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Look before you leap: Why politicians may have a point to be hesitant about the gains from trade

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ABSTRACT

Economists emphasize the welfare gains of unrestricted trade, but politicians worry about the income distribution effects of increased competition. We show that the welfare gains of a trade shock become ambiguous if inaccurate information hinders optimal income redistribution with distortionary policy instruments. To be sure about the net welfare outcome of a compensated trade shock, the government must know the size of the trade shock and the corresponding size of the policy instrument that is needed to generate a balanced budget. If this is not the case, politicians may have a point when being hesitant about the gains from trade.

1. Introduction

Trade and specialization according to comparative advantage cause welfare gains and income distribution effects. This is hardly a new insight. But from a purely economic point of view, it is hard to understand why politicians usually resist the move to free trade. As all economists know, the welfare gains resulting from larger markets should be big enough to compensate the losers without taking away all the gains from the winners. So why is it that politicians do not buy this argument?

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Politicians are obviously less interested in welfare gains than in income distribution effects. As Corden (1997) notes, this attitude goes back at least as far as the Napoleonic Wars. Prominent examples include the institutionalization of the EU's Common Agricultural Policy or the EU's protectionist policy responses to cheap imports of textiles from East Asia in the 1950s and 1960s. Income distribution effects also constitute a prime rationale for countries to engage in multilateral trade negotiations on a reciprocal basis as in the World Trade Organization (WTO). If welfare considerations were all that mattered, there would be no need for multilateral trade negotiations and a WTO.[1]

The focus of politicians on income distribution effects is easily understood from a political economy point of view. But economists also have a point when arguing that the overall welfare effects should matter. We try to improve the communication between economists and politicians by studying the effects of an exogenous trade shock on the income distribution and overall welfare in a way that recognizes the reference system of politicians. In our reading, the reference system of politicians excludes lump-sum transfers to redress income distribution effects and emphasizes that political decisions have to be made on the basis of inaccurate information. The trade shock example is chosen because the trade-offs faced by politicians in response to such a shock can be discussed in terms of two well-known policy instruments, namely a tariff or a subsidy financed by a tax.

Our main argument runs as follows. With additional possibilities for trade in a larger market, i.e., after a positive trade shock, two things will happen. Welfare will be redistributed from "producers" to "consumers" or vice versa, depending on the new product price after the shock, and there will be a net welfare gain. For economists the net gain would suffice to favor the larger market. But politicians will not be interested as long as it has not been made clear how and at what cost the losers of a larger market may be compensated.[2]

The losers of a larger market can be compensated by a tariff or a subsidy, but both measures create net welfare losses relative to the overall welfare gain that would result from a larger market without redressing income distribution effects. The politically relevant question is, therefore, whether a larger market still leads to net welfare gains after the losers have been fully compensated. The textbook answer given by economists is that there remain net welfare gains even after full income compensation with subsidies and distortionary taxation. But, as it turns out, the textbook answer may not hold if politicians do not have accurate information on the size of the initial shock and on the size of the corresponding policy instrument that is needed to generate a balanced budget. Hence, at least from a comparative static point of view, politicians may have a point when being hesitant about the gains from trade that are emphasized by economists.[3]

To show these and other points, we employ partial equilibrium analysis to investigate the welfare consequences of a trade shock when a government uses distortionary measures to redress the income distribution effects. We think of a trade shock as an exogenous fall in transportation or communication costs ("globalization"), which increases the size of the market for all countries.[4] We use a tariff and a subsidy as the two alternative policy responses the government could employ. We first set up a case of correct information, which serves as a point of reference for an analysis of the welfare effects for consumers, producers, government and society at large when the government has to deal with information inaccuracies. We use partial equilibrium analysis because it allows for a simple assessment of the trade-offs faced by the government when redressing adverse income distribution

[1] Except perhaps to escape from the prisoner's dilemma of trade policy setting for large countries, which is based on the terms of trade argument. However, the large country case is typically seen as a theoretically sound but politically irrelevant reason for implementing trade policies.

