THE TARIFF GAME

A Two Country Model of Optimal Tariff Rates with Negotiation

The Setup

- Two countries: foreign and domestic
- Two goods: good one and good two
- The domestic country has an advantage at producing good one and exports it. Likewise the foreign country exports good two.
- Money does not matter
- Countries may set tariffs which are taxed from producers.

The Setup

- $x_i^c = e_i - f_i p_i$
- $\hat{x}_2^c = \hat{e}_2 - \hat{f}_2 p_2$
- $\pi_1 = x_1^p\, p_1 - p_1 \hat{t}_1 (\, x_1^p - x_1^c) - a_1 - b_1\; x_1^p - c_1\; {x_1^p}^2$
- $\pi_2 = x_2^p\, p_2 - a_2 - b_2\; x_2^p - c_2\; {x_2^p}^2$
- $x_1^p = \frac{p_1(1-\hat{t}_1)-b_1}{c_1}$
- $x_2^p = \frac{p_2-b_2}{c_2}$

The Setup

- $x_1^p + \hat{x}_1^p = x_1^c + \hat{x}_1^c$
- $x_2^p + \hat{x}_2^p = x_2^c + \hat{x}_2^c$
- $p_1{}^* = \dfrac{e_1 + \hat{e}_1 + \frac{b_1}{c_1} + \frac{\hat{b}_1}{\hat{c}_1}}{\frac{1-\hat{t}_1}{c_1} + \frac{1}{\hat{c}_1} + f_1 + \hat{f}_1}$
- $p_2{}^* = \dfrac{e_2 + \hat{e}_2 + \frac{b_2}{c_2} + \frac{\hat{b}_2}{\hat{c}_2}}{\frac{1}{c_2} + \frac{1-t_2}{\hat{c}_2} + f_2 + \hat{f}_2}$

