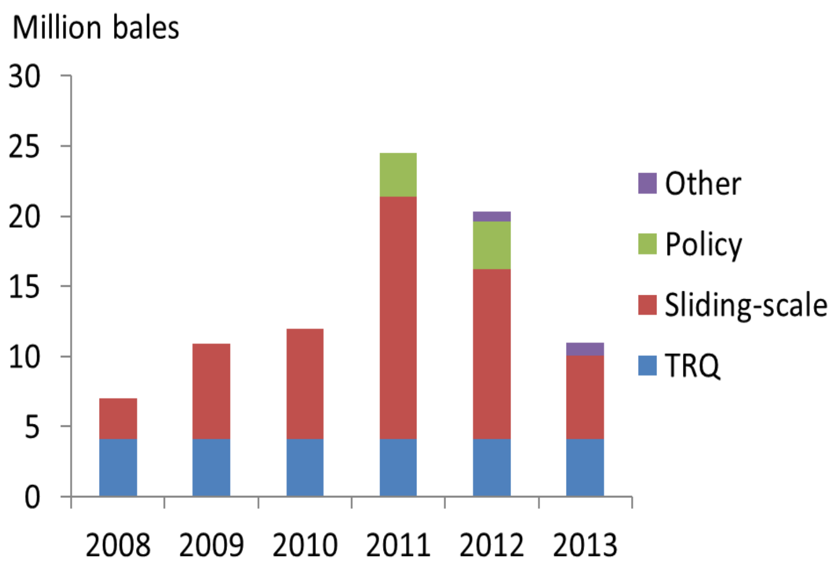

Figure 4: China's cotton import composition during 2008 to 2013

Notes: "Policy" e.g. imports by China National Cotton Reserves Corporation (CNCRC); "Other:" imported at full 40% WTO bound tariff

Source: MacDonald *et al.* (2015)

This paper mostly focuses on the variation of the import tariff. It analyses how the tariff rate is calculated based on the Sliding Scale Duty within the additional quotas range. The Chinese government introduced the Sliding Scale Duty system in 2005 and has since adjusted it considerably. The Sliding Scale Duty system is categorized into two stages (periods): during period 1 (May 1, 2005 –December 31, 2006), if the import price including Cost Insurance and Freight (CIF) was at or above a reference price ($\overline{P_t}$)[8] set by the government, the tariff rate is 5% for imported cotton within the additional quotas. If the CIF price is higher than the reference price, the following formula was adopted to calculate cotton tariff rate.

$$T^I = \min\big(INT\big((P_t/CIF - 1) * 1000 + 0.5\big)/1000, 0.4\big) \tag{1}$$

[8] The Chinese government sets the reference price (cost, insurance, and freight) for the lowest tariff on cotton imported under a sliding scale quota (calendar year) (MacDonald *et al.*, 2015). The reference price was 10029 Yuan/Ton in 2005, 10746 Yuan/Ton in 2006, 11397 Yuan/Ton between 2007 and 2011, and 14000 yuan/Ton from 2012 to 2015.

where T^I is the import tariff rate in period one; CIF is the import price;[9] P_t is the value of $\overline{P_t}(1+0.05)$; and min is a minimum function indicating that the maximum import tariff value is 0.4. INT is an INT function to get the integer part of the value in the outer parentheses.

The second period covers a longer time (January 1, 2007 –December 31, 2015) and the Sliding Scale Duty for additional quota was managed by the government as follows. If the import price is at or above government's reference price $\overline{P_t}$, the tariff rate for import cotton was 0.57 Yuan per kilogram. If the reference price is below the reference price, the import tariff is calculated using the following formula.

$$T^{II} = min(INT\left(P_t^{'} * CIF + \alpha * CIF - 1000 + 0.5\right) * 1000, 0.4)^{10} \quad (2)$$

where T^{II} is the import tariff rates in period two; $P_t^{'} = (1+0.05)\overline{P_t} - \alpha\,(\overline{P_t})^2$; α is a constant number whose value takes 2.526% from 2007-2011, 3.235% in 2012, and 2.908 in 2013, respectively.

From the Sliding Scale Duty system, we can see that the import tariffs ranging from 1% to 40% are determined by the category of the imports and the year the cotton is imported. Wang *et al.* (2014) rewrite the above two formulas into equivalent *ad valorem* tariff format, but it does not change the import tariff rules. In short, the tariff rate is inversely related to the international price.

4 Theoretical framework

Cotton producers are almost always net sellers in the short-term, which makes them different from staple food producers. The income effects due to a product price change are not

[9] Under the Sliding Scale Duty system, the Chinese government can import from any other cotton exporting countries. These countries are competitive. In the empirical part, the CIF price is functioned as the world price.
[10] See Wang *et al.* (2014).

ambiguous for cotton planters: they gain when facing domestic market price increases, and vice versa.

This section presents a theoretical framework to be used in the applied empirical analysis in section 4.5. Two cases are considered: a small open economy, and a large open economy.

4.1 Model assumptions[11]

Consider a small open economy populated by individuals with identical preferences. Individuals own different types of specific factors and labor endowments. All the agents have the following consumption preference characterized by loss aversion and reference dependence:

$$U = x_0 + \sum_1^n u_i(x_i) + min(h(x_0 + \sum_1^n u_i(x_i) - \overline{U}), 0) \quad (3)$$

where x_0 is numeraire good produced only by labor with constant return to scale, and the input-output coefficient equals 1 ($x_0 = L_0$). The numeraire good could be defined as the import good or the export good. By definition, its domestic price and world price are equal to 1. Under a competitive labor market, the wage rate is equal to 1. x_i is consumption of good i, $i = 1, 2, \ldots, n$. All the normal goods require labor- and sector-specific inputs with fixed supply in the economy exhibiting constant returns to scale. While the specific factors are immobile across sectors, laborers have free mobility in the economy. With the wage rate equal to one, the returns to the specific factor owners depend only on the domestic market price p_i denoted by $\pi_i(p_i)$. The supply of good i is denoted by $y_i(p_i) = \pi_i^{'}(p_i)$, which is an application of Hoteling's lemma.

[11] The author borrows some of the basic assumptions from Grossman and Helpman (1994) in the small open economy, and assumptions from Grossman and Helpman (1995) in the context of a large country. The difference between the two cases is whether the country can affect the international market price.

Following Freund and Özden (2008), we introduce behavior features into consumer utility through a $h(\cdot)$ function. The $h(\cdot)$ function is called "gain-loss" utility[12] (Dissanayake, 2014), and its first derivative is positive[13] and second derivative is negative.[14] In other words, the gain-loss term is increasing in the difference between the actual utility level and the reference utility level indicated by $\overline{U}$. $\overline{U}$ is an individual's reference utility derived from consuming a reference consumption bundle. The function takes a negative value when the actual utility is lower than the reference level, and zero otherwise. With the above preferences an individual consumes $x_i = d_i(x_i)$ normal goods, $i = 1,2,\dots,n$, where demand is the inverse of $U_i^{'}\ (x_i)$ and $x_0 = E - \sum_1^n p_i x_i$. The related indirect utility function is expressed as:

$$W_i(p_i) = E - \sum_i p_i d_i(p_i) + \sum_{i=1}^n u_i\big(d_i(p_i)\big) + mi\,n\Big(h\big(E - \sum_i p_i d_i(p_i) + \sum_{i=1}^n u_i\big(d_i(p_i)\big) - \overline{H}\big), 0\Big)$$

(4)

The utility equation could be rewritten as:

$$W_i(p_i) = E + s(p_i) + min(h(E + s(p_i) - \overline{U}), 0) \tag{5}$$

where $s(p_i) = \sum_{i=1}^n u_i\big(d_i(p_i)\big) - \sum_i p_i d_i(p_i)$ indicates the consumer surplus. If we denote the reference level of utility as $\overline{U} = \bar{E} + \overline{S(p)}$, then the above function (5) could be rearranged as:

$$W_i(p_i) = E + s(p_i) + min\Big(h\big(E + s(p_i) - \bar{E} + \overline{S(p)}\big), 0\Big) \tag{6}$$

---

[12] The price of the numeraire goods is constant. Therefore, the utility function is linear in x_0 but not other normal goods.
[13] Indicating as $h'(\cdot) > 0$, which means the extent of loss an individual feels for having less than they are accustomed to.
[14] Indicating as $h''(\cdot) < 0$, which means the marginal increase is declining in the size of loss due to diminishing sensitivity to losses.

The wedge between the domestic market price (p_i) and the international market price (p_i^w) is t_i^s, created by the government's price-distorting policy. The relationship between the domestic market price and the world price is simply expressed as:

$$p_i = p_i^w + t_i^s \tag{7}$$

If $t_i^s > 0$, it means that the domestic market price is higher than that in the international market, indicating that the government imposes a tariff on imports or an export subsidy on exports. When $t_i^s < 0$, it means the domestic market price is lower than the world price, in which case imports are subsidized or exports are taxed.[15] As per the above assumption, the government only imposes trade distortions to manage the variations in the domestic price.