[2] Corden (1997) hints that a social welfare function based on a constant income distribution may be "particularly helpful for understanding actual trade policies of many countries" (p. 74).

[3] Our argument is related to Acemoglu and Robinson (2013), who emphasize that a given *political* equilibrium may actually rest upon a distortion that inhibits an *economic* equilibrium. The economists' view in favor of removing the distortion because of the overall welfare effects may fail to take into account that a free market policy may strengthen groups and interests that are opposing redistributive measures. Hence, removing a market distortion may not always lead to an improved allocation of resources because it will affect future political equilibria, which are likely to come with other distortions.

[4] The decline in transportation and communication costs is seen as one of the main reasons for the globalization wave that started in the 1980s. See for example IMF (1997) and O'Rourke and Williamson (1999) for a comprehensive survey on the determinants of globalization.

effects. Furthermore, partial equilibrium analysis may help to better understand political decision making than general equilibrium analysis. This is because the income distribution effects of a trade shock are usually perceived as a sector-specific phenomenon in the political debate. The political focus is clearly on declining production and employment in import-competing sectors, thereby neglecting increasing production and employment in export sectors that result from the same shock.

The structure of our paper is as follows. In the next section, we set up our partial equilibrium analysis and use it for a detailed assessment of the welfare gains and losses from distortionary income redistribution for consumers, producers, government, and society at large. Section 3 builds on this reference system to assess welfare outcomes if incorrect information is used by the government for designing optimal redistribution policies. In this section we also formulate conditions that make it more likely that negative welfare effects arise in case of incorrect information. Section 4 concludes.

2. Assessing the trade-offs in partial equilibrium

The partial equilibrium effects of a trade shock[5] when the government uses tariffs and subsidies (financed by a tax) to redress the income distribution effects can be demonstrated by considering a standard set of supply and demand equations:

$$S^D = b\,p^D - a \tag{1}$$

$$D^D = d - c\,p^D, \tag{2}$$

where a, b, c and d are positive constants. We suppose that the country already trades and consider a trade shock that leads to increased competition due to an autonomous fall in transportation costs. Accordingly, the domestic price of some import-competing commodity is p^D, which is equal to the price at world markets, p^*, plus transportation costs $T>0$:

$$p^D = (1+T)\,p^*. \tag{3}$$

Import demand is a function of world market prices and positive when the autarky price of the domestic economy exceeds $(1+T)p^*$, which we assume:

$$Im(p^*;T) = (d+a) - (c+b)(1+T)\,p^* > 0. \tag{4}$$

Suppose that the country faces a significant reduction in the costs of international transportation, lowering the domestic price to $p^{D'} < p^D$. Furthermore, assume that the country is "small", taking world market prices as given. In order to assess reductions in T and concomitant redistribution policies, we require a measure of welfare. In this simple partial equilibrium framework, it is customary to see welfare as the sum of consumer surplus (CS), producer surplus (PS), and government revenue (GR):

$$W = CS + PS + GR. \tag{5}$$

The expressions for changes in consumer surplus and producer surplus are, respectively,

$$dCS = -D_0^D \cdot d\,pD - \frac{1}{2}\,d\,p^D \cdot dD_0^D$$

and

$$dPS = S_0^D \cdot d\,pD + \frac{1}{2}\,d\,p^D \cdot dS_0^D.$$

The subscript 0 is added to refer to values in the initial situation. Government revenue is zero because there are no redistributive policies in place.

[5] The details of all mathematical derivations underlying the results presented in this paper are included in an appendix that is available on the website of the first author.

The welfare effects of the trade shock are revealed by taking partial derivatives with respect to T for all terms in (5). It is no surprise to find that consumer surplus increases and producer surplus decreases when T falls: $dCS/dT<0$ and $dPS/dT>0$. By default, there is no effect on government revenue. Overall welfare increases when T falls: $dW/dT<0$. This is the standard result of reduced transportation costs when world prices are given.

