Online Appendix for Cross-retaliation and International Dispute Settlement

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In this online appendix we provide the background calculations for the material in sections 5, 6, and 7 as well as the proofs of proposition 10, lemma 2 and proposition 11 from section 5 and proposition 12 from section 6.

Section 5. Probabilistic retaliation

The tariffs for each state and the side payment are chosen before the realization of the state, therefore the same-sector probabilistic mechanism maximization problem can be written as

$$\max_{\tau_{aH},\tau^*_{aH},\tau_{aL},\tau^*_{aL},\tau_b,\tau^*_b}[EV^S(\tau_a,\tau^*_a,\theta,\tau_b,\tau^*_b,\gamma)-EV^{BN}(\theta)-\zeta_{SP}]\times[EV^{*S}(\tau_a,\tau^*_a,\tau_b,\tau^*_b,\gamma)-EV^{*BN}(\theta)+\zeta_{SP}] \tag{1}$$

subject to the reciprocity and tariff non-negativity constraints given by equations (12) and (13) from the main text, as well as the probabilistic retaliation version of Home's incentive compatibility conditions:

$$\vartheta_a(\tau_{aL},\tau^*_{aL},\theta_L)\geq\gamma\vartheta_a(\tau_{aH},\tau^*_{aH},\theta_L)+(1-\gamma)\vartheta_a(\tau_{aH},\tau^*_{aL},\theta_L), \tag{2}$$

$$\gamma\vartheta_a(\tau_{aH},\tau^*_{aH},\theta_H)+(1-\gamma)\vartheta_a(\tau_{aH},\tau^*_{aL},\theta_H)\geq\vartheta_a(\tau_{aL},\tau^*_{aL},\theta_H). \tag{3}$$

Note that although the reciprocity constraint is the same in the probabilistic case the probabilistic tariffs are different, therefore, the full and constrained reciprocal tariffs ($\tau^{*FRS}_{aH}$and τ^{*RRS}_{aH}) are different. The side

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payment, ζ_{SP}, is again chosen to equalize the welfare gains from adhering to the mechanism.[1]

The incentive-unconstrained optimal same-sector probabilistic retaliation mechanism tariffs are:

$$\tau_b^{SP} = \tau_b^{*SP} = \tau_{aL}^{SP} = \tau_{aL}^{*SP} = 0 < \tau_{aH}^{*S} = \tau_{aH}^{SP} = \frac{(\theta_H - 1)(2A + 2Df - 3f)}{(D-2)(\theta_H - 5 - 4\gamma - 4D\gamma)}. \quad (4)$$

where the superscript "S" represents "same-sector" and the superscript "P" denotes "probabilistic".

The negotiators' maximization problem under a cross-sector probabilistic retaliation mechanism is:

$$\max_{\tau_{aH}, \tau_{aL}, \tau_{aL}^*, \tau_{bH}^*, \tau_{bL}, \tau_{bL}^*} [EV^C(\tau_a, \tau_a^*, \theta, \tau_b, \tau_b^*, \gamma) - EV^{BN}(\theta) - \zeta_{CP}] \times [EV^{*C}(\tau_a, \tau_a^*, \tau_b, \tau_b^*, \gamma) - EV^{*BN}(\theta) + \zeta_{CP}] \quad (5)$$

subject to the reciprocity, cross-sector, and tariff non-negativity constraints given by equations (18), (19), and (20) from the main text, and also the probabilistic renditions of Home's incentive compatible constraints:

$$\begin{aligned} &\vartheta_a(\tau_{aL}, \tau_{aL}^*, \theta_L) + \vartheta_b(\tau_{bL}, \tau_{bL}^*) \\ &\geq \gamma[\vartheta_a(\tau_{aH}, \tau_{aL}^*, \theta_L) + \vartheta_b(\tau_{bL}, \tau_{bH}^*)] + (1-\gamma)[\vartheta_a(\tau_{aH}, \tau_{aL}^*, \theta_L) + \vartheta_b(\tau_{bL}, \tau_{bL}^*)], \end{aligned} \quad (6)$$

$$\begin{aligned} &\gamma[\vartheta_a(\tau_{aH}, \tau_{aL}^*, \theta_H) + \vartheta_b(\tau_{bL}, \tau_{aH}^*)] + (1-\gamma)[\vartheta_a(\tau_{aH}, \tau_{aL}^*, \theta_H) + \vartheta_b(\tau_{bL}, \tau_{bL}^*)] \\ &\geq \vartheta_a(\tau_{aL}, \tau_{aL}^*, \theta_H) + \vartheta_b(\tau_{bL}, \tau_{bL}^*). \end{aligned} \quad (7)$$

The side payment, ζ_{CP}, is chosen to equalize the welfare gains from applying the on-schedule tariffs instead of the non-cooperative tariffs.[2]

Using the superscripts "C" for "cross-sector" and "P" for "probabilistic", the incentive-unconstrained optimal cross-sector probabilistic retaliation tariffs are:

$$\tau_{bL}^{CP} = \tau_{bL}^{*CP} = \tau_{aL}^{CP} = \tau_{aL}^{*CP} = \tau_{bH}^{CP} = \tau_{aH}^{*CP} = 0 < \tau_{bH}^{*CP} = \tau_{aH}^{CP} = \frac{(\theta_H - 1)(2A + 2Df - 3f)}{(D-2)(\theta_H - 5 - 4\gamma)}. \quad (8)$$

We now provide the proof to proposition 10.

Proposition 10. *For any given $\gamma \in (0, 1]$, when considering the joint political-welfare-maximizing incentive-unconstrained negotiated import tariffs under cross-sector and same-sector probabilistic retaliation mechanisms:*

[1] $\zeta_{SP} = \frac{EV^S(\tau_a, \tau_a^*, \theta, \tau_b, \tau_b^*, \gamma) - EV^{BN}(\theta) - EV^{*S}(\tau_a, \tau_a^*, \tau_b, \tau_b^*, \gamma) + EV^{*BN}(\theta)}{2}$.

[2] $\zeta_{CP} = \frac{EV^C(\tau_a, \tau_a^*, \theta, \tau_b, \tau_b^*, \gamma) - EV^{BN}(\theta) - EV^{*S}(\tau_a, \tau_a^*, \tau_b, \tau_b^*, \gamma) + EV^{*BN}(\theta)}{2}$.

(i) $\tau_{aH}^{SP} < \tau_{aH}^{CP} < \tau_{aH}^{E}$.

(ii) *joint political welfare is greater under a cross-sector probabilistic retaliation mechanism and joint social welfare is greater under a same-sector retaliation mechanism;*

(iii) *if given the choice ex-post Foreign will retaliate cross-sector, but Foreign political and social welfare is greater if restricted ex-ante to same-sector retaliation.*

Proof. (i) From equations (4) and 8 we see that the numerators are the same. Since $2A > 3f$, and $\theta_H > 1$ the numerator is positive. Since $2 > D$, all we need to show is that

$$5 - \theta_H + 4\gamma + 4D\gamma \geq 5 - \theta_H + 4\gamma \geq 5 - \theta_H - D^2 > 0,$$

which is true since $D \in (0, 1)$, $\gamma \in [0, 1]$ and $\theta_H < \bar{\theta} < 5 - D^2$.

(ii) Let $E\Omega^S(\gamma, \theta)$ and $E\Omega^C(\gamma, \theta)$ denote the expected joint welfare generated by the incentive-unconstrained negotiated import tariffs under a same-sector and cross-sector probabilistic retaliation mechanisms, respectively, where

$$\begin{aligned}
E\Omega^S(\gamma, \theta) &= (1-\lambda)[\vartheta_a(\tau_{aL}^{SP}, \tau_{aL}^{*SP}, \theta_L)) + \vartheta_a^*(\tau_{aL}^{SP}, \tau_{aL}^{*SP})] \\
&\quad + \lambda\{\gamma[\vartheta_a(\tau_{aH}^{SP}, \tau_{aH}^{*SP}, \theta_H) + \vartheta_a^*(\tau_{aH}^{SP}, \tau_{aH}^{*SP})] + (1-\gamma)[\vartheta_a(\tau_{aH}^{SP}, \tau_{aL}^{*SP}, \theta_H) + \vartheta_a^*(\tau_{aH}^{SP}, \tau_{aL}^{*SP})]\} \\
&\quad + \vartheta_b(\tau_b^{SP}, \tau_b^{*SP}) + \vartheta_b^*(\tau_b^{SP}, \tau_b^{*SP}) \\
E\Omega^C(\gamma, \theta) &= (1-\lambda)[\vartheta_a(\tau_{aL}^{CP}, \tau_{aL}^{*CP}, \theta_L) + \vartheta_a^*(\tau_{aL}^{CP}, \tau_{aL}^{*CP}) + \vartheta_b(\tau_{bL}^{CP}, \tau_{bL}^{*CP}) + \vartheta_b^*(\tau_{bL}^{CP}, \tau_{bL}^{*CP})] \\
&\quad + \lambda\{\gamma[\vartheta_a(\tau_{aH}^{CP}, \tau_{aL}^{*CP}, \theta_H) + \vartheta_a^*(\tau_{aH}^{CP}, \tau_{aL}^{*CP}) + \vartheta_b(\tau_{bL}^{CP}, \tau_{aH}^{CP}) + \vartheta_b^*(\tau_{bL}^{CP}, \tau_{aH}^{CP})] \\
&\quad + (1-\gamma)[\vartheta_a(\tau_{aH}^{CP}, \tau_{aL}^{*CP}, \theta_H) + \vartheta_a^*(\tau_{aH}^{CP}, \tau_{aL}^{*CP}) + \vartheta_b(\tau_{bL}^{CP}, \tau_{bL}^{*CP}) + \vartheta_b^*(\tau_{bL}^{CP}, \tau_{bL}^{*CP})]\}.
\end{aligned}$$

