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AGRICULTURAL MULTIFUNCTIONALITY: A CASE AGAINST TRADE LIBERALISATION?

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Abstract

This paper analyses the welfare effects of agricultural trade liberalisation when taking into account the positive environmental externalities of European farming. It will be shown that free trade is suboptimal, if no efficient environmental policy addressing the provision of multifunctional amenities is implemented. However, tariff reductions in a net-importing country will increase the incentive for introducing an environmental policy, though this policy will be strategically distorted. Despite its strategic character, introducing an optimal environmental policy, when simultaneously abolishing a tariff policy in an importing country, will unambiguously enhance global welfare.

Keywords

Agricultural trade, agricultural multifunctionality, strategic environmental policy

Zusammenfassung

Der vorliegende Beitrag analysiert die Wohlfahrtswirkungen von Handelsliberalisierung im Agrarsektor unter besonderer Berücksichtigung der positiven Umweltwirkungen der europäischen Landwirtschaft. Es wird gezeigt, dass Freihandel suboptimal ist, sofern keine Umweltpolitik implementiert ist, welche die multifunktionalen Aspekten der Landwirtschaft effizient internalisiert. Der Anreiz, eine Umweltpolitik einzuführen, wird jedoch durch den Abbau von Importzöllen erhöht. Obwohl eine durch Zollreduzierung herbeigeführte Umweltpolitik strategischen Handelsinteressen unterliegen mag, löst der Politikwechsel insgesamt eine Steigerung der Weltwohlfahrt aus.

Schlüsselwörter

Agrarhandel, Multifunktionalität, strategische Umweltpolitik

1 Introduction

The liberalisation of agricultural trade and the protection of the environment are widely regarded by economists as necessary for social welfare improvements, yet they have given rise to tensions in recent WTO negotiations (KENNEDY et. al 1999). While the main goal of freer trade is to enhance international specialization, policy makers in Europe and parts of Asia fear that trade liberalisation and the reduction of agricultural support may adversely affect the delivery of public goods that are jointly produced with agricultural commodities (MAHÉ 2001; LATACZ-LOHMANN and HODGE 2001). While the EU stresses the importance of safeguarding the provision of positive agri-environmental goods, other countries suspect that domestic policies might be used strategically as a substitute for conventional border protection without genuinely pursuing environmental goals (VASAVADA and WARMERDAM 1998; FREEMAN and ROBERTS 1999; BAGWELL and STAIGER 2001; BLANDFORD et al. 2003).

World welfare will be enhanced, if efficient environmental policies are introduced while trade is liberalised (ANDERSON 1992; RUNGE 1999). Hence, when taking global welfare effects as a

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benchmark for judging the trade-distorting character of national policies, we may infer that trade liberalisation reduces trade-distortions. However, efficient agri-environmental policies may not be implemented or poorly designed because of prohibitively high administrative costs or information deficiencies, or if a country is sufficiently large to manipulate the terms of trade by means of domestic policy (MARKUSEN 1975; KRUTILLA 1991; RAUSCHER 1994; PETERSON et. al 2002). In the presence of existing market distortions, important questions remain to be answered: Will trade liberalisation enhance global welfare in the presence of non-internalised positive externalities? May agricultural trade liberalisation provide an incentive to introduce an environmental policy which internalises the positive non-market effects of farming? Is trade liberalisation welfare-enhancing if large countries introduce a strategically distorted environmental policy as a result of tariff reduction requirements?

The present paper will deal with this set of questions by incorporating 'multifunctionality'– modelled as a domestic externality of agricultural production – into a bilateral trade model, an extended version of KRUTILLA's (1991) partial equilibrium trade model. The purpose of the paper is to analyse whether the multifunctional role of farming may provide a valid argument against trade liberalisation. The analysis of interacting trade and environmental policies is therefore based on the assumption that the overall environmental effect of European farming is positive, though the paper does not say that this assumption is necessarily true. The main contribution of the paper is to show that, though the multifunctionality argument may lend some support to the criticism against trade liberalisation, this argument is substantially weakened if it is accounted for that environmental policies may change simultaneously. We show that trade liberalisation will enhance the incentive for a country to introduce an environmental policy. The paper then demonstrates that, while global welfare effects of trade liberalisation are generally ambiguous in the absence of environmental policy, the likelihood for global welfare improvements will increase if an environmental policy is introduced at the same time. This result holds even for the case that the environmental policy is strategically chosen to partly substitute for an optimum tariff.

