

# Inequity Aversion and the International Distribution of Trade Protection

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*One important puzzle in international political economy is why lower-earning and less-skilled intensive industries tend to receive relatively high levels of trade protection. This pattern of protection holds across countries with vastly different economic and political characteristics and is not well accounted for in existing political economy models. We propose and model one possible explanation: that individual inequity aversion leads to systematic differences in support for trade protection across industries. We conduct original survey experiments in China and the United States and provide strong evidence that individual policy opinions about sector-specific trade protection depend on the earnings of workers in the sector. We also present structural estimates that advantageous and disadvantageous inequality influence support for trade protection in the two countries.*

One important puzzle in international political economy is why lower-earning and less-skilled intensive industries tend to receive relatively high levels of trade protection. Because this pattern of protection holds even in low-income countries for which lower-earning and less-skilled intensive industries are likely to be comparative advantage sectors, it is arguably at odds with the common empirical finding that declining, comparative disadvantage industries are more likely to receive protection. Moreover, it is at odds with most theoretical political economy models, which tend to either predict, consistent with most empirical work, that losing sectors from international trade receive more protection or that expanding sectors that gain from greater trade should enjoy more government support. Existing accounts are generally good at explaining support for winners or for losers. They are not, however, good at

explaining why winning sectors are supported in some countries and losing sectors in others, and they do not explain why lower-earning sectors seem to be advantaged in the contest for trade support in almost all countries. Our article analyzes this puzzle in two steps.

First, we propose and model one possible explanation: that individual preferences over trade policy are shaped by considerations of others, above and beyond one's own income. A growing literature has explored theoretically and empirically the possibility that individuals may have *other-regarding* or *social* preferences.<sup>1</sup> Our model of trade policy incorporates the form of social preferences known as *inequity aversion*, in which individuals are altruistic toward others if their material payoffs are below an equitable benchmark but envious of others whose payoffs are above this level. Specifically, we focus on self-centered inequity aversion for which the

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<sup>1</sup> For reviews, see Charness and Rabin (2002), Sobel (2005), Fehr and Schmidt (2006), and Levitt and List (2007).

equitable benchmark for a given individual is his or her own outcome. Individuals do not care about inequity generally but are interested in the fairness of their own outcome relative to others (Fehr and Schmidt 1999, 819). This form of inequity aversion has two distinct parts. *Advantageous inequality aversion* is the loss individuals incur because others have worse material outcomes than they do, while *disadvantageous inequality aversion* is the loss individuals incur because others have better outcomes than they do.

We show how inequity aversion—from both advantageous and disadvantageous inequality—leads to systematic differences in support for trade protection across industries, with sectors employing lower-earning workers more intensively being relatively preferred recipients for trade protection. The essence of our argument is that if individual citizens and policy makers care not only about how trade policy influences their real incomes but also how it affects their incomes relative to others, with a preference for policies that promote income equality, then government policies will tend to support industries that employ lower-earning, less-skilled workers more intensively.

The second step of our article is to evaluate the argument empirically through the analysis of original survey experiments on national samples of citizens in the world's two largest economies, China and the United States. These analyses include two main tests. First, in a survey question, we randomly assign the average wage of the worker in the industry under consideration for trade protection and estimate the effect of variation in workers' wages on support for sectoral trade protection. In both China and the United States, we find that sectors with lower average incomes receive broader support for trade protection. Second, we derive from our model and estimate an equation of policy preferences, and we find evidence that the social preferences assumed in our model do influence support for sector-specific trade protection.

Our estimates for the United States indicate that support for sector-specific trade protection depends on both advantageous and disadvantageous inequality aversion. Increasing our measure of advantageous inequality (the gap by which a respondent's income exceeds the income of the typical worker in the sector being considered for increased trade protection) by two standard deviations raises the probability that respondents support trade protection by 18 percentage points (about a 59% increase). Similarly, increasing the measure of disadvantageous inequality (the gap by which a respondent's income lies below the income of the typical worker in the sector being considered for increased trade protection) by two standard deviations lowers the probability that respon-

dents support trade protection by 16 percentage points (about a 53% decrease). Our estimates for China indicate that support for sector-specific trade protection depends on advantageous inequality but provide little evidence of a substantively important effect for disadvantageous inequality. Increasing the measure of advantageous inequality by two standard deviations raises the probability that respondents support trade protection by almost 17 percentage points (about a 37% increase).

Overall, our analysis finds substantial evidence that Chinese and American citizens exhibit inequity aversion in their preferences for sector-specific trade protection. In turn, this feature of preferences can explain the puzzle of lower-earning sectors receiving greater trade protection in so many countries around the world. Such preferences would be expected to be influential across a wide variety of political economy models of trade, including standard lobbying models. Moreover, the article also contributes to the literature on the determinants of trade policy opinions.<sup>2</sup> Although this literature has entertained the possibility that various departures from material self-interest, such as nationalism and ideas about optimal policy, may influence policy opinions, this research has not formally specified the implications of inequity aversion for preferences nor has it evaluated these implications empirically. Further, our article departs from previous studies emphasizing other-regarding preferences in that we emphasize their influence along with self-interested considerations and we adopt a research design which addresses limitations in existing studies. For example, Mansfield and Mutz (2009) argue that support for free trade depends not on self-interested considerations but on perceptions of how trade affects the economy as a whole. The correlation of these beliefs with policy opinions may reflect other-regarding behavior, but it may also reflect unobserved or unmeasured differences in interests that determine both beliefs about the effects of trade on the economy and policy opinions. Our study employs an experimental design that provides more reliable evidence of the influence of other-regarding preferences on policy opinions without excluding the possibility that self-interest is also a factor in opinion formation. More generally, this literature has also not included detailed analysis of trade policy opinions in China, which is central to understanding contemporary globalization and international economic cooperation.

Beyond trade policy, our article provides a new methodology for investigating the role of inequity

<sup>2</sup> Previous research on trade preferences includes, among others, Scheve and Slaughter (2001a), O'Rourke and Sinnott (2001), Baker (2005), Hays, Ehrlich, and Peinhardt (2005), Mayda and Rodrik (2005), Hainmueller and Hiscox (2006), and Naoi and Kume (2011).

aversion in determining policy preferences. This general strategy—characterized by formal derivation of the impact of other-regarding preferences on policy preferences, specification of an experimental design for evaluating these predictions, and estimation of the theoretical parameters of interest—could be applied to many other areas of economic policymaking for which inequity aversion may be influential in opinion formation.

The rest of our article is organized as follows. In the next section, we document the puzzle that lower-earning, less-skilled sectors receive more trade protection in many countries around the world. We then model trade policy preferences in a setting in which individual preferences display inequity aversion. The next section of the article includes our empirical analysis of the role of inequity aversion in sector-specific trade preferences in the United States and China, and the following section offers some concluding remarks.

## The Puzzle: Sectoral Wages and Trade Protection

This section provides descriptive evidence that for a broad sample of countries, low-earning, less-skilled intensive industries receive relatively high levels of trade protection. This pattern holds across countries with very different patterns of trade and comparative advantage and is not well accounted for by existing explanations of the determinants of trade policy.

Figure 1 plots trade-weighted tariffs in manufacturing industries in 2000 against normalized average wages in those sectors for the United States and China.<sup>3</sup> The first panel of the graph shows a pattern familiar to students of trade policymaking in the United States. Tariffs are relatively low in the United States, but those industries that use lower-skilled, lower-paid workers more intensively receive higher levels of trade protection.

The most common explanation for this pattern of trade protection in the United States is that comparative

disadvantage sectors—losers from expanding trade—get more protection. A large empirical literature has documented the tendency of governments to provide greater trade protection to declining industries. In the United States and Europe, for example, heavily protected industries include textiles, footwear, clothing, and agriculture, which have been contracting for decades.<sup>4</sup>

One implication of the idea that governments tend to support declining sectors is that we should expect significant differences across countries in the distribution of trade protection across different sectors of the economy. While some losing sectors may be common across all countries due to changes in technology or consumer tastes, many changes in the fortunes of industries will reflect differences in comparative advantage across countries. To the extent that winning and losing sectors are in part determined by comparative advantage, we would expect that patterns of trade protection vary across countries and that this variation might be explained in turn by the sources of a country's comparative advantage, such as differences in technology or factor endowments.