Substituting $\tau_{aH}^{SP} = \tau_{aH}^{*SP}$, $\tau_{aH}^{CP}, \tau_{bH}^{*CP}$, $\tau_{aL}^{SP} = \tau_{aL}^{*SP} = \tau_b^{SP} = \tau_b^{*SP} = \tau_{bL}^{CP} = \tau_{bL}^{*CP} = \tau_{aL}^{CP} = \tau_{aL}^{*CP} = \tau_{bH}^{CP} = \tau_{aH}^{*CP} = 0$, as well as the facts that $\vartheta_b(\tau, \tau) = \vartheta_b^*(\tau, \tau)$, $\vartheta_b(0, \tau) = \vartheta_b^*(\tau, 0)$, and $\vartheta_b(\tau, 0) = \vartheta_b^*(0, \tau)$ into the above and simplifying yields:

$$\begin{aligned}
E\Omega^S(\gamma, \theta) - E\Omega^C(\gamma, \theta) = \lambda\{\gamma[&\vartheta_a(\tau_{aH}^{SP}, \tau_{aH}^{SP}, \theta_H) + \vartheta_a^*(\tau_{aH}^{SP}, \tau_{aH}^{S}) + 2\vartheta_b(0, 0) \\
&- \vartheta_a(\tau_{aH}^{CP}, 0, \theta_H) - 2\vartheta_b(0, \tau_{aH}^{CP}) - \vartheta_b(\tau_{aH}^{CP}, 0)] \\
&+ (1-\gamma)[\vartheta_a(\tau_{aH}^{SP}, 0, \theta_H) + \vartheta_a^*(\tau_{aH}^{SP}, 0) - \vartheta_a(\tau_{aH}^{CP}, 0, \theta_H) - \vartheta_a^*(\tau_{aH}^{CP}, 0)]\}.
\end{aligned} \tag{9}$$

Using equation (31) from the main text and equation (9) above, we then have:

$$
\begin{aligned}
&E\Omega^S(\gamma,\theta) - E\Omega^C(\gamma,\theta) \\
=&\lambda\{\gamma[\frac{(\tau_{aH}^{CP})^2}{2} - \frac{(\tau_{aH}^{SP})^2(1+D)}{2}] + [(\tau_{aH}^{SP})^2 - (\tau_{aH}^{CP})^2]\frac{\theta_H - 5}{8} + (\tau_{aH}^{SP} - \tau_{aH}^{CP})(\theta_H - 1)\frac{\Psi - f}{2}\}
\end{aligned}
$$

where $\Psi = \frac{2A+f}{4-2D}$. Substituting $\tau_{aH}^{CP} = \frac{(\theta_H-1)(2A-3f+2Df)}{(2-D)(5-\theta_H+4\gamma)}$ and $\tau_{aH}^{SP} = \frac{(\theta_H-1)(2A-3f+2Df)}{(2-D)(5-\theta_H+4\gamma+4D\gamma)}$ into the above equation yields:

$$
\begin{aligned}
&E\Omega^S(\gamma,\theta) - E\Omega^C(\gamma,\theta) \\
=&\frac{\lambda(\theta_H-1)^2(2A-3f+2Df)^2[-D\gamma][(5-\theta_H)^2+16\gamma^2(1+D)]}{2(2-D)^2(5-\theta_H+4\gamma)^2(5-\theta_H+4\gamma(1+D))^2} \\
+&\frac{\lambda 2(\theta_H-1)^2(2A-3f+2Df)^2(5-\theta_H)((2+D)\gamma)[-D\gamma]}{(2-D)^2(5-\theta_H+4\gamma)^2(5-\theta_H+4\gamma(1+D))^2} \\
=&\frac{-D\gamma\lambda(\theta_H-1)^2(2A-3f+2Df)^2}{2(2-D)^2(5-\theta_H+4\gamma)(5-\theta_H+4\gamma(1+D))} < 0
\end{aligned}
$$

because $1 < \theta_H < \bar{\theta} < 5$, $D \in (0,1)$, $A > 2f$, and $\gamma \in (0,1]$. Therefore, $E\Omega^S(\gamma,\theta) - E\Omega^C(\gamma,\theta) < 0$ for all $\gamma \in (0,1]$, completing the proof.

Let $E\Omega^{US}(\gamma,\theta)$ and $E\Omega^{UC}(\gamma,\theta)$ denote social welfare from the same- and cross-sector probabilistic retaliation mechanisms. We then have

$$
\begin{aligned}
E\Omega^{US}(\gamma,\theta) - E\Omega^{UC}(\gamma,\theta) &= \lambda\frac{(\tau_{aH}^C)^2(1+\gamma) - (1+\gamma(1+D))(\tau_{aH}^S)^2}{2} \\
&= \frac{\lambda D\gamma(2A-3f+2Df)^2(\theta_H-1)^2(15+16\gamma(2+\gamma+D+\gamma D)+2\theta-\theta^2)}{2(2-D)^2(5-\theta_H+4\gamma)^2(5-\theta_H+4\gamma(1+D))^2} > 0
\end{aligned}
$$

(iii)

$$
\begin{aligned}
&\lambda\{\gamma[\vartheta_a^*(\tau_{aH},\tau_{aH}) + \vartheta_b^*(0,0) - \vartheta_a^*(\tau_{aH},0) - \vartheta_b^*(0,\tau_{aH})](1-\gamma)[\vartheta_a^*(\tau_{aH},0) + \vartheta_b^*(0,0) - \vartheta_a^*(\tau_{aH},0) - \vartheta_b^*(0,0)]\} \\
=&\lambda\frac{(\tau_{aH})^2(1+\gamma) - (1+\gamma(1+D))(\tau_{aH})^2}{4} < 0
\end{aligned}
$$

so that Foreign would always choose cross-sector retaliation if permitted.

If $\tau_{aH}^C = \tau_{aH}^S = \tau_{aH}$, then $E\Omega^{US}(\gamma,\theta) - E\Omega^{UC}(\gamma,\theta) = \lambda\frac{(\tau_{aH})^2(1+\gamma)-(1+\gamma(1+D))(\tau_{aH})^2}{2} < 0$. □

Lemma 2. *Joint political welfare under both the same- and cross-sector probabilistic retaliation mechanisms is monotonically decreasing in* $\gamma \in [0,1]$.

Proof. Taking the derivative of the expected political joint welfare in the same-sector probabilistic retaliation mechanism with respect to γ, and using the results that $\tau_{aH}^{SP} = \tau_{aH}^{*SP}$ and $\tau_{aL}^{SP} = \tau_{aL}^{*SP} = \tau_{b}^{SP} = \tau_{b}^{*SP} = 0$, yields

$$\begin{aligned}\frac{\partial E\Omega^S(\gamma,\theta)}{\partial\gamma} &= \lambda\{\vartheta_a(\tau_{aH}^{SP},\tau_{aH}^{SP},\theta_H) + \vartheta_a^*(\tau_{aH}^{SP},\tau_{aH}^{SP}) - \vartheta_a(\tau_{aH}^{SP},0,\theta_H) - \vartheta_a^*(\tau_{aH}^{SP},0)\\ &\quad + \gamma[\vartheta_{a1}(\tau_{aH}^{SP},\tau_{aH}^{SP},\theta_H) + \vartheta_{a1}^*(\tau_{aH}^{SP},\tau_{aH}^{SP}) + \vartheta_{a2}(\tau_{aH}^{SP},\tau_{aH}^{SP},\theta_H) + \vartheta_{a2}^*(\tau_{aH}^{SP},\tau_{aH}^{SP})]\frac{\partial\tau_{aH}^{SP}}{\partial\gamma}\\ &\quad + (1-\gamma)[\vartheta_{a1}(\tau_{aH}^{SP},0,\theta_H) + \vartheta_{a1}^*(\tau_{aH}^{SP},0)]\frac{\partial\tau_{aH}^{SP}}{\partial\gamma}\}.\end{aligned}$$

Then

$$\frac{\partial E\Omega^S(\gamma,\theta)}{\partial\gamma} = \lambda[\vartheta_a(\tau_{aH}^{SP},\tau_{aH}^{SP},\theta_H) + \vartheta_a^*(\tau_{aH}^{SP},\tau_{aH}^{SP}) - \vartheta_a(\tau_{aH}^{SP},0,\theta_H) - \vartheta_a^*(\tau_{aH}^{SP},0)] \tag{10}$$

because $\gamma[\vartheta_{a1}(\tau_{aH}^{SP},\tau_{aH}^{SP},\theta_H)+\vartheta_{a1}^*(\tau_{aH}^{SP},\tau_{aH}^{SP})+\vartheta_{a2}(\tau_{aH}^{SP},\tau_{aH}^{SP},\theta_H)+\vartheta_{a2}^*(\tau_{aH}^{SP},\tau_{aH}^{SP})]+(1-\gamma)[\vartheta_{a1}(\tau_{aH}^{SP},0,\theta_H)+\vartheta_{a1}^*(\tau_{aH}^{SP},0)=0$ by the optimality of τ_{aH}^{SP}. Substituting equation (31) from the main text into equation (10) yields

$$\frac{\partial E\Omega^S(\gamma,\theta)}{\partial\gamma} = -\lambda\frac{1+D}{2}(\tau_{aH}^{SP})^2 < 0.$$

By following similar steps, we can show that

$$\frac{\partial E\Omega^C(\gamma,\theta)}{\partial\gamma} = -\lambda\frac{1}{2}(\tau_{aH}^{CP})^2 < 0.$$

□

Proposition 11.

(i) $E\Omega^C(\gamma,\theta) > E\Omega^S(\gamma,\theta)$

(ii) $E\Omega^{US}(\gamma^S,\theta) > E\Omega^{UC}(\gamma^C,\theta)$.

Proof. Let γ^S and γ^C be the smallest values such that incentive constraints in equations (2) and (6) are satisfied. Both of these expressions (for γ^S and γ^C) are determined as the root of a quadratic equation. In order that these roots are both real we require that $\theta_H < \bar{\theta}^{NI}(A,f,D)$, where $\bar{\theta}^{NI} > 1$. The critical theta for a real value of γ^C is smaller and is, therefore, the binding restriction. In particular, as long as

$\theta_H \leq \bar{\theta}^{NI}(A,f,D) = \frac{4A^2+4Af(23-11D)+f^2(-111+134D-39D^2)-16\sqrt{(D-2)^2f^2(2A-3f+2Df)(4A-4f+3Df)}}{(2A+(D-1)f)^2}$, then both γ^S and γ^C are real numbers between zero and one.