If the government wants to maintain the initial income distribution, it will have to retain sectoral employment and production levels. However, our partial equilibrium approach also allows for alternative interpretations of budget policies. For instance, to balance the budget one could assume that if the government imposes a tariff on an import good, then the tariff revenue will be given to the consumers of that good and if the government provides a subsidy to producers of an import-competing good, then a tax will be levied on the consumption of that good. We refer to this case as (sector-specific) budget neutrality. However, with a partial equilibrium approach, one could also assume that the tariff revenue is spent on something else and the subsidy is financed by someone else. We refer to this alternative case as (sector-specific) budget non-neutrality and study how the welfare assessments of using a tariff or a subsidy are affected by the assumption on budget neutrality.

Suppose that government pays domestic producers a specific subsidy s that exactly offsets the price decline due to the initial trade shock and that it pursues budget non-neutrality. With such a production subsidy, the domestic supply curve should be written as:

$$S^D = b(p^D + s) - a.$$

The government now faces a subsidy outlay, but the welfare effect for producers becomes zero by construction. The welfare effect on consumers remains as without government intervention, however, since the government subsidy does not affect domestic prices. The net effect is a fall in welfare by the standard production distortion of a subsidy: $-(1/2)b\cdot(p^* dT)^2$. These are the costs of income redistribution in this case. The costs arise because the subsidy helps less efficient domestic producers to survive after the fall of transportation costs.

The welfare loss would be larger if the government used an import tariff τ instead of a subsidy to keep domestic production at initial levels. With the tariff in place, the domestic supply and demand curves remain as before, but the expression for the domestic price changes to[6]:

$$p^D = (1+\tau)(1+T)\,p^*.$$

This equation implies that for domestic prices to remain at their initial levels, the initial tariff rate τ has to change by $-dT/(1+T)>0$ in response to a trade shock. Producer surplus *and* consumer surplus go back to their initial levels, but the government receives tariff revenue. While the import tariff has nullified the impact of reduced transportation costs on producers and consumers, it has amounted to a welfare gain for the government of: $-(p^*\mathrm{Im})dT>0$. Overall, compensation with a tariff implies a net negative welfare effect of $-(1/2)(b+c)\cdot(p^* dT)^2<0$.

The welfare outcomes of both policy options make clear that pursuing income redistribution after a trade shock is costly for society as a whole. However, the overall welfare gains are lower by an amount of $(1/2)c\,(p^* dT)^2$ in the case of a tariff as compared to the case of a subsidy. Some policy options are clearly more costly than others. This reflects the familiar insight that policy actions should create as few distortions as possible: a producer subsidy creates a distortion only on the supply side, whereas a tariff also creates a distortion on the demand side. Furthermore, both policy options clearly differ in their respective impact on specific groups in society. Producers are indifferent between both policy instruments, but consumers and the government are not. Consumers would prefer a subsidy to producers, whereas government prefers a tariff since it generates a budget surplus. This could lead government to favor a tariff policy for political reasons, despite its higher cost for society as a whole.

[6] Our assumption that import tariffs are levied on the transportation costs inclusive price implies that we see T as international transportation costs. Including some domestic transportation costs as well would not make the analysis qualitatively different.

Similar outcomes arise if we assume that the government pursues sector-specific budget neutrality when compensating the losers. We assume government does so by applying a specific consumption tax t. This changes our set of equations to:

$$S^D = b(p^D + s) - a \tag{1'}$$

$$D^D = d - c(p^D + t) \tag{2'}$$

$$p^D = (1+\tau)(1+T)\,p^*, \tag{3'}$$

where t denotes the consumption tax. This framework can be used to assess alternative welfare scenarios that would result from implementing a specific policy measure in combination with a specific budget strategy.

Consider first a production subsidy in response to a decline in transportation costs. If the government wants to fully compensate the losses of its domestic producers without generating a sector-specific budget deficit, it must levy a consumption tax such that $D^D dt - S^D ds = 0$, implying

$$dt = -\frac{S^D}{D^D}\,p^* dT > 0$$

when s and t are zero before the trade shock and where S^D and D^D denote post-shock-post-policy supply and demand levels.