To investigate this question further, the second panel of Figure 1 plots trade-weighted tariffs in Chinese manufacturing industries in 2000 against normalized average wages in those sectors. While the level of tariffs in China is higher than the United States, what is striking about this graph is how similar the distribution of protection by factor intensity is compared to the United States. Those sectors which employ less-skilled, lower-paid workers more intensively have higher levels of trade protection. Under the common empirical claim that China has a comparative advantage in sectors such as textiles and toys, which use less-skilled workers more intensively, the pattern of protection observed in this graph is not easily explained by describing these sectors as losing sectors as in the U.S. case. Importantly, this pattern of trade protection in which lower-paying and less-skilled intensive sectors are more likely to get greater trade protection in countries generally thought to have a comparative advantage in those sectors has also been noted for several other developing countries in previous research.<sup>5</sup>

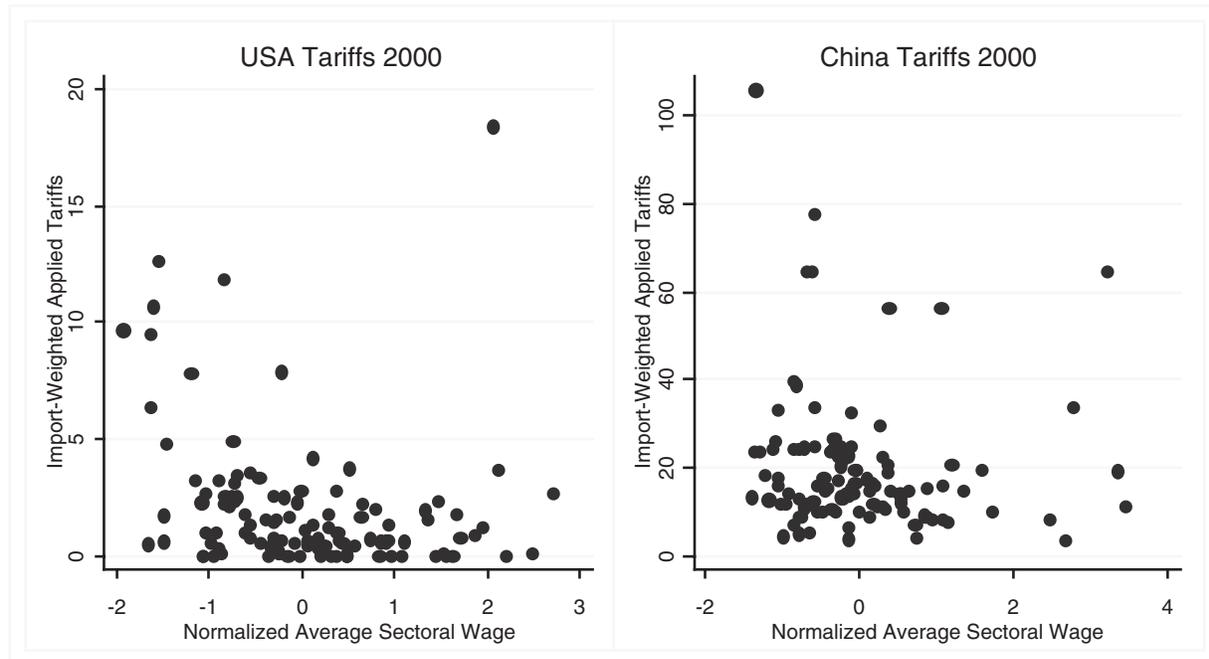
To investigate systematically the possibility that protection is generally higher in lower-paying and less-skilled intensive sectors, we examine the correlation of trade protection and skill intensity in a large cross-section

<sup>3</sup> The U.S. data are for four-digit, ISIC, revision 3 manufacturing sectors. The source for the tariff data is the TRAINS database. The source for the wage data is the most recent UNIDO Industrial Statistics Database (INDSTAT4 2008 ISIC Rev. 3). The outlier industry in the upper right of the graph is Tobacco Products, which is an outlier in many other countries as well. The Chinese data are also for four-digit, ISIC, revision 3 manufacturing sectors and the source for the tariff data is again the TRAINS database. The Chinese wage data were obtained from the China Data Center at the University of Michigan. The original dataset consists of over 500 four-digit industries under the Chinese Industrial Classification System (GB/T 4754 - 1994). We then converted the data into four-digit, ISIC, revision 3 based on the concordances in *The People's Republic of China Standards: Industrial Classification for National Economic Activities* (2002).

<sup>4</sup> See Gawande and Krishna (2003) and Baldwin and Robert-Nicoud (2007) for detailed reviews of this literature.

<sup>5</sup> See, e.g., Hanson and Harrison (1999) for evidence from Mexico, Currie and Harrison (1997) for evidence from Morocco, and Goldberg and Pavcnik (2005) for Colombia, and general discussion in Goldberg and Pavcnik (2007). Note, though, that Milner and Mukherjee (2009) argue that the relationship reverses itself in transitions to democracy.

**FIGURE 1 Imported-Weighted Applied Tariffs and Average Wages in Chinese and U.S. Manufacturing in 2000**



*Note:* Each panel plots import-weighted applied tariffs in four-digit, ISIC, revision 3 manufacturing industries in 2000 against normalized average wages in these industries. See text for sources.

of countries. Our data for this analysis are from the *Trade, Production and Protection (1976-2004)* World Bank dataset arranged by Alessandro Nicita and Marcelo Olarreaga.<sup>6</sup> This dataset contains variables on trade, production, and protection in 28 manufacturing sectors (three-digit ISIC, revision 2). For each country, we picked a year close to 2001 for which data were available to calculate trade-weighted tariffs and average industry wages. We then calculated Spearman's rank correlation coefficient for the tariff and wage data. A negative Spearman's rank correlation coefficient here indicates that the industry ranks for tariffs and average wages are negatively correlated with lower-wage industries receiving relatively greater tariff protection. We report these results for trade-weighted tariffs; the results look quite similar for simple average tariffs.<sup>7</sup>

Figure 2 plots the Spearman rank correlation between weighted tariffs and average wages in three-digit ISIC,

revision 2 manufacturing industries in each country against GDP per capita.<sup>8</sup> The figure reveals two significant patterns in the data. First, for all but two of the countries, the Spearman's rank correlation coefficient is negative, indicating that in almost every country, industries with lower wages receive greater protection. Second, the magnitude of this correlation does not vary across countries by GDP per capita, which is a rough measure of human/physical capital endowments and thus one likely source of comparative advantage. This suggests that there is little evidence in this data that comparative advantage is driving the distribution of trade protection across sectors.

### **A Social Concerns Model of Trade Protection**

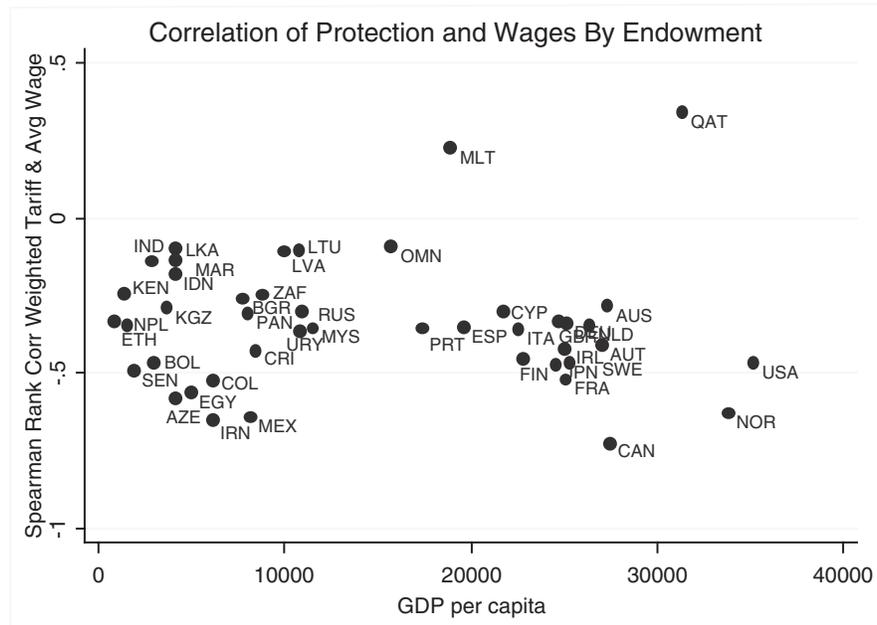
The data reviewed in the previous section show that sectors that employ lower-paid, less-skilled workers more intensively receive greater trade protection across

<sup>6</sup> See <http://go.worldbank.org/EQW3W5UTP0>.