Using equation (31) from the main text and equation (9) and substituting for the chosen tariffs as well as the fact that $\vartheta_b(0,\tau^{CP}) = \vartheta_b^*(\tau^{CP},0)$, we have:

$$\begin{aligned}
&E\Omega^S(\gamma^S,\theta) - E\Omega^C(\gamma^C,\theta)\\
=&\lambda\{\gamma^S[\vartheta_a(\tau_{aH}^{SP},\tau_{aH}^{SP},\theta_H) + \vartheta_a^*(\tau_{aH}^{SP},\tau_{aH}^{SP}) - \vartheta_a(\tau_{aH}^{SP},0,\theta_H) - \vartheta_a^*(\tau_{aH}^{SP},0)]\\
-&\gamma^C[\vartheta_b(\tau_{aH}^{CP},0) + \vartheta_b(0,\tau_{aH}^{CP}) - 2\vartheta_b(0,0)] + \vartheta_a(\tau_{aH}^{SP},0,\theta_H) + \vartheta_a^*(\tau_{aH}^{SP},0) - \vartheta_a(\tau_{aH}^{CP},0,\theta_H) - \vartheta_a^*(\tau_{aH}^{CP},0)\}\\
=&\lambda[\gamma^C\frac{(\tau_{aH}^{CP})^2}{2} - \gamma^S\frac{(\tau_{aH}^{SP})^2(1+D)}{2} + [(\tau_{aH}^{SP})^2 - (\tau_{aH}^{CP})^2]\frac{\theta_H-5}{8} + (\tau_{aH}^{SP} - \tau_{aH}^{CP})(\theta_H-1)\frac{\Psi-f}{2}]
\end{aligned}$$

where $\Psi = \frac{2A+f}{4-2D}$. Substituting $\tau_{aH}^{CP}(\gamma^C) = \frac{(\theta_H-1)(2A-3f+2Df)}{(2-D)(5-\theta_H+4\gamma^C)}$ and $\tau_{aH}^{SP}(\gamma^S) = \frac{(\theta_H-1)(2A-3f+2Df)}{(2-D)(5-\theta_H+4\gamma^S+4D\gamma^S)}$ into the above equation, we have

$$E\Omega^S(\gamma^S,\theta) - E\Omega^C(\gamma^C,\theta) = \frac{\lambda[\gamma^C-(1+D)\gamma^S](\theta_H-1)^2(2A-3f+2Df)^2}{2(2-D)^2(5-\theta_H+4\gamma^C)(5-\theta_H+4\gamma^S+4D\gamma^S)}.$$

Since $1<\theta_H<\bar{\theta}<5$, $D\in(0,1)$, $A>2f$,$\gamma^S\in[0,1]$ and $\gamma^C\in[0,1]$, the sign of the above expression is that of $\gamma^C-(1+D)\gamma^S$. Hence, for $\Omega^C(\gamma^C,\lambda,\theta) > \Omega^S(\gamma^S,\lambda,\theta)$ we require $\gamma^C < (1+D)\gamma^S$.

The difference in social welfare can be expressed, after some simplification, as

$$\begin{aligned}
&E\Omega^{US}(\gamma^S,\theta) - E\Omega^{UC}(\gamma^C,\theta)\\
=&\frac{(\tau_{aH}^C)^2(1+\gamma^C) - (1+\gamma^S(1+D))(\tau_{aH}^S)^2}{2}\\
=&\frac{\lambda[(1+D)\gamma^S-\gamma^C](2A-3f+2Df)^2(\theta_H-1)^2(15+16[\gamma^S(1+D)+\gamma^C(1+\gamma^C+\gamma^C D)]+2\theta-\theta^2)}{2(2-D)^2(5-\theta_H+4\gamma)^2(5-\theta_H+4\gamma(1+D))^2}.
\end{aligned}$$

Hence, the sign of the difference in social welfare is the opposite of the difference in political welfare and it also comes down to the sign of $\gamma^C-(1+D)\gamma^S$. Rewriting the binding incentive constraints, we see that γ^S and γ^C must satisfy:

$$\tau_{aH}^{SP}(\gamma^S)\frac{3-\gamma^S+D\gamma^S}{1-\gamma^S} = f,$$
$$\tau_{aH}^{CP}(\gamma^C)\frac{3-\gamma^C}{1-\gamma^C} = f.$$

Substituting $\tau_{aH}^{SP}(\gamma^S)$ and $\tau_{aH}^{CP}(\gamma^C)$ into the above two equations, solving for γ^S and γ^C, and reporting the larger root (so that $\gamma^S > 0$ and $\gamma^C > 0$), we have:

$$\gamma^S = \frac{(\theta_H - 1)(2A(1-D) - f) + (\theta_H + 1)(4Df - 2D^2 f) + \sqrt{\Delta_S}}{8(2-D)f(1+D)}$$
$$\gamma^C = \frac{(\theta_H - 1)(2A - f(1-D) + \sqrt{\Delta_C}}{8(2-D)f},$$

where $\Delta_S = [(\theta_H - 1)(2A(1-D) - f) + (\theta_H + 1)(4Df - 2D^2 f)]^2 + 16(D^2 - D - 2)[(6A - 7f + 5Df)\theta_H - (6A + f + Df)]$ and $\Delta_C = (\theta_H - 1)^2[2A - f(1-D)]^2 + 16f(2-D)[f(1+D) + \theta_H f(7-5D) - 6A(\theta_H - 1)]$.

So that both γ^S and $\gamma^C$are real numbers we require that $\Delta_S \geq 0$ and that $\Delta_C \geq 0$. Each of these equations is quadratic in θ_H. The larger root in both cases yields a θ_H that will generate autarky. Hence we consider the smaller roots and we require that θ_H is less than each smaller root. For same-sector retaliation we require that

$$\theta_H < \bar{\theta}^{NIS}(A,f,D)$$
$$= \frac{4A^2(1-D)^2 + 4Af(23+13D-12D^2) + f^2(-111+24D+80D^2-24D^3-4D^4) - 8\sqrt{(D+1)(D^2-4)^2 f^2(2A-3f+2Df)(4A-4f+3Df)}}{[2A(D-1)+f(1-4D+2D^2)]^2}$$

and for cross-sector we require that

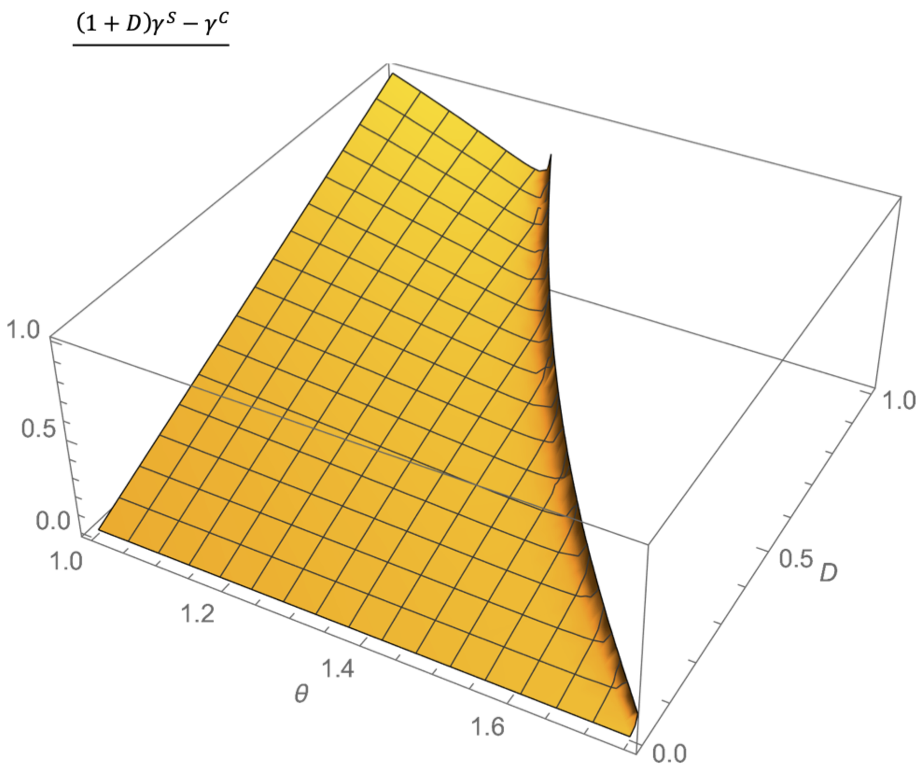
$$\theta_H < \bar{\theta}^{NIC}(A,f,D)$$
$$= \frac{4A^2 + 4Af(23-11D) + f^2(-111+134D-39D^2) - 16\sqrt{(D-2)^2 f^2(2A-3f+2Df)(4A-4f+3Df)}}{(2A+(D-1)f)^2}.$$

Comparison shows that $\bar{\theta}^{NIC}(A,f,D) < \bar{\theta}^{NIS}(A,f,D)$, so we take $\bar{\theta}^{NI}(A,f,D) = \bar{\theta}^{NIC}(A,f,D)$.

We next note that either f or A appear in each element of the the above equations for $\bar{\theta}^{NIS}(A,f,D)$, $\bar{\theta}^{NIC}(A,f,D), \gamma^S$, and γ^C. Hence, A can be expressed as a multiple of f and, therefore, we set $f = 1$ in evaluating $\gamma^C < (1+D)\gamma^S$. In this way we can find a set of parameters $\{A, D\}$ such that $\theta_H < \bar{\theta}^{NI}(A,f,D)$ and, therefore, that $\gamma^S$and $\gamma^C$are both real numbers strictly between zero and 1.