In this scenario, the net welfare implications are zero for producers since they are fully compensated for the losses implied by the lower domestic prices. The subsidy implies that supply is restored to its pre-shock level. The effect on consumers, by contrast, depends on how high the government sets the tax rate. The mutual dependence of dt and D^D implies that the solution to dt is a quadratic function with two positive solutions. To balance the budget, the government can choose between a high and a low tax rate. For budgetary reasons, the government is indifferent between both tax rates, since in both cases it neither gains nor loses. We nevertheless assume that the government will always opt for the lowest tax rate possible. The main reason for this assumption is that the low tax rate minimizes the tax-ridden welfare loss for consumers, which makes it a politically sensible choice. But even with a high tax rate consumers would still be better off than before the trade shock: the welfare loss due to the tax required to compensate domestic producers is lower than the welfare gain due to the decline in domestic prices. However, the remaining net positive welfare effects would be larger with a low tax rate.

The same result emerges if the government uses an import tariff instead of a subsidy to compensate producers. In this case, choosing the lowest possible tax rate implies that the government will levy a *negative* consumption tax to maintain sector-specific budget neutrality. Though perhaps an unlikely outcome, we also pursue this possibility to allow for a direct comparison with the subsidy case:

$$dt = -\frac{p^*(D^D - S_0^D)}{D^D}\,dT < 0.$$

Restoring the initial domestic production levels with an import tariff generates revenues for compensating the welfare losses of consumers (as compared to a situation without government interference). The negative consumption tax guarantees that the overall effects for consumers (and society) will be exactly the same in case of a tariff and in case of a production subsidy as long as sector-specific budget neutrality is maintained:

$$dW_{dT,\tau} - dW_{dT,s} = 0$$

with $dW_{dT,\tau}$ and $dW_{dT,s}$ denoting the changes in overall welfare due to budget-neutral compensations by a tariff and a subsidy.

It is noteworthy at this stage to compare the results of the partial equilibrium analysis with the results of a general equilibrium analysis.[7] In both cases, the overall welfare effect of a trade shock remains positive for an importing economy despite a distortionary compensation of the income distribution. Furthermore, in both cases the distortionary income compensation of producers in the import-competing sector comes at the expense of consumers.

The point of the partial equilibrium analysis is to show which group realizes a welfare advantage conditional on the policy instrument (subsidy vs. tariff) and the budget policy. For instance, with sector-specific budget-neutrality, the costs of the subsidy are not spread over the whole economy but must be entirely borne by the consumers of the import-competing good. This would eliminate all the remaining welfare gains after the compensation with the subsidy, implying that it would not matter whether the government uses a tariff or a subsidy to compensate the losers of a trade shock, in contrast to the standard result of a general equilibrium analysis. The welfare advantage of a subsidy compensation over a tariff compensation returns from the partial equilibrium analysis under the assumption of sector-specific budget non-neutrality. However, in this case consumers of the subsidized good would not be affected at all by a subsidy to producers.

Table 1 provides a summary of the partial equilibrium welfare results of a trade shock. The welfare effects for consumers, producers, government, and society as a whole are derived at three layers of analysis: compensated vs. uncompensated effects, compensation by subsidy or tariff, and compensation with or without a sector-specific budget constraint. The aggregate result of course resembles the familiar general equilibrium result: income redistribution is costly, though welfare gains remain even if the adverse income distribution effects of a trade shock are redressed by distortionary measures. This result holds at least as long as all decisions are based on correct information. Unfortunately, most politicians will have to decide on policy alternatives without knowing whether the available information is correct or not. This may not only affect the particular choice of policy instrument, but also, and probably in the first place, the government's stance regarding a policy change in favor of open markets versus the status quo of an unchanged income distribution.

3. Policy responses to a trade shock with inaccurate information

Apart from the inevitable transaction costs of the political process that accompanies the redistribution of income through tariffs, taxes, and subsidies,[8] the desired policy outcome is difficult to reach in practice. The reason is that the government has to base its policy measures on incomplete and hence probably incorrect information. Our main hypothesis is that the missing accuracy of the information needed to achieve the desired policy outcome may lead to ambiguous welfare results and hence to a preference for the status quo.