The assumed aim of the government is to maximize its objective by implementing price-distorting policies, with the ultimate objective of being to stay in office and control the country's power. In the context of China, there is no formal lobby group to make money contributions to the government. However, interest groups can express their unwillingness or anger through, for example, creating social unrest. We model the government's political objective function as the summation of total political support from politically sensitive groups, and the aggregrate welfare of the economy as the following linear function:

$$OFG = \sum_{i\in g} PS_i + \varphi \sum_{i=1}^{n} W(t_i^s)\, \varphi \geq 0$$

(8)

where OFG is the objective function of the government; $\sum_{i\in g} PS_i$ is the political support from politically sensitive groups indicated by g; $W(t_i^s)$ is the aggregrate social welfare; and φ represents the weight that the government puts on aggregate social welfare. The value of φ is

[15] The protected product could be import goods or export goods. In China, cotton is a type of net import agricultural product. The Chinese government imposes tariffs on import cotton to manage domestic market price.

a positive value. We propose that political support is a strictly monotonic increasing function with respect to the welfare of the politically sensitive group. Equivalently, the government's objective function could be rewritten as:

$$\Omega = \sum_{i\in g} H(t_i^s) + \varphi \sum_{i=1}^{n} W(t_i^s), \ \varphi \geq 0$$

(9)

In this model, the government of China considers politically sensitive areas which are geographically related to producing a specific product. The government would like to consider that region's welfare more than the welfare of other groups, which is expresses as follows:

$$\sum_{i\in g} H(t_i^s) = a_g l + a_g \sum_{i=1}^{n} t_i^s M_i(p_i) + \sum_{i\in g} \pi_i(p_i) + a_g \sum_{i=1}^{n} s_i(p_i) \quad (10)$$

where g in the third term is a set of politically sensitive groups which have the higher power to argue with the government, and a_g is the proportion of individuals in the total population who belong to the politically sensitive groups.

For the second term, the aggregate social welfare consists of four terms:

$$\sum_{i=1}^{n} W(t_i^s) = l + \sum_{i=1}^{n} t_i^s M_i(p_i) + \sum_{i=1}^{n} \pi_i(p_i) + \sum_{i=1}^{n} s_i(p_i) \quad (11)$$

where l is the total labor income (wage rate is one and total labor supply is l); $\sum_{i=1}^{n} t_i^s M_i(p_i)$ denotes total tariff revenue and $M_i(p_i)$ is the trade value for product i; $\sum_{i=1}^{n} \pi_i\ (p_i)$ is the total return for specific factors; and $\sum_{i=1}^{n} s_i\ (p_i)$ is the total consumer surplus.

The equilibrium optimal tariff rate can be solved by maximizing the government's objective function (equation (9)) with respect to the trade protection level (t_i^s):

$$t_i^s = arg \max\left(\sum_{i\in g} H(t_i^s) + \varphi \sum_{i=1}^{n} W(t_i^s)\right) \quad (12)$$

4.2 A small country model: Three scenarios

Regarding the model assumptions, the individuals' preferences depend on the difference between the actual consumption and the reference consumption levels. Because of this, the form of the government objective function depends on the difference between the equilibrium domestic market price and the reference price set by the government authority. Therefore, three scenarios are considered in turn in analysing the optimal trade policy for the government to maximize its object function: when the equilibrium price exactly equals, is lower than, or is higher than the reference price.

The equilibrium domestic price equals the reference price

When the domestic equilibrium market price equals the reference price, the individuals will have a utility function excluding the loss-gain term. The welfare of the politically sensitive groups and the aggregate social welfare are the same as equations (10) and (11) respectively. Substituting the two equations into the government objective function (equation (9)), we get:

$$\Omega = \left[a_g l + a_g \sum_{i=1}^{n} t_i^s M_i(p_i) + \sum_{i\in g} \pi_i(p_i) + a_g \sum_{i=1}^{n} s_i(p_i)\right] + \varphi\left[l + \sum_{i=1}^{n} t_i^s M_i(p_i) + \sum_{i=1}^{n} \pi_i(p_i) + \sum_{i=1}^{n} s_i(p_i)\right] \quad (13)$$

Simplifying the above equation (13):

$$\Omega = (\varphi + a_g)l + (\varphi + a_g)\sum_{i=1}^{n}(t_i^s M_i(p_i) + s_i(p_i)) + \sum_{i=1}^{n}(\varphi + g_i)\pi_i(p_i \quad (14)$$

Trying to choose the optimal trade protection vector (based on political support schedules) is equivalent to maximizing the objective function of the government with respect to protection level t_i^s, which is following the idea of equation (12). The first-order condition is given as the following equation (15) by using Roy's identity ($\frac{\partial s(p_i)}{\partial p_i} = -d_i(p_i)$) and Hotelling's lemma ($\pi_i^{'}(p_i) = y_i(p_i)$), where $d_i(p_i)$ is domestic demand and $y_i(p_i)$ is the domestic supply for product i. Besides, the relationship between domestic market price and international market price (equation (5)) is applied here.

$$(\varphi + a_g)\left[-d_i(p_i) + t_i^s M_i^{'}(p_i) + M_i(p_i)\right] + (\varphi + g_i)y_i(p_i) = 0 \tag{15}$$

The relationship between domestic demand, supply and import is expressed as:

$$M_i(p_i) - d_i(p_i) = -y_i(p_i) \tag{16}$$

Then equation (15) can be expressed as:

$$(\varphi + a_g)\left[-y_i(p_i) + t_i^s M_i^{'}(p_i)\right] + (\varphi + g_i)y_i(p_i) = 0 \tag{17}$$

Rearranging the above equation, the optimal trade protection level is given by:

$$t_i^s = [\frac{g_i - a_g}{\varphi + a_g}]\frac{y_i(p_i)}{-M_i^{'}(p_i)}$$

(18)

The solution can be rewritten as:

$$\frac{t_i^s}{p_i} = \left[\frac{g_i - a_g}{\varphi + a_g}\right]\frac{z_i}{e_i}$$

(19)

where $e = -(\Delta M_i(p_i) / M_i(p_i)) / (\Delta p_i / p_i) = \frac{\Delta M_i(p_i)}{\Delta p_i}\frac{p_i}{M_i(p_i)} = -M_i^{'}(p_i)\frac{p_i}{M_i(p_i)}$ is the import demand or export supply elasticity of good i; and $z_i = \frac{y_i(p_i)}{M_i(p_i)}$ is an equilibrium ratio of domestic output to imports (negative for exports). In the following, we change the form of the tariff to become ad valorem:[16]

[16] Because the domestic price ($p_i = p_i^w + t_i^s$) is known, we can get the trade distortion as $t_i^s = p_i - p_i^w$, then $\frac{t_i^s}{p_i} = \frac{p_i - p_i^w}{p_i}$. In the final step, the numerator and denominator are simutaneously divided by p_i^w :

$$\frac{t_i}{1+t_i} = \left[\frac{g_i - a_g}{\varphi + a_g}\right]\frac{z_i}{e_i}$$

(20)

This is the solution for the benchmark situation when the domestic equilibrium price equals the reference price. No loss aversion is created by an upward spike in the agricultural price for the consumers or by a downward spike for the producers. From the above optimal protection, politically sensitive groups receive positive protection. This is because g_i is an indicator variable: if the group who own a specific factor to produce a politically sensitive product, the value equals one, and zero otherwise. The other effect of one specific product is the output to import ratio. If that one specific product accounts for a large share, the specific group has more power to gain from price distortions. The protection level is negatively related to the import demand elasticity. The other two variables are the weight on the aggregrate social welfare, and the share of the population that belongs to the politically sensitive groups. In short, the predictions of the above optimal trade protection are:

Benchmark results*: Politically sensitive groups receive positive protection. The protection level is positively related to the output-import ratio; negatively proportional to the share of the total population in the politically sensitive regions, the import demand elasticity, and the government's weight on the aggregrate social welfare.*

The equilibrium domestic price is below the reference price

$$\frac{t_i^s}{p_i} = \frac{p_i - p_i^w}{p_i} = \frac{\frac{p_i - p_i^w}{p_i^w}}{\frac{p_i}{p_i^w}} = \frac{\frac{p_i - p_i^w}{p_i^w}}{\frac{p_i - p_i^w + p_i^w}{p_i^w}} = \frac{\frac{p_i - p_i^w}{p_i^w}}{1 + \frac{p_i - p_i^w}{p_i^w}} = \frac{t_i}{1 + t_i}$$

What should be the trade protection level when the equilibrium price is lower than the reference price? In this situation, the return of specific factors will be low due the decrease in the output price. Therefore, the negative deviation of price from its reference price will result in further welfare loss for the producers through the loss aversion term if they produce that product.

Following the same argument as Freund and Özden (2008) and Dissanayake (2014), the producers pay more attention to the return of factor income than to changes in tariff revenue and consumer surplus. The other individuals, whose specific factors are not used to produce this product whose price decreases, are net buyers. The price decrease of this product will contribute to the positive gain of net indirect utility to consumers. However, the positive gain in the loss-gain function does not add additional utility gain.

Based on these arguments, the standard aggregate social welfare (equation (11)) becomes the following form:

$$\sum_{i=1}^{n} W(t_i^s) = l + \sum_{i=1}^{n} t_i^s M_i(p_i) + \sum_{i=1}^{n} \pi_i(p_i) + \sum_{i=1}^{n} s_i\,(p_i) + \min\left(-\sum_{i=1}^{n} a_i N h\left(\frac{\overline{\pi_l} - \pi_i(p_i)}{\alpha_i N}\right), 0\right) \tag{21}$$

The first four terms are the same as equation (11) indicating total labor income, tariff revenue, total specific factor income, and consumer surplus. The last term in the above equation is the loss aversion part from producers whose specific factors experience return decreases, leading to negative social welfare. In the loss aversion term, α_i denotes the share of the population who owns one specific factor i, and N is the total population.