Substituting $f = 1$ into the above we can then verify that for all $\{A, D\}$ such that $\theta_H < \bar{\theta}^{NI}(A,f,D)$ we have that $\gamma^C < (1+D)\gamma^S$. For example, if $A = 3, f = 1, D = \frac{1}{2}$, then $\bar{\theta}^{NIC}= 1.465$ and $\bar{\theta}^{NIS} = 1.49$. If we let $\theta_H = \frac{5}{4}$, then we have $\gamma^C = .786$, $\gamma^S = .797$ and $\gamma^C - (1+D)\gamma^S = -.41$. Similarly, if $A = 3, f = 1, D = \frac{3}{4}$, then $\bar{\theta}^{NIC}$=1.35 and $\bar{\theta}^{NIS} = 1.38$. If we let $\theta_H = 5/4$, then $\gamma^C = .68 < .71 = \gamma^S$, but $\gamma^C - (1+D)\gamma^S = -.56$. If $A = 4, f = 1, D = \frac{1}{2}$, then $\bar{\theta}^{NIC}$=1.32 and $\bar{\theta}^{NIS} = 1.34$ and if we let $\theta_H = \frac{5}{4}$, then $\gamma^C - (1+D)\gamma^S = -.36$. If $A = 3, f = 1, D = \frac{1}{4}$, then $\bar{\theta}^{NIC}$=1.6 and $\bar{\theta}^{NIS} = 1.62$. If we let $\theta_H = \frac{5}{4}$, then $\gamma^C = .85 < .86 = \gamma^S$, but $\gamma^C - (1+D)\gamma^S = -.22$. □

In the proof to Proposition 11 we show that the sign of $E\Omega^C(\gamma^C, \theta) - E\Omega^S(\gamma^S, \theta)$ is equal to the sign of $(1+D)\gamma^S - \gamma^C$. We provide a graphical depiction of $(1+D)\gamma^S - \gamma^C$ in the figure below. In drawing this figure we set $f = 1$ and $A = 3$. For all values of $D \in [0, 1]$ and all $\theta_H \leq \bar{\theta}^{NI}(A, f, D)$ the expression is positive. For θ larger than this critical value this difference is not defined. As D increases we see that $\bar{\theta}^{NI}(A, f, D)$ decreases and for $D = 1/2$ it can be seen that $\bar{\theta}^{NI}(3, 1, 1/2) = 1.465$. As a point of reference, if $A = 3f, D = \frac{1}{2}$, then the critical value of θ for a real γ^C is 1.465 and for γ^S it is 1.49. If we let $\theta_H = 5/4$, then we have $\gamma^C = .786$ and $\gamma^S = .797$. Hence, we have $\gamma^C < (1 + D)\gamma^S$, so that $\tau^{CP}_{aH} > \tau^{SP}_{aH}$.



Section 6. Dynamic Setup: "Off-schedule" Violations

Proposition 12. *The same-sector probabilistic retaliation mechanism is self-enforcing for all $\delta \in [\delta^S, 1]$ and the cross-sector probabilistic retaliation mechanism is self-enforcing for all $\delta \in [\delta^C, 1]$, where $\delta^C < \delta^S < 1$.*

Proof. The sector-a deviation tariffs are the same for either mechanism, $\tau^{Cd}_{a\kappa t} = \tau^{Sd}_{a\kappa t} = \tau^{d}_{a\kappa t} = \frac{(2A+2Df-3f)\theta_\kappa - 2A - 3Df + 5f}{(7-\theta_\kappa)(2-D)}$. To see that the optimal deviation is always greater than the high-state tariff given by the mechanism first note that the cross-sector high-state tariff is larger. Comparing this larger mechanism tariff to the optimal deviation tariff yields $\tau^d_{a\kappa t} - \tau^{CP}_{aH} = \frac{4A(2\gamma-1)(\theta-1)+Df(4\gamma(2\theta-3)-1-3\theta)+4f(\gamma(5-3\theta)+\theta+1)}{(7-\theta_\kappa)(2-D)(5+4\gamma-\theta_H)}$. This difference is increasing in γ and for $\gamma = 1/2$ it becomes $\frac{f}{7-\theta} > 0$. Although the minimal $\gamma > 1/2$ for either mechanisms for any set of parameters that satisfy our above noted restrictions we can also examine the above difference for $\gamma < 1/2$ and any $\theta_H \leq \bar{\theta}^{NI}(A, f, D)$ and again we see that $\tau^d_{a\kappa t} > \tau^{CP}_{aH}$ so that the optimal deviation tariff is greater than the maximum tariff allowed by either mechanism.

The voluntary participation constraints for the same- and cross-sector mechanisms in period s are:

$$\begin{aligned} & V^S(\tau_{as}, \tau^*_{as}, \theta_{\kappa s}, \tau_b, \tau^*_b, \gamma^S) + \sum_{t=s+1}^{\infty} \delta^{(t-s)}[EV^S(\tau_a, \tau^*_a, \theta, \tau_b, \tau^*_b, \gamma^S) - \zeta_{SP}] \\ & \geq V(\tau^d_{a\kappa s}, \tau^*_{aL}, \theta_\kappa, \tau^d_b, \tau^*_{aL}) + \sum_{t=s+1}^{\infty} \delta^{(t-s)}[EV^{BN}(\theta)], \end{aligned} \tag{11}$$

$$\begin{aligned} & V^C(\tau_{as}, \tau^*_{as}, \theta_{\kappa s}, \tau_b, \tau^*_b, \gamma^C) + \sum_{t=s+1}^{\infty} \delta^{(t-s)}[EV^C(\tau_a, \tau^*_a, \theta, \tau_b, \tau^*_b, \gamma^C) - \zeta_{CP}] \\ & \geq V(\tau^d_{a\kappa s}, \tau^*_{aL}, \theta_\kappa, \tau^d_b, \tau^*_{aL}) + \sum_{t=s+1}^{\infty} \delta^{(t-s)}[EV^{BN}(\theta)]. \end{aligned} \tag{12}$$

Note that for both mechanisms the deviation payoff is greater than the mechanism payoff which is larger than the Nash equilibrium payoff, therefore it is harder to enforce the mechanism when the discount factor is lower and for both mechanisms the critical discount factor is less than unity. Given that the right-hand sides of equations (11) and (12) are the same, it is easier to enforce the mechanism, and the critical discount factor is lower, if the left-hand side is larger. Note that the summand of the second expression on the left-hand side $EV(\tau_a, \tau^*_a, \theta, \tau_b, \tau^*_b, \gamma) - \zeta = \frac{E\Omega(\gamma,\theta)+EV^{BN}(\theta)-EV^{*BN}(\theta)}{2}$ which, by Proposition 11 is larger for the cross-sector mechanism. Furthermore note that the first term on the left-hand-sides of equations (11) and (12) are the same in the low state.

Hence, to establish that, for Home, $\delta^C < \delta^S$ we only need to show that

$$V^C(\tau^{CP}_{aH}, 0, \theta_H, 0, \tau^{CP}_{aH}, \gamma^C) > V^S(\tau^{SP}_{aH}, \tau^{SP}_{aH}, \theta_H, 0, 0, \gamma^S).$$

To show the above equation is satisfied we first show that

$$\begin{aligned} & V^C(\tau^{CP}_{aH}, 0, \theta_H, 0, \tau^{CP}_{aH}, \gamma^C) - V^S(\tau^{SP}_{aH}, \tau^{SP}_{aH}, \theta_H, 0, 0, \gamma^S) \\ > & V^C(\tau^{CP}_{aH}, 0, \theta_L, 0, \tau^{CP}_{aH}, \gamma^C) - V^S(\tau^{SP}_{aH}, \tau^{SP}_{aH}, \theta_L, 0, 0, \gamma^S). \end{aligned} \tag{13}$$

To see that the inequality in equation (13) is satisfied first note that for any value of θ

$$\begin{aligned}
&V^C(\tau_{aH}^{CP},0,\theta,0,\tau_{aH}^{CP},\gamma^C)-V^S(\tau_{aH}^{SP},\tau_{aH}^{SP},\theta,0,0,\gamma^S)\\
=&\gamma^C[\vartheta_a(\tau_{aH}^{CP},0,\theta)+\vartheta_b(0,\tau_{aH}^{CP})]+(1-\gamma^C)[\vartheta_a(\tau_{aH}^{CP},0,\theta)+\vartheta_b(0,0)]\\
-&\gamma^S[\vartheta_a(\tau_{aH}^{SP},\tau_{aH}^{SP},\theta)+\vartheta_b(0,0)]-(1-\gamma^S)[\vartheta_a(\tau_{aH}^{SP},0,\theta)+\vartheta_b(0,0)].
\end{aligned}\tag{14}$$

Substitute equation (14) into equation (13), together with the welfare function from lemma 1. We then have:

$$\begin{aligned}
&V^C(\tau_{aH}^{CP},0,\theta_H,0,\tau_{aH}^{CP},\gamma^C)-V^S(\tau_{aH}^{SP},\tau_{aH}^{SP},\theta_H,0,0,\gamma^S)\\
-&V^C(\tau_{aH}^{CP},0,\theta_L,0,\tau_{aH}^{CP},\gamma^C)+V^S(\tau_{aH}^{SP},\tau_{aH}^{SP},\theta_L,0,0,\gamma^S)\\
=&\gamma^C[\vartheta_a(\tau_{aH}^{CP},0,\theta_H)+\vartheta_b(0,\tau_{aH}^{CP})-\vartheta_a(\tau_{a}^{CP},0,\theta_L)-\vartheta_b(0,\tau_{a}^{CP})]\\
+&(1-\gamma^C)[\vartheta_a(\tau_{aH}^{CP},0,\theta_H)+\vartheta_b(0,0)-\vartheta_a(\tau_{aH}^{CP},0,\theta_L)-\vartheta_b(0,0)]\\
-&\gamma^S[\vartheta_a(\tau_{aH}^{SP},\tau_{aH}^{SP},\theta_H)+\vartheta_b(0,0)-\vartheta_a(\tau_{aH}^{SP},\tau_{aH}^{SP},\theta_L)-\vartheta_b(0,0)]\\
-&(1-\gamma^S)[\vartheta_a(\tau_{aH}^{SP},0,\theta_H)+\vartheta_b(0,0)-\vartheta_a(\tau_{aH}^{SP},0,\theta_L)-\vartheta_b(0,0)]\\
=&(\gamma^C+1-\gamma^C)[\frac{1}{8}(\theta_H-1)(\tau_{aH}^{CP})^2+\frac{1}{2}(\theta_H-1)\tau_{aH}^{CP}(\Psi-f)+\frac{1}{2}(\theta_H-1)(\Psi-f)^2]\\
-&(\gamma^S+1-\gamma^S)[\frac{1}{8}(\theta_H-1)(\tau_{aH}^{SP})^2+\frac{1}{2}(\theta_H-1)\tau_{aH}^{SP}(\Psi-f)+\frac{1}{2}(\theta_H-1)(\Psi-f)^2]\\
>&0
\end{aligned}$$

since $\tau_{aH}^{CP}>\tau_{aH}^{SP}$, because $\gamma^C<(1+D)\gamma^S$ (as shown in proposition 11) and because $\theta_H>1$.