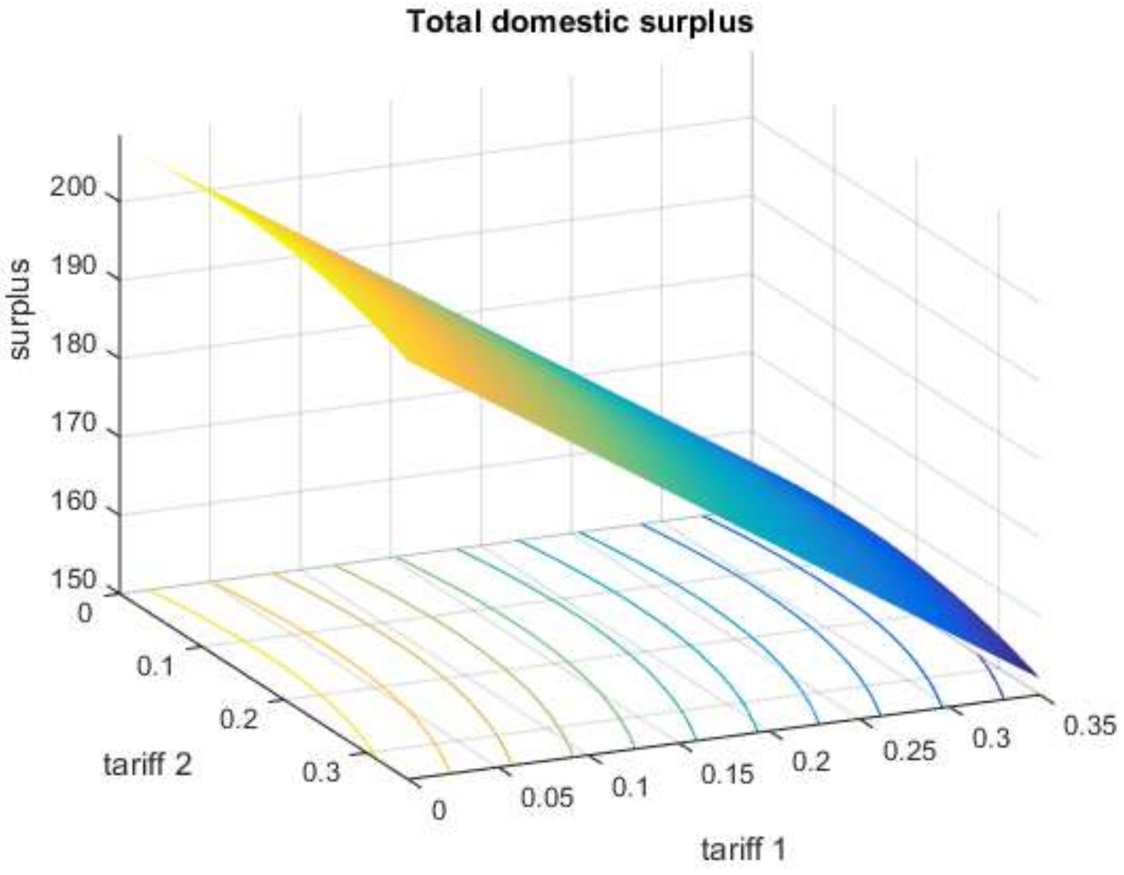
The Setup

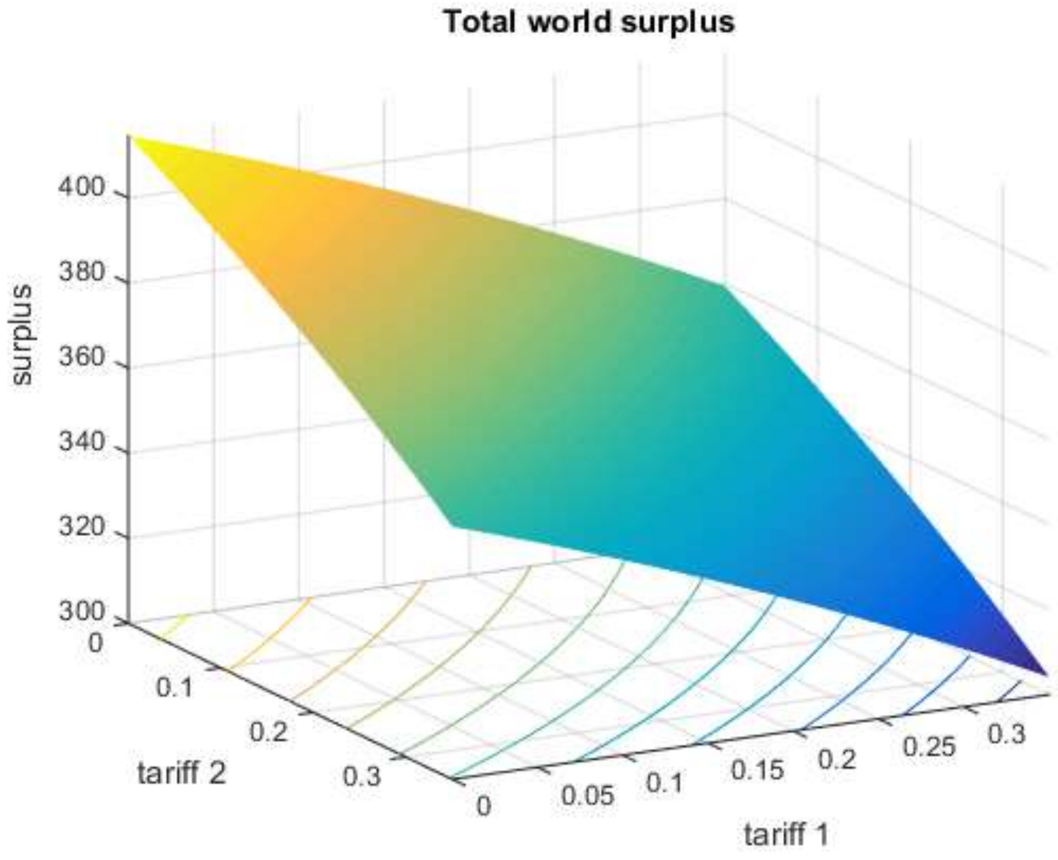
- $CS_i = x_i^c \left(\frac{e_i}{f_i} - \frac{1}{2f_i} x_i^c - p_i\right) = \frac{x_i^{c\,2}}{2f_i}$
- $PS_1 = x_1^p \left(p_1 - b_1 - c_1 x_1^p\right) = \frac{c_1}{2} x_1^{p\,2} + \hat{t}_1 p_1 x_1^c$
- $PS_2 = x_2^p \left(p_2 - b_2 - c_2 x_2^p\right) = \frac{c_2}{2} x_2^p$
- $GS_2 = t_2 p_2 (x_2^c - x_2^p)$
- $TS_2 = \frac{1}{2f_2} x_2^{c\,2} + \frac{c_2}{2} x_2^p + t_2 p_2 (x_2^c - x_2^p)$