The paper is divided into five sections. After presenting the model in the following section, Section 3 demonstrates that tariff concessions enhance the incentive for introducing an environmental policy. In Section 4 we then analyse the welfare implications of trade liberalisation, depending on whether the country offering tariff concessions simultaneously introduces an optimum environmental policy. The paper concludes in Section 5 with a summary of the main findings.

2 The model

Consider a partial equilibrium trade model consisting of two large countries trading in a single homogeneous agricultural commodity. The supply S_1 in the home country (Country 1) is produced at costs $C_1(S_1)$, but also affects the environment $E_1(S_1)$. We assume that the environmental impact of production ($\partial E_1(S_1)/\partial S_1$), which also includes the multifunctional effects of farming, is not internalised into the market system and that externalities do not spill over across national boundaries.

The analysis is based on the hypothesis that the positive non-market effects of agricultural production more than outweigh the detrimental impacts, while the utility from marginal environmental improvements is decreasing. Hence, $\partial E_1(S_1)/\partial S_1 > 0$ and $\partial^2 E_1/\partial S_1^2 < 0$. Note that the article does not suggest that this assertion is necessarily true, given the difficulty of assessing the various environmental impacts of agriculture in monetary terms. The article rather aims to test whether multifunctionality may provide a case against trade liberalisation based on the hypothesis of an overall positive environmental effect of farming. The agricultural good is also produced in the rest of the world (Country 2); however, in the interest of simplicity, the environmental impact of the production abroad is considered to be neutral.

The government of the home country has the policy option to fix a tariff (T), which is defined as a specific tax or subsidy on exports or imports. It can also introduce an environmental instrument, a specific tax (t) or subsidy ($-t$) on production. The focus of this analysis is to analyse a large country's optimal trade and environmental policy without considering possible retaliatory policy measures which might follow. Hence, we assume that tax/subsidy and tariff instruments are not available to the regulatory authorities abroad.

The home country's supply $S_1(P_{S_1})$ and demand $D_1(P_{D_1})$ are defined as functions of domestic supply and demand prices, respectively, whereas Country 2's supply $S_2(P_w)$ and demand $D_2(P_w)$ are determined by the world price. We assume supply and demand curves to be well-behaved and non-concave. Hence, $\partial S_1/\partial P_{S_1}, \partial S_2/\partial P_w > 0$, $\partial D_1/\partial P_{D_1}, \partial D_2/\partial P_w < 0$ and $\partial^2 S_1/\partial P_{S_1}^{\ 2}, \partial^2 S_2/\partial P_w^{\ 2} \leq 0$, $\partial^2 D_1/\partial P_{D_1}^{\ 2}, \partial^2 D_2/\partial P_w^{\ 2} \geq 0$. Building upon these relationships, social welfare functions can be derived for the home country and the rest of the world. The welfare for Country 1 (W_1) is defined as the sum of consumer surplus and producer benefit of both commodities and includes also tax revenues, tariff revenues and the value of the environmental externality:

$$W_1(t,T) = \int_{P_{D_1}}^{\infty} D_1(P_{D_1})\,dP_{D_1} + P_{S_1} S_1(P_{S_1}) - C_1(S_1(P_{S_1})) + t\,S_1(P_{S_1}) + T\left[D_1(P_{D_1}) - S_1(P_{S_1})\right] + E_1(S_1(P_{S_1})). \tag{1}$$

Analogously, equation (2) defines social welfare for Country 2 (W_2) as the aggregate of consumer surplus and producer benefit:

$$W_2(t,T) = \int_{P_w}^{\infty} D_2(P_w)\,dP_w + P_w S_2(P_w) - C_2(S_2(P_w)). \tag{2}$$