We now show that $V^C(\tau_{aH}^{CP},0,\theta_H,0,\tau_{aH}^{CP},\gamma^C)-V^S(\tau_{aH}^{SP},\tau_{aH}^{SP},\theta_H,0,0,\gamma^S)>0$. Suppose not. It must then be the case that $V^C(\tau_{aH}^{CP},0,\theta_H,0,\tau_{aH}^{CP},\gamma^C)-V^S(\tau_{aH}^{SP},\tau_{aH}^{SP},\theta_H,0,0,\gamma^S)\leq 0$. From proposition 11 we know that $\Omega^C(\gamma^C,\lambda,\theta)>\Omega^S(\gamma^S,\lambda,\theta)$, or equivalently that

$$\begin{aligned}
&V^C(\tau_{aH}^{CP},0,\theta_H,0,\tau_{aH}^{CP},\gamma^C)+V^{*C}(\tau_{aH}^{CP},0,0,\tau_{aH}^{CP},\gamma^C)\\
-&[V^S(\tau_{aH}^{SP},\tau_{aH}^{SP},\theta_H,0,0,\gamma^S)+V^{*S}(\tau_{aH}^{SP},\tau_{aH}^{SP},0,0,\gamma^C)]>0.
\end{aligned}$$

Thus, we must have $V^{*C}(\tau_{aH}^{CP},0,0,\tau_{aH}^{CP},\gamma^C)-V^{*S}(\tau_{aH}^{SP},\tau_{aH}^{SP},0,0,\gamma^C)>0$ and, therefore,

$$\begin{aligned}
&V^C(\tau_{aH}^{CP},0,\theta_H,0,\tau_{aH}^{CP},\gamma^C)-V^S(\tau_{aH}^{SP},\tau_{aH}^{SP},\theta_H,0,0,\gamma^S)\leq 0\\
<&V^{*C}(\tau_{aH}^{CP},0,0,\tau_{aH}^{CP},\gamma^C)-V^{*S}(\tau_{aH}^{SP},\tau_{aH}^{SP},0,0,\gamma^C)\\
<&V^C(\tau_{aH}^{CP},0,\theta_L,0,\tau_{aH}^{CP},\gamma^C)-V^S(\tau_{aH}^{SP},\tau_{aH}^{SP},\theta_L,0,0,\gamma^S),
\end{aligned}$$

which is a contradiction. The reason for the last inequality is that although political welfare of Home in the low state and Foreign are the same when the same tariff is levied, there is a probability $(1-\gamma)$ that the tariff will not be reciprocated so that Home political welfare is larger. $\square$

Section 7. Export Lobbies

First, consider political welfare. If we extend our model to include political pressure in Home's export industries, then the high-state expected joint-welfare under same-sector and under cross-sector retaliation, respectively, becomes:

$$E\Omega^S(\gamma^S,\theta_H,\chi_a,\chi_b) = \gamma^S[\vartheta_a(\tau_{aH}^{SP_\chi},\tau_{aH}^{SP_\chi},\theta_H,\chi_a)+\vartheta_a^*(\tau_{aH}^{SP_\chi},\tau_{aH}^{SP_\chi})+\vartheta_b(\tau_b^{SP_\chi},\tau_b^{*SP_\chi},\chi_b)+\vartheta_b^*(\tau_b^{SP_\chi},\tau_b^{*SP_\chi})]$$
$$+(1-\gamma^S)[\vartheta_a(\tau_{aH}^{SP_\chi},\tau_{aL}^{*SP_\chi},\theta_H,\chi_a)+\vartheta_a^*(\tau_{aH}^{SP_\chi},\tau_{aL}^{*SP_\chi})+\vartheta_b(\tau_b^{SP_\chi},\tau_b^{*SP_\chi},\chi_b)+\vartheta_b^*(\tau_b^{SP_\chi},\tau_b^{*SP_\chi})]$$

and

$$E\Omega^C(\gamma^C,\theta_H,\chi_a,\chi_b) = \gamma^C[\vartheta_a(\tau_{aH}^{CP_\chi},\tau_{aL}^{*CP_\chi},\theta_H,\chi_a)+\vartheta_a^*(\tau_{aH}^{CP_\chi},\tau_{aL}^{*CP_\chi})+\vartheta_b(\tau_b^{CP_\chi},\tau_{aH}^{CP_\chi},\chi_b)+\vartheta_b^*(\tau_b^{CP_\chi},\tau_{aH}^{CP_\chi})]$$
$$+(1-\gamma^C)[\vartheta_a(\tau_{aH}^{CP_\chi},\tau_{aL}^{*CP_\chi},\theta_H,\chi_a)+\vartheta_a^*(\tau_{aH}^{CP_\chi},\tau_{aL}^{*CP_\chi})+\vartheta_b(\tau_b^{CP_\chi},\tau_b^{CP_\chi},\chi_b)+\vartheta_b^*(\tau_b^{CP_\chi},\tau_b^{CP_\chi})],$$

where we have included the reciprocity and cross-sector constraints in these expected joint-welfare functions.

The individual value functions can be expressed as:

$$\vartheta_a(\tau_{aH}^{SP_\chi},\tau_{aH}^{SP_\chi},\theta_H,\chi_a) = \frac{4A^2(-2-(1-D)\theta_H-(1-D)\chi_a)-4A(1-D)((2-D)\tau_{aH}^{SP_\chi}(\theta_H-\chi_a)+f(-2+(2D-3)\theta_H+\chi_a))}{8(2-D)^2(D-1)}$$
$$+\frac{f\tau_{aH}^{SP_\chi}(4+2D(\theta_H-1)-3\theta_H-\chi_a)}{4(2-D)}+\frac{(\tau_{aH}^{SP_\chi})^2(\theta_H+\chi_a-6-2D))}{8}+\frac{f^2(2+9\theta_H+4D^2\theta_H-2D(1+6\theta_H)+\chi_a}{8(2-D)^2}$$

$$\vartheta_a^*(\tau_{aH}^{SP_\chi},\tau_{aH}^{SP_\chi}) = \frac{4A^2-4A(1-D)f+(1-D)((3-2D)f^2-(4-D^2)(\tau_{aH}^{SP_\chi})^2)}{4(2-D)(1-D)}$$

$$\vartheta_a(\tau_{aH}^{SP_\chi},\tau_{aL}^{*SP_\chi},\theta_H,\chi_a) = \frac{A^2(2+(1-D)(\theta_H+\chi_a))}{2(2-D)^2(1-D)}+\frac{A((2-D)(\tau_{aH}^{SP_\chi}(\theta_H-1)-f(2+(3-2D)\theta_H+\chi_a))}{2(2-D)^2}$$
$$+\frac{f(5-3\theta_H-D(3-2\theta_H))\tau_{aH}^{SP_\chi}}{4(2-D)}-\frac{(7-\theta_H)(\tau_{aH}^{SP_\chi})^2}{4}+\frac{f^2(2+9\theta_H+4D^2\theta_H-2D(1+6\theta_H)+\chi_a)}{8(2-D)^2}$$

$$\vartheta_a^*(\tau_{aH}^{SP_\chi},\tau_{aL}^{*SP_\chi}) = \frac{4A^2-4A(1-D)f+(1-D)((3-2D)f^2-(2-D)f\tau_{aH}^{SP_\chi}-(2-D)(\tau_{aH}^{SP_\chi})^2)}{4(2-D)(1-D)}$$

$$\vartheta_b(\tau_b^{SP_\chi},\tau_b^{*SP_\chi},\chi_b) = \frac{4A(1-D)f(\chi_b-5+2D)+(1-D)f^2(11-14D+4D^2+\chi_b)-4A^2(3-D+\chi_b-D\chi_b)}{8(2-D)^2(1-D)}$$

$$\vartheta_b^*(\tau_b^{SP_\chi},\tau_b^{*SP_\chi}) = \frac{4A^2-4A(1-D)f+(1-D)(3-2D)f^2}{4(2-D)(1-D)}$$

$$\vartheta_a(\tau_{aH}^{CP_\chi},\tau_{aL}^{*CP_\chi},\theta_H,\chi_a) = \frac{A^2(2+(1-D)\theta_H+(1-D)\chi_a)}{2(2-D)^2(1-D)}+\frac{A((-2+D)(\tau_{aH}^{CP_\chi}-\tau_{aH}^{CP_\chi}\theta_H+\tau_{aL}^{*CP_\chi}(-1+\chi_a))+f(-2+(-3+2D)\theta_H+\chi_a))}{2(2-D)^2}$$
$$+\frac{f(\tau_{aH}^{CP_\chi}(5-3\theta_H+D(-3+2\theta_H))+\tau_{aL}^{*CP_\chi}(-1+D-\chi_a)}{4(2-D)}+\frac{f^2(2+9\theta_H+4D^2\theta_H-2D(1+6\theta_H)+\chi_a)}{8(2-D)^2}$$
$$-\frac{2D\tau_{aH}^{CP_\chi}\tau_{aL}^{*CP_\chi}-(\tau_{aH}^{CP_\chi})^2(\theta_H-7)-(\tau_{aL}^{*CP_\chi})^2(1+\chi_a)}{4}$$

$$\vartheta_a^*(\tau_{aH}^{CP_\chi},\tau_{aL}^{*CP_\chi}) = \frac{A^2-A(1-D)f}{(2-D)(1-D)}+\frac{(3-2D)f^2+(2-D)f(\tau_{aL}^{*CP_\chi}-\tau_{aH}^{CP_\chi})-(-2+B)(3(\tau_{aH}^{CP_\chi})^2+B\tau_{aL}^{*CP_\chi}\tau_{aH}^{CP_\chi}-(\tau_{aH}^{CP_\chi})^2)}{4(2-D)}$$