The Optimal Tariff

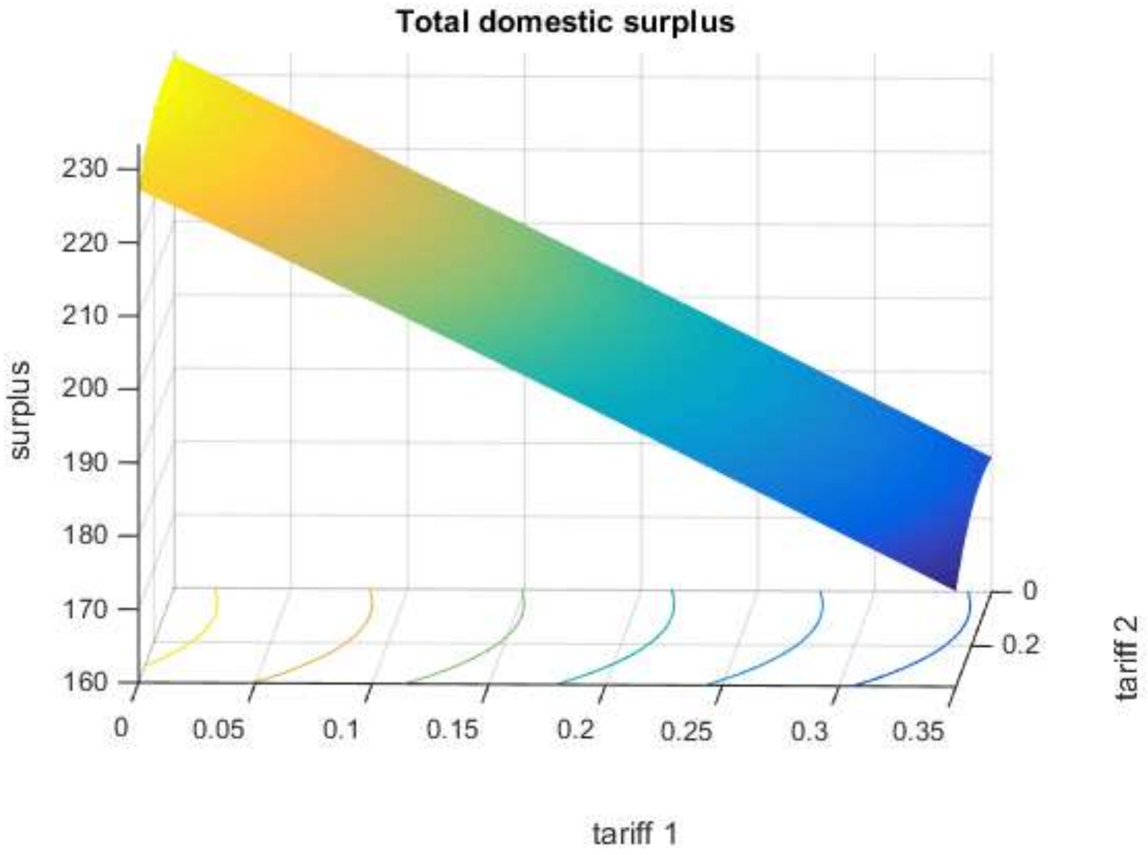
- $\frac{\partial TS_2}{\partial t_2} = \frac{\partial p_2}{\partial t_2}\left[\left(x_2^p - x_2^c\right)(1 - 2t_2) + t_2\left(e_2 + \frac{b_2}{c_2}\right)\right] + p_2\left(x_2^c - x_2^p\right) = 0$
- $\frac{\partial p_2}{\partial t_2} = \frac{e_2+\hat{e}_2+\frac{b_2}{c_2}+\frac{\hat{b}_2}{\hat{c}_2}}{\hat{c}_2\left(\frac{1}{c_2}+\frac{1-t_2}{\hat{c}_2}+f_2+\hat{f}_2\right)^2}$
- $t_2{}^* = g(b, c, e, f)\ \forall b, c, e, f$