To set tariffs, subsidies and taxes optimally, the government requires information on many aspects. For a start, the appropriate subsidy rate necessary to compensate domestic producers requires knowledge of the world market prices and the size of the trade shock. When the government wants to design budget-neutral policies, further information is required on the domestic supply and demand functions. For large countries that influence world market prices, additional information would be required on demand and supply elasticities on the world market.

All of this is probably more than can be hoped for, especially because the accuracy of the information is of importance. To demonstrate the resulting biases, we derive the welfare effects when the government has inaccurate information on (1) the initial trade shock, (2) the supply response by domestic producers, or (3) the demand response by domestic consumers. A factor $\varepsilon > 0$ is used to

[7] A mathematical treatment of the welfare implications of tax-cum-subsidy schemes in general equilibrium is given by Dixit and Norman (1980). The comparison between partial equilibrium analysis and general equilibrium analysis outcomes is discussed in more detail in a longer version of the paper, which is available from the corresponding author upon request. The longer version of the paper also discusses the large country case. The results for the large country case are quantitatively different, but they do not differ qualitatively from the results presented for the small country case.

[8] See Dixit (1996) for an overview on the welfare effects of the transaction costs of the political process and the many uncertainties attached to it.

Table 1
Quantifying the welfare effects of income redistribution in response to a decline in transportation costs.[a]

Decline in transportation cost that is:		Welfare effect on:			
		Consumers	Producers	Government	Overall welfare
Uncompensated by government		$\left[-D_0^D + c\,p^*\frac{dT}{2}\right] p^* dT$	$\left[S_0^D + b\,p^*\frac{dT}{2}\right] p^* dT$	Zero	$-(D_0^D - S_0^D)\,p^* dT + \frac{(c+b)}{2}(p^* dT)^2$
Compensated by government with a production subsidy	No budget constraint	$\left[-D_0^D + c\,p^*\frac{dT}{2}\right] p^* dT$	Zero	$S_0^D\,p^* dT$	$-(D_0^D - S_0^D)\,p^* dT + \frac{c}{2}(p^* dT)^2$
	Budget constraint	$-\left(D_0^D - \frac{c}{2}\frac{(D^D - S_0^D)}{D^D}\,p^* dT\right)\frac{(D^D - S_0^D)}{D^D}\,p^* dT$	Zero	Zero	$-\left(D_0^D - \frac{c}{2}\frac{(D^D - S_0^D)}{D^D}\,p^* dT\right)\frac{(D^D - S_0^D)}{D^D}\,p^* dT$
Compensated by government with an import tariff	No budget constraint	Zero	Zero	$-p^*(D_0^D - S_0^D)dT$	$-p^*(D_0^D - S_0^D)dT$
	Budget constraint	$-\left(D_0^D - \frac{c}{2}\frac{(D^D - S_0^D)}{D^D}\,p^* dT\right)\frac{(D^D - S_0^D)}{D^D}\,p^* dT$	Zero	Zero	$-\left(D_0^D - \frac{c}{2}\frac{(D^D - S_0^D)}{D^D}\,p^* dT\right)\frac{(D^D - S_0^D)}{D^D}\,p^* dT$

[a] All details of the derivation can be found in the appendix that is available on the website of the first author.

Table 2
Welfare effects caused by inaccurate information.[a]

Inaccurate information on	(Panel A) Tax-cum-subsidy compensation: welfare effect (relative to comparable correct information case) on			
	Consumers	Producers	Government	Overall welfare
Budget non-neutrality				
Trade shock (dT)	Zero	$>(<)$ 0 if $\varepsilon>(<)$ 1[b]	$<(>)$ 0 if $\varepsilon>(<)$ 1	$<(>)$ 0 if $\varepsilon>(<)$ 1
Supply response (b)	Zero	Zero	Zero	Zero
Demand response (c)	Zero	Zero	Zero	Zero
Budget neutrality				
Trade shock (dT)	Unclear	$>(<)$ 0 if $\varepsilon>(<)$ 1[b]	$<(>)$ 0 if $\varepsilon>(<)$ 1	Unclear
Supply response (b)	Zero	Zero	Zero	Zero
Demand response (c)	Unclear	Zero	$<(>)$ 0 for $\varepsilon>(<)$ 1	Unclear