Following the same logic, the welfare of the politically sensitive groups becomes:

$$\sum_{i\in g} H(t_i^s) = \alpha_g l + \alpha_g \sum_{i=1}^{n} t_i^s M_i(p_i) + \alpha_g \sum_{i\in g} \pi_i(p_i) + \alpha_g \sum_{i=1}^{n} s_i(p_i) + \min\left(-\sum_{i\in g} a_i N h\left(\frac{\overline{\pi_l} - \pi_i(p_i)}{\alpha_i N}\right), 0\right) \tag{22}$$

The only difference between equation (22) and equation (10) is that the loss aversion term enters the welfare function, which is expressed as the last term in equation (22).

Therefore, we substitute euqations (21) and (22) into equation (9) and rearrange the equation as:

$$\Omega = (\varphi + \alpha_g)l + (\varphi + \alpha_g)\sum_{i=1}^{n}(t_i^s M_i(p_i) + S_i(p_i)) + \sum_{i=1}^{n}(\varphi + g_i)\pi_i\,(p_i) +$$

$$min(-\sum_{i=1}^{n}(\varphi + g_i)a_i N h\left(\frac{\overline{\pi_l} - \pi_i(p_i)}{\alpha_i N}\right), 0) \qquad (23)$$

We maximize Ω with respect to t_i^s following the idea of equation (12), which yields the following first-order condition by using Roy's identity, Hotelling's lemma and equation (7) again:

$$(\varphi + \alpha_g)\left[-d_i(p_i) + t_i^s M_i^{\prime}\,(p_i) + M_i(p_i)\right] + (\varphi + g_i)y_i(p_i) - (\varphi +$$

$$g_i)a_i N h^{\prime}\,\left(\frac{\overline{\pi_l} - \pi_i(p_i)}{\alpha_i N}\right)\frac{1}{\alpha_i N}\left(-y_i(p_i)\right) = 0$$

(24)

Solving this equation with respect to the optimal trade distortion and writing it in ad valorem form on good i gives:

$$\frac{t_i}{1+t_i} = \left[\frac{g_i - a_g + (\varphi + g_i)h^{\prime}\,(\cdot)}{\varphi + a_g}\right]\frac{z_i}{e_i} \qquad (25)$$

where e is import demand elasticity of good i or export supply; and z_i is an equilibrium ratio of domestic output to imports (negative for exports). Comparing the optimal protection level with equation (20), the only change is the term from the numerator $(\varphi + g_i)h^{\prime}\,(\cdot)$. According to the characteristics of the loss aversion function, the first derivative is positive, illustrated as $h^{\prime}\,(\cdot) > 0$, and then $(\varphi + g_i)h^{\prime}\,(\cdot) > 0$. Thus the optimal protection level is higher compared with the protection level when the equilibrium price equals the reference price. When trade protection is higher, the domestic market price must be higher than the world price. If the equilibrium domestic price goes lower than the reference price, the world price is lower than the reference price. Hence the following Proposition:

Proposition 1: *When the world price is below its reference price i.e.* $p_i^w < \overline{p_\iota}$, *the government introduces a higher distortion than the level of distortion when the world price is at the reference level.*

$$\left[\frac{g_i - a_g + (\varphi + g_i)h'(\cdot)}{\varphi + a_g}\right]\frac{z_i}{e_i} > \left[\frac{g_i - a_g}{\varphi + a_g}\right]\frac{z_i}{e_i} \qquad (26)$$

The equilibrium domestic price is above the reference price

If the equilibrium price goes above the reference price, producers gain. However, net buyers whose specific factors do not experience a price increase will lose. The loss aversion term enters the objective function of the government due to this loss of consumers' surplus. In for the special case of cotton, the gain for producers' dominants the situation. The difference between the gains in factor income and the loss in consumer surplus is positive for producers who are net sellers. In this scenario, the loss aversion term from consumers' perspective is added to the standard aggregate social welfare (equation (11)) .

$$\sum_{i=1}^{n} W(t_i^s) = l + \sum_{i=1}^{n} t_i^s M_i(p_i) + \sum_{i=1}^{n} s_i(p_i) + \sum_{i=1}^{n} \pi_i(p_i) + mi\,n\Bigg(-(1 - a_i)Nh\left(\frac{\overline{\sum_{l=1}^{n} t_i^s M_l} - \sum_{l=1}^{n} t_i^s M_l(p_i) + \overline{\sum_{l=1}^{n} s_l} - \sum_{i=1}^{n} s_i(p_i)}{N}\right), 0\Bigg) \qquad (27)$$

where a_i is the share of individuals that experience a price increase in the good they produce; $1 - a_i = \beta_i$ represents the share of individuals who are net buyers of the good that experience a world price increase.

In this case, following the same logic, the welfare of the politically sensitive groups is:

$$\sum_{i\in g} H(t_i^s) = \alpha_g l + \alpha_g \sum_{i=1}^{n} t_i^s M_i(p_i) + \alpha_g \sum_{i=1}^{n} s_i(p_i) + \sum_{i\in g} \pi_i(p_i) +$$

$$min\left(-\beta_i^g Nh\left(\frac{\overline{\sum_{l=1}^{n} t_l^s M_l} - \sum_{l=1}^{n} t_l^s M_l(p_l) + \overline{\sum_{l=1}^{n} s_l} - \sum_{i=1}^{n} s_i(p_i)}{N}\right), 0\right) \quad (28)$$

where β_i^g is the share of individuals, who are net buyers of the good that experiences a world price increase in the politically sensitive groups. β_i^g is smaller or equal to β_i in the economy.

Substitute equation (27) and (28) into equation (9), we get:

$$\Omega = (\varphi + \alpha_g) l + (\varphi + a_g) \sum_{i=1}^{n} \left(t_i^s M_i(p_i) + s_i(p_i)\right) + \sum_{i=1}^{n} (\varphi + g_i) \pi_i(p_i) +$$

$$min\left(-(\varphi\beta_i + \beta_i^g) Nh\left(\frac{\overline{\sum_{l=1}^{n} t_l^s M_l} - \sum_{l=1}^{n} t_l^s M_l(p_l) + \overline{\sum_{l=1}^{n} s_l} - \sum_{i=1}^{n} s_i(p_i)}{N}\right), 0\right) \quad (29)$$

Applying Roy's identity, Hotelling's lemma and equation (7) , the first-order condition of equation (29) with respect to t_i^s is:

$$(\varphi + a_g)\left[-d_i(p_i) + t_i^s M_i^{'}(p_i) + M_i(p_i)\right] + (\varphi + g_i) y_i(p_i) + (\varphi\beta_i +$$

$$\beta_i^g) N h^{'}(\cdot)[-y_i(p_i) + t_i^s M_i(p_i) + M_i(p_i)] \frac{1}{N} = 0$$

(30)

Rearranging the above equation, we can solve the politically optimal trade protection:

$$t_i^s = \frac{[g_i - a_g - (\varphi\beta_i + \beta_i^g) h^{'}(\cdot)]}{[\varphi + a_g + (\varphi\beta_i + \beta_i^g) h^{'}(\cdot)]} \frac{y_i(p_i)}{-M_i^{'}(p_i)} \quad (31)$$

Finally, we write the protection in ad valorem form on good i as:

$$\frac{t_i}{1+t_i} = \left[\frac{g_i - a_g - (\varphi\beta_i + \beta_i^g) h^{'}(\cdot)}{\varphi + a_g + (\varphi\beta_i + \beta_i^g) h^{'}(\cdot)}\right] \frac{z_i}{e_i} \quad (32)$$

Compared with the benchmark protection level (equation (20)), the only different term entering the politically optimal solution is $(\varphi\beta_i + \beta_i^g) h^{'}(\cdot)$, which takes a positive value according to the characteristics of the loss aversion function. The decrease of the numerator and the increase of the denominator lead to the ratio value decrease. Thus the protection level is lower than in the scenario where the equilibrium domestic price equals the reference price. In addition, when the protection level is lower and domestic market is lower than the reference price, the international market price must be lower than the reference price. Proposition 2 summarizes this conclusion as follows:

Proposition 2: *when the world price goes higher than the reference price i.e.* $p_i^w > \overline{p_i}$, *the government introduces lower distortions than the level of distortion introduced when the world price is at its reference price.*

$$\left[\frac{g_i - a_g - (\varphi\beta_i + \beta_i^g)h^{\prime}(\cdot)}{\varphi + a_g + (\varphi\beta_i + \beta_i^{ps})h^{\prime}(\cdot)}\right]\frac{z_i}{e_i} < \left[\frac{g_i - a_g}{\varphi + a_g}\right]\frac{z_i}{e_i} \tag{33}$$

4.3 Do terms of trade effects matter?

From the above general equilibrium model, we can predict the politically optimal tariff response in a small open economy to changes in the international market price. However, the politically optimal policies for a large open economy take into account a country's ability to influence its international terms of trade (Feenstra, 2016, p. 213). Broda *et al.* (2008) argue that market power explains more of the tariff variation than a commonly used political economy variable. Freund and Özden (20) and Dissanayake (2014) ignore terms of trade. This sub-section explores whether the above theoretical predictions for a small open economy are still relevant if terms of trade matter to the government.

