The Distributional Effects of International Tariffs
Online Appendix

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1 Additional quantitative exercises

1.1 Alternative tariff revenue allocation

In this section, we consider an alternative redistribution of tariff revenue: a combination of labor and capital income tax reductions and lump-sum transfers that are proportional to the reductions in tax revenues enacted in the Tax Cuts and Jobs Act of 2017 (TCJA) and the Market Facilitation Program of 2018 (MFP).

The USDA's MFP was enacted in 2018 and aims to assist "farmers suffering from damage due to unjustified trade retaliation by foreign nations."[1] The USDA made about $8.6 billion in transfer payments to producers who applied for the MFP in 2018,[2] or approximately 12.3 percent of estimated tariff revenue. In the model, there are no "farmer" households, so we approximate these payments with a universal lump-sum transfer.

We assume that the remaining revenues are used to partially offset the revenue losses from the TCJA, which lowered labor income tax rates and reduced the taxes on capital gains and investment income. Analyses published around the time of enactment estimate that the TCJA would reduce revenues from labor income by $1.9 trillion and from capital income by $1.7 trillion over 10 years.[3] Clearly, these revenue losses—in magnitudes—are much larger than the estimated tariff revenue. However, we use the proportion of tax revenue changes related to labor and to capital in the TCJA to guide the tax reforms in our model. This equates to allocating 52.8 and 47.2 percent of the remaining tariff revenue toward reducing labor and capital income taxes, respectively.

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[1]https://www.usda.gov/media/press-releases/2020/02/03/usda-issues-third-tranche-2019-mfp-payments.

[2]https://www.usda.gov/media/press-releases/2019/07/25/usda-announces-details-support-package-farmer

[3]See Table 5 in Tax Foundation (2017), which attributes $1.9 trillion to the adjustment to individual income tax rates and thresholds and $1.7 trillion to lower corporate income taxes and the deduction for pass-through business income.

Table 1: Welfare decomposition (alternative tariff revenue allocation)

| | Total | Decomposition | | | | Support |
		wage	investment	expenditure	transfer	
All	−0.1	0.2	0.2	−0.7	0.2	16
Skilled	−0.1	0.2	0.2	−0.6	0.1	17
Unskilled	−0.0	0.3	0.2	−0.7	0.2	20
Retired	−0.3	0.0	0.1	−0.7	0.3	8
High wealth	0.2	0.1	0.6	−0.6	0.1	97
Low wealth	−0.3	0.1	0.0	−0.8	0.3	0
High income	−0.0	0.2	0.2	−0.4	0.1	23
Low income	−0.1	0.2	0.1	−0.7	0.3	15

Units: percent. High and low wealth correspond to the top and bottom deciles of wealth, respectively. High and low income correspond to the top and bottom deciles of labor income, respectively, conditional on working age. Support reports the percent of each (sub)population that has a positive welfare gain.

As in the baseline quantitative exercise, we initialize the economy in a steady state with no tariffs. Then, at the beginning of period $t = 1$, the US imposes an unanticipated tariff of 4.0 percent on imports from ROW, and ROW responds with a retaliatory tariff of 2.5 percent. The US redistributes tariff revenue in the following manner: 12.3 percent is given back to households lump-sum; 46.3 percent is used to reduce the labor income tax rate; and the remaining 41.4 percent reduces the capital income tax rate. Specifically, the government reduces labor income tax rates by decreasing τ_{yt}, the capital income tax rate by lowering τ_{kt}, and provides a lump-sum transfer, Tr_{it}, to households.

The results from this exercise with an alternative allocation of tariff revenue (summarized in Table 1) are similar to those in the baseeline. The combined effect of a rise in tariffs and the fiscal reforms resulted in a decline in average welfare of 0.1 percent. The welfare changes are highly unequally distributed: Only the high-wealth subgroup, defined as households in the top wealth decile, experiences an average welfare gain, while those in the bottom decile of wealth and retirees experience much larger losses in welfare than the average.

Wealth is one of the dimensions along which welfare differences are most pronounced. Nearly all households in the top decile of wealth support the tariff-financed tax reform, while those in the bottom decile universally oppose it. The difference in average welfare between these two groups is mostly explained by the investment channel. The additional harm to the poor from the expenditure channel is roughly offset by the welfare gain from the transfer channel.

1.2 Lump-sum transfers to worker households only

In this section, we consider the case where tariff revenue is redistributed as lump-sum transfers that are provided to worker households only (Table 2). Unsurprisingly, retirees suffer larger welfare losses in this case (–0.6 percent), relative to the case where lump-sum transfers are provided universally (as in the baseline). Somewhat surprisingly, even though the size of the lump-sum transfer provided to worker households is now larger, worker households do not gain in welfare relative to the case with universal lumpsum transfers. This is because worker households anticipate that they will not receive any transfers when they retire in the future. This is also the reason that the counterfactual policy in which tariff revenue is fully redistributed lump-sum to worker households only is not associated with an average welfare gain.

Table 2: Welfare decomposition (transfers to workers only)

| | Total | Decomposition | | | | Support |
		wage	investment	expenditure	transfer	
All	0.0	–0.1	0.1	–0.6	0.7	54
Skilled	–0.1	–0.2	0.1	–0.6	0.7	23
Unskilled	0.5	–0.0	0.1	–0.6	1.1	99
Retired	–0.6	0.0	0.1	–0.7	0.0	0
High wealth	–0.0	–0.1	0.2	–0.6	0.4	39
Low wealth	–0.2	–0.0	–0.0	–0.7	0.6	36
High income	–0.1	–0.1	0.0	–0.4	0.4	31
Low income	0.7	–0.1	0.1	–0.7	1.5	99

Units: percent. High and low wealth correspond to the top and bottom deciles of wealth, respectively. High and low income correspond to the top and bottom deciles of labor income, respectively, conditional on working age. Support reports the percent of each (sub)population that has a positive welfare gain.