Inaccurate information on	(Panel B) Tariff compensation: welfare effect (relative to comparable correct information case) on			
	Consumers	Producers	Government	Overall welfare
Budget non-neutrality				
Trade shock (dT)	$<(>)$ 0 if $\varepsilon>(<)$ 1[c]	$>(<)$ 0 if $\varepsilon>(<)$ 1[b]	$>(<)$ 0 if $\varepsilon>(<)$ 1[d]	$<(>)$ 0 if $\varepsilon>(<)$ 1
Supply response (b)	Zero	Zero	Zero	Zero
Demand response (c)	Zero	Zero	Zero	Zero
Budget neutrality				
Trade shock (dT)	Unclear	$>(<)$ 0 if $\varepsilon>(<)$ 1[b]	$<(>)$ 0 if $\varepsilon>(<)$ 1	Unclear
Supply response (b)	Zero	Zero	Zero	Zero
Demand response (c)	Unclear	Zero	$<(>)$ 0 for $\varepsilon>(<)$ 1	Unclear

[a] All details of the derivation can be found in the appendix that is available on the website of the first author.
[b] For $\varepsilon>1$ always true. For $\varepsilon<1$ only if trade shock is not too high and/or initial domestic supply not too low.
[c] For $\varepsilon<1$ always true. For $\varepsilon>1$ only if trade shock is not too high and/or initial domestic demand not too low.
[d] Provided initial imports are not too low and/or trade shock not too high. Else, condition becomes exactly opposite.

indicate the extent by which the government is misinformed about either of these aspects, with a value of $\varepsilon=1$ implying that the government uses the correct information. Consequently, values of ε below or above one imply that the government would underestimate or overestimate the particular aspect.

Table 2 reports the welfare effects for producers, consumers, the government, and society at large if the government uses incorrect information in response to a trade shock and tries to maintain sector-specific budget neutrality or budget non-neutrality with the two alternative policy instruments. All results are presented relative to the results of the correct information case reported in Table 1. Hence, a zero in Table 2 means that having incorrect information does not affect the welfare effect for that particular item under incorrect information.

Three assumptions have been used to derive the results reported in Table 2: (i) The government has correct information on all prices and volumes in the initial situation, i.e., *prior* to the trade shock. (ii) The government calculates required subsidies and taxes based on the *perceived* information on the trade shock (dT), the supply response (b), and the demand response (c), using either εdT, εb, or εc in its calculation of a policy measure. (iii) Producers and consumers base their supply and demand decisions on correct information on prices and volumes and on the miscalculated policy measures.

In terms of notation, the variables and policy parameters that result from the (misinformed) calculations by the government are denoted by a tilde above a variable, such as $\tilde{S}^D$ for the domestic supply level and $\tilde{s}$ for its associated subsidy level. The actual demand and supply responses are denoted with a bar above a variable to set them apart from what the government uses in its own calculations.

Focusing on the overall welfare effects, the first thing to note from Table 2 is that using incorrect information does not always imply a different welfare effect as compared to using correct information (the zeros in the table).[9] For example, if the government does not pursue sector-specific budget

[9] Detailed mathematical derivations of all results presented in Table 2 are available from the website of the first author.

Table 3
Conditions for negative welfare effects of distortionary compensation and inaccurate information.[a]