We assume two countries exist and both have the power to affect the world price, but otherwise keep the same assumptions as in the small country case. The foreign country is indicated by $*$. The world price is expressed as p_i^w for product i. In order to simplify the calculation process, the relationship between the domestic market and international market is assumed to be $p_i = t_i p_i^w$ in the home country and $p_i^* = t_i^* p_i^w$ for the foreign country. If t_i and t_i^* are bigger than one, it means the governments implement an import tariff or export subsidy. If t_i and t_i^* are less than one, it indicates an import subsidy or export tax. The political support functions are the same as in the small country case. The welfare of the politically sensitive groups is:

$$\sum_{i\in g} H(t_i^s) = a_g l + a_g \sum_{i=1}^{n} r(t_i, p_i^w) + \sum_{i\in g} \Pi_i(t_i, p_i^w) + a_g \sum_{i=1}^{n} S(t_i, p_i^w) \quad (34)$$

where l continues to represent the total labor income. The remaining three terms are functions of trade protection and the world price. $r(t_i, p_i^w)$, $\Pi_i(t_i, p_i^w)$ and $S(t_i, p_i^w)$ indicate trade revenue, return for specific factors and consumer surplus, respectively.

The aggregate welfare of the economy is expressed as the following equation whose four terms have the same meaning as equation (11). However, terms of trade effects are considered in this case.

$$\sum_{i=1}^{n} W(t_i^s) = l + \sum_{i=1}^{n} \Pi_i(t_i, p_i^w) + \sum_{i=1}^{n} r(t_i, p_i^w) + \sum_{i=1}^{n} S(t_i, p_i^w)$$

(35)

The objective function of the government does not change, which is the same as equation (9), and we continue to solve the politically optimal trade protection following the idea of equation (12).

Equilibrium domestic price equals the reference price

When the equilibrium domestic market price equals the reference price, the welfare change will not lead to any negative deviation from the target value. Because of this, the loss aversion term does not enter the government objective function, which is the same as scenario one of a small country case. Substituting the welfare of politically sensitive groups (equation (34)) and the aggregate social welfare (equation (35)) into government objective function (equation (9)) yields:

$$\Omega = a_g l + a_g \sum_{i=1}^{n} r(t_i, p_i^w) + \sum_{i\in g} \Pi_i(t_i, p_i^w) + a_g \sum_{i=1}^{n} S(t_i, p_i^w) + \varphi l +$$

$$\varphi \sum_{i=1}^{n} \Pi_i(t_i, p_i^w) + \varphi \sum_{i=1}^{n} r(t_i, p_i^w) + \varphi \sum_{i=1}^{n} S(t_i, p_i^w)$$

(36)

The trade revenue function ($r(t_i, p_i^w)$) is known as the product of trade quantity and tariff rate:

$$r(t_i, p_i^w) = \sum_{i=1}(t_i - 1)p_i^w[d_i(t_i, p_i^w) - \frac{1}{N}y_i(t_i, p_i^w)]$$

(37)

Substituting equation (37) into equation (36) and rearranging the function gives:

$$\Omega = (a_g + \varphi)l + (\varphi + g_i)\sum_1^n \Pi_i(t_i, p_i^w) + (a_g + \varphi)\{\sum_{i=1}(t_i - 1)p_i^w \left[d_i(t_i, p_i^w) - \frac{1}{N}y_i(t_i, p_i^w)\right] + \sum_{i=1}^n S(t_i, p_i^w)\}$$

(38)

Maximizing the objective function of the government with respect to t_i provides the first order condition:

$$(\varphi + g_i)y_i p_i^w + (\varphi + g_i)y_i t_i p_{i1}^w + (a_g + \varphi)\left[g_i M_i(t_i, p_i^w) + (t_i - 1)p_{i1}^w M_i(t_i, p_i^w) + (t_i - 1)p_i^w M_i^{'} p_i^w + (t_i - 1)p_i^w t_i M_i^{'} p_{i1}^w - d_i(t_i, p_i^w)p_i^w - d_i(t_i, p_i^w)t_i p_{i1}^w\right] = 0 \quad (39)$$

Equation (39) is simplified as:

$$(g_i - a_g)(p_i^w + t_i p_{i1}^w)y_i + (\varphi + a_g)[(t_i - 1)p_i^w(p_i^w + t_i p_{i1}^w)M_i^{'} - p_{i1}^w M_i(t_i, p_i^w)] = 0$$
(40)

In the two large countries' case, the terms of trade effects matter for the variance of trade distortions. Based on the world market clearing condition, one obtains the following equation:

$$M_i(t_i, p_i^w) + M_i^*(t_i^*, p_i^w) = 0 \quad i = 1, 2, \ldots\ldots, n.$$

(41)

The partial derivative of the world price with respect to home country's trade policy is expressed as:

$$p_{i1}^{w} = \frac{\partial p_i^w}{\partial t_i} = -\frac{M_i^{'} \, p_i^w}{M_i^{'} \, t_i + M_i^{*'} \, t_i^*}$$

(42)

The politically optimal trade protection is solved by substituting equations (41) and (42) into equation (40) to get:

$$(t_i - 1) = \frac{(g_i - a_g)}{(\varphi + a_g)} \frac{y_i}{p_i^w(-M_i^{'})} + \frac{1}{e_i^*} \text{ for } i = 1, 2, \; \ldots., n \tag{43}$$

The above solution is the maximized political target function regarding the protection level for the home country.[17] $e_i^* = \frac{\pi_i M_i^{*'} \, t_i^*}{M_i^*}$ is the elasticity of foreign country's export supply. Compared with the small country case, the only difference is the terms of trade effect expressed as $\frac{1}{e_i^*}$.

The equilibrium domestic price is lower than the reference price

When the domestic equilibrium price goes below the reference price, producers will experience a loss. Following the same idea as in scenario two in the small country case, the loss aversion part for the producers will enter the objective function of the government. The other individuals whose specific factors are not used to produce this product are net buyers. The price decrease of this product will contribute to a positive gain of net indirect utility. However, the positive gain in the loss-gain function does not add additional utility gain to consumers. In this case, the aggregate social welfare becomes:

[17] The unilateral trade policy for the foreign country could be derived through the same method expressed as: $(t_i^* - 1) = -\frac{(g_i^* - a_g^*)}{(\varphi^* + a_g^*)} \frac{y_i^*}{p_i^w M_i^{*\prime}} + \frac{1}{e_i}$. The resulting structure is the same as for the home county.

$$\varphi \sum_{i=1}^{n} W(t_i^s) = \varphi l + \varphi \sum_{i=1}^{n} \Pi_i(t_i, p_i^w) + \varphi \sum_{i=1}^{n} r(t_i, p_i^w) + \varphi \sum_{i=1}^{n} S(t_i, p_i^w) +$$

$$mi\,n\left(-\sum_{i=1}^{n} a_i N h\left(\frac{\overline{\pi_l} - \Pi_i(t_i, p_i^w)}{a_i N}\right), 0\right)$$

(44)

The welfare of the politically sensitive groups will be expressed as follows:

$$\sum_{i \in g} H(t_i^s) = a_g l + a_g \sum_{i=1}^{n} r(t_i, p_i^w) + \sum_{i \in g} \Pi_i(t_i, p_i^w) + a_g \sum_{i=1}^{n} S(t_i, p_i^w) +$$

$$min\left(-\sum_{i \in g} a_i N h\left(\frac{\overline{\pi_l} - \Pi_i(t_i, p_i^w)}{a_i N}\right), 0\right) \tag{45}$$

Plugging equations (44) and (45) into the government objective function (equation (9)) gives:

$$\Omega = a_g l + a_g \sum_{i=1}^{n} r(t_i, p_i^w) + \sum_{i \in g} \Pi_i(t_i, p_i^w) + a_g \sum_{i=1}^{n} S(t_i, p_i^w) +$$

$$min\left(-\sum_{i \in g} a_i N h\left(\frac{\overline{\pi_l} - \Pi_i(t_i, p_i^w)}{a_i N}\right), 0\right) + \varphi l + \varphi \sum_{i=1}^{n} \Pi_i(t_i, p_i^w) + \varphi \sum_{i=1}^{n} r(t_i, p_i^w) +$$

$$\varphi \sum_{i=1}^{n} S(t_i, p_i^w) + min\left(-\sum_{i=1}^{n} a_i N h\left(\frac{\overline{\pi_l} - \Pi_i(t_i, p_i^w)}{a_i N}\right), 0\right)$$

(46)

Substituting the tariff revenue equation (37) into (46) yields:

$$\Omega = \left(a_g + \varphi\right) l + (\varphi + g_i) \sum_{1}^{n} \Pi_i(t_i, p_i^w) + \left(a_g + \varphi\right)\left\{\sum_{i=1}(t_i - 1) p_i^w \left[d_i(t_i, p_i^w) - \right.\right.$$

$$\left.\left.\frac{1}{N} y_i(t_i, p_i^w)\right] + \sum_{i=1}^{n} S(t_i, p_i^w)\right\} + min\left(-\sum_{i=1}^{n} (\varphi + g_i)\, a_i N h\left(\frac{\overline{\pi_l} - \sum_{i}^{n} \Pi_i(t_i, p_i^w)}{a_i N}\right), 0\right)$$

(47)