1.3 Transitory tariffs

Here, we further investigate the alternative scenarios under which both the tariffs and the associated fiscal reforms are transitory. In the first case, households have perfect foresight regarding the future path of tariffs and we consider how the distribution of welfare changes to varying degrees of persistence. In the second case, we consider how welfare is affected by the role of expectations. Finally, we consider the case in which discounted future tariff revenues are used to finance a one-period tax reduction, with various discount rates.

1.3.1 Perfect foresight

Here, we consider the alternative scenarios under which both the tariffs and the associated fiscal reforms are transitory (instead of permanent as in the baseline). Tariff revenues are assumed to be allocated to reducing income and consumption taxes in the same manner as in the baseline. Table 3 reports the welfare gains for various degrees of persistence (represented by half-life years). As can be expected, the average welfare loss is reduced when tariffs are less persistent. Even if the magnitudes of the welfare losses are smaller, it remains the case that larger welfare losses are concentrated among the low-wealth and retired households.

Table 3: Welfare (permanent and transitory tariffs)

	Permanent	Half-life (years)		
		64	16	8
Average	–0.13	–0.10	–0.06	–0.04
Skilled	–0.06	–0.04	–0.02	–0.01
Unskilled	–0.01	0.00	0.02	0.02
Retired	–0.39	–0.35	–0.25	–0.19
High wealth	0.07	0.07	0.06	0.05
Low wealth	–0.39	–0.35	–0.26	–0.20
High income	–0.01	0.00	0.00	0.00
Low income	–0.08	–0.05	–0.02	–0.00

Units: percent. High and low wealth correspond to the top and bottom deciles of wealth, respectively. High and low income correspond to the top and bottom deciles of labor income, respectively, conditional on working age.

1.3.2 The role of expectations

In this exercise, tariffs are assumed to be constant at 4 percent in the US and 2.5 percent in the ROW for the first four years and then gradually decline with a half-life of 8 years. We contrast two cases. In the first case (perfect foresight), households know the full path of tariffs. In the second case (surprise), for the first four years, households believe that tariffs will remain permanently high, and then are surprised when the government announces that tariffs will decline going forward.

While the aggregate dynamics can be different (for example, the perfect foresight case features a larger decline in capital and output initially), the welfare losses and how they are distributed are similar across the two cases. In particular, the largest welfare losses are concentrated among the low wealth and retired households (Table 4).

Table 4: Welfare (Role of expectations)

	Perfect foresight	Surprise
Average	−0.05	−0.04
Skilled	−0.01	−0.02
Unskilled	0.02	0.03
Retired	−0.23	−0.19
High wealth	0.06	−0.07
Low wealth	−0.24	−0.21
High income	0.00	0.00
Low income	−0.01	−0.01

Units: percent. High and low wealth correspond to the top and bottom deciles of wealth, respectively. High and low income correspond to the top and bottom deciles of labor income, respectively, conditional on working age.

1.3.3 Front-loaded spending of tariff revenue

Finally, we consider the case where current and future tariff revenues are used to fund a one-time tax reduction. Specifically, we let the government access the entire present discounted value of tariff revenues. The present value of tariff revenues are assumed to be allocated to a one-time reduction of income and consumption taxes in the same proportion as in the baseline, before reverting to their initial pre-tariff values. As in Appendix C.3, tariffs are assumed to decay geometrically with a half-life of 8 years.

As shown in Table 5, the welfare change from the tariff and one-period tax reductions are decreasing in the discount rate. For example, when using a discount rate of 2 percent, there is a slight average welfare gain (second column). This is not surprising given that we are reporting the welfare of the current living, who enjoy lower taxes at the expense of future generations. The largest welfare losses are still concentrated among the retired and the low wealth households. When using a higher discount rate (e.g. 5 percent), the distribution of welfare losses (last column) are very similar to the baseline case with transitory tariffs (first column). In all cases, high-income households benefit more with front-loading because they benefit from a large reduction in income taxes at precisely the moment when their income is high.

Table 5: Welfare (Front-loaded spending)

	baseline	Discount rate (percent)				
		2	2.4	3	4	5
Average	–0.04	0.04	0.02	0.01	–0.01	–0.03
Skilled	–0.01	0.10	0.08	0.07	0.04	0.01
Unskilled	0.02	0.09	0.08	0.07	0.05	0.03
Retired	–0.19	–0.12	–0.13	–0.14	–0.15	–0.16
High wealth	0.05	0.05	0.05	0.04	0.04	0.03
Low wealth	–0.20	–0.10	–0.11	–0.13	–0.15	–0.16
High income	0.00	0.16	0.15	0.13	0.11	0.08
Low income	–0.00	0.06	0.05	0.03	0.01	–0.01

Units: percent. High and low wealth correspond to the top and bottom deciles of wealth, respectively. High and low income correspond to the top and bottom deciles of labor income, respectively, conditional on working age.

References

Tax Foundation, "Preliminary Details and Analysis of the Tax Cuts and Jobs Act," https://taxfoundation.org/final-tax-cuts-and-jobs-act-details-analysis/ 2017.