

# Do free trade agreements affect tariffs of non-member countries? A theoretical and empirical investigation.

## Online Appendix

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### Results with import share weights from the first year of the sample.

In this section we show results with import shares from the first year of the sample used as weights in construction of the explanatory variables. This approach alleviates simultaneity of import shares and changes in MFN tariffs is to use, although may not resolve the problem completely, especially if import shares respond to FTA formation with a delay. Panel C of Figure 1A presents the OLS results with import shares weights obtained from the first year of the sample. Panels A and B report the benchmark OLS and IV-GMM with  $IV_2^S(T)$  instruments, respectively, for comparison. The pattern in  $\beta_T$  coefficients in Figure 1A resembles that of the estimates with instrumental variables in Panel B but the magnitudes are notable lower in absolute value, suggesting that using import shares from the first year of the sample reduces the endogeneity bias but not eliminate it completely. Using import shares from the first year of the sample instead of predicted import shares in the instruments (Panel D) leads to a similar conclusion.

### Political economy

Suppose countries are politically biased and attach an additional weight to the domestic producer surplus relative to the other components of welfare. For simplicity, let all members of a prospective trade agreement have symmetric political preferences, with  $\beta_m$  denoting their political bias. Let the political bias of non-member country  $c$  be denoted by  $\beta_c \geq 1$ .

We begin by considering a scenario where country  $z$  negotiates an FTA with  $m$  other countries. Before the FTA is formed (i.e., in policy regime  $\phi$ ), the optimal MFN tariff of an outside country  $c$  on imports from  $z$  is denoted by  $t_c^{gz}(\phi)$ . Similarly,  $t_m^{gz}$  denotes the optimal MFN tariff of prospective FTA members prior to the agreement. Once the FTA is in place, the internal tariff of each member country  $m$  and the optimal MFN tariff of a non-member country  $c$  are denoted by  $\widehat{t}^{gz}$  and  $t_c^{gz}$ , respectively.

It is straightforward to show that the formation of an FTA induces non-member countries to reduce their MFN tariffs:

$$\Delta t_c^{gz} = t_c^{gz}(\phi) - t_c^{gz} = \frac{2[\beta_c[2(n-1) - \lambda] + 4][m\varphi_{int}^{gz}(\beta_m)]}{[2(n-1) + \lambda][4(n+1) + 2\lambda - 2(n-2 + \lambda)\beta_c]} > 0 \quad (1)$$

where  $\varphi_{int}^{gz}(\beta_m) = t_m^{gz}(\beta_m) - \widehat{t}^{gz}$  is the FTA internal preference margin that refers to a reduction in member countries' tariffs following the formation of an FTA. Comparative statics analysis of expression (1) leads to several important testable findings. First, as before, an increase in the preferential export share (along either the intensive or the extensive margins) induces deeper tariff cuts by non-members:  $\frac{\partial \Delta t_c^{gz}}{\partial m} > 0$ ;  $\frac{\partial \Delta t_c^{gz}}{\partial \varphi_{int}^{gz}(\beta_m)} > 0$ . Second, the effect of preferential export share on tariffs of non-member countries is amplified by the presence of political bias:  $\frac{\partial^2 \Delta t_c^{gz}}{\partial m \partial \beta_c} > 0$  and  $\frac{\partial^2 \Delta t_c^{gz}}{\partial \varphi_{int}^{gz}(\beta_m) \partial \beta_c} > 0$ . Hence, non-members with stronger political motivations should respond to trade agreements with deeper tariff cuts. To understand the intuition, first note that the optimal tariff of a non-member country rises with its political bias under any given regime:  $\frac{\partial t_c^{gz}}{\partial \beta_c} > 0$ . However, relative to no agreement, when country  $z$  forms an FTA with  $m$  countries, the external trade diversion occurs, reducing the effect of political bias on tariff protection:  $\frac{\partial t_c^{gz}(m=0)}{\partial \beta_c} > \frac{\partial t_c^{gz}(m)}{\partial \beta_c} > 0$ . Third, non-member countries reduce their tariffs more in response to an FTA if members have larger political bias:  $\frac{\partial^2 \Delta t_c^{gz}}{\partial m \partial \beta_m} > 0$ . If prospective FTA members are more politically motivated, they use more protectionist trade policies so that preferential trade liberalization results in more trade between members. In such a case, an FTA would induce deeper tariff cuts by non-members because of the greater increase in preferential trade share induced by it. Therefore, our empirical framework is robust to the presence of political economy motives of the FTA member countries as  $PXS(T)$  variables pick up the effect of the members' political preferences.