We assume that world welfare can be depicted as the sum of welfare of the home and foreign country ($W = W_1 + W_2$). Furthermore, the model is based on the trade equilibrium requirements of excess supply ($X_i = S_i - D_i$) in Country 1 being equal to excess demand in Country 2:

$$X_1 = -X_2 \tag{3}$$

In the interest of simplicity, we ignore the existence of transaction and transportation costs. Hence, the margin between the home country's demand price P_{D_1} and the world price P_w is determined solely by the tariff rate, whereas the environmental tax/subsidy rate exclusively determines the difference between domestic supply price P_{S_1} and demand price. The model is completed with the supposition that markets operate perfectly, hence supply prices equal marginal production costs both at home and abroad:

$$P_w = \partial C_2/\partial S_2 = P_{D_1} - T \qquad P_{S_1} = \partial C_1/\partial S_1 = P_{D_1} - t. \tag{4}$$

3 Introduction of an environmental policy as a response to trade liberalisation

We first analyse whether trade liberalisation may provide an incentive for the home country to introduce an environmental policy. Consider that, prior to trade liberalisation, Country 1 is free to set its environmental tax/subsidy and tariff rates simultaneously in order to maximize national social welfare. The first-order condition for an interior maximum is then obtained by taking the partial derivatives of the domestic welfare function W_1 with respect to the tax/subsidy and tariff rates, setting these as equal to zero and solving simultaneously ($\partial W_1/\partial t = \partial W_1/\partial T = 0$). Taking this rule and applying the constraints in equation (3) and (4) to simplify the result, we obtain:

$$\frac{\partial W_1}{\partial t} = \frac{\partial S_1}{\partial P_{S_1}} \frac{1}{(\alpha+\beta)} \left(X_1 - \left(\frac{\partial E_1}{\partial S_1} + t \right) \left(-\frac{\partial D_1}{\partial P_{D_1}} + \beta \right) + T\beta \right) = 0 \tag{5}$$

$$\frac{\partial W_1}{\partial T} = \frac{1}{(\alpha+\beta)} \left(-X_1\alpha + \left(t + \frac{\partial E_1}{\partial S_1} \right) \frac{\partial S_1}{\partial P_{S_1}} \beta - T\alpha\beta \right) = 0 \tag{6}$$

where $\alpha = \partial S_1/\partial P_{S_1} - \partial D_1/\partial P_{D_1}$ and $\beta = \partial S_2/\partial P_w - \partial D_2/\partial P_w$.

Simultaneously solving equation (5) and (6) yields:

$$t_1^{**} = -\frac{\partial E_1}{\partial S_1} \quad \text{and} \quad T_1^{**} = -X_1/\beta \tag{7}$$

Equations (7) constitute the first-best policy set. The first-best environmental tax rate t_1^{**} is the Pigouvian tax/subsidy rate ($-\partial E_1/\partial S_1$), while the first-best tariff T_1^{**} is identical to Bhagwati and Ramaswami's (1963) optimal tariff of international trade theory. The optimal tariff is determined by Country 1's trade flow (X_1) and the price responsiveness of Country 2's excess supply (β). From equation (7) we derive that the optimum tariff will be positive ($T_1^{**} > 0$), if Country 1 is a large net-importing country ($X_1 < 0$). In addition, equation (7) proves that the tariff is not affected by the environmental externality. Hence, we conclude that domestic environmental problems are best addressed by environmental regulation, whereas trade-related issues are most efficiently dealt with through tariff instruments.

Based on this result, the question arises why Country 1 may not be willing to introduce a domestic tax/subsidy instrument ($t^o = 0$), but use trade policy for pursuing environmental policy goals. Besides government failure, an explanation could be that the implementation of an efficient agri-environmental instrument is involved with high administrative and transactions costs, which might be larger than the welfare gains resulting from the implementation of a first-best policy. In any case, the incentive for introducing an environmental policy will increase, as the national welfare gain, which could be realised as a result of such policy change, increases. In order to analyse the incentives for introducing environmental policy, we will analyse how the home country's welfare is affected by tariff rate changes, depending on whether an optimal environmental policy is implemented ($W_1(t_1^*)$) or not ($W_1(t^o)$).[1]