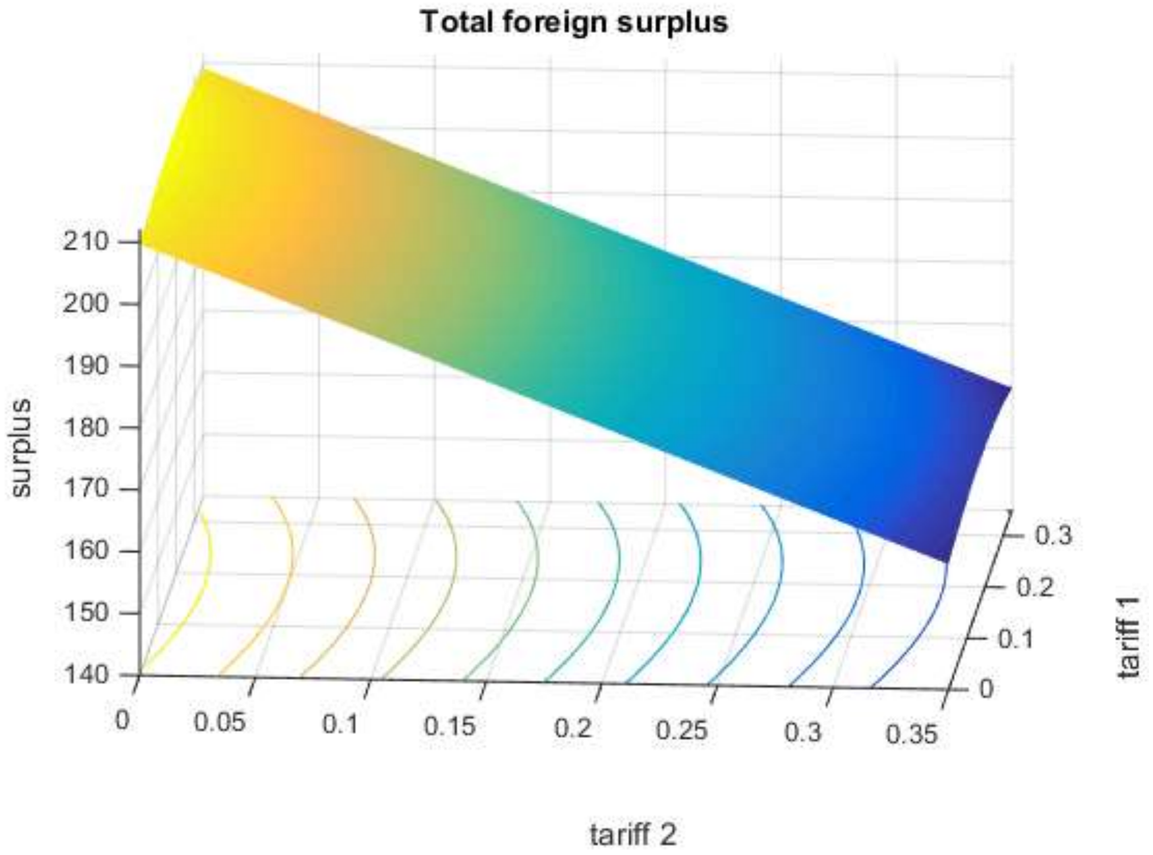
Mirror Countries



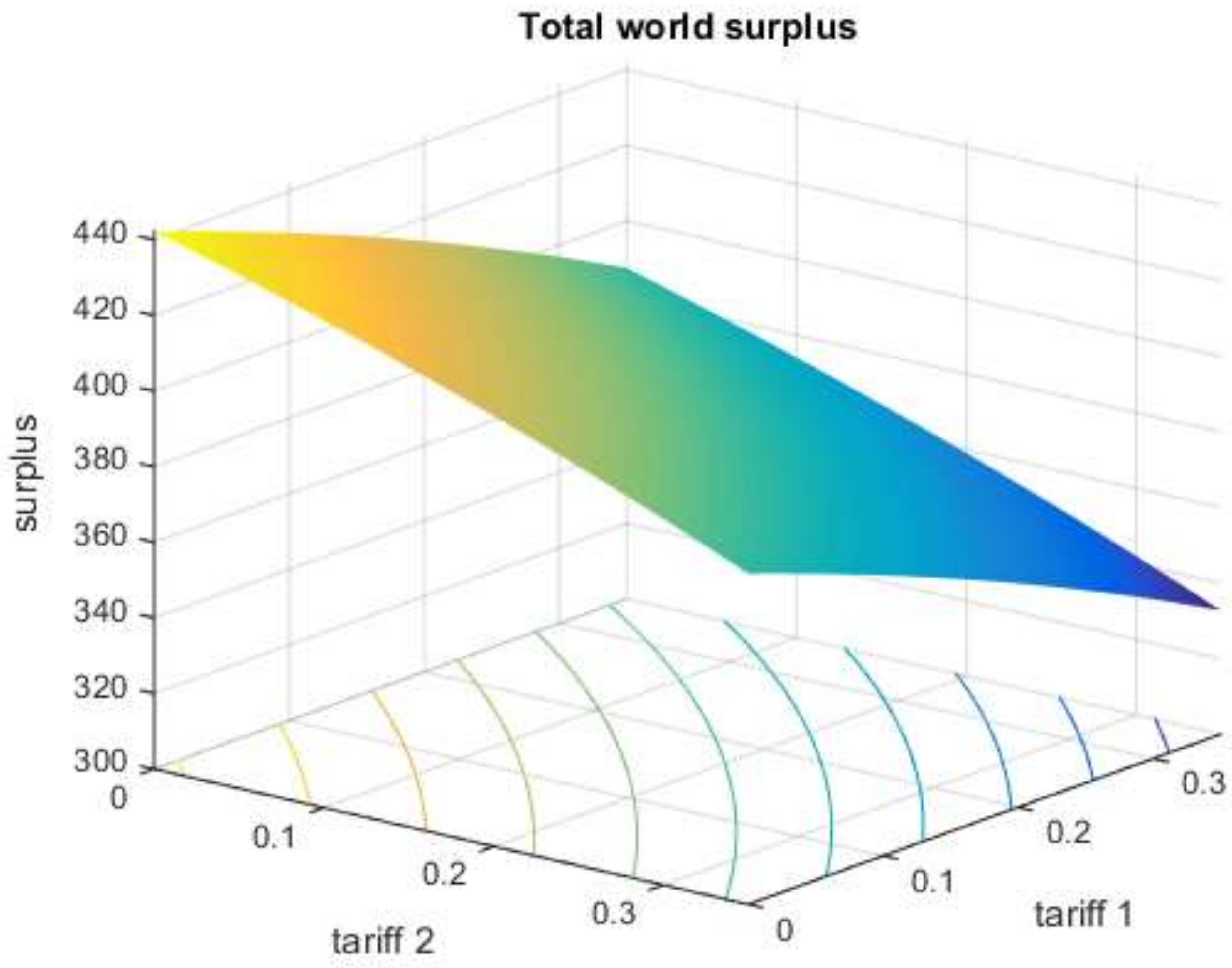


High and low productivity