<sup>7</sup> The graphs reported also exclude tobacco products for all countries because this sector is almost always a significant outlier in each country. The results are qualitatively similar if tobacco products is included, though it does somewhat attenuate the negative correlations.

<sup>8</sup> GDP data are from the most recent Penn World Table, <http://pwt.econ.upenn.edu/>.

FIGURE 2 Correlation of Protection and Wages by Endowment



Note: This figure plots the Spearman rank correlation between weighted tariffs and average wages in three-digit, ISIC, revision 2 manufacturing industries in each country against GDP per capita. See text for sources.

countries with very different economic and political characteristics. There are a number of alternative explanations for this pattern of protection. For example, it may be that tariffs are constrained by GATT and WTO commitments, and these policies are dominated by the domestic political interests of relatively wealthy countries for which losing sectors certainly do include industries that employ less-skilled workers more intensively. Another alternative might be that lower-paid sectors lobby harder because their opportunity costs for lobbying are lower. The explanation that we explore in this article is that individual citizens care not only about how trade policy influences their real incomes but also how it affects their incomes relative to others, with a preference for policies that promote equality. As a result, policies that support the incomes of low earners are favored in the policymaking process.

In this section, we develop a theoretical model of trade policy preferences which closely follows standard political economy trade models except for the key difference that individuals in our model care about both their own incomes and their incomes relative to others—they are motivated by inequity aversion.<sup>9</sup> The model focuses

<sup>9</sup> Specifically, we adopt the same assumptions and notation for the economic environment as in Grossman and Helpman (1994) except for the specification of individual utility functions.

on identifying how inequity aversion influences preferences about trade protection in a standard setting, and then we discuss how such preferences may influence policymaking outcomes in diverse institutional settings.<sup>10</sup>

In a perfectly competitive economy with the size of the population normalized to one and  $n$  sectors, individuals maximize the utility function given by:<sup>11</sup>

$$u_i = x_0 + \sum_{i=1}^n u_i(x_i) - \alpha \sum_{i \neq j} \phi_j \max\{I_j - I_i, 0\} - \beta \sum_{i \neq j} \phi_j \max\{I_i - I_j, 0\} \quad (1)$$

<sup>10</sup> Our argument is related to an older literature that suggested the possibility that governments use trade policy to combat inequality. For example, “social change” arguments discussed in Gawande and Krishna (2003), Ball (1967), and Constantopoulos (1974) are all related to the idea that reducing inequality might be one explanation for why governments in the United States and Europe seem to favor declining sectors that employ less-skilled workers more intensively. More recently, Davidson, Matusz, and Nelson (2006) argue that inequality aversion is important for understanding trade politics. Limao and Panagariya (2007) address the question of why trade policy is biased toward import-competing sectors—and therefore restricts rather than increases trade—and show that this bias may be a consequence of government concern about inequality.

<sup>11</sup> See the online appendix of Supporting Information for a more complete description of the model.

This utility function has two components: utility from consumption ( $x_0 + \sum_{i=1}^n u_i(x_i)$ ) and disutility from inequity aversion ( $-\alpha \sum_{i \neq j} \phi_j \max\{I_j - I_i, 0\} - \beta \sum_{i \neq j} \phi_j \max\{I_i - I_j, 0\}$ ). Goods/sectors and types of individuals—as all individuals within a sector are identical—are indexed by  $i, i = 1, 2, \dots, n$ .  $x_0$  is the consumption of the numeraire good 0, and  $x_i$  is the consumption of nonnumeraire good  $i$ . The utility functions  $u_i(\cdot)$  are increasing functions which are differentiable, separable, and strictly concave.

To account for inequity aversion, we incorporate a social preference term into the individual's utility function. The term for inequity aversion is equivalent to the specification in equation (1) in Fehr and Schmidt (1999, 822).  $I_i$  is income of individual  $i$  and  $\phi_i$  indicates the fraction of the population working in sector  $i$ . As in Fehr and Schmidt, the parameter  $\beta$  measures utility loss from advantageous inequality when  $I_i > I_{-i}$ , and the parameter  $\alpha$  measures the utility loss from disadvantageous inequality when  $I_i < I_{-i}$ .<sup>12</sup>

We assume that workers in sector  $i$  all earn identical incomes, which are a function of their labor and the return to a sector-specific input owned only by individuals working in each respective sector. Note that an individual owns at most one type of sector-specific input, and we assume the sector-specific factor input is indivisible and nontradable. The technologies to produce these goods have constant returns to scale, and the specific factor inputs have inelastic supplies. The numeraire good 0 is produced with labor alone and sets the economy-wide return to labor. The nonnumeraire good  $i$  is produced with labor and the sector-specific factor input. We normalize the wage to 1, and the aggregate reward to the specific factor depends on the domestic price of the good, that is,  $\pi_i(p_i)$ , where  $p_i$  is the domestic price. We index each sector's return such that  $\pi_i(p_i) > \pi_{i-1}(p_{i-1})$ . The total income ( $I_i$ ) to an individual in sector  $i$  is equal to his or her wage of 1 plus  $\pi_i(p_i)$ . Individual consumption must meet the budget constraint such that  $I_i \geq x_0 + \sum_{i=1}^n p_i x_i$ . We also denote the exogenous world price of the good to be  $p_i^*$ . The policy choice under consideration is a specific tariff or subsidy  $\tau_i$  on the good produced in sector  $i$ , such that  $\tau_i = p_i - p_i^*$ .

<sup>12</sup> Note that in Fehr and Schmidt and in our model,  $\alpha$  and  $\beta$  are exogenous parameters consistent with the idea that inequity aversion reflects individual preferences for equality. While this is a reasonable assumption for a given institutional context, government policies and societal institutions could influence these losses over time. For example, one might not be as concerned about market inequalities in the context of a highly redistributive tax and transfer system. It is further worth pointing out that the linear specification of losses from inequality is a simplifying assumption, also in Fehr and Schmidt, that may be useful to relax in future work.

The net revenue per capita from trade policies (tariffs or subsidies) is expressed as  $r(\mathbf{p}) = \sum_{i=1}^n (p_i - p_i^*)[d_i(p_i) - y_i(p_i)]$ , where  $d_i(p_i)$  is the demand function of good  $i$  by an individual, and  $d_i(\cdot)$  equals the inverse of  $u'_i(x_i)$ , and  $y_i(p_i)$  is the domestic output of good  $i$  and  $y_i(p_i) = \pi'_i(p_i)$ .  $\mathbf{p} = (p_1, p_2, \dots, p_n)$  is a vector of domestic prices of the nonnumeraire goods. Each individual receives an equal net transfer of  $r(\mathbf{p})$ . The consumer surplus derived from these goods is  $s(\mathbf{p}) \equiv \sum_i u_i[d_i(p_i)] - \sum_i p_i d_i(p_i)$ . Given these assumptions, we can derive individuals' indirect utility in sector  $i$  as follows:

$$Z_i(\mathbf{p}) = 1 + \pi_i(p_i) + r(\mathbf{p}) + s(\mathbf{p}) - \alpha \sum_{i \neq j} \phi_j \max\{\pi_j(p_j) - \pi_i(p_i), 0\} - \beta \sum_{i \neq j} \phi_j \max\{\pi_i(p_i) - \pi_j(p_j), 0\} \quad (2)$$

To determine individual preferences about trade policy in sector  $j$  ( $\tau_j$ ), we derive an expression for optimal tariffs by maximizing this function with respect to  $p_j$ , which is simply the sum of the exogenous world price and the tariff, and then solving for  $\tau_j$ . We are looking for the domestic prices (and implied tariffs) in sector  $j$  that maximize welfare for an individual in sector  $i$ .