Considering a net-importing country that has implemented a positive tariff as a substitute for a missing environmental policy ($t^o = 0$), we will first determine the optimal tariff policy. The domestically optimum second-best tariff rate T^* for a given environmental tax/subsidy rate can be calculated by solving equation (6) for the tariff rate:[2]

$$T_1^*(t) = -\frac{X_1}{\beta} + \left(t + \frac{\partial E_1}{\partial S_1} \right) \frac{\partial S_1}{\partial P_{S_1}} \frac{1}{\alpha} \tag{8}$$

Equation (8) demonstrates that the domestically optimal tariff in the absence of environmental policy ($t^o = 0$) is unambiguously positive ($T_1^*(t^o) > 0$). This is because a positive tariff will not only correct for the missing environmental policy, but will also improve an importer's ($X_1 < 0$) terms of trade.

Next, we will analyse how domestic welfare is affected if Country 1 introduces an optimal environmental policy. It is plausible that domestic welfare will increase if the home country adjusts its environmental policy as a result of tariff rate changes, hence

1 Let t_1^* denote the domestically optimal second-best tax rate for a given tariff rate.

2 Note, that the domestically optimal tariff T_1^* differs from the tariff calculated within Krutilla's partial equilibrium framework (1991), which was not correctly specified.

$W_1(t_1^*(T),T) \geq W_1(t^o,T)$.[3] In addition, by inserting equation (8) into (5), we can demonstrate that the domestically optimal second-best tariff rate in the absence of environmental policy is generally greater than the first-best tariff rate ($T_1^*(t^o) > T_1^{**}(t_1^{**})$):

$$\frac{\partial W_1\left(t^o, T_1^*\left(t^o\right)\right)}{\partial t} = \frac{\partial D_1}{\partial P_{D_1}} \frac{\partial E_1}{\partial S_1} \frac{\partial S_1}{\partial P_{S_1}} \frac{1}{\alpha} \tag{9}$$

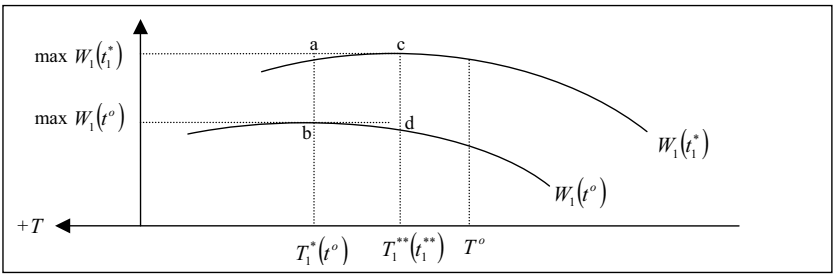
Equation (9) takes a negative value and thereby suggests that the optimal environmental policy in the presence of a positive externality would be to introduce a subsidy (negative tax) policy. The introduction of an environmental subsidy, in turn, will reduce Country 1's optimum tariff. This can be derived by taking the first derivative of equation (8) with respect to the environmental tax rate:

$$\frac{\partial T_1^*\left(t^o\right)}{\partial t} = \frac{X_1}{\beta^2} \frac{\partial \beta}{\partial t} - \frac{\partial X_1}{\partial t} \frac{1}{\beta} + \frac{\partial E_1}{\partial S_1} \frac{1}{\alpha^2(\alpha+\beta)} \left(\frac{\partial D_1}{\partial P_{D_1}} \frac{\partial^2 S_1}{\partial P_{S_1}^2} \left(-\frac{\partial D_1}{\partial P_{D_1}} + \beta \right) + \frac{\partial S_1}{\partial P_{S_1}} \frac{\partial S_1}{\partial P_{S_1}} \frac{\partial^2 D_1}{\partial P_{D_1}^2} \right) + \left(1 + \frac{\partial^2 E_1}{\partial S_1^2} \frac{\partial S_1}{\partial t} \right) \frac{\partial S_1}{\partial P_{S_1}} \frac{1}{\alpha} \tag{10}$$

Since equation (10) will take a positive value for a large net-importing country, we conclude that the first-best tariff will be lower than the tariff rate prior to the introduction of an environmental policy ($T_1^*(t^o) > T_1^{**}(t_1^{**})$), as depicted in Figure 1.