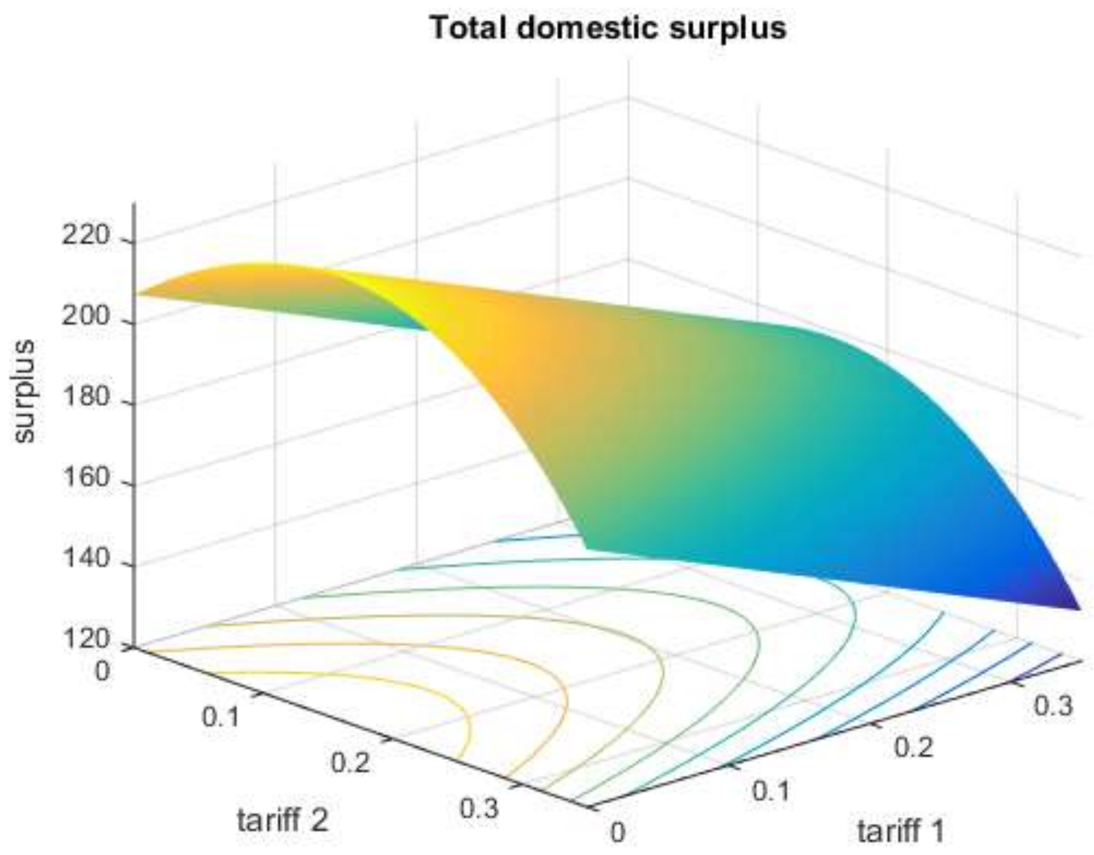
High and low productivity

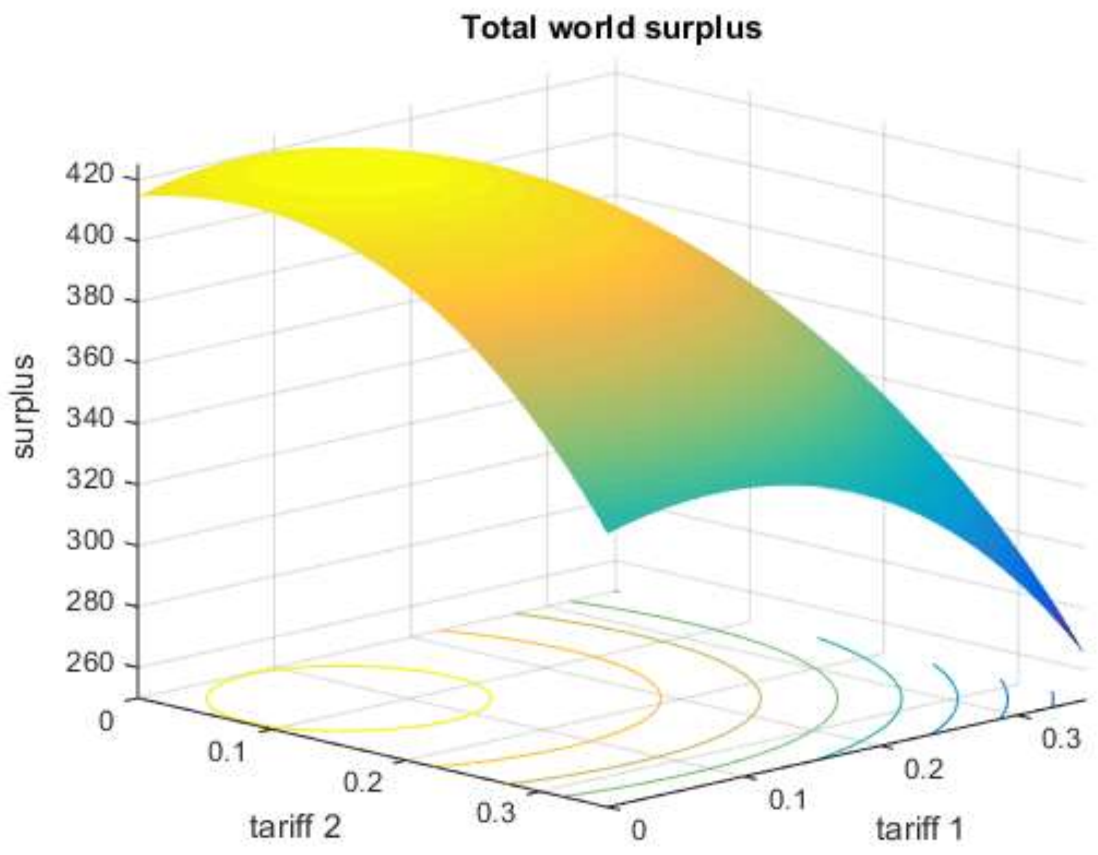


