Macroeconomic Effects of Tariffs: Insights from a New Open Economy Macroeconomics Model

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1. Introduction

The macroeconomics of protection attracted attention when economies increasingly suffered from internal and external instabilities. This was the case, when the disintegration effects of the Bretton Woods system and a series of import price shocks resulted in high inflation and unemployment as well as remarkable current account imbalances. To deal with this macroeconomic environment, the Mundell Fleming model seemed to be a suitable framework for analyzing the effects of trade policy (Mundell, 1961; Eichengreen, 1981, 1983; Krugman, 1982). At first glance, the imposition of an import tariff should raise the competitiveness of domestic producers thereby promoting production and employment. However, the models developed so far repeatedly revealed that under fairly general assumptions output and employment may instead be reduced by restricting international trade (Ford and Sen, 1985; Sauernheimer, 1986; Sen and Turnovsky, 1989) leading to the conclusion that trade policy is by no means a substitute for domestic labor market policy. While the consideration of macroeconomic repercussions represents an important contribution to the analysis of protection, the Mundell Fleming-type models exhibit at least two theoretical shortcomings (Lane, 2001). First, demand and supply functions on macroeconomic goods and

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factor markets are formulated generally in an *ad hoc* manner and do not allow for a rigorous welfare analysis. Whether or not a given policy measure should be preferred is decided by means of the resulting change in macroeconomic target variables such as inflation or employment. Second, these models are entirely static implying that agents do not form forward looking expectations and intertemporal optimization is not taken into account. These drawbacks have been recently addressed in a new type of macroeconomic approach introduced by Obstfeld and Rogoff (1995) in their *redux* model. The new open economy macroeconomics is particularly appealing, since it combines intertemporally optimizing agents with market imperfections such as monopolistic competition or rigid market prices. Subsequently, the Obstfeld Rogoff framework has been substantially refined in different directions. Obstfeld and Rogoff (2000) themselves made another important contribution by extending their model to an explicitly stochastic environment. Within such a setting Bacchetta and van Wincoop (2000) analyze the impact of uncertainty on the volume of international trade. Another strand of literature maintains the assumption of perfect foresight and provides generalizations of standard building blocks of the *redux* model. For example, Tille (2001) stresses the role of consumption substitutability, while Melitz's (2003) dynamic industry model accounts for firm level productivity differences. An overview is provided by Lane (2001) and Sarno (2001).

Given the huge body of literature on new open economy macroeconomics it is noteworthy that the effects of protection has been scarcely analyzed within the Obstfeld Rogoff framework up to now. Fender and Yip (2000) examine a two-country model similar to the *redux* model, but they assume that only two assets exist, domestic and foreign money. Excluding bonds from the analysis implies that neither interest rates nor capital movements are taken into consideration. Consequently, the current account is always balanced in their model. To close the gap, our model incorporates a fully integrated bond market, thereby allowing for short-run current account imbalances and wealth redistributions. Within this setting, the imposition of a permanent tariff leads to a domestic price increase of foreign products (demand diversion effect), and a contrarian terms of trade effect that redirects world demand away from domestic products as is the case in the standard Mundell Fleming approach (Krugman, 1982). Regarding the net effect of a tariff on aggregate demand for domestic products, our model reveals that the terms of trade effect unambiguously outweighs the demand diversion effect.

Due to the intertemporal linkages embedded in the Obstfeld Rogoff framework, the short-run deficit of the home country's current account necessitates interest payments to foreigners in the long run. Hence, compared to their short-run levels, domestic output must rise in the long run, whereas foreign output must fall. That is, the decrease of domestic output in proportion to foreign output is diminished in the long run. As a consequence of the intertemporal budget constraint, the improvement in the home country's terms of trade is smaller in the long run than it is in the short run. In comparison to their initial steady state levels, both domestic and foreign output shrink in the long run.

The welfare implications of our model are in line with the traditional perfect competition framework (Corden, 1971). The imposition of a tariff raises domestic welfare, while lowering foreign as well as global welfare. The positive effect on domestic welfare can be mainly attributed to the short run, as home residents enjoy better terms of trade, less labor effort, and consumption exceeding real income, whereas foreigners suffer from the opposite. In the long run, the asymmetric welfare effect becomes ambiguous, which contrasts with the model of Fender and Yip (2000) predicting an unambiguously positive impact on the steady state welfare of the home country. The reason is that our approach takes the long-run effect of a short-run deficit in the domestic current account into consideration. As the trade balance reverses and the improvement in the terms of trade declines, the impact of a tariff on domestic welfare turns ambiguous in the long run.

The paper is organized as follows: the next section describes the model and the according short-run and long-run equilibrium conditions. Section 3 analyzes the effects of a permanent tariff imposed by domestic policy makers on macroeconomic variables and welfare. The paper ends with some concluding remarks.

2. The Model

The world we assume is divided into two countries, home and foreign. The world population consists of a continuum of producer-consumers ("yeoman farmers"), indexed by $z \in [0; 1]$ and simply referred to as agents. Agents on the interval [0; n] live in the home country, while those on the interval (n; 1] reside in the foreign country. Thus, the parameter n is a measure of the relative size of the home country. Each agent produces a single differentiated good so that z also indicates the good produced by agent z. There is no (real) capital, and agents use only their own labor to produce their goods. Thereby, the labor market is suppressed.