This yields the following optimum tariffs preferred by individual  $i$  for sector  $j$ :

$$\tau_j^{D.0} = \frac{y_j(p_j)}{m'_j(p_j)} [1 + \alpha \phi_j] \quad \text{if } \pi_j(p_j) > \pi_i(p_i) \text{ \& } i \neq j \quad (3a)$$

$$\tau_j^{A.0} = \frac{y_j(p_j)}{m'_j(p_j)} [1 - \beta \phi_j] \quad \text{if } \pi_j(p_j) < \pi_i(p_i) \text{ \& } i \neq j \quad (3b)$$

where the superscript  $D.0$  indicates the optimal tariff for "disadvantageous inequality" when  $\pi_j(p_j) > \pi_i(p_i)$ ,  $A.0$  indicates the optimal tariff for "advantageous inequality" when  $\pi_j(p_j) < \pi_i(p_i)$ , the net import function is  $m_j(p_j) \equiv d_j(p_j) - y_j(p_j)$ , and the other terms are as defined above. This expression, like similar models in the literature, defines optimal tariffs implicitly because import demand and domestic output are endogenous. Nonetheless, this expression provides us with a description of how inequity aversion influences tariff preferences. Assuming good  $j$  is a normal good, then  $y_i(p_i) = \pi'_i(p_i) > 0$ . Further,  $m'_j(p_j) < 0$  because net imports decrease with an increase in the domestic price, and recall that  $\phi_j$  is simply a positive weight for the size of sector  $j$ . This implies that for sectors with incomes higher than a given individual  $i$  ( $\pi_j(p_j) > \pi_i(p_i) \text{ \& } i \neq j$ ), an increase in  $\alpha$  results in a lower preferred tariff. This means that the greater an individual's utility loss from

“disadvantageous inequality,” the lower will be the preferred tariff for that individual in all sectors with higher incomes. Because tariffs raise returns to specific factors, the more that individuals do not like it when others make more than they do, the lower they will want the tariff for these sectors to be.

Similarly, we can evaluate the impact of advantageous inequality. For sectors with incomes lower than a given individual  $i$  ( $\pi_j(p_j) < \pi_i(p_i)$  &  $i \neq j$ ), an increase in  $\beta$  results in a higher preferred tariff. This means that the greater an individual’s utility loss from “advantageous inequality,” the higher will be the preferred tariff for that individual in all sectors with lower incomes. Because tariffs raise returns to specific factors, the more individuals do not like it when others make less than they do, the higher they will want the tariff for these sectors to be.

This model identifies how self-centered inequity aversion influences policy preferences about trade protection in a standard setting, and it provides clear empirical predictions that we will evaluate in the next section of the article. It is straightforward to see that the preferences described in our model would tend to push policy outcomes in a direction for which lower-earning industries tend to receive higher levels of protection under a number of alternative assumptions about the policymaking process. Thus, inequity aversion constitutes one possible answer to the empirical puzzle that we have documented.

For example, suppose policy is chosen by a single individual in the society with the preferences described above. This policy maker could be a citizen from the median industry, or an individual elected to office for reasons unrelated to trade policy, or a leader in a non-democratic political regime. The exact policy selected for each industry by such a leader will depend on the individual’s position in the income distribution and the relative magnitude of the parameters in the model. That said, lower-paying industries are more likely to benefit from the policy maker’s dislike of advantageous inequality and less likely to be punished by his or her aversion to disadvantageous inequality, yielding a pattern of greater protection for lower-paying industries.

Another relatively simple way to think about the policy implications of our model of preferences is to consider the case of a social welfare maximizing planner. In this setting, aggregate utility losses from disadvantageous inequality toward workers in a sector will tend to lower that sector’s protection while aggregate utility losses from advantageous inequality toward workers in a sector will tend to raise that sector’s protection. Lower-earning sectors will have lower levels of aggregate utility losses from

disadvantageous inequality and higher levels of aggregate utility losses from advantageous inequality, and thus will be more likely to be protected than higher-earning sectors.<sup>13</sup> Many political economy models of trade are, in effect, models for which a policy maker weighs aggregate welfare against some other gain, such as lobbying contributions. To the extent that aggregate welfare is influential at all in the policymaking process, inequity aversion is likely to push policy toward greater protection for lower-earning sectors and less for higher-earning sectors.

## Inequity Aversion in Trade Policy Preferences

In this section we use national samples of citizens in China and the United States to provide two critical empirical tests in support of our model. First, we show that preferences aggregated across all respondents in each country vary systematically with the treatment income of industry workers: industries with lower-income workers receive broader support for trade protection. Second, we derive from our model and estimate an equation of policy preferences, and we find that individuals exhibit inequity aversion. Econometrically identifying these preferences lends considerable support to our explanation of the trade-policy puzzle documented above.

### Experimental Design

To estimate the effect of inequity aversion—both from advantageous and disadvantageous inequality—on support for sector-specific trade protection, we designed a survey experiment that randomly assigned respondents to consider trade protection for industries with different wage levels and recorded their support for sector-specific trade protection. In China, the experiment was conducted in face-to-face interviews for a national sample of the Chinese adult population living in major cities and county-level cities.<sup>14</sup> In the United States, the experiment was conducted over the Internet for a nationally representative

<sup>13</sup> In this very simple economic setting, a welfare-maximizing policy maker would choose no tariffs for many sectors, but depending on the relative magnitude of the model’s parameters, some sectors would receive protection, and those sectors would be low-earning sectors with high-aggregate losses from advantageous inequality and low-aggregate losses from disadvantageous inequality.

<sup>14</sup> The experiment was conducted by the Horizon Research Consultancy Group in summer 2009.

sample of the U.S. adult population.<sup>15,16</sup> These two countries were selected as a starting point for evaluating the importance of inequity aversion in opinion formation because their observed comparative advantage is in very different sectors and because of their importance in the world economy.

The English translation of the question that we asked to elicit support for sector-specific trade protection in China was as follows:

There is an industry in China in which the average worker makes X yuan per month. To increase the wages of workers in this industry, some people want the government to limit imports of foreign products in this industry. Others oppose these limits because such limits would raise prices that consumers pay and hurt other industries. Do you favor or oppose limiting the import of foreign products in this industry?

IF FAVOR: Do you strongly favor or only somewhat favor limiting the import of foreign products in this industry?

IF OPPOSE: Do you strongly oppose or only somewhat oppose limiting the import of foreign products in this industry?

An analogous question was posed to our U.S. sample.<sup>17</sup> The value of X was assigned randomly across respondents to be equal to 800, 2,000, or 4,000 yuan per month in China and 18,000, 40,000, or 80,000 dollars per year in the United States.<sup>18</sup> These values were chosen so that respondents were considering trade protection for low-, average-, and high-wage industries. For example, in the United States, the low value of \$18,000 corresponds to an income a bit higher than the total money income in 2007 for an adult who worked full-time, year-round at the 10th percentile in the income distribution.<sup>19</sup> Alternatively, one can think about this low income amount

as the wage earned by a worker who worked full-time, year-round at about \$9.00 per hour or a bit higher than the minimum wage. The average value was selected as a round value close to the median total money income in 2007 for an adult who worked full-time, year-round of \$41,245. Similarly, the high wage of \$80,000 falls at about the 84th percentile in the total money income distribution in 2007. The values for China correspond to points in the 2007 monthly Chinese wage distribution similar to those used for the United States.<sup>20,21</sup>

It is important to compare the wording of our survey question to other questions examined in the literature on the determinants of trade policy opinions. This question asks respondents whether they favor new trade barriers for a single industry and consequently is more narrowly focused than typical question formats which elicit opinions about general trade policy across an entire economy. Moreover, although not stated explicitly, our wording implies that the industry in question is not the industry in which the respondent works. We chose our question wording to correspond with the empirical puzzle of this article, which is focused on the distribution of protection across industries and with our theoretical model, which assumes that income to workers and policy setting are both determined by industry.

The marginal responses to this question are consistent with the intention to elicit support for sector-specific trade policies. Specifically, respondents are much less likely to give a protectionist response when considering a single industry than when answering a question about general trade policy. This is most clearly the case for the United States, for which there is a long record of polling public opinion about trade policy. In our U.S. survey, just 30.9% of respondents favor new trade barriers while nearly 70% of respondents are opposed (44% favor limiting imports with 56% opposed in the Chinese data).<sup>22</sup> This ratio of two-to-one against new sector-specific trade barriers contrasts with responses to more general trade policy questions which, depending on question wording, tend to elicit anywhere from two-to-one support for further trade barriers to equal support and opposition to new barriers (see Scheve and Slaughter 2001b, chap. 2).