$$\vartheta_b(\tau_b^{CP_\chi}, \tau_{aH}^{CP_\chi}, \chi_b) = \frac{A^2(3-D+\chi_b-D\chi_b)+A(1-D)((2-D)\tau_{aH}^{CP_\chi}(1-\chi_b)-f(5-2D-\chi_b))}{2(2-D)^2(1-D)}$$
$$+\frac{f^2(11-14D+4D^2+\chi_b)}{8(2-D)^2} + \frac{6(\tau_b^{CP_\chi})^2+2D\tau_b^{CP_\chi}\tau_{aH}^{CP_\chi}-(\tau_{aH}^{CP_\chi})^2(1+\chi_b)}{8(1-D)} - \frac{f\tau_b^{CP_\chi}}{4(1-D)} - \frac{\tau_{aH}^{CP_\chi}(1-D+\chi_b)}{4(1-D)(2-D)}$$

$$\vartheta_b^*(\tau_b^{CP_\chi}, \tau_{aH}^{CP_\chi}) = \frac{A^2-A(1-D)f}{(2-D)(1-D)} + \frac{(3-2D)f^2-(2-D)f(\tau_b^{CP_\chi}-\tau_{aH}^{CP_\chi})+(2-D)((\tau_b^{CP_\chi})^2-D\tau_b^{CP_\chi}\tau_{aH}^{CP_\chi}-3(\tau_{aH}^{CP_\chi})^2)}{4(2-D)}$$

$$\vartheta_b(\tau_b^{CP_\chi}, \tau_b^{CP_\chi}, \chi_b) = \frac{A^2(3-B+\chi_b-D\chi_b)}{2(2-D)^2(1-D)} + \frac{A(2-D)\tau_b^{CP_\chi}(1-\chi_b)+f(\chi_b-5+2D)}{(2-D)^2} + \frac{(\tau_b^{CP_\chi})^2(\chi_b-5-2D)}{8} + \frac{f\tau_b^{CP_\chi}(1-\chi_b)}{(2-D)}$$
$$+\frac{f^2(11-14D+4D^2+\chi_b)}{8(2-D)^2}$$

$$\vartheta_b^*(\tau_b^{CP_\chi}, \tau_b^{CP_\chi}) = \frac{A^2-A(1-D)f}{(2-D)(1-D)} + \frac{(3-2D)f^2-(4-D^2)(\tau_b^{CP_\chi})^2}{4(2-D)}.$$

As noted in the main text the optimal tariffs are chosen as the solution to a Nash-bargaining problem whereby home gives a side payment, that equalizes the expected gains from the agreement, to Foreign before the state is revealed. Hence, this Nash-bargaining problem yields the same solution as the maximization of joint welfare. Substituting the individual value functions into the expected joint-welfare functions, taking derivatives with respect to each tariff, and using the non-negativity constraints shows that all of the optimal tariffs except for τ_{aH}^{SPx} in the same-sector problem and τ_{aH}^{CPx} in the cross-sector problem are zero and that

$$\tau_{aH}^{SPx} = \frac{(\theta_H - 1)(2A - 3f + 2Df) + \gamma^S(2A + f)(1 - \chi_a)}{(2 - D)(5 - \theta_H + \gamma^S(5 - \chi_a + 4D))} \tag{15}$$

and

$$\tau_{aH}^{CPx} = \frac{(\theta_H - 1)(2A - 3f + 2Df) + \gamma^C(2A + f)(1 - \chi_b)}{(2 - D)(5 - \theta_H + \gamma^C(5 - \chi_b))} \tag{16}$$

as given by equation (27) in the main text. Substituting these optimal tariffs into the above high-state world-welfare equations and simplifying yields:

$$E\Omega^S(\gamma^S, \theta_H, \chi_a, \chi_b) = \frac{A^2(13+\theta_H+\chi_a+\chi_b-D(5+\theta_H+\chi_a+\chi_b))}{2(2-D)^2(1-D)} + \frac{A(1-\gamma^S-\theta_H+\gamma^S\chi_a)(f(3+\gamma^S+2D(-1+\theta_H)-3\theta_H-\gamma^S\chi_a))}{2(2-D)^2(-5+\theta_H+\gamma^S(-5-4D+\chi_a))}$$
$$-\frac{A^2(1-\gamma^S-\theta_H+\gamma^S\chi_a)^2}{(2-D)^2(5-\theta_H+\gamma^S(5+4D-\chi_a))} - \frac{Af(15+3\theta_H-2D(3+\theta_H)-\chi_a-\chi_b)}{2(2-D)^2} - \frac{A^2(1-\gamma^S-\theta_H+\gamma^S\chi_a)^2}{2(5-\theta_H+\gamma^S(5+4D-\chi_a))(2-D)^2}$$
$$+\frac{f^2(194-10\theta_H+5\chi_a-\theta_H\chi_a+5\chi_b-\theta_H\chi_b)}{8(2-D)^2(5-\theta_H+\gamma^S(5+4D-\chi_a))} + \frac{2f^2D^3\gamma^S(3+\theta_H)}{(2-D)^2(5-\theta_H+\gamma^S(5+4D-\chi_a))} + \frac{f^2(\gamma^S)^2(1-\chi_a)^2}{8(2-D)^2(5-\theta_H+\gamma^S(5+4D-\chi_a))}$$
$$+\frac{D^2f^2(16-\gamma^S(29+3\chi_a+7\theta_H+\theta_H\chi_a))}{2(2-D)^2(5-\theta_H+\gamma^S(5+4D-\chi_a))} + \frac{f^2\gamma^S(191+3\theta_H(13-\chi_a)-\chi_a^2+5\chi_b-\chi_a(38+\chi_b))}{8(2-D)^2(5-\theta_H+\gamma^S(5+4D-\chi_a))}$$
$$+\frac{f^2D(2\theta_H-58-\gamma^S(19-13\chi_a+\theta_H(5-2\chi_a)-\chi_b))}{2(2-D)^2(5-\theta_H+\gamma^S(5+4D-\chi_a))}$$

and

$$E\Omega^C(\gamma^C, \theta_H, \chi_a, \chi_b) = \frac{A^2(66+5\chi_a+5\chi_b-10\theta_H-\theta_H\chi_a-\theta_H\chi_b+D(1-\gamma^C)\gamma^C\chi_b^2)}{2(2-D)^2(1-D)(5-\theta_H+5\gamma^C-\gamma^C\chi_b)} - \frac{A^2D(26+(\gamma^C)^2+5\chi_a-\theta_H(2+\chi_a)+\gamma^C(23+7\theta_H+5\chi_a))}{2(2-D)^2(1-D)(5-\theta_H+5\gamma^C-\gamma^C\chi_b)}$$
$$-\frac{A^2D\chi_b(5-\theta_H+\gamma^C(2-2\gamma^C-3\theta_H-\chi_a))+A^2(\gamma^C)^2(1-\chi_b)^2}{2(2-D)^2(1-D)(5-\theta_H+5\gamma^C-\gamma^C\chi_b)} + \frac{A^2\gamma^C(63+7\theta_H+5\chi_a-(6+3\theta_H+\chi_a)\chi_b-(\chi_b)^2)}{2(2-D)^2(1-D)(5-\theta_H+5\gamma^C-\gamma^C\chi_b)}$$

$$+\frac{f^2(194+5\chi_a+64D^2+4D^2\gamma^C(5-\chi_b)(3+\theta_H))-f^2(\gamma^C)^2(1-\chi_b)^2}{8(2-D)^2(5-\theta_H+5\gamma^C-\gamma^C\chi_b)}-\frac{f^2(\theta_H(10+\chi_a+\chi_b)-5\chi_b)}{8(2-D)^2(5-\theta_H+5\gamma^C-\gamma^C\chi_b)}$$
$$-\frac{f^2D(29-\theta_H+7\gamma^C(4+\theta_H)-\gamma^C\chi_b(6+\theta_H))}{(2-D)^2(5-\theta_H+5\gamma^C-\gamma^C\chi_b)}-\frac{\gamma^C(191+3\theta_H(13-\chi_b)+\chi_a(5-\chi_b)-\chi_b(38+\chi_b))}{8(2-D)^2(5-\theta_H+5\gamma^C-\gamma^C\chi_b)}$$
$$-\frac{Af(78-5\chi_a-(\gamma^C)^2(1-\chi_b)^2-5\chi_b-\theta_H(6-\chi_a-\chi_b))}{2(2-D)^2(5-\theta_H+5\gamma^C-\gamma^C\chi_b)}-\frac{Af\gamma^C(73+17\theta_H-5\chi_a-(18+5\theta_H-\chi_a)\chi_b+(\chi_b)^2)}{2(2-D)^2(5-\theta_H+5\gamma^C-\gamma^C\chi_b)}$$
$$+\frac{2AfD(8+\gamma^C(7+\theta_H(3-\chi_b)-\chi_b))}{2(2-D)^2(5-\theta_H+5\gamma^C-\gamma^C\chi_b)}.$$

If we let the export lobbies exert equal pressure in both sectors, so that $\chi_a = \chi_b = \chi$ and we also allow retaliation to be deterministic and certain, so that $\gamma^S = \gamma^C = 1$, then, after some algebra, the difference in joint-political-welfare with political pressure in both of Home's exporting industries can be expressed as:

$$E\Omega^S(\theta,\chi) - E\Omega^C(\theta,\chi) = \frac{-D\lambda[2A(\theta_H-\chi)-f(3\theta_H+\chi-4)+2Df(\theta_H-1)]^2}{2(2-D)^2(10-\chi-\theta_H)(10-\chi-\theta_H+4D)} < 0$$

which is the the first part of equation (28) in the main text. Note that the two mechanisms differ only in the high state which occurs with probability λ and for that reason there is a λ in the numerator of the above expression.