Based on the constellation of the domestic welfare function prior and after the introduction of an optimal environmental policy, as illustrated in Figure 1, we can derive that the incentive for a large net-importing country to introduce an environmental policy increases as trade is liberalised. If we assume that, prior to tariff reduction requirements, Country 1 was not willing to introduce an environmental subsidy, it's second-best policy would have been the tariff $T_1^*(t^o)$. Let us now assess the welfare gain Country 1 would realise, if it decided to introduce a first-best policy set instead. Implementing an environmental subsidy, while deliberately reducing the tariff rate from $T_1^*(t^o)$ to $T_1^{**}(t_1^{**})$, can be illustrated as a move from point *b* towards point *c* (Figure 1). From this we can derive that the potential welfare gain associated with the introduction of an optimal environmental policy is given by the distance $\overline{ab}$.

Figure 1. Domestic welfare for a large net-importing country ($X_1 < 0$)



Next, we will analyse how the potential welfare gain from introducing an environmental policy changes, if an international trade agreement would require the home country to lower the tariff rate from $T_1^*(t^o)$ to $T_1^{**}(t_1^{**})$. At the first-best tariff rate $T_1^{**}(t_1^{**})$, Country 1 could only attain the welfare level *d*, if it were not willing to introduce an environmental policy. However, if it decided to introduce an optimal environmental policy, it could reach the welfare

3 Domestic welfare with and without environmental policy will be equal at the tariff rate at which the optimal second-best tax/subsidy rate is zero ($t_1^* = 0$). For any other tariff rate, domestic welfare will increase with the introduction of a domestically optimum environmental policy.

level *c*; hence, the domestic welfare gain is equal to $\overline{cd}$. Since the welfare gain from introducing an environmental policy increases from $\overline{ab}$ (without tariff reduction requirement) to $\overline{cd}$ (with tariff reduction requirement), we conclude that trade liberalisation enhances the incentive for introducing an environmental policy.

4 Welfare effects of trade liberalisation and strategic environmental policy

Having demonstrated that trade liberalisation will increase the incentive for introducing a domestically optimal environmental policy, we will now analyse how trade liberalisation affects world welfare. To assess the world welfare effects of tariff reductions, we will derive as a benchmark the policy set that maximizes world welfare. We will refer to the latter as the globally (as opposed to domestically) optimal policy set. The globally optimal first-best policy solution for an open economy is free trade ($T_w^{**}=0$) combined with a Pigouvian tax or subsidy ($t_w^{**}=-\partial E_1/\partial S_1$). The intuition behind this finding is that free trade between different nations within an open world economy is identical to free trade between different regions within a closed economy. It can be calculated by setting the partial derivatives of the world welfare function ($W=W_1+W_2$) equal to zero. Applying the constraints in equations (3) and (4) to simplify the result, we can write:

$$\frac{\partial W}{\partial t}=\frac{\partial S_1}{\partial P_{S_1}}\frac{1}{(\alpha+\beta)}\left(\left(t+\frac{\partial E_1}{\partial S_1}\right)\left(\frac{\partial D_1}{\partial P_{D_1}}-\beta\right)+\beta T\right)=0 \tag{11}$$

$$\frac{\partial W}{\partial T}=\frac{1}{(\alpha+\beta)}\left(\left(t+\frac{\partial E_1}{\partial S_1}\right)\frac{\partial S_1}{\partial P_{S_1}}\beta-\alpha\beta T\right)=0\ . \tag{12}$$

Solving equations (11) and (12) simultaneously for the tax and tariff rates, yields:

$$t_w^{**}=-\partial E_1/\partial S_1 \text{ and } \qquad T_w^{**}=0\ . \tag{13}$$

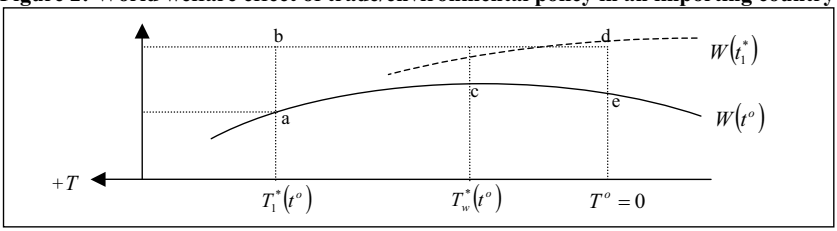
4.1 Trade liberalisation without environmental policy