	(A) Inaccurate information on trade shock (dT)	
	Welfare effect	Conditions for negative welfare effect
Tax-cum-subsidy compensation		
Budget non-neutrality	$d\tilde{W} = \left[-(D_0^D - S_0^D) + \frac{c}{2}\, p^* dT + \frac{b}{2}(1+\epsilon)(1-\epsilon)\, p^* dT\right] p^* dT$	If $\varepsilon > 1$ (necessary condition) and low $(D_0^D - S_0^D)$ and/or high b.
Budget neutrality	$d\tilde{W} = \left[-(D_0^D - S_0^D) + \left(\frac{D_0^D}{\tilde{D}^D} - 1\right)\epsilon S_0^D - \epsilon\left(\frac{\tilde{D}^D}{\tilde{D}^D} - \frac{S^D}{S_0^D}\right) + \left(\frac{c}{2}\left(1 - \frac{\epsilon S_0^D}{\tilde{D}^D}\right) + \frac{b}{2}(1-\epsilon)^2\right) p^* dT\right] p^* dT$	More likely if $\epsilon > \frac{\tilde{D}^D}{S_0^D} > 1$ and if $(D_0^D - S_0^D)$ is low.
Tariff compensation		
Budget non-neutrality	$d\tilde{W} = \left[-(D_0^D - S_0^D) + \frac{c+b}{2}(1+\epsilon)(1-\epsilon)\, p^* dT\right] p^* dT$	If $\varepsilon > 1$ (necessary condition) and low $(D_0^D - S_0^D)$ and/or high b, c.
Budget neutrality	$d\tilde{W} = \left[-(D_0^D - S_0^D) + \left(\frac{D_0^D}{\tilde{D}^D} - \frac{\tilde{D}^D}{\tilde{D}^D}\right)\epsilon S_0^D + \frac{c}{2}\left(1 - \frac{\epsilon S_0^D}{\tilde{D}^D}\right)^2 p^* dT + \frac{b}{2}(1+\epsilon)(1-\epsilon)\, p^* dT\right] p^* dT$	More likely if $1 < \epsilon < \frac{\tilde{D}^D}{S_0^D}$ and if $(D_0^D - S_0^D)$ is low.

	(B) Inaccurate information on demand response (c)	
	Welfare effect	Conditions for negative welfare effect
Tax-cum-subsidy compensation		
Budget non-neutrality	$d\tilde{W} = dW > 0$	Not applicable
Budget neutrality	$d\tilde{W} = \left[-(D_0^D - S_0^D) + \left(\frac{D_0^D}{\tilde{D}^D} - \frac{\tilde{D}^D}{\tilde{D}^D}\right) S_0^D + \frac{c}{2}\left(1 - \frac{S_0^D}{\tilde{D}^D}\right)^2 p^* dT\right] p^* dT > 0$	Not applicable
Tariff compensation		
Budget non-neutrality	$d\tilde{W} = dW > 0$	Not applicable
Budget neutrality	$d\tilde{W} = \left[-D_0^D + \frac{c}{2}\left(1 + (1-2\epsilon)\frac{S_0^D}{\tilde{D}^D}\right)^2 p^* dT\right]\left(1 - \frac{S_0^D}{\tilde{D}^D}\right) p^* dT$	If $\epsilon > \frac{1}{2}\left(1 + \frac{\tilde{D}^D}{S_0^D}\right) > 1$ (necessary condition) and b and c high.

[a] All details of the derivation can be found in the appendix that is available on the website of the first author.

neutrality, there is no difference in the welfare effect if the government misreads the *supply response* (b) to a trade shock as long as it gets the size of the trade shock right. This is because the supply response has no bearing on the subsidy level that is required to restore producer prices to their pre-shock levels: $ds = -p^* dT > 0$ holds as before. Though producers do react differently to the initial trade shock than the government believes, they also react differently than the government believes to the implemented subsidy. Hence, the actual net supply response of producers will be zero, which is correctly perceived by the government. In this case, total subsidy outlays are as if the government had the right information, implying equal tax rates and welfare effects as in the case with correct information.

Second, it matters for outcomes whether or not the government pursues budget neutrality, particularly when the government has inaccurate information on the demand responses of consumers. The reason is of course that pursuing budget neutrality implies calculating budget-neutralizing taxes as well, making outcomes sensitive to having correct information on consumer demand.