Before considering the optimal probabilities of retaliation and the specific parameter values we consider social welfare when our model is extended to include political pressure in Home's exporting industries. The high-state expected social-welfare under same- and cross-sector retaliation mechanisms, respectively, can be written as:

$$E\Omega^{US}(\gamma^S,\theta_H,\chi_a) = \gamma^S[\vartheta_a(\tau_{aH}^{SP_\chi},\tau_{aH}^{SP_\chi},1,1)+\vartheta_a^*(\tau_{aH}^{SP_\chi},\tau_{aH}^{SP_\chi})+\vartheta_b(\tau_b^{SP_\chi},\tau_b^{*SP_\chi},1)+\vartheta_b^*(\tau_b^{SP_\chi},\tau_b^{*SP_\chi})]$$
$$+(1-\gamma^S)[\vartheta_a(\tau_{aH}^{SP_\chi},\tau_{aL}^{*SP_\chi},1,1)+\vartheta_a^*(\tau_{aH}^{SP_\chi},\tau_{aL}^{*SP_\chi})+\vartheta_b(\tau_b^{SP_\chi},\tau_b^{*SP_\chi},1)+\vartheta_b^*(\tau_b^{SP_\chi},\tau_b^{*SP_\chi})]$$

and

$$E\Omega^{UC}(\gamma^C,\theta_H,\chi_b) = \gamma^C[\vartheta_a(\tau_{aH}^{CP_\chi},\tau_{aL}^{*CP_\chi},1,1)+\vartheta_a^*(\tau_{aH}^{CP_\chi},\tau_{aL}^{*CP_\chi})+\vartheta_b(\tau_b^{CP_\chi},\tau_{aH}^{CP_\chi},1)+\vartheta_b^*(\tau_b^{CP_\chi},\tau_{aH}^{CP_\chi})]$$
$$+(1-\gamma^C)[\vartheta_a(\tau_{aH}^{CP_\chi},\tau_{aL}^{*CP_\chi},1,1)+\vartheta_a^*(\tau_{aH}^{CP_\chi},\tau_{aL}^{*CP_\chi})+\vartheta_b(\tau_b^{CP_\chi},\tau_b^{CP_\chi},1)+\vartheta_b^*(\tau_b^{CP_\chi},\tau_b^{CP_\chi})],$$

where

$$\vartheta_a(\tau_{aH}^{SP_\chi},\tau_{aH}^{SP_\chi},1,1) = \vartheta_a^*(\tau_{aH}^{SP_\chi},\tau_{aH}^{SP_\chi}) = \frac{4A^2-4A(1-D)f+(1-D)((3-2D)f^2-(4-D^2)(\tau_{aH}^{SP_\chi})^2)}{4(2-D)(1-D)}$$
$$\vartheta_b(\tau_b^{SP_\chi},\tau_b^{*SP_\chi},1) = \vartheta_b^*(\tau_b^{SP_\chi},\tau_b^{*SP_\chi}) = \frac{4A^2-4A(1-D)f+(1-D)(3-2D)f^2}{4(2-D)(1-D)}$$
$$\vartheta_a(\tau_{aH}^{CP_\chi},\tau_{aL}^{*CP_\chi},1,1) = \vartheta_a^*(\tau_{aH}^{CP_\chi},\tau_{aL}^{*CP_\chi}) = \frac{4A^2-4A(1-D)f+(1-D)((3-2D)f^2+(2-D)f\tau_{aH}^{CP_\chi}-3(2-D)(\tau_{aH}^{CP_\chi})^2)}{4(2-D)(1-D)}$$
$$\vartheta_b(\tau_b^{CP_\chi},\tau_{aH}^{CP_\chi},1) = \vartheta_b^*(\tau_b^{CP_\chi},\tau_{aH}^{CP_\chi}) = \frac{4A^2-4A(1-D)f+(1-D)((3-2D)f^2+(2-D)f\tau_{aH}^{CP_\chi}-(2-D)(\tau_{aH}^{CP_\chi})^2)}{4(2-D)(1-D)}$$
$$\vartheta_b(\tau_b^{CP_\chi},\tau_b^{CP_\chi},1) = \vartheta_b^*(\tau_b^{CP_\chi},\tau_b^{CP_\chi}) = \frac{4A^2-4A(1-D)f+(1-D)(3-2D)f^2}{4(2-D)(1-D)}.$$

If we then substitute the optimal tariffs into the above value functions and then joint social welfare we have the following equations:

$$E\Omega^{US}(\gamma^S,\theta_H,\chi_a,\chi_b) = \tfrac{4A^2-(1-D)[4Af+(3-2D)f^2]}{(2-D)(1-D)}$$
$$-\tfrac{(1+\gamma^S+D\gamma^S)[2A(1-\gamma^S-\theta_H+\gamma^S\chi_a)-f(3+\gamma^S-2D(1-\theta_H)-3\theta_H-\gamma^S\chi_a)]^2}{2(2-D)^2(5-\theta_H+\gamma^S(5+4D-\chi_a))^2}$$

$$E\Omega^{UC}(\gamma^C,\theta_H,\chi_a,\chi_b) = \tfrac{4A^2-(1-D)[4Af+(3-2D)f^2]}{(2-D)(1-D)}$$
$$-\tfrac{(1+\gamma^C)[-2A(1-\gamma^C-\theta_H+\gamma^C\chi_b)+(f(3+\gamma^C+2D(1-\theta_H)-3\theta_H-\gamma^C\chi_b)]^2}{2(2-D)^2(5-\theta_H+\gamma^C(5-\chi_b))^2}$$

Together with $\chi_a = \chi_b = \chi$ and $\gamma^S = \gamma^C = 1$, the difference in social welfare can be expressed, after some simplification, as:

$$E\Omega^{US}(\theta,\chi) - E\Omega^{UC}(\theta,\chi) = \tfrac{\lambda D[2A(\theta_H-\chi)-f(3\theta_H+\chi-4)+2Df(\theta_H-1)]^2[32D-(-10+\chi+\theta_H)(6+\chi+\theta_H)]}{2(2-D)^2(10-\chi-\theta_H)^2(10-\chi-\theta_H+4D)^2} > 0$$

which is the second part of equation (28) in the main text.

To proceed further we now solve for the optimal values of γ^S and γ^C. As in the previous cases the high-state incentive constraint is always slack, because Home, in a high state would not wish to claim the state is low. The incentive constraints for the low state for each mechanism are given below.

$$\vartheta_a(\tau_{aL}^{SP_\chi},\tau_{aL}^{SP_\chi},\theta_L,\chi_a) \geq \gamma^S\vartheta_a(\tau_{aH}^{SP_\chi},\tau_{aH}^{SP_\chi},\theta_L,\chi_a) + (1-\gamma^S)\vartheta_a(\tau_{aH}^{SP_\chi},\tau_{aL}^{SP_\chi},\theta_L,\chi_a)$$

and

$$\vartheta_a(\tau_{aL}^{CP_\chi},\tau_{aL}^{CP_\chi},\theta_L,\chi_a) + \vartheta_b(\tau_b^{CP_\chi},\tau_{aL}^{CP_\chi},\chi_b)$$
$$\geq \gamma^C(\vartheta_a(\tau_{aH}^{CP_\chi},\tau_{aL}^{CP_\chi},\theta_L,\chi_a)+\vartheta_b(\tau_b^{CP_\chi},\tau_{aH}^{CP_\chi},\chi_b))+(1-\gamma^C)(\vartheta_a(\tau_{aH}^{CP_\chi},\tau_{aL}^{CP_\chi},\theta_L,\chi_a)+\vartheta_b(\tau_b^{CP_\chi},\tau_{aL}^{CP_\chi},\chi_b)),$$

where

$$\vartheta_a(\tau_{aL}^{SP_\chi},\tau_{aL}^{SP_\chi},\theta_L,\chi_a) = \tfrac{4A(1-D)f(\chi_a-5+2D)+(1-D)f^2(11-14D+4D^2+\chi_a)-4A^2(3-D+\chi_a-D\chi_a)}{8(2-D)^2(1-D)}$$

$$\vartheta_a(\tau_{aH}^{SP_\chi},\tau_{aH}^{SP_\chi},\theta_L,\chi_a) = \tfrac{4A^2(-3+D-(1-D)\chi_a)-4A(1-D)((2-D)\tau_{aH}^{SP_\chi}(1-\chi_a)+f(2D-5+\chi_a))}{8(2-D)^2(D-1)}$$
$$+\tfrac{f\tau_{aH}^{SP_\chi}(1-\chi_a)}{4(2-D)} + \tfrac{(\tau_{aH}^{SP_\chi})^2(\chi_a-5-2D)}{8} + \tfrac{f^2(11+4D^2-2D(7)+\chi_a}{8(2-D)^2}$$

$$\vartheta_a(\tau_{aH}^{SP_\chi},\tau_{aL}^{*SP_\chi},\theta_L,\chi_a) = \tfrac{A^2(3-D+(1-D)\chi_a)}{2(2-D)^2(1-D)} + \tfrac{A((2-D)-f(5-2D+\chi_a))}{2(2-D)^2} + \tfrac{f\tau_{aH}^{SP_\chi}-6(\tau_{aH}^{SP_\chi})^2}{4} + \tfrac{f^2(11+4D^2-14D+\chi_a)}{8(2-D)^2}$$

$$\vartheta_a(\tau_{aL}^{CP_\chi},\tau_{aL}^{CP_\chi},\theta_L,\chi_a) = \tfrac{A^2(3-B+(1-D)\chi_a)}{2(2-D)^2(1-D)} + \tfrac{A(2-D)\tau_b^{CP_\chi}(1-\chi_a)+f(\chi_a-5+2D)}{(2-D)^2} + \tfrac{(\tau_b^{CP_\chi})^2(\chi_a-5-2D)}{8} + \tfrac{f\tau_b^{CP_\chi}(1-\chi_a)}{(2-D)}$$
$$+\tfrac{f^2(11-14D+4D^2+\chi_a)}{8(2-D)^2}$$

$$\vartheta_b(\tau_b^{CP_\chi},\tau_{aL}^{CP_\chi},\chi_b) = \tfrac{A^2(3-B+\chi_b-D\chi_b)}{2(2-D)^2(1-D)} + \tfrac{A(2-D)\tau_b^{CP_\chi}(1-\chi_b)+f(\chi_b-5+2D)}{(2-D)^2} + \tfrac{(\tau_b^{CP_\chi})^2(\chi_b-5-2D)}{8} + \tfrac{f\tau_b^{CP_\chi}(1-\chi_b)}{(2-D)}$$
$$+\tfrac{f^2(11-14D+4D^2+\chi_b)}{8(2-D)^2}$$