The question of interest is now how the globally optimal trade policy changes, if the environmental subsidy rate is not set at the optimal level. By solving equation (12) for the tariff rate, we derive the globally optimal *second*-best tariff rate as follows:

$$T_w^{*}=\left(t+\frac{\partial E_1}{\partial S_1}\right)\frac{\partial S_1}{\partial P_{S_1}}\frac{1}{\alpha}\ . \tag{14}$$

Since a positive tariff is the globally optimal trade policy in the absence of environmental policy ($T_w^{*}(t^{o})>0$), a net-importing home country would need to introduce a tariff to maximise world welfare. This is plausible because a tariff would increase domestic production and thereby also enhance the positive environmental effects associated with production. From this we conclude that complete trade liberalisation would not be efficient, in case that no environmental policy is implemented.

Figure 2: World welfare effect of trade/environmental policy in an importing country



Next, we will demonstrate that, without environmental policy, a domestically optimally second-best tariff rate is greater than the globally optimal tariff ($T_1^*(t^o) > T_w^*(t^o)$), as depicted in Figure 2. This can be proven by evaluating the marginal global welfare change (equation 12) at the domestically optimal second-best tariff rate of equation (8):

$$\frac{\partial W(t^o, T_1^*(t^o))}{\partial T} = \frac{\alpha}{(\alpha+\beta)} X_1(t^o, T_1^*(t^o)) \tag{15}$$

Since equation (15) takes a negative value for a net-importing country, we conclude that lowering of a domestically optimum tariff rate will increase world welfare. The rationale is that a net-importing country's optimal trade policy not only corrects for the missing environmental policy, but also improves its terms of trade by choosing a higher tariff rate than that which is globally optimal. Increasing the tariff rate improves an importing country's terms of trade, however, at the expense of global welfare losses. Moreover, we can derive from equation (14) that, given that no environmental policy is implemented, global welfare is maximised at a positive tariff rate ($T_w^*(t^o) > 0$). Subsequently, global welfare ($W(t^o)$) will only increase until the globally optimal tariff rate is reached, but decrease if the tariff rate is further reduced (Figure 2). We conclude that in the absence of efficient environmental policies, a partial move towards free trade (move from *a* to *c*) will enhance global welfare, whereas global welfare effects of complete trade liberalisation (move from *a* to *e*) are ambiguous.

4.2 Trade liberalisation leading to environmental policy adjustments

Consider now that Country 1 introduces an environmental policy as a response to tariff reduction requirements. The domestically optimal environmental policy for a given tariff rate can be derived by solving equation (5) for the tax rate:

$$t_1^*(T) = -\frac{\partial E_1}{\partial S_1} + (X_1 + T\beta)\left(-\frac{\partial D_1}{\partial P_{D_1}} + \beta\right)^{-1} \tag{16}$$

The domestically optimal tax rate would internalise the environmental externality, represented by the first term of equation (16). Note further, that the domestically optimal second-best tax/subsidy policy will have a "strategic" component, indicated by the second term of equation (16). The second term would take a zero value in case of a small country, which would therefore maintain a Pigouvian tax/subsidy rate. On the other hand, if the home country is large the environmental policy will deviate from a Pigouvian tax/subsidy rate since it may deal as a substitute for an optimum tariff policy.

We will show that the abolishment of a positive tariff in a large importing country which leads to the implementation of an optimal environmental policy (move from *a* to *d*) will unambiguously enhance global welfare. This result is obtained by calculating the domestically optimal environmental policy response at the globally optimal second-best tariff rate:

$$\frac{\partial W_1\left(t^o, T_w^*\left(t^o\right)\right)}{\partial t} = \frac{\partial S_1}{\partial P_{S_1}} \frac{1}{(\alpha+\beta)} \left(X_1 + \frac{\partial D_1}{\partial P_{D_1}} \frac{\partial E_1}{\partial S_1} \frac{1}{\alpha} (\alpha+\beta) \right) \tag{17}$$