<sup>15</sup> The experiment was conducted by Knowledge Networks as part of their QuickView studies employing respondents from their KnowledgePanel in summer 2009. For more information, see [www.knowledgenetworks.com](http://www.knowledgenetworks.com).

<sup>16</sup> Both experiments were reviewed and granted exemptions by Yale University's Faculty of Arts and Sciences Human Subjects Committee.

<sup>17</sup> The exact wording for the U.S. question can be found in the online appendix of Supporting Information.

<sup>18</sup> See the online appendix of Supporting Information for evidence that the observed characteristics of the respondents across treatment groups are closely balanced.

<sup>19</sup> The source for this data is the Current Population Survey, Annual Social and Economic Supplement, Table PINC-02.

<sup>20</sup> See National Bureau of Statistics of China (2008).

<sup>21</sup> Note that the slight difference in the English translation of the Chinese question arose from back translation and pilot testing of the original U.S. question.

<sup>22</sup> Descriptive statistics are based on weighted averages, though these differed little from the unweighted averages.

## Experimental Results

Our first set of empirical results reports the basic findings from the experiment—that is, the effect of variation in the assumed average wage of the industry under consideration for trade protection on support for sector-specific trade protection.

We constructed two measures of support for new trade barriers based on responses to our question. *Trade Opinion 1* is set equal to one for respondents who favor new trade barriers and is equal to zero for those opposed. *Trade Opinion 2* is set equal to one for respondents who oppose new trade barriers strongly, two for respondents who oppose new trade barriers somewhat, three for respondents who favor new trade barriers somewhat, and four for those who favor new trade barriers strongly. Each of the measures is increasing in support for a protectionist policy.

Table 1 reports the mean estimates for each treatment category and difference-in-means estimates for each combination of treatments. These results provide substantial evidence that support for sector-specific trade barriers is influenced by the average wage of workers in the industry.

For China, support for limiting the import of foreign products is 7 percentage points higher (a 16% increase) for respondents who considered protection for an industry with a low wage versus respondents who considered protection for an industry with an average wage. This difference was of a similar magnitude for respondents who considered protection for an industry with a low wage versus respondents who considered protection for an industry with a high wage. The results thus suggest for China a significant difference between respondents receiving the low-wage treatment and both the middle- and high-wage treatments, but no difference between the middle and high treatments.

In the United States, the results are even more striking. Support for new trade barriers is 8 percentage points higher (a 26% increase) for respondents who considered protection for an industry with a low wage versus respondents who considered protection for an industry with an average wage. This difference was nearly 19 percentage points (an over 90% increase) for respondents who considered protection for an industry with a low wage versus respondents who considered protection for an industry with a high wage. The differences between the middle- and high-wage treatments are also substantively and statistically significant. It is clear that support for sectoral trade protection is decreasing in the average wages of the sector under consideration.

Table 2 reports estimates of the differences across our treatment categories controlling for various demo-

graphic characteristics of respondents and fixed effects for geographical location, industry of employment, and interviewer. This framework allows identification of the treatment effects within geographical location, industry, and other respondent characteristics. We estimate the following ordinary least squares regressions:

$$\begin{aligned} TradeOpinion1_{i,k,j,l} = & \pi_0 + \pi_1 MWT_{i,k,j,l} \\ & + \pi_2 HWT_{i,k,j,l} + \Pi X_{i,k,j,l} \\ & + \delta_k + \eta_j + \lambda_l + \epsilon_{i,k,j,l} \quad (4) \end{aligned}$$

where the dependent variable *Trade Opinion 1* is the dichotomous measure described above and is increasing in support for trade protection;<sup>23</sup> *MWT*, *Middle-Wage Treatment*, is a dichotomous measure equal to one if the respondent received the middle-wage treatment for that country and zero otherwise; *HWT*, *High-Wage Treatment*, is a dichotomous measure equal to one if the respondent received the high-wage treatment for that country and zero otherwise; *X* is a vector of demographic variables measuring education attainment, sex, age, and income;<sup>24</sup>  $\delta_k$  are fixed effects for geographical location;<sup>25</sup>  $\eta_j$  are fixed effects for industries;<sup>26</sup>  $\lambda_l$  are fixed effects for interviewers (China only);  $\epsilon$  is the error term; *i*, *k*, *j*, and *l* index individuals, geographic locations, industries, and interviewers, respectively; and  $\pi_0$ ,  $\pi_1$ ,  $\pi_2$ , and  $\Pi$  are parameters to be estimated. The omitted treatment category is *Low-Wage Treatment*, and so the parameters  $\pi_1$  and  $\pi_2$  should be interpreted respectively as the effect of being exposed to the middle- and high-wage treatments compared to the low-wage treatment.

The estimates reported in Table 2 closely mirror those discussed for Table 1 without control variables. For both countries, Model 1 excludes industry fixed effects and Model 2 includes them. For China, exposure to the *Middle-Wage Treatment* decreased the probability of giving a protectionist response by about 7 percentage points compared to exposure to the *Low-Wage Treatment*. This

<sup>23</sup> The results are qualitatively similar employing the *Trade Opinion 2* measure.

<sup>24</sup> The variables are *College Grad* equal to one if the respondent graduated from college and zero if not, *Female* equal to one if the respondent is female and zero if not, *Age* equal to age in years, and *Personal Income* equal to an individual's monthly (China) or annual (U.S.) income (see below for further details on the construction of this variable).

<sup>25</sup> These are cities and counties in China and states in the United States.

<sup>26</sup> These industry dummy variables are fairly aggregated in our Chinese data and include about 20 categories. For the United States, we recorded the industry of employment for each working respondent using the North American Industry Classification System at the three-digit level, and there are over 100 industries in our data.

**TABLE 1 Estimated Effect of Average Wage of Industry on Support for Trade Protection**

	Mean Estimates by Treatment Category			Difference Estimates		
	Low Wage 800Y	Middle Wage 2,000Y	High Wage 4,000Y	Low-Middle	Low-High	Middle-High
<b>China</b>						
<i>Trade Opinion 1</i>	0.485 (0.018)	0.418 (0.017)	0.435 (0.017)	0.067 (0.025)	0.051 (0.025)	-0.016 (0.024)
<i>Trade Opinion 2</i>	2.477 (0.028)	2.405 (0.026)	2.403 (0.027)	0.006 (0.038)	0.040 (0.039)	0.504 (0.037)
Number of Observations	814	825	817	0.059	0.057	0.954
<b>United States</b>						
<i>Trade Opinion 1</i>	0.392 (0.018)	0.310 (0.017)	0.205 (0.015)	0.082 (0.024)	0.187 (0.023)	0.105 (0.022)
<i>Trade Opinion 2</i>	2.311 (0.032)	2.133 (0.031)	1.963 (0.031)	0.001 (0.045)	0.000 (0.045)	0.000 (0.044)
Number of Observations	762	767	736	0.000	0.000	0.000

Note: Columns 1–3 report mean estimates for *Trade Opinion 1* and *Trade Opinion 2* by treatment category and the standard error of the estimate in parentheses. Columns 4–6 report difference-in-means tests, the standard error in parentheses, and p-value assuming unequal variances.

**TABLE 2 Estimated Effect of Average Wage of Industry on Support for Trade Protection, Linear Probability Model Estimates**

	Ordinary Least Squares Estimates			
	China		United States	
	Model 1	Model 2	Model 1	Model 2
<i>Middle-Wage Treatment</i>	-0.068 (0.024)	-0.072 (0.027)	-0.089 (0.025)	-0.075 (0.037)
<i>High-Wage Treatment</i>	0.005	0.007	0.000	0.043
	-0.054 (0.024)	-0.059 (0.028)	-0.198 (0.024)	-0.164 (0.036)
	0.025	0.032	0.000	0.000
Demographic Controls	Yes	Yes	Yes	Yes
Local/State Fixed Effects	Yes	Yes	Yes	Yes
Industry Fixed Effects	No	Yes	No	Yes
Interviewer Fixed Effects	Yes	Yes	NA	NA
Standard Error of Regression	0.470	0.469	0.453	0.453
Observations	2,441	1,997	2,097	1,111

Note: The table reports for China and the United States the results of ordinary least squares regressions for the variable *Trade Opinion 1* on *Middle-Wage Treatment*, *High-Wage Treatment*, and various control variables. The omitted treatment is the *Low-Wage Treatment*. The demographic control variables include *College*, *Female*, *Age*, and *Income*. For each model, the table reports the coefficient estimates for each variable, their heteroskedastic-consistent robust standard errors in parentheses, and p-values. A constant term is included in each regression but not reported in the table.

estimate is quite similar across Models 1 and 2. The estimated difference for the *High-Wage Treatment* is between 5 and 6 percentage points across the two specifications. This again suggests that there is no difference between the middle- and high-wage treatments. It is worth noting the stability of these estimates despite the fact that the specifications with industry fixed effects have many fewer observations because individuals not in the labor market cannot be coded for this variable. For the United States, the differences across the treatments are statistically and substantively significant across all combinations, and the magnitudes are quite close to those reported in Table 1.