$$\vartheta_a(\tau_{aH}^{CP_\chi},\tau_{aL}^{*CP_\chi},\theta_L,\chi_a) = \tfrac{A^2(2+(1-D)(1+\chi_a))}{2(2-D)^2(1-D)} + \tfrac{A((-2+D)(\tau_{aH}^{CP_\chi}-\tau_{aH}^{CP_\chi}+\tau_{aL}^{*CP_\chi}(-1+\chi_a))+f(-5+2D+\chi_a))}{2(2-D)^2}$$
$$+\tfrac{f(\tau_{aH}^{CP_\chi}(2-D)+\tau_{aL}^{*CP_\chi}(-1+D-\chi_a)}{4(2-D)} + \tfrac{f^2(11+4D^2-14D+\chi_a)}{8(2-D)^2} - \tfrac{2D\tau_{aH}^{CP_\chi}\tau_{aL}^{*CP_\chi}+6(\tau_{aH}^{CP_\chi})^2-(\tau_{aL}^{*CP_\chi})^2(1+\chi_a)}{4}$$

$$\vartheta_b(\tau_b^{CP_\chi}, \tau_{aH}^{CP_\chi}, \chi_b) = \frac{A^2(3-D+\chi_b-D\chi_b)+A(1-D)((2-D)\tau_{aH}^{CP_\chi}(1-\chi_b)-f(5-2D-\chi_b))}{2(2-D)^2(1-D)}$$
$$+\frac{f^2(11-14D+4D^2+\chi_b)}{8(2-D)^2} + \frac{6(\tau_b^{CP_\chi})^2+2D\tau_b^{CP_\chi}\tau_{aH}^{CP_\chi}-(\tau_{aH}^{CP_\chi})^2(1+\chi_b)}{8(1-D)} - \frac{f\tau_b^{CP_\chi}}{4(1-D)} - \frac{\tau_{aH}^{CP_\chi}(1-D+\chi_b)}{4(1-D)(2-D)}$$

It is straight forward to verify that the first (second) inequality is slack when $\gamma^S = 1$ ($\gamma^C = 1$) and that first (second) is not satisfied when $\gamma^S = 0$ ($\gamma^C = 0$). Along the equilibrium path joint welfare is decreasing in the probability of retaliation, therefore, we look for the lowest value of γ^S and γ^C such that each constraint is satisfied. Substituting the optimal tariffs from equations (15) and (16) into the above incentive constraints and evaluating as equalities yields:

$$\vartheta_a(0,0,\theta_L,\chi_a) - \gamma^S\vartheta_a(\tau_{aH}^{SP_\chi}, \tau_{aH}^{SP_\chi}, \theta_L, \chi_a) + (1-\gamma^S)\vartheta_a(\tau_{aH}^{SP_\chi}, 0, \theta_L, \chi_a)$$
$$= \frac{A(6(1-\theta_H)+(\gamma^S)^2(11+6D-\chi_a)(1-\chi_a))(2A(1-\gamma^S-\theta_H)+2A\gamma^S\chi_a+f(3\theta_H+\gamma^S\chi_a-3-\gamma^S+2D(1-\theta_H))}{4(2-D)^2(5-\theta_H+5\gamma^S+4D\gamma^S-\chi_a\gamma^S)^2}$$
$$+\frac{A\gamma^S(3+2D(1-\theta_H)-\theta_H-5\chi_a+3\theta_H\chi_a)(2A(1-\gamma^S-\theta_H)+2A\gamma^S\chi_a+f(3\theta_H+\gamma^S\chi_a-3-\gamma^S+2D(1-\theta_H))}{4(2-D)^2(5-\theta_H+5\gamma^S+4D\gamma^S-\chi_a\gamma^S)^2}$$
$$+\frac{f(4D^2\gamma^S(2\gamma^S-1-\theta_H)+2(1+7\theta_H))(2A(1-\gamma^S-\theta_H)+2A\gamma^S\chi_a+f(3\theta_H+\gamma^S\chi_a-3-\gamma^S+2D(1-\theta_H))}{8(2-D)^2(5-\theta_H+5\gamma^S+4D\gamma^S-\chi_a\gamma^S)^2}$$
$$+\frac{f\gamma^S(7-\theta_H-(5+\theta_H)\chi_a-\gamma^S(9-\chi_a)(1+\chi_a))(2A(1-\gamma^S-\theta_H)+2A\gamma^S\chi_a+f(3\theta_H+\gamma^S\chi_a-3-\gamma^S+2D(1-\theta_H))}{8(2-D)^2(5-\theta_H+5\gamma^S+4D\gamma^S-\chi_a\gamma^S)^2}$$
$$+\frac{fD(1-5\theta_H+\gamma^S(4-4\gamma^S\chi_a+3\theta_H+\theta_H\chi_a))(2A(1-\gamma^S-\theta_H)+2A\gamma^S\chi_a+f(3\theta_H+\gamma^S\chi_a-3-\gamma^S+2D(1-\theta_H))}{4(2-D)^2(5-\theta_H+5\gamma^S+4D\gamma^S-\chi_a\gamma^S)^2} = 0$$

and

$$\vartheta_a(0,0,\theta_L,\chi_a) + \vartheta_b(0,0,\chi_b)$$
$$-[\gamma^C(\vartheta_a(\tau_{aH}^{CP_\chi}, 0, \theta_L, \chi_a) + \vartheta_b(0, \tau_{aH}^{CP_\chi}, \chi_b)) + (1-\gamma^C)(\vartheta_a(\tau_{aH}^{CP_\chi}, 0, \theta_L, \chi_a) + \vartheta_b(0,0,\chi_b))]$$
$$= \frac{3A(1-\theta_H)(3f\theta_H+f\gamma^C\chi_b-3f-f\gamma^C-2Df\theta_H+2Df+2A-2A\theta_H-2A\gamma^C+2A\gamma^C\chi_b)}{2(2-D)^2(5-\theta_H+5\gamma^C-\chi_b\gamma^C)^2}$$
$$+\frac{A\gamma^C(3-\theta_H+\gamma^C(11-\chi_b)(1-\chi_b)-5\chi_b+3\theta_H\chi_b)(3f\theta_H+f\gamma^C\chi_b-3f-f\gamma^C-2Df\theta_H+2Df+2A-2A\theta_H-2A\gamma^C+2A\gamma^C\chi_b)}{4(2-D)^2(5-\theta_H+5\gamma^C-\chi_b\gamma^C)^2}$$
$$+\frac{f(1+7\theta_H+D(1-\gamma^C-5\theta_H+(\gamma^C)^2(5-\chi_b)+\gamma^C\theta_H\chi_b))(3f\theta_H+f\gamma^C\chi_b-3f-f\gamma^C-2Df\theta_H+2Df+2A-2A\theta_H-2A\gamma^C+2A\gamma^C\chi_b)}{4(2-D)^2(5-\theta_H+5\gamma^C-\chi_b\gamma^C)^2}$$
$$+\frac{f\gamma^C(7-\theta_H-(5+\theta_H)\chi_b-\gamma^C(9-\chi_b)(1+\chi_b))(3f\theta_H+f\gamma^C\chi_b-3f-f\gamma^C-2Df\theta_H+2Df+2A-2A\theta_H-2A\gamma^C+2A\gamma^C\chi_b)}{4(2-D)^2(5-\theta_H+5\gamma^C-\chi_b\gamma^C)^2} = 0.$$

When solving each of the above incentive constraints for γ^S and γ^C we find that each equation has three roots or three potential values of γ^S and γ^C. The first roots are the values of γ^S and γ^C that make the optimal tariffs zero. From equations (15) and (16) these are given as $\gamma^S = \frac{(\theta_H-1)(2A-3f+2Df)}{(2A+f)(\chi_a-1)}$ and $\gamma^C = \frac{(\theta_H-1)(2A-3f+2Df)}{(2A+f)(\chi_b-1)}$. Of course, when the high state tariffs are zero there is no difference between the two mechanisms. Of the remaining two roots only one provides non-negative values of γ^S and γ^C. These optimal probabilities of retaliation are given as:

$$\gamma^S = \frac{2A(3-5\chi_a+\theta_H(3\chi_a-1)-2D(\theta_H-1))+f(7-5\chi_a-\theta_H(1+\chi_a)+2D(\theta_H(\chi_a+3-2D)+4-2D)+\sqrt{\triangle_1}}{4A(11+6D-\chi_a)(\chi_a-1)+2f(9+8(\chi_a+D\chi_a-D^2)-\chi_a^2)}$$

and

$$\gamma^C = \frac{2A(3-5\chi_b+\theta_H(3\chi_b-1))+f(7-5\chi_b-\theta_H(1+\chi_b)+2D(\theta_H\chi_b-1))+\sqrt{\triangle_2}}{4Df(\chi_b-5)-4A(11-\chi_b)(1-\chi_b)+2f(9-\chi_b)(1+\chi_b)}$$

where

$$\Delta_1 = 8[6A(\theta_H-1)-(1+D)f-7f\theta_H+5Df\theta_H][2A(11+6D-\chi_a)(1-\chi_a)-f(9+8(\chi_a+D\chi_a-D^2)-\chi_a^2)]$$
$$+[2A(3-5\chi_a+\theta_H(3\chi_a-1)+2D(\theta-1))+f(7-\theta_H-(5+\theta_H)\chi_a+2D(4(1-D)+\theta_H(3+\chi_a-4D)))]^2$$

and

$$\Delta_2 = 8[6A(\theta_H-1)-(1+D)f-7f\theta_H+5Df\theta_H][10Df-2Df\chi_b+2A(11-\chi_b)(1-\chi_b)-f(9-\chi_b)(1+\chi_b)]$$
$$+[2A(3-5\chi_b+\theta_H(3\chi_b-1))+f(7-\theta_H-(5+\theta_H)\chi_b-2D(1-\theta_H\chi_b))]^2.$$

To produce figures 7 and 8 in the main text (which illustrate the effect of export lobbies on the difference in welfare produced by the two mechanisms) we inserted the optimal values of γ^S and γ^C derived above into the above equations for joint political and social welfare. We then allowed either χ_a or χ_b or both to vary while fixing the remaining parameters at the set values described in the main text.