Since equation (17) takes a negative value, the domestically optimal environmental policy would be to introduce an environmental subsidy. Next, we analyse how global welfare is affected by the introduction of an environmental policy:

$$\frac{\partial W\left(t^o, T_w^*\left(t^o\right)\right)}{\partial t} = \frac{\partial E_1}{\partial S_1} \frac{\partial S_1}{\partial P_{S_1}} \frac{1}{\alpha} \frac{\partial D_1}{\partial P_{D_1}} \tag{18}$$

Since equation (18) takes a negative value, we derive that global welfare will increase, if the home country introduces an environmental subsidy while maintaining the globally optimal second-best tariff rate ($W\left(t_1^*, T_w^*\left(t^o\right)\right) > W\left(t^o, T_w^*\left(t^o\right)\right)$). This is illustrated in Figure 2. We can now show that, once a strategically optimal environmental policy is introduced, abolishing the tariff policy will further enhance global efficiency. This result can be derived when calculating the globally optimal tariff rate for the home country's strategically optimal environmental policy. The latter is obtained by inserting equation (16) into (14) and solving for the globally optimum tariff rate:

$$T_w^{**}\left(t_1^*\left(T_w^{**}\right)\right) = -\frac{X_1}{(\alpha+\beta)} \frac{\partial S_1}{\partial P_{S_1}} \left(\frac{\partial D_1}{\partial P_{D_1}} \right)^{-1} \tag{19}$$

Since equation (19) takes a negative value for a net-importing country, we conclude that, in the presence of a strategically chosen environmental policy, global welfare ($W\left(t_1^*\right)$) is maximised at a negative tariff rate. This is plausible, because the tariff would need to correct for the distorted environmental policy (Figure 2). By making use of equations (12), (16) and (19), it can be proven that the slope of the global welfare function is generally positive ($\partial W / \partial T > 0$) for any $T > T_w^*\left(t_1^*\left(T_w^*\right)\right)$. This provides the proof that global welfare will increase (by $\overline{ab}$ in Figure 2), if the abolishment of a positive tariff leads to the introduction of a strategically optimal environmental policy. Hence, we infer that in the absence of an environmental policy, it is globally optimal to liberalise trade only partially. However, if trade liberalisation causes a country to introduce an environmental policy, complete trade liberalisation will be more efficient.

5 Conclusions

In this paper we developed an extended trade model to investigate whether multifunctionality may provide a justification for the maintenance of trade barriers. Based on a bilateral partial equilibrium trade model, in which a country had implemented a positive optimum tariff policy as a substitute for a missing environmental policy addressing agriculture's positive multifunctional effects, we first analysed how tariff reduction requirements would change a country's incentive for introducing an environmental policy. We then analysed whether trade liberalisation would reduce trade-distortions, based on the suggestion that a policy's impact on global welfare would be the appropriate benchmark for judging the trade-distorting effect of changing policies.

The paper demonstrated that, in case that no environmental policy is implemented, a partial move towards trade liberalisation will increase global welfare. On the other hand, since the globally optimal trade policy is to implement a positive tariff, world welfare effects of complete trade liberalisation will be ambiguous. However, the most important result of the analysis is that tariff reductions will increase the incentive to introduce an environmental policy. We further showed that, as long as that trade liberalisation induces the introduction of an en-

vironmental policy, global welfare will be unambiguously enhanced, even if the environmental policy might be strategically distorted.

Based on this analysis one may suggest that a second-best tariff might be a more appropriate benchmark for assessing the trade-distorting effect of trade barriers, if there is little prospect for the introduction of an environmental policy as a result of trade liberalisation. The multifunctional role of European farming may then provide a case against complete trade liberalisation. However, the recent CAP reform may provide some evidence that agricultural trade liberalisation requirements do have an influence on the design of national policies. Particularly the linking of environmental cross-compliance conditions to the EU's direct payment scheme seems to be part of a wider strategy to qualify them for the Green Box of the WTO. The paper suggests therefore that, if the trade liberalisation process of the WTO leads to the introduction of national environmental policies, global welfare is likely to be enhanced by completely liberalising trade, even if national environmental policy might be chosen strategically.

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