These experimental results in Tables 1 and 2 provide strong evidence that increasing the average wage of the industry under consideration for trade protection reduces support for new trade barriers in that industry. The random assignment of the treatments in the experiment makes us confident that these differences are not attributable to other characteristics of the respondents or other selection effects. The result further provides evidence for one possible explanation why low-earning, less-skilled industries tend to be more heavily protected across countries with different factor endowments and political institutions: citizens prefer to support the incomes of low-wage sectors more than high-wage sectors, and this preference is influential in the policy making process. More generally, this finding is consistent with our specific explanation why low-earning, less-skilled industries tend to be more heavily protected across lots of different countries: inequity-averse citizens prefer to support the incomes of low-wage sectors more than high-wage sectors.

This interpretation, however, should be made with some caution. First, these estimates do not provide direct evidence of inequity aversion as defined in our model, but rather are consistent with these mechanisms. Second, there may be alternative reasons why trade opinions vary with the average wage of the industry under consideration for protection. Some alternatives, while logically possible, seem unlikely. For example, one possibility is that respondents may be more concerned about the potential fiscal costs of job loss from import competition in terms of unemployment insurance, welfare, or other trade-adjustment assistance in low-wage sectors than in high-wage sectors. This mechanism is, however, somewhat at odds with the fact that the relationship is observed in a country like China, which does not have generous unemployment compensation or trade-adjustment assistance programs. Other alternative mechanisms, however, may be more difficult to rule out. For example, other forms of other-regarding preferences distinct from inequity aversion might lead respondents to prefer lower-paying sectors. Consequently, our interpretation of

Tables 1 and 2 is that they report evidence consistent with our argument though there could be other related factors driving preferences in a similar direction. They do, nonetheless, constitute strong evidence that preferences may be important in accounting for the puzzle of low-earning industries receiving more trade protection across many countries. We now turn to more direct evidence of inequity aversion in policy opinions about sectoral trade protection.

## Estimation of Inequity Aversion Parameters

To derive our statistical model for estimating the effect of inequity aversion on support for sector-specific trade protection, we start with the individual indirect-utility function in our model, equation (2), introduce an error term,  $\epsilon_i$ , and specify its distribution. The error term should be thought to be composed primarily of those factors influencing opinion about sector-specific trade protection not included in our model. We assume that  $\epsilon_i$  is normally distributed and that it enters the function additively.

We further simplify our model in four ways. First, we omit the term  $r(\mathbf{p})$ , which represents per capita tariff revenues. This argument does not vary across individuals and so will be captured by the constant in our estimating equation. Second, the survey question forces respondents to focus on one industry at a time, and so we consider only income differences between the individual and the average worker in this industry. Consistent with the model, this assumes that changes in trade policy in one industry do not affect income in other industries. The focus on a single industry also allows us to drop the industry-size parameter  $\phi_j$ . Third, we omit the consumer surplus term,  $s(\mathbf{p})$ , as it is a function of individual utility from consumption and not directly measurable. This factor is moved to the error term, and we will use our experimental design to consistently estimate the model parameters despite its omission. Fourth, the term  $\pi_i(p_i)$  is equal to the portion of individual  $i$ 's income that varies across individuals/sectors and is denoted as  $I_i$  (and analogously for individual/sector  $j$ ). The addition of the error term and these simplifications yield:

$$Z_i(\mathbf{p}) = I_i - \alpha[\max\{I_j - I_i, 0\}] - \beta[\max\{I_i - I_j, 0\}] + \epsilon_i \text{ where } i \neq j \quad (5)$$

Let  $z_i^F$  be the utility to individual  $i$  from introducing new trade barriers and  $z_i^O$  be the utility to individual  $i$  from the status quo policy with no new trade barriers. We assume that our survey respondents answer our question favoring or opposing new trade barriers by selecting the policy option that yields the highest utility.

Let  $Y^* \equiv z_i^F - z_i^O$ . If  $y^* > 0$ , the individual favors new trade barriers and otherwise will be opposed. Further, let  $y_i = 1$  if  $y^* > 0$  and  $y_i = 0$  otherwise.  $Y^*$  is the difference between two normally distributed variables and is itself normally distributed. As such, the probability that an individual favors  $P(Y^* > 0) = P(Y = 1)$  or opposes  $P(Y^* \leq 0) = P(Y = 0)$  new trade barriers can be derived from the standard normal CDF. This yields:

$$P(Y = 1) = \Phi(\gamma_0 - \alpha[\max\{I_j - I_i, 0\}] - \beta[\max\{I_i - I_j, 0\}]) \quad (6)$$

where  $\Phi(\cdot)$  is the standard normal CDF and  $\gamma_0$  is a constant.<sup>27</sup>

The variable *Trade Opinion 1* described above is defined to follow this estimation framework and is set equal to one if the respondent favors new trade barriers and is set equal to zero if he or she is opposed. In both our surveys, we also measured annual personal income. In China, the survey instrument places individuals into one of 16 monthly personal income categories. We then defined the actual magnitude of each respondent's income as equal to the midpoint of the income range in which they placed themselves. This variable, *Personal Income*, serves as our measure of  $I_i$ . For the United States, our survey assigned respondents to one of 19 annual personal-income categories, and we constructed the variable *Personal Income* in the same way as for the China data. The variable *Other Income* is equal to treatments in our survey questions and takes on the three randomly assigned values of 800, 2,000, or 4,000 yuan in China and 18,000, 40,000, or 80,000 dollars in the United States. This variable serves as our measure of  $I_j$ . We define the variable *Disadvantageous Inequality* equal to *Other Income* minus *Personal Income* if *Other Income* is greater than *Personal Income* and equal to zero if not. We define the variable *Advantageous Inequality* equal to *Personal Income* minus *Other Income* if *Personal Income* is greater than *Other Income* and equal to zero if not.<sup>28</sup> Thus, we have measures of each argument in equation (6) and our initial estimating equation is:

$$P(Y = 1) = \Phi(\gamma_0 + \alpha \text{Disadvantageous Inequality} + \beta \text{Advantageous Inequality}) \quad (7)$$

<sup>27</sup> Note that we observe  $I_i$  and  $I_j$  under the status quo policy only. We model the differences in utility under new trade barriers and the status quo by allowing  $\alpha$  and  $\beta$  to vary across the two conditions with  $\alpha^F$  ( $\beta^F$ ) differing from  $\alpha^O$  ( $\beta^O$ ) because of the change in  $I_j$  due to new trade barriers. In equation (6),  $\alpha = \alpha^F - \alpha^O$  and  $\beta = \beta^F - \beta^O$  as only the difference is identified. Note further that the income term  $I_i = \pi_i(p_i)$  drops out when  $z_i^O$  is subtracted from  $z_i^F$  because trade barriers in sector  $j$  do not affect the income of individuals in other sectors in the model.

<sup>28</sup> All of these variables are measured in thousands.

We estimate this equation as a probit model and report heteroskedastic-consistent standard errors.<sup>29</sup> The first key hypothesis from our model is that  $\alpha < 0$  because sector-specific trade protection will raise the income of workers in that industry, reducing the utility of individuals who have lower incomes than the industry under consideration for trade protection. The second main hypothesis from our model is that  $\beta > 0$  because sector-specific trade protection will raise the income of workers in that industry, increasing the utility of individuals who have higher incomes than the industry under consideration for trade protection. In short, new trade barriers increase or decrease inequality depending on own income and thus the sign of our advantageous and disadvantageous inequality parameters, although both indicating a form of inequity aversion, are in opposite directions.<sup>30</sup>

Our initial specification follows directly from our theoretical framework. Given that our substantive interest is in estimating the *Disadvantageous Inequality* and *Advantageous Inequality* parameters, it is important to note that this specification makes the usual strong identification assumptions of a cross-sectional analysis. These assumptions would be violated if the model was incomplete and the omitted factors were correlated with *Disadvantageous Inequality* or *Advantageous Inequality*. Because *Personal Income* is a component of the *Disadvantageous Inequality* and *Advantageous Inequality* variables, and because personal income and its correlates such as education have been shown to be associated with trade opinions, there is little doubt that the estimates in this baseline specification are biased.