Maximizing the above function with respect to t_i gives the first order condition as follows:

$$(\varphi + ps_i) y_i p_i^w + (\varphi + ps_i) y_i t_i p_{i1}^w + \left(a_g + \varphi\right)\left[p_i^w M_i(t_i, p_i^w) + (t_i - 1) p_{i1}^w M_i(t_i, p_i^w) + \right.$$

$$\left.(t_i - 1) p_i^w M_i^{'} p_i^w + (t_i - 1) p_i^w t_i M_i^{'} p_{i1}^w - d_i(t_i, p_i^w) p_i^w - d_i(t_i, p_i^w) t_i p_{i1}^w\right] -$$

$$(\varphi + ps_i)a_i N h^{'}(\cdot)\frac{1}{a_i N}(-y_i p_i^w - y_i t_i p_{i1}^w) = 0$$

(48)

Solving the optimal trade protection level by applying equations (41) and (42) gives:

$$(t_i - 1) = \frac{[g_i - a_g + (\varphi + g_i)h^{'}(\cdot)]}{[a_g + \varphi]}\frac{y_i}{p_i^w(-M_i^{'})} + \frac{1}{e_i^*}$$

(49)

Comparing equation (49) with (43), the only change is the term in the numerator $(\varphi + g_i)h^{'}(\cdot)$, which is positive according to the characteristics of the loss aversion function. This means the protection level is higher compared with the protection level when the equilibrium price equals the reference price. When trade protection is higher, the domestic market price must be higher than the world price. If the equilibrium domestic price goes lower than the reference price, the world price is lower than the reference price. Therefore, we can conclude that the terms of trade do not change the result of Proposition 1, which could be expressed as follows:

$$\left\{\frac{[g_i - a_g + (\varphi + g_i)h^{'}(\cdot)]}{[a_g + \varphi]}\frac{y_i}{p_i^w(-M_i^{'})} + \frac{1}{e_i^*}\right\} > \left\{\frac{(g_i - a_g)}{(\varphi + a_g)}\frac{y_i}{p_i^w(-M_i^{'})} + \frac{1}{e_i^*}\right\}$$

(50)

The equilibrium domestic price is higher than the reference price

If the equilibrium price is higher than the reference price, producers gain. Following the arguments of Freund and Özden (2008), when the producers own one specific factor and the product experiences an increase of price, the return dominates the loss aversion term for producers. However, the net buyers whose specific factors do not experience price increases will have loss aversion effects. The loss aversion term enters the government objective function due to loss of consumers' surplus. In this scenario, adding the loss aversion term from consumers' perspective means the standard aggregate social welfare (equation (11)) becomes:

$$\varphi \sum_{i=1}^{n} W(t_i^s) = \varphi l + \varphi \sum_{i=1}^{n} \Pi_i(t_i, p_i^w) + \varphi \sum_{i=1}^{n} r(t_i, p_i^w) + \varphi \sum_{i=1}^{n} S(t_i, p_i^w) + min\left(-\varphi\beta_i Nh\left(\frac{\overline{\sum_{l=1}^{n} r(t_\iota, p_l^w)} - \sum_{l=1}^{n} r(t_i, p_i^w) + \overline{\sum_{l=1}^{n} S(t_\iota, p_l^w)} - \sum_{i=1}^{n} S(t_i, p_i^w)}{N}\right), 0\right)$$

(51)

Following the same idea, the welfare of the politically sensitive groups becomes:

$$\sum_{i\in g} H(t_i^s) = a_g l + a_g \sum_{i=1}^{n} r(t_i, p_i^w) + \sum_{i\in g} \Pi_i(t_i, p_i^w) + a_g \sum_{i=1}^{n} S(t_i, p_i^w) + min\left(-\beta_i^g Nh\left(\frac{\overline{\sum_{l=1}^{n} r(t_\iota, p_l^w)} - \sum_{l=1}^{n} r(t_i, p_i^w) + \overline{\sum_{l=1}^{n} S(t_\iota, p_l^w)} - \sum_{i=1}^{n} S(t_i, p_i^w)}{N}\right), 0\right)$$

(52)

Substituting the above two equations (51) and (52) into the government objective function (equation (9)) yields:

$$\Omega = \varphi l + \varphi \sum_{i=1}^{n} \Pi_i(t_i, p_i^w) + \varphi \sum_{i=1}^{n} r(t_i, p_i^w) + \varphi \sum_{i=1}^{n} S(t_i, p_i^w) + min\left(-\varphi\beta_i Nh\left(\frac{\overline{\sum_{l=1}^{n} r(t_\iota, p_l^w)} - \sum_{l=1}^{n} r(t_i, p_i^w) + \overline{\sum_{l=1}^{n} S(t_\iota, p_l^w)} - \sum_{i=1}^{n} S(t_i, p_i^w)}{N}\right), 0\right) + a_g l + a_g \sum_{i=1}^{n} r(t_i, p_i^w) + \sum_{i\in g} \Pi_i(t_i, p_i^w) + a_g \sum_{i=1}^{n} S(t_i, p_i^w) + min\left(-\beta_i^g Nh\left(\frac{\overline{\sum_{l=1}^{n} r(t_\iota, p_l^w)} - \sum_{l=1}^{n} r(t_i, p_i^w) + \overline{\sum_{l=1}^{n} S(t_\iota, p_l^w)} - \sum_{i=1}^{n} S(t_i, p_i^w)}{N}\right), 0\right)$$

(53)

From tariff revenue equation (37), the equation (53) could be rewritten as:

$$\Omega = (a_g + \varphi)l + (\varphi + g_i)\sum_{1}^{n} \Pi_i(t_i, p_i^w) + (a_{ps} + \varphi)\left\{\sum_{i=1}(t_i - 1)p_i^w\left[d_i(t_i, p_i^w) - \frac{1}{N} y_i(t_i, p_i^w)\right] + \sum_{i=1}^{n} S(t_i, p_i^w)\right\} + \min\left(-(\varphi\beta_i + \right.$$

$$\beta_i^g)Nh\left(\frac{\overline{\sum_{l=1}^{n} r(t_l,p_l^w)}-\sum_{i=1}^{n}(t_i-1)p_i^w\left[d_i(t_i,p_i^w)-\frac{1}{N}y_i(t_i,p_i^w)\right]+\overline{\sum_{l=1}^{n} S(t_l,p_l^w)}-\sum_{i=1}^{n} S(t_i,p_i^w)}{N}\right),0\Big)$$

(54)

We can get the following first-order condition by using Roy’s identity, Hotelling's lemma, and relationship between the domestic market price and the international market price:

$$(\varphi+g_i)y_ip_i^w+(\varphi+g_i)y_it_ip_{i1}^w+\left(a_g+\varphi\right)\Big[p_i^wM_i(t_i,p_i^w)+(t_i-1)p_{i1}^wM_i(t_i,p_i^w)+$$

$$(t_i-1)p_i^wM_i^{'}\ p_i^w+(t_i-1)p_i^wt_iM_i^{'}\ p_{i1}^w-d_i(t_i,p_i^w)p_i^w-d_i(t_ip_i^w)t_ip_{i1}^w\Big]-$$

$$\left(\varphi\beta_i+\beta_i^g\right)Nh^{'}(\cdot)\Big[-p_i^wM_i(t_i,p_i^w)-(t_i-1)p_{i1}^wM_i(t_i,p_i^w)-(t_i-1)p_i^wM_i^{'}\ p_i^w-$$

$$(t_i-1)p_i^wt_iM_i^{'}\ p_{i1}^w+d_i(t_i,p_i^w)p_i^w+d_i(t_i,p_i^w)t_ip_{i1}^w\Big]\frac{1}{N}=0$$

(55)

Rearranging the above function, we can get the optimal protection level by applying equations (41) and (42):

$$(t_i-1)=\frac{[g_i-a_g-(\varphi\beta_i+\beta_i^g)h^{'}(\cdot)]}{[a_g+\varphi+(\varphi\beta_i+\beta_i^g)h^{'}(\cdot)]}\frac{y_i}{p_i^w(-M_i^{'})}+\frac{1}{e_i^*}$$

(56)

Compared with case one in a large country, the term $(\varphi\beta_i+\beta_i^g)h^{'}(\cdot)$, which takes a positive value according to the characteristics of the loss aversion function, enters the numerator and denominator of the politically optimal trade policy. The decrease of the numerator and the increase of the denominator lead to the ratio value decreasing. Thus the protection level is lower than in the scenario when the equilibrium domestic price equals the reference price. In addition, when the protection level is lower and the domestic market price is lower than the reference price, the international market price must be lower than the reference price. Finally, we can conclude that the large country model does not change the theoretical prediction of Proposition

2 when considering the terms of trade effect. This is illustrated in the following inequality equation:

$$\left\{\frac{[g_i-a_g-(\varphi\beta_i+\beta_i^g)h^{'}(\cdot)]}{\left[a_g+\varphi+(\varphi\beta_i+\beta_i^g)h^{'}(\cdot)\right]}\frac{y_i}{p_i^w(-M_i^{'})}+\frac{1}{e_i^*}\right\}<\left\{\frac{(g_i-a_g)}{(\varphi+a_g)}\frac{y_i}{p_i^w(-M_i^{'})}+\frac{1}{e_i^*}\right\} \tag{57}$$

5 Empirical test

In this section, we investigate the cotton protection pattern in China for consistency with our theoretical model predictions. The cotton sector provides an ideal experiment to analyze trade policy formation motives of the government. Firstly, as illustrated in section 4.3.4, China's imports account for virtually all of China's cotton trade activity. Secondly, Cotton is a special agricultural product, and it makes up a relatively smaller share of expenditure for poor producers, and in most cases they are net sellers (Martin, 2009). This is exactly the same as our model assumptions. During price spikes periods, the income of the cotton producer dominates the producers' "loss-gain" utility . The Chinese government has set a cotton reference price[18] in each year from 2005 to 2015. For this reason, we do not have to estimate the reference price. This helps us test the effects of loss aversion and reference dependence on trade policy formation more accurately. Finally, the cotton producers in Xinjiang benefit when the government increases the tariff (helped by the fact that the Chinese government subsidizes domestic transportation of cotton delivered from Xinjiang to Southeast regions of the country).