Third, having incorrect information could aggravate as well as mitigate the negative welfare effects of income redistribution. Take, for example, the case of misinformation on the initial trade shock dT in the budget non-neutrality scenario. An overestimation of the trade shock ($\varepsilon > 1$) would lower overall welfare compared to the correct information case, whereas underestimating the trade shock ($\varepsilon < 1$) would decrease the welfare loss. The simple reason is that the subsidy paid by the government is always larger than the resulting gain for producers, the difference being accounted for by the higher costs of the less efficient producers that can stay in business because of the subsidy. If the government overestimates (underestimates) the trade shock, more (less) inefficient producers are 'saved' and more (less) welfare is lost. There are reasons to believe that $\varepsilon > 1$ is a more likely outcome in a political economy setting than $\varepsilon < 1$. Since the producer surplus increases when the government overestimates the trade shock, producers have a clear incentive to exaggerate the extent of the trade shock in their lobbying efforts for compensating measures.

The non-zero entries in Table 2 indicate cases where not having the right information may generate different welfare effects relative to having correct information. As we see, welfare differences may arise for two information inaccuracies–a misreading of the initial trade shock and a misreading of the demand response of consumers. In fact, in these cases the use of distortionary income redistribution measures could lead to a negative overall welfare effect. To establish conditions for such welfare losses, Table 3 gives the algebraic expressions for the welfare effects of compensatory measures under incorrect information ($d\tilde{W}$) for these cases.

From Table 3 we see that a negative welfare effect may arise independent of the compensatory measure and the budget policy if the government does not have the right information on the trade shock, and it may also arise if the government misreads the demand response of consumers and uses a tariff to pursue compensation with sector-specific budget neutrality. In both cases, the welfare losses would result from an overestimation of the trade shock or demand response ($\varepsilon > 1$). Furthermore, the likelihood for a negative overall welfare effect is enhanced in these cases when the initial trade shock dT is large. A low level of initial imports also contributes to the chance that a negative overall welfare effect is achieved because it mitigates the positive welfare effect of the initial trade shock. Finally, a high supply response b and a high demand response c both lower initial import levels and thus work to generate a negative overall welfare effect, independent from over- or underestimating the shock. In addition, in most cases a high supply response and a high demand response exert a direct negative effect on $d\tilde{W}$ if the condition on ε for a negative welfare effect is met.

The mathematical expressions in Table 3 highlight the often subtle combination of factors that may cause a decrease in welfare as a consequence of distortionary income compensation. Of course this is not necessarily the most likely outcome of the political process *if* distortionary policies are implemented. Our argument is that the *possibility* of a negative welfare outcome may already prevent the adoption of policies in favor of open markets that would come with income distribution effects.

4. Concluding remarks

Economists insist that there are gains from trade to be had, but politicians are generally reluctant to endorse unconditional free trade. As probably all parties understand, market liberalization increases

welfare and changes the income distribution. Politicians usually care more about distribution than about welfare. Economic theory suggests that some of the welfare gains of free trade can be maintained even if the negative income distribution effects are compensated with distortionary policies. The problem is that politicians have to decide on distortionary policies like subsidies and taxes without having correct information on the size of a trade shock and on the subsequent reactions of consumers and producers, i.e., politicians have to implement a policy instrument without knowing its appropriate size.

We study the conditions under which compensation with distortionary policies may lead to overall welfare losses due to inaccurate information. We find that redressing the distributional effects of a trade shock with tariffs, subsidies, and taxes may lead to overall welfare losses if the initial trade shock is large and substantially overestimated by the government. We also find that misreading the demand response to tariffs that are imposed to finance production subsidies may lead to overall welfare losses if the government pursues sector-specific budget neutrality. Since there is the possibility that the overall welfare effects become ambiguous under the stated conditions, politicians may have a point when being hesitant about market liberalization, especially in countries that stand to realize large welfare gains – and hence large income distribution effects – after a move to free trade.

For a diehard economist, these results would probably suggest a hands-off policy after trade liberalization occurs. Given political reality, we would argue that a hands-off policy would never be implemented, so a move to free trade becomes less likely in the first place. In order to convince politicians to implement measures in favor of open markets, the real question is whether market liberalization still leads to net welfare gains once the losers have indeed been fully compensated by taxing the winners. Our analysis makes clear that this may not be an easy task in a world with imperfect information.

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