High and low productivity=>real world

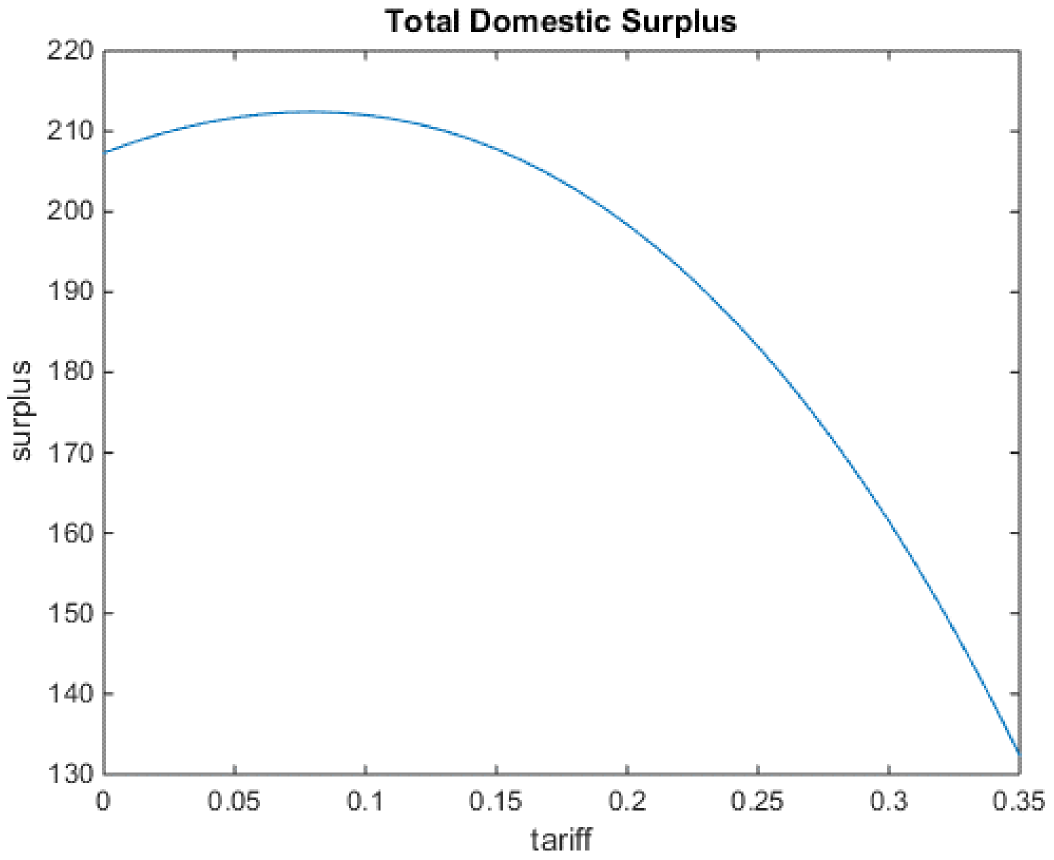
Country Income Group	Weighted Average Tariff (%)
Low income	9.15
Lower middle income	4.94
Middle income	4.2
Upper middle income	4.07
High income: nonOECD	0.78
High income: OECD	1.99