5.1 Data sources

In the empirical part, we apply montly, seasonal and annual frequency data to run the empirical model. The monthly data cover 132 months from May 2005 to December 2015. Trade

[18] Freund and Özden (2008) set the reference price as the average of the world price during a particular period.

protection is measured by NRA [19] calculated using the domestic cotton price and the international market price. China cotton monthly prices are mainly collected from the China Cotton Almanac from January 2005 to October 2014, and the data from November 2014 to December 2015 are compiled from the website of China Cotton.[20] The international cotton price is from the National Cotton Council of America (NCCA) between January 2005 and December 2015. To measure the world cotton price in Renminbi (RMB), the monthly exchange rate data are collected from the Board of Governors of the Federal Reserve System (2005-2015).[21] The reference price is the annual value set by the Chinese government at the beginning of each year. The reference price does not stick to a fixed value, and it increased from 10029 Yuan/Ton in 2005 to 12935 Yuan/Ton in 2015. Concerning seasonal fluctuations, we aggregate the monthly data to the seasonal level and add the harvest cycle as the control variable measured by $Sin(\cdot)$ and $Cos(\cdot)$ functions. These data are created by combining the value of π and code numbers of the domestic price series. As a robustness check, a seasonal dummy variable is also applied to control for the production cycles. Meanwhile, in order to test for it being a politically sensitive product, the annual panel data method is implemented by covering 11 agricultural products and the NRA data are from Anderson and Nelgen (2013).

5.2 The effects of political sensitivity on cotton trade protection

One prediction is that a politically sensitive product receives a higher protection level relative to non-politically sensitive products. Trade protection for different types of products are measured by NRA. The products include cotton, poultry, fruits, rice, sugar, soybean and wheat. Figure 5 illustrates the extent of trade protection for six agricultural products excluding sugar. Cotton trade protection is higher comparing with other agricultural products, according to

[19] See "Measuring distortions to agricultural incentives, Revisited" Anderson *et al.* (2008) for more details of NRA indicator.
[20] See *http://www.cncotton.com/*
[21] See *http://www.federalreserve.gov/releases/h10/hist/default1989.htm*

Figure 5.[22] The policy transfers from taxing to subsidizing the cotton sector could be explained by the theoretical model because of cotton's role as a politically sensitive product.

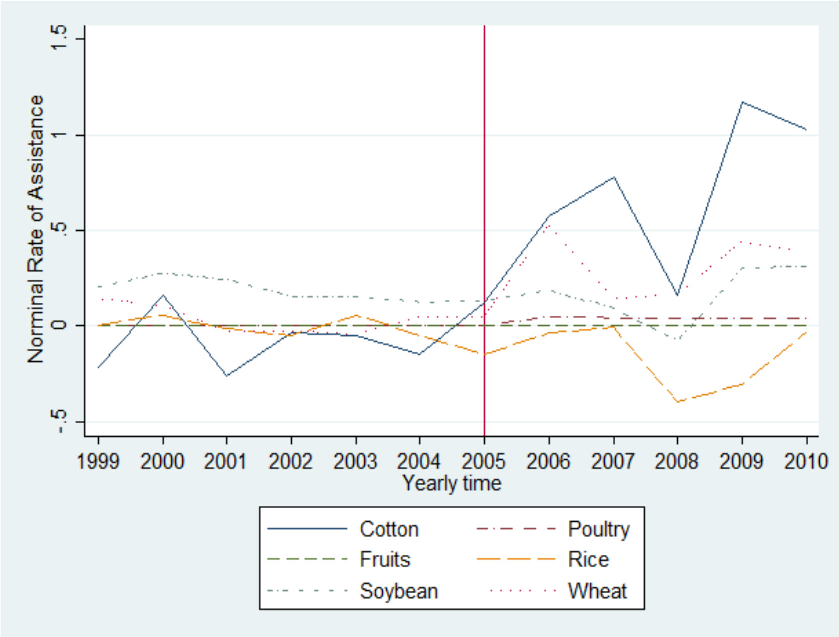

Figure 5: Cotton compared with other agricultural products' trade protection

In order to confirm the theoretical prediction and the role of politically sensitive products, we add two dummy variables to represent cotton and sugar. Table 3 reports the empirical regression results between politically sensitive product dummies and the change of border trade protection by applying panel data. From column 1 to 5, the effect of politically sensitive cotton on the changes of its trade protection is positive and statistically significant at 1% level. Year dummy and product dummy variables are all controlled in the five models. Cotton receives 0.023 point higher trade protection measured by NRA when controlling the international price as reported in column 1. When adding the self-sufficiency ratio (column 2), production value

[22] Sugar receives higher protection than cotton or other agricultural products. However, sugar is not geographically produced in one or a few regions. In the empirical part, we test whether sugar is a politically sensitive product. However, that hypothesis is not supported by the econometrics (see Table 3).

in GDP (column 3), consumption value in total agriculture (column 4) and production value in total agriculture (column 5) into the regression as control variables, the effect size is still around 0.01 and statistically significant. Unlike for cotton, the empirical results do not show any significant effect of the dummy variable for sugar from columns 1 to 5 reported in Table 3.

Table 3: Effect of politically sensitive products on the changes of protection level

Variables	**Δ Protection level (1)**	**Δ Protection level (2)**	**Δ Protection level (3)**	**Δ Protection level (4)**	**Δ Protection level (5)**
Dummy variable	0.023***	0.011**	0.011**	0.010*	0.010**
for cotton	(0.003)	(0.005)	(0.005)	(0.005)	(0.005)
Dummy variable	0.012	0.007	0.005	0.006	0.007
for sugar	(0.091)	(0.005)	(0.007)	(0.007)	(0.006)
Δ ln(world price)	-0.392***	-0.406***	-0.415***	-0.397***	-0.390***
	(0.091)	(0.069)	(0.083)	(0.087)	(0.080)
Δ self-sufficiency		-0.451	-0.458	-0.493	-0.468
ratio		(0.290)	(0.286)	(0.306)	(0.291)
Δ production value in GDP			0.408	0.930	1.515*
			(0.677)	(0.587)	(0.791)
Δ consumption value in total agriculture				-0.474	
				(0.477)	
Δ production value in total agriculture					-0.944
					(0.662)
Constant	0.034***	0.037***	0.035***	0.034***	0.032**
	(0.012)	(0.012)	(0.012)	(0.013)	(0.013)
Year dummy	Yes	Yes	Yes	Yes	Yes
Product dummy	Yes	Yes	Yes	Yes	Yes
Observations	300	300	300	300	300
No. of products	11	11	11	11	11
Adj. R^2	0.484	0.484	0.484	0.484	0.484

Notes: 1) Robust standard errors are reported in the parentheses; 2) * significant at 10%; ** significant at 5%; *** significant at 1%.

5.3 The effects of loss aversion on cotton trade protection

This section empirically tests the effects of loss aversion and reference dependence on the variations of trade restriction in the China cotton sector, both when the world price is lower than the reference price and when it is higher than reference price.

Visual figure illustration

The relationship between cotton trade protection, the international market price, and the reference price is illustrated in Figure 6. The author divides the period into six, depending on the level of world price compared with the reference price level. The blue dotted line indicates the international market price and the green dashed line represents the level of China cotton trade protection. The red horizontal line is the domestic reference price set by the government. When the world price is lower than the reference price, the trade protection level is higher, and when the world price is higher than that of the reference price, the cotton protection level is lower. This is consistent with the theoretical model predictions summarized as Propositions 1 and 2.

When world price is lower, and trade protection is higher, compensating protection is triggered for producers (Freund and Özden, 2008). One interesting finding is in the last period. When the world price continues to decrease, cotton protection sharply decreases despite being outside the compensation period. That government behavior could be explained by diminishing sensitivity to loss.[23] The continuous decrease in the world price leads producers to adjust their planting and investing behaviors. Finally, they accept the loss phenomenon due to the further decrease of the world price. According to the production data, total production of cotton in China decreased from 30 million 480-pound bales in 2014 to 23.8 million a year later.

[23] Diminishing sensitivity means that the marginal value of gains and loss decreases with their size.