In order to test whether countries with stronger political preferences in trade policies reduce their tariffs by more in response to FTA formation by other countries, we need data on political preferences by country. We take these data from Gawande, Krishna, and Olarreaga (2009). The authors estimate the protection for sale model by Grossman and Helpman (1994) for 51 countries and quantify the extent to which governments are concerned about national welfare relative to rents of special interest groups. Using the estimates of the relative weight that governments attach to welfare over private interests,  $a$ , we run several tests for the hypothesis that political preferences lead to stronger response in trade policies to FTA formation.

First, in column (1) of Table 1A we report the estimates of equation (30) augmented with the interactions of  $PXS(T)$  variables with the welfare mindedness of governments,  $a$ . If more politically biased governments (higher  $\beta$ , lower  $a$ ) reduce tariff by more in response to an increase in  $PXS(T)$ , we would expect to find positive coefficients on  $PXS(T) \times a$  interactions. The estimates in column 1(b) show that only one of the interactions has a positive and marginally significant coefficient. Next, we estimate the coefficients on  $PXS(T)$  variables separately for countries with high and low values of  $a$  using different percentile thresholds on  $a$  to assign countries to one of the two groups. Results with three percentile thresholds, in increasing order of  $a$ , are presented in Table 1A: the 25th percentile (column 2), the 50th percentile (column 3), and the 75th percentile (column 4). For any given threshold, we include the interactions of  $PXS(T)$  with a dummy variable  $I_c$  which takes the value

of one for countries with  $a_c$  above the threshold. Only when we consider countries with the lowest political bias (column 4), we find that they reduce tariffs by less in response to an FTA in the third and the fifth year of the agreement. However, insignificant coefficients on  $PXS(T) \times I_c$  interactions suggest that trade policies of countries with the highest political biases seem to be equally responsive to FTA formation than other countries (column 2). Similar conclusions are drawn from results in column (5) where we add interactions of  $PXS(T)$  with the quartile dummy variables for  $a$ : countries with high  $a$  do not seem to adjust their tariffs any different from countries with low  $a$ . Therefore, there is little evidence in the data that the political economy factors is an important determinant of a responsiveness a country's trade policy to FTA formation by other countries.

## Trade diversion

While a decrease in exports of FTA partners to third countries increases export supply elasticity faced by non-members, the FTA market becomes (relatively) less accessible for goods from the non-members which may start exporting relatively more to each other. This trade diversion effect of the FTAs and the following increase in trade between non-members will tend to decrease the elasticity of export supply, which may partially offset the direct effect of an FTA on non-member tariffs. To test the effect of trade diversion on non-member tariffs, we construct six variables that measure the change in non-member countries' exports to members subsequent to FTA commencement and capture the trade diversion effect:

$$\Delta TD(T)_{cit-1} = \left( \sum_p imp\_share_{cpi} \cdot \Delta EXP\_SHARE(T)_{pit-1} \right)$$

$$\Delta EXP\_SHARE(T)_{pit-1} = \sum_{j,k \neq c,p} FTA(T)_{kjt} \cdot \Delta Texp\_share_{pjit-1}$$

If FTAs cause trade diversion ( $\Delta TD(T) < 0$ ) and deflect trade from non-members to third countries, it would decrease export supply elasticities and increase tariffs of non-member countries. Hence, we would expect coefficients on  $\Delta TD(T)$  variables to be negative. Results in Figure 2A show that while the coefficients on  $\Delta TD(T)$  variables tend to be negative, they are small in magnitudes and largely insignificant. Most importantly, controlling for trade diversion variables does not change the estimates of the  $PXS(T)$  effect.

## References

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