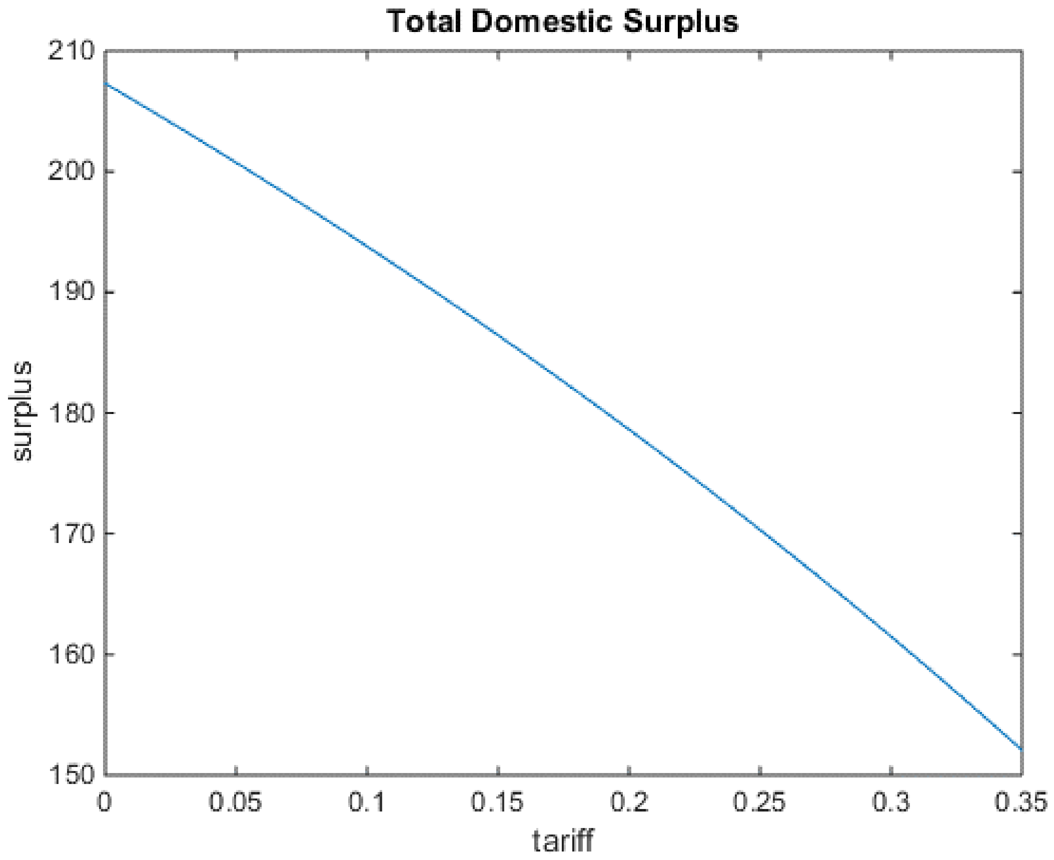
Governments who love themselves





Governments who love themselves





Conclusions

- To determine “optimal tariffs” very extensive knowledge, of both domestic and foreign conditions, is required.
- More productive countries have higher incentives to negotiate for low tariffs.
- Tariffs in my model fight inequality.
- Tariff matching works better than transfer payments or negotiating.
- Biased governments are game changers; tariff matching may not be sufficient.