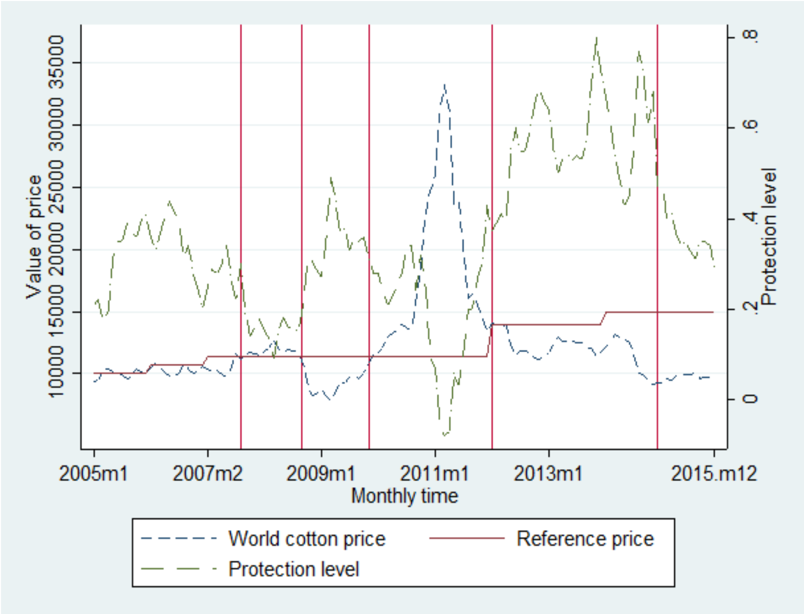

Figure 6: Relationships between world price, reference price and trade protection

Visually, Figure 6 illustrates the theoretical predictions quite well between the trade protection level, the reference price and the world price due to loss aversion effects. However, that does not tell us if the effects of loss aversion and reference dependence are statistically significant. In the following, the correlation is tested using the whole sample and subsamples.

Correlation confirmation

Table 4 reports the correlation and significance level between trade protection and the world price contingent on the reference and the magnitude of loss aversion effects from consumers and producers during world price upward spike and downward spike periods, respectively. The relationship between the international market price and cotton trade protection level should be negatively correlated. The correlation is calculated from the full sample and subsample separately. Based on the calculation of the full sample, the correlation between China cotton protection and the international market price is -0.4237 which is significantly different from zero at 1% significant level. When applying the first half sample and the other later half sample to the robustness checks for correlation, the absolute value of the coefficient increases from

0.4237 to 0.6646 for the first half subsample and then further to 0.7397 for the second half subsample. Both of the coefficients, calculated from two subsamples, are negative and statistically significant at 1% level.

Table 4: Correlation between cotton trade protection and international market price

Correlation size	Sample chosen
-0.4237***	Full sample
-0.6646***	Subsample between Jan 2005 and May 2010
-0.7397***	Subsample between Jun 2010 and Dec 2015

Notes: 1) *** Significantly different from zero at 1% significant level; 2) the coefficients of the two subsamples are statistically the same according to coefficient equality test.

Empirical regression test

In order to further confirm the loss aversion effect on the fluctuations of trade protection level, a complementary econometric regression method is adopted in this part. Table 5 reports the regression results by apply monthly time series data. Because the time series for China cotton price, the international market price and cotton trade protection are not stationary, first differences of the three indicators are calculated. Column 1 reveals that a 10 percent decrease of the international cotton price leads to the cotton trade protection level increasing by 0.065 points measured by NRA without controlling other variables. The effect of world price changes on China's cotton trade protection does not change when the robust standard error is applied in column 2. In columns 3 and 4, China's cotton price and the square term of world cotton price are added as control variables. The effect size increases by adding more control variables. The price comparison between world price and reference may have heterogeneous effects when the world price is higher or lower than the reference price. The interaction term is added into regression as shown in column 5. The result shows that when the world price is higher or lower than the reference price, the result does not change greatly.

Table 5: World price changes on changes of cotton protection level

Variables	**Δ Protection level (1)**	**Δ Protection level (2)**	**Δ Protection level (3)**	**Δ Protection level (4)**	**Δ Protection level (5)**
Δ ln(world cotton price)	-0.654***	-0.654***	-1.347***	-3.129***	-2.378***
	(0.062)	(0.093)	(0.039)	(0.370)	(0.4429)
Δ ln(China cotton price)			1.416***	1.393***	1.381***
			(0.054)	(0.052)	(0.053)
Δ ln(square of world cotton price)				0.093***	0.051**
				(0.019)	(0.024)
Δ ln(world cotton price)×Dummy(world price higher or lower than reference price)					0.096
					(0.049)
Constant	0.001	0.001	-0.000	-0.000	-0.000
	(0.004)	(0.004)	(0.001)	(0.001)	(0.001)
Observations	131	131	131	131	131
Adj. R^2	0.456	0.456	0.973	0.979	0.980

Notes: 1) (Robust) standard errors are reported in the parentheses; 2) ** significant at 5%; *** significant at 1%.

Do production cycles and time trend matter?

Agricultural price and trade protection may be affected by production cycles and a time trend. Therefore, we use the seasonal data to test the effect through controlling the harvest cycles through $Sin(\cdot)$ and $Cos(\cdot)$ functions reported in column 1 (see Table 6). Though harvest production cycles have no significant effect on trade protection fluctuations, it adds to the effect between changes of world price and changes of cotton trade protection levels in China. The time trend is added as a control variable reported in column 2. Quantitatively, a 10 percent fall in the international market price leads to an improvement of 1.1 points in the Norminal Rate of Assistance and the effect is statistically significantly at the 99 percent confidence level. Following a traditional approach to control production cycles, a seasonal dummy variable is added to the model in column 3 and time trends are further controlled in column 4. The effect size of the world price changes on cotton protection changes is 0.11 with a negative sign and it is statistically significant at 1% when the international market price decreases by 1%.

Table 6: Changes of the world price and changes of protection level

Variables	**Δ Protection level (1)**	**Δ Protection level (2)**	**Δ Protection level (3)**	**Δ Protection level (4)**
Δ ln(world cotton price)	-11.328***	-11.311***	-10.968***	-10.906***
	(1.396)	(1.463)	(1.241)	(1.289)
Δ ln(China cotton price)	1.023***	1.000***	1.009***	0.988***
	(0.179)	(0.178)	(0.181)	(1.812)
Δ ln(square of world cotton price)	0.531***	0.530***	0.514***	0.511***
	(0.066)	(0.069)	(0.058)	(0.061)
Δ Cos(·)	0.020	0.023		
	(0.019)	(0.020)		
Δ Sin(·)	-0.007	-0.007		
	(0.022)	(0.022)		
Seasonal dummy			0.003	0.002
			(0.007)	(0.007)
Constant	-0.000	0.014	-0.006	0.004
	(0.001)	(0.015)	(0.198)	(0.021)
Time trend		Yes		Yes
Observations	43	43	43	43
Adj. R^2	0.757	0.076	0.752	0.756

Notes: 1) (Robust) standard errors are reported in the parentheses; 2) *** significant at 1%.

Compared with the effect reported in Table 5, the effect size in Table 6 sharply increases by applying seasonal data. This increase could potentially be explained by the sticky and delayed changes of trade policy in response to international market price: the Chinese government prefers to adjust trade policy acoss seasons rather than altering trade policy promptly and sharply each month.

6 Conclusions

Research to explain variances in trade restrictions in non-democratic and developing countries is rare. Based on Freund and Özden's (2008) model, this paper provides a political support model characterized by spatial dimensions of interest-group politics to explain changes in trade restrictions in China. The results explain trade distortion fluctuations from two perspectives. On the one hand, politically sensitive groups receive greater protection. On the other hand, the target of the government's changing trade distortions is to stabilize the domestic market by insulating it from short-term fluctuations in the international market. This behavior of government could be explained by introducing loss aversion and reference dependence into the government's objective function. The government reduces protection when the world price is higher than the target reference price if the loss aversion for consumers is large enough, and it reduces the protection level when the world price is lower than the target reference price if the loss aversion for producers is large enough.

In order to uncover the ambiguous effects of terms of trade on trade policy jointly with loss aversion, the model is extended to a large country case. The results show that terms of trade effects do matter for the trade protection level. However, the effect of loss aversion is independent of the terms of trade effects.

Finally, we apply our theoretical model to the cotton sector in China, and the empirical results favorably explain the puzzling cotton protection policy in China between 2005 and 2015. Cotton is a politically sensitive product which is produced intensively in Xinjiang province. Consistent with the model predictions, cotton gets positive protection that is much higher than for other agricultural products. For a small extension, the changing format of cotton protection compared with other agricultural products could explain the changing variance of protection within a country over time. The short-term fluctuations of cotton protection could be explained by adding the feature of loss aversion. In order to insulate the domestic market from the international market, cotton trade protection is higher when the world price is lower than the reference price due to producers' loss aversion, and the cotton protection level is lower when the international market price is higher than the reference price due to loss aversion of consumers. The Chinese government evidently uses trade restrictions to balance income redistribution between cotton producers and consumers.