In a second, preferred specification, we add three additional controls. The first is *Personal Income*; the second is an indicator variable, *Personal Income Greater*, equal to one if the individual's *Personal Income* is greater than the *Other Income* treatment which he or she received; and the third is an interaction term between *Personal Income Greater* and *Personal Income*. This specification recognizes that the *Disadvantageous Inequality* and *Advantageous Inequality* variables are a function of *Personal*

<sup>29</sup> The preceding derivation could be adjusted for analysis of the ordered opinion measure *Trade Opinion 2* and estimated with an ordered probit model or a regression. Our results below are qualitatively similar in these alternative specifications. We also calculated bootstrap standard errors and found little difference in the magnitudes of our standard errors.

<sup>30</sup> We note that our estimates of the advantageous and disadvantageous inequality parameters investigate whether the data from the experiment are consistent with our theoretical framework. It is possible that an alternative theory, perhaps an alternative theory of other-regarding preferences, would explain the data as well. We note, though, that the results described below are more consistent with inequity aversion than a pure altruism account.

*Income*, *Other Income*, and which one is greater than the other. The experimental treatments ensure that *Other Income* is randomly assigned across respondents, but *Personal Income* is not. However, once we control for *Personal Income*, *Personal Income Greater*, and their interaction, variation in the *Disadvantageous Inequality* and *Advantageous Inequality* variables is driven exclusively by the random assignment of the *Other Income* treatments from the survey experiment. This specification has the substantial advantage of fully employing the experiment to identify our estimates of the *Disadvantageous Inequality* and *Advantageous Inequality* parameters, and it yields consistent estimates of the parameters even if the model is incomplete.<sup>31</sup> For this reason, although we report results for the initial specification, we focus attention on the models that include *Personal Income*, *Personal Income Greater*, and their interaction as controls.<sup>32</sup> We also present additional results which add control variables to this second specification.

Table 3 reports our main results for China. The estimates for Model 3 are for our initial specification, equation (7). The estimates for both inequity aversion parameters are small in magnitude and statistically insignificant. As discussed above, this specification follows from the theoretical model but is likely biased because although the *Other Income* component of *Disadvantageous Inequality* and *Advantageous Inequality* is randomly assigned, the *Personal Income* component is not. The Model 4 specification in Table 3 addresses this issue by adding the variables *Personal Income*, *Personal Income Greater*, and their interaction. Once we add these controls, variation in the *Disadvantageous Inequality* and *Advantageous Inequality* variables is driven only by the random assignment of the *Other Income* treatments from the survey experiment, and so we can be confident our estimates are not biased by omitted unobserved factors influencing trade opinions.

The estimates for Model 4 indicate that the estimates for both the *Disadvantageous Inequality* and *Advantageous Inequality* parameters are correctly signed but that only the estimate for *Advantageous Inequality* is statistically and substantively significant (the probit coefficient

estimate for  $\beta$  is 0.159 with a standard error of 0.055). This indicates that, all else equal, individuals with incomes greater than the income of the average worker in the industry under consideration for protection are more supportive of sector-specific trade barriers, the greater their income is relative to the income of workers in the industry which may be protected. To get a sense of the magnitude of this effect, the impact of increasing the *Advantageous Inequality* measure from 0—the value assigned to the variable when the respondent has an income less than or equal to the average income in the industry under consideration for protection—to 2.68—a two standard deviation increase, equivalent to an income difference of 2,680 yuan—on the probability of supporting new trade barriers, holding all other variables at their means, is 0.165 (standard error of 0.057). This means that the probability of favoring new trade barriers increases 16.5 percentage points, which is over a 37% increase from the overall mean of the *Trade Opinion 1* measure.<sup>33</sup>

Table 3 also reports two additional specifications which add various control variables to Model 4. The Model 5 specification adds the variables *College Grad*, *Female*, and *Age* defined above and fixed effects for geographical location and interviewer, while the Model 6 specification also adds fixed effects for industry of employment. Not surprisingly, given the design of the experiment, our estimates of the parameters  $\alpha$  and  $\beta$  in Models 5 and 6 are quite similar to those reported for Model 4. Overall, the estimates in Table 3 provide robust evidence that in China, aversion to *Advantageous Inequality* has a positive effect on support for trade protection.<sup>34</sup>

Table 4 reports our main results for the United States. The estimates for Model 3 indicate negative and statistically significant coefficients for both the *Disadvantageous Inequality* and *Advantageous Inequality* variables. The *Disadvantageous Inequality* result is consistent with our theoretical expectations, whereas the *Advantageous Inequality* estimate is not. However, as discussed in the results for China, this specification follows from the theoretical model but is likely biased given what we know about determinants of trade policy opinions and the assignment of the *Personal Income* component of the

<sup>31</sup> Note that one potential concern is if there are heterogeneous treatment effects from the different components of the *Advantageous Inequality* and *Disadvantageous Inequality* variables, this specification would only estimate the effect from the *Other Income* component of *Advantageous Inequality* and *Disadvantageous Inequality*.

<sup>32</sup> It is worth noting that the estimates for the *Advantageous Inequality* and *Disadvantageous Inequality* parameters, in both China and the United States, are qualitatively the same in unreported specifications that condition only on *Personal Income* in comparison to the specification highlighted here with all three controls.

<sup>33</sup> This estimate was calculated by simulating from the sampling distribution of the probit parameter estimates, following the procedures described in King, Tomz, and Wittenberg (2000).

<sup>34</sup> It is worth pointing out again that the China sample is representative of individuals in major and county-level cities. An interesting question for future research is if rural respondents behave differently, potentially exhibiting more disadvantageous inequality aversion or perhaps less inequity aversion of either type. Similarly, the face-to-face mode of the survey could also influence the relative prevalence of advantageous and disadvantageous inequality aversion, and future research should explore this possibility.

TABLE 3 Inequity Aversion and Support for Trade Protection in China, Probit Estimates

	Probit Model Estimates			
	Model 3 Coefficient Estimates	Model 4 Coefficient Estimates	Model 5 Coefficient Estimates	Model 6 Coefficient Estimates
<i>Disadvantageous Inequality</i> , $\alpha$	-0.004 (0.024)	-0.022 (0.030)	-0.017 (0.032)	-0.018 (0.040)
<i>Advantageous Inequality</i> , $\beta$	0.856 -0.002 (0.021)	0.470 0.159 (0.055)	0.593 0.188 (0.060)	0.663 0.189 (0.062)
<i>Personal Income</i> , $\gamma_1$		0.925 -0.039 (0.040)	0.002 0.005 (0.048)	0.002 -0.044 (0.063)
<i>Personal Income Greater</i> , $\gamma_2$		0.326 0.089 (0.120)	0.910 0.220 (0.136)	0.485 0.150 (0.166)
<i>Personal Income Greater*</i> <i>Personal Income</i> , $\gamma_3$		0.462 -0.111 (0.063)	0.106 -0.172 (0.070)	0.366 -0.140 (0.081)
Demographic Controls	No	No	Yes	Yes
Local Fixed Effects	No	No	Yes	Yes
Industry Fixed Effects	No	No	No	Yes
Interviewer Fixed Effects	No	No	Yes	Yes
Log-likelihood	-1679.2	-1673.4	-1434.9	-1135.3
Observations	2,442	2,442	2,401	1,912

Note: The table reports the results of probit regressions for the variable *Trade Opinion 1* on *Disadvantageous Inequality*, *Advantageous Inequality*, and various control variables. For each model, the table reports the probit coefficient estimates for each variable, their heteroskedastic-consistent robust standard errors in parentheses, and p-values. A constant term is included in each regression but not reported in the table.

*Disadvantageous Inequality* and *Advantageous Inequality* variables. The Model 4 specification in Table 4 addresses this potential problem by adding the variables *Personal Income*, *Personal Income Greater*, and their interaction.