Appendix

Table A: Statistics of Han-Uyghur conflict cases during 2007 to 2015

No.	Dates	Place	Casualties	Arrested
1	January 5, 2007	Akto county, SX	18 dead	17
2	August 4, 2008	Kashgar city, SX	16 dead; 16 wounded	2
3	June 25-26, 2009	Shaoguan city, Guangdong	2 dead; 118 wounded	8
4	July 5, 2009	Urumqi city, SX	197 dead; 1,721 wounded	1,000
5	August 2010	Aksu city, SX	>7 dead; 14 wounded	N/A
6	July 18, 2011	Hotan city, SX	16 dead; 4 wounded	4
7	February 28, 2012	Yecheng city, SX	23 dead; 15 wounded	N/A
8	April 23, 2013	Bachu county, Kashgar prefecture, SX	21 dead	8
9	June 26, 2013	Shanshan county, Turpan prefecture, NX	35 dead; 25 wounded	5
10	October 28, 2013	Tiananmen, Beijing	5 dead; 40 wounded	5
11	March 1, 2014	Kunming, Yunnan	33 dead; 143 wounded	4
12	April 18, 2014	Mong Cai city, Quang Ninh province, Vietnam	7 dead	11
13	April 30, 2014	Urumqi city, NX	3 dead; 79 wounded	7
14	May 22, 2014	Urumqi city, NX	39 dead; 94 wounded	1
15	July 28, 2014	Shache county, Kashgar prefecture, SX	96 dead; 13 wounded	215
16	August 1, 2014	Moyu county, Kashgar prefecture, SX	9 dead	1
17	September 21, 2014	Luntai county, SX	50 dead, 50 wounded	2
18	October 12, 2014	Maralbeshi county, Kashgar prefecture, SX	20 dead	N/A
19	November 29, 2014	Shache county, SX	15 dead, 14 wounded	N/A
20	September 18, 2015	Aksu city, SX	50 dead	N/A

Notes: 1) NX, Northern Xinjiang; 2) SX, Southern Xinjiang; 3) N/A Not available

Source: Wikipedia website[24] named Xinjiang conflict and Guo R. (2015).

[24] *https://en.wikipedia.org/wiki/Xinjiang_conflict#cite_note-theguardian.com-15*

References

Acemoglu, D., & Robinson, J. A. (2006). *Economic origins of dictatorship and democracy*. New York: Cambridge Univeristy Press.

Acemoglu, D., & Robinson, J. A. (2012). *Why nations fail: The origins of power, prosperity, and poverty*. New York: Crown Publishers.

Anderson, K. (1995b). The political economy of coal subsidies in Europe. *Energy Policy, 23*(6), 485–496.

Anderson, K., & Hayami, Y. (1986). *The political economy of agricultural protection: East Asia in international perspective*. Bonson, London and Sydney: Allen and Unwin.

Anderson, K., Kurzweil, M., Martin, W., Sandri, D., & Valenzuela, E. (2008). Measuring distortions to agricultural incentives, revisited. *World Trade Review, 7*(4), 675-704.

Anderson, K., & Nelgen, S. (2012). *Trade policy for loss aversion: Evidence from agriculture*. Paper presented at the 55th Annual Conference of the Australian Agricultural and Resource.

Anderson, K., & Nelgen, S. (2013). *Updated national and global estimates of distortions to agricultural incentives, 1955 to 2011*. Retrieved from: www.worldbank.org/agdistortions

Arezki, R., & Brückner, M. (2011). *Food prices and political instability*. IMF Working Paper: WP/11/62.

Baldwin, R.E. (1987). Political realistic objective functions and trade policy PROFs and tarif. *Economic Letters, 24*, 287-290.

Becker, G. S. (1983). A theory of competition among pressure groups for political influence. *The Quarterly Journal of Economics, 98*(3), 371-400.

Becker, G. S. (1985). Public policies, pressure groups, and dead weight costs. *Journal of Public Economics, 28*(3), 329-347.

Bellemare, M. F. (2014). Rising food prices, food price volatility, and social unrest. *American Journal of Agricultural Economics, 97*(1), 1-21.

Besley, T., & Persson, T. (2011). *Pillars of prosperity: The political economics of development clusters*. United Kingdom: Princeton University Press.

Blanchard, E., & Willmann, G. (2013). *Unequal gains, prolonged pain: Dynamic adjustment costs and protectionist overshooting*. NBER ITI Meeting.

Board of Governors of the Federal Reserve System. Foreign exchange rate-H.10: Historial data through 1989. Retrieved from: http://www.federalreserve.gov/releases/h10/hist/default1989.htm

Broda, C., Limão, N., & Weinstein, D. E. (2008). Optimal tariffs and market power: The evidence *The American Economic Review, 98*(5), 2032-2065.

Bullock, D. S. (1994). In search of rational government: What political preference function studies measure and assume. *American Journal of Agricultural Economics, 76(3),* 347-361.

Chase, K. A. (2015). Domestic geography and policy pressures. In L. L. Martin (Ed.), *The oxford handbook of the political economy of international trade*. Oxford, United Kingdom: Oxford University Press.

China Natoinal Cotton Information Center. China cotton price. (2015). Retrieved from: http://www.cncotton.com/

Corden, W. M. (1997). *Trade policy and economic welfare* (Second ed.): Clarendon Press.

Dissanayake, J. (2014). *Political economy of altering trade restrictions*. SSNR Working paper: No. 2539324.

Dominique Patton, R. (2015). China's top cotton producer is resisting the government's reforms. Retrieved from: http://www.businessinsider.com/r-top-china-cotton-producer-resists-reforms-in-restive-xinjiang-2015-2/?r=AU&IR=T

Feenstra, R. C. (2016). *Advanced international trade: Theory and evidence* (Second ed.). Princeton NJ: Princeton University Press.

Findlay, R., & Wellisz, S. (1982). Endogenous tariffs, the political economy of trade restrictions, and welfare. In J. N. Bhagwati (Ed.), *Import Competition and Response* (pp. 223-234). Chicago: University of Chicago Press.

Freund, C., & Özden, Ç. (2008). Trade policy and loss aversion. *American Economic Review, 98*(4), 1675-1691.

Fulton, M. E., & Reynolds, T. (2015). The political economy of food price volatility: The case of Vietnam and rice. *American Journal of Agricultural Economics, 97*(4), 1206-1226.

Gardner, B. L. (1987). Causes of U.S. farm commodity programs. *Journal of Political Economy, 95*(2), 290-310.

Giordani, P. E., Rocha, N., & Ruta, M. (2016). Food prices and the multiplier effect of trade policy. *Journal of International Economics, 101*, 102–122.

Grossman, G. M., & Helpman, E. (1994). Protection for sale. *The American Economic Review, 84*(4), 833-850.

Grossman, G. M., & Helpman, E. (1995). Trade war and trade talks. *Journal of Political Economy, 103*(4), 675-708.

Guo, R. (2015). *China's spatial (dis)integration: Political economy of the inter-ethnic unrest in Xinjiang.* United Kingdom: Elsvier.

Hillman, A. L. (1982). Declining industries and political-support protectionist motives. *The American Economic Review, 72*(5), 1180-1187.

Jean, S., Laborde, D., & Martin, W. (2011). Formulas and flexibility in trade negotiations: Sensitive agricultural products in the World Trade Organization's Doha Agenda. *World Bank Economic Review, 24*(3), 500 - 519.

Lü, X., Scheve, K., & Slaughter, M. J. (2012). Inequity aversion and the international distribution of trade protection. *American Journal of Political Science, 56*(3), 638-654.

MacDonald, S., Gale, F., & Hansen, J. (2015). Cotton policy in China. United States: Economic Research Service, United States Department of Agriculture.

Magee, S. P., Brock, W. A., & Young, L. (1989). *Black hole tariffs and endogenous policy theory: Political economy in general equilibrium*: Cambridge University Press.

Martin, W. (2009). Some support policy options for cotton in China. *China Agricultural Economic Review, 1*(1), 23-37.

Mayer, W. (1984). Endogenous tariff formation. *The American Economic Review, 74*(5), 970-985.

North, D. C., Wallis, J. J., & Weingast, B. R. (2009). *Violence and social orders: A conceptual framework for interpreting recorded human history*. United States: Cambridge University Press.

Olson, M. (1965). *The logic of collective action*. Cambridge MA: Harvard University Press.

Persson, T., & Tabellini, G. (2000). *Political economics explaining economic policy*. Cambridge MA: MIT Press.

Rausser, G. C. (1982). *Political economic markets: PERTS and PESTS in food and agriculture*. CUDARE Working Papers: No.231.

Rausser, G. C., & Freebairn, J. W. (1974). Estimation of policy preference functions an application to U.S. beef import quota. *The Review of Economics and Statistics, 56*(4), 437-449.

Robinson, E. (2013). Chinese cotton policy: Social stability, not trade. Retrieved from: http://deltafarmpress.com/cotton/chinese-cotton-policy-social-stability-not-trade

Rodrik, D. (1995). Poltical economy of trade policy. In G. M. Grossman & K. Rogoff (Eds.), *Handbook of international economics* (pp. 1457-1494).

Stigler, G. J. (1971). The theory of economic regulation. *The Bell Journal of Economics and Management Science, 2*(1), 3-21.

The Cotton Outlook. (2015). The cotlook A index plus: An explanation. (2014). Retrieved from https://www.cotlook.com/information/the-cotlook-a-index-plus-an-explanation/

The sixth census of Chinese government and reports of the local government. (2014). Retrieved from: http://tieba.baidu.com/p/3622083537

Thennakoon, J. (2015). Political economy of altering trade restrictions in response to commodity price spikes. *Review of Development Economics, 19*(2), 434-447.

Tovar, P. (2009). The effects of loss aversion on trade policy: Theory and evidence. *Journal of International Economics, 78*(1), 154-167.

USDA. (2015). Foreign Agriculture Service. Retrieved from: http://www.fas.usda.gov/

Wang, X., Maeda, K., Hokazono, S., & Kaiser, H. M. (2014). Measuring the effects of a sliding scale duty system on China's cotton market: A spatial equilibrium approach. *Agribusiness, 30*(3), 345-365.

Wikipedia. (2016). Xinjiang conflict. Retrieved from: https://en.wikipedia.org/wiki/Xinjiang_conflict#cite_note-theguardian.com-15