The results for Model 4 indicate that the estimates for both the *Disadvantageous Inequality* and *Advantageous Inequality* parameters are correctly signed and statistically and substantively significant. The estimated probit coefficient,  $\alpha$ , for the variable *Disadvantageous Inequality* is equal to -0.010 with a standard error of 0.002. This indicates that, all else equal, individuals are less supportive of sector-specific trade barriers, the greater the income of the average worker in the industry under consideration for protection relative to the survey respondent. The magnitude of this effect is substantial. To get a sense of the substantive magnitude of this estimate, the effect of increasing the *Disadvantageous Inequality* measure from 0—the value assigned to the variable when the respondent has an income greater than or equal to the aver-

age income in the industry under consideration for trade protection—to 48.8—a two standard deviation increase, equivalent to an income difference of \$48,800—on the probability of supporting new trade barriers, holding all other variables at their means, is -0.163 (standard error of 0.025). This means that the probability of favoring new trade barriers falls 16.3 percentage points, which is almost a 53% decrease from the overall mean of the *Trade Opinion 1* measure.

The estimated probit coefficient,  $\beta$ , for the variable *Advantageous Inequality* is equal to 0.010 with a standard error of 0.004. The magnitude of this effect is also substantively significant. The effect of increasing the *Advantageous Inequality* measure from 0—the value assigned to the variable when the respondent has an income less than or equal to the average income in the industry under consideration for trade protection—to 48.4—a two standard deviation increase, equivalent to an income difference of \$48,400—on the probability of supporting new trade

TABLE 4 Inequity Aversion and Support for Trade Protection in the United States, Probit Estimates

	Probit Model Estimates			
	Model 3 Coefficient Estimates	Model 4 Coefficient Estimates	Model 5 Coefficient Estimates	Model 6 Coefficient Estimates
<i>Disadvantageous Inequality</i> , $\alpha$	-0.009 (0.001)	-0.010 (0.002)	-0.010 (0.002)	-0.012 (0.003)
<i>Advantageous Inequality</i> , $\beta$	0.000	0.000	0.000	0.000
	-0.003 (0.001)	0.010 (0.004)	0.010 (0.004)	0.007 (0.004)
<i>Personal Income</i> , $\gamma_1$	0.012	0.004	0.004	0.139
		-0.006 (0.002)	-0.005 (0.002)	-0.006 (0.003)
<i>Personal Income Greater</i> , $\gamma_2$		0.003	0.016	0.110
		0.268 (0.140)	0.219 (0.143)	0.028 (0.235)
<i>Personal Income Greater*</i> <i>Personal Income</i> , $\gamma_3$		0.056	0.125	0.905
		-0.008 (0.004)	-0.007 (0.004)	-0.002 (0.005)
		0.033	0.063	0.765
Demographic Controls	No	No	Yes	Yes
State Fixed Effects	No	No	Yes	Yes
Industry Fixed Effects	No	No	No	Yes
Log-likelihood	-1270.6	-1254.9	-1221.6	-566.3
Observations	2,097	2,097	2,091	999

Note: The table reports the results of probit regressions for the variable *Trade Opinion 1* on *Disadvantageous Inequality*, *Advantageous Inequality*, and various control variables. For each model, the table reports the probit coefficient estimates for each variable, their heteroskedastic-consistent robust standard errors in parentheses, and p-values. A constant term is included in each regression but not reported in the table.

barriers, holding all other variables at their means, is 0.182 (standard error of 0.065). This means that the probability of favoring new trade barriers increases 18.2 percentage points, which is about a 59% increase from the overall mean of the *Trade Opinion 1* measure.

Table 4 also reports two additional specifications which add various control variables to Model 4. The Model 5 specification adds the variables *College Grad*, *Female*, and *Age* defined above and fixed effects for the state of the respondent. The Model 6 specification also adds fixed effects for industry of employment.<sup>35</sup> Our estimates of the parameters  $\alpha$  and  $\beta$  are quite similar to those reported for Model 4. So although education and sex influence trade opinions, their inclusion makes little difference

<sup>35</sup> The addition of the industry dummy variables decreases the number of observations even more than in the analyses reported in Table 2 because the probit model drops from the analysis any observations for which an industry dummy variable perfectly predicts opinion.

for our estimates because conditional on *Personal Income*, *Personal Income Greater*, and their interaction, variation in *Disadvantageous Inequality* and *Advantageous Inequality* is randomly assigned and thus uncorrelated with our measures of education, sex, or any other determinants of trade opinion. Overall, the estimates in Table 4 provide robust evidence that aversion to advantageous and disadvantageous inequality has an important effect on support for trade protection in our U.S. data.<sup>36</sup>

<sup>36</sup> One of the distinctive features of trade policy is that it is an inefficient policy instrument for redistributing income. To explore further the importance of inequality aversion in understanding trade policy preferences, and perhaps shed some light on why individual citizens support costly redistribution, we conducted a small follow-up experiment with a subset of our U.S. respondents in which we experimentally vary the extent to which the inefficiency of trade policy was salient to respondents. We find that inequity aversion remains important for understanding variation in support for sectoral trade protection when the inefficiency is made more salient. The details of this follow-up experiment are reported in the online appendix in the Supporting Information.

Taken together, the results in both China and the United States strongly support the overall argument of this article. One reason that lower-earning sectors receive more trade protection around the world may be that citizens support trade protection more for low-earning sectors. This support could obviously be influential in a democratic setting, but it could also be influential in an environment in which special interests dominate—whether it be in a democratic or nondemocratic regime. Furthermore, when we combine our model with our experiment, our empirical results are consistent with inequity aversion, accounting for why individuals are more supportive of protection for lower-earning sectors.

## Conclusion

Trade and economic policy making more generally form so much political activity and theatre because of the significant distributional consequences at stake. One important class of explanations for why governments adopt policies that support the incomes of some citizens but not others is that these policies reflect the preferences of particular actors—voters, industry lobbies, politicians, etc.—in the policy making process. An essential element of any explanation of policy outcomes is what accounts for the preferences of the relevant actors. In trade and virtually all areas of economic policy making, self-interest—how policy affects an individual's economic welfare—is a compelling place to start in explaining support for policy alternatives.

Nonetheless, this does not preclude the possibility that economic policy preferences are also influenced by other-regarding preferences. Our article investigates the possibility that social concerns influence policy opinions in trade, an important area of economic policy making, and that these preferences may help explain outcomes not easily accounted for by existing theories.

Specifically, we address the question of why in so many countries lower-earning, less-skilled intensive industries receive relatively high levels of trade protection. What is especially puzzling is that this pattern of protection holds even in low-income countries, for which lower-earning and less-skilled intensive industries are likely to be comparative advantage industries and therefore would be expected in many standard political-economy frameworks to receive relatively low, not high, levels of protection.

We offer an explanation of this puzzle: individual preferences that display inequity aversion. Under a variety of models of the policy making process, inequity aversion on the part of individual citizens would make it

more likely that governments favor lower-earning, less-skilled intensive industries in setting trade policy. To provide evidence in support of our explanation, we analyze policy preferences in national samples of citizens in China and the United States. First, we show that preferences aggregated across all respondents in each country vary systematically with the treatment income of industry workers: industries with lower-income workers receive broader support for trade protection. Second, we derive from our model and estimate an equation for policy preferences, and we find that individuals exhibit aversion to advantageous and disadvantageous inequality. Econometrically identifying these preferences lends considerable support to our explanation of the trade policy puzzle and suggests that social concerns as well as self-interest influence opinion formation about trade policy. It will be important in future research to extend the empirical analysis to test more directly the influence that the social preferences that we document in this article have on the policymaking process generally and on the distribution of trade protection across sectors specifically.

In addition to contributing to the trade policy literature, our article provides a new methodology for investigating the role of inequity aversion in determining policy preferences. This general strategy could be applied to many other areas of economic policymaking for which inequity aversion may be influential in opinion formation. Our findings for trade policy recommend greater attention to social concerns across many areas of economic policymaking.

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## Supporting Information

Additional Supporting Information may be found in the online version of this article:

**Table A1:** Summary Statistics for Control Variables in China Experiment

**Table A2:** Summary Statistics for Control Variables in United States Experiment

**Table A3:** Support for Trade Protection Under Efficient and Inefficient Prime

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