2.1. Preferences

Agents are infinitely-lived and have perfect foresight. Preferences are assumed to be identical for all agents throughout the world. Therefore, we focus on representative agents from the home and foreign country respectively in order to analyze the intertemporal optimization problem individuals face. As for the representative home agent, preferences are described by the following intertemporal utility function:

$$U_s = \sum_{s=t}^{\infty}\left(\frac{1}{1+\delta}\right)^{s-t}\left[\log C_s + \chi \log \frac{M_s}{P_s} - \frac{\kappa_t}{2}Y_s(z)^2\right], \tag{1}$$

where $\delta, \chi > 0$. An analogous equation using foreign variables depicts the representative foreign agent's preferences. Since the model is symmetric and population size is normalized, individual variables are identical to aggregate per-capita variables in equilibrium. Thus, we do not differentiate between these two, and we suppress any index referring to the representative agents specifically. Foreign variables are denoted by an asterisk, whereas the global level of a variable is marked by a superior w.

In (1) the round brackets contain the subjective time discount factor, which is dependent on the time preference rate δ. The square brackets capture the period utility function, which is additively separable in consumption (C), real money balances (M/P), and output of good z [$Y(z)$]. As a whole, (1) yields the present discounted value of the lifetime utility the representative agent enjoys. For convenience the elasticities of marginal utility from consumption and real money holdings are set equal to one respectively, resulting in the logarithmic terms in the period utility function.[1] Correspondingly, the elasticity of marginal disutility from output is set equal to one, leading to the quadratic term in the period utility function. The parameter χ is just a scale parameter determining the size of the impact real money balances has on the individual's period utility. C represents a consumption index or bundle that incorporates all goods, i.e. both domestically and foreign produced ones, and takes the form of a CES function:

1 In contrast, OBSTFELD and ROGOFF allow the elasticity of marginal utility from real money holdings to differ from one in the original *redux* model. Here we follow the simpler approach they have taken in the textbook version of their model. See OBSTFELD and ROGOFF (1995, p. 628), as well as OBSTFELD and ROGOFF (1996, p. 661).

$$C_t = \left[\int_0^1 C_t(z)^{\frac{\theta-1}{\theta}} \mathrm{d}z \right]^{\frac{\theta}{\theta-1}}, \tag{2}$$

where $\theta > 1$ and $C(z)$ is the consumption of good z. The parameter θ is the elasticity of substitution between any two goods implying that agents' preferences are not biased towards domestically produced goods. As will be apparent from the demand function, it also stands for the constant price elasticity of demand that each producer faces. Furthermore, it provides a measure of the degree of competition in the economy. Since goods become perfect substitutes, the economy reaches perfect competition as θ approaches infinity.

In order to derive a money demand function, real money balances are introduced into the period utility function. This is justified by assuming that holdings of real money balances yield direct utility in providing liquidity or transaction services to agents. However, individuals receive such services only from holdings of their domestic money, so that foreign currency is not held by the representative home agent and does not appear in (1). Analogously, the representative foreign agent holds only foreign money, and the home currency does not enter her utility function.

Finally, the last term in the period utility function represents the disutility from labor. In order to produce output of her good z [$Y(z)$], the representative agent must expend labor effort and, thereby, forgo leisure. This reduction in leisure diminishes her utility. The letter κ_t stands for a shock variable and can be interpreted as a productivity shock. A positive productivity shock lowers the labor effort needed to produce a given output, thereby increasing leisure and, hence, utility. Thus, a positive productivity shock diminishes the disutility from labor and will be represented by a fall in κ.[2]

2 Alternatively, a fall in κ can also be regarded as a change in preferences in favor of consumption, which lowers the utility from leisure and, therefore, lowers the disutility from labor effort or output.

2.2. Price Level and Product Demand

In (1) nominal money balances are deflated by the price level P which represents the minimum cost (or price) home agents incur in buying one unit of the consumption bundle. The consumption bundle also contains foreign goods, on which a tariff τ is levied. Hence, the price of any imported good paid on the domestic goods market is given by $P(z)\cdot(1+\tau)$, $z\in(n;\,1]$, and the domestic price level takes the form

$$P_t=\left\{\int_0^n P_t(z)^{1-\theta}\mathrm{d}z+\int_n^1[P_t(z)\cdot(1+\tau)]^{1-\theta}\mathrm{d}z\right\}^{\frac{1}{1-\theta}}, \tag{3}$$

where $P(z)$ is the home currency (producer) price of good z. By contrast, as the foreign country abstains from protection, its price level is simply

$$P_t^*=\left[\int_0^1 P_t^*(z)^{1-\theta}\mathrm{d}z\right]^{\frac{1}{1-\theta}}, \tag{4}$$

where $P_t^*(z)$ is the price of good z in the foreign country, expressed in terms of the foreign currency. Because of the symmetry among producers we can refer to a typical domestic good, denoted by h, and a typical foreign good, indicated by f. Thus, (3) and (4) can be rewritten as

$$P_t=\{nP_t(h)^{1-\theta}+(1-n)[P_t(f)\cdot(1+\tau)]^{1-\theta}\}^{\frac{1}{1-\theta}} \text{ and} \tag{5}$$

$$P_t^*=\left[nP_t^*(h)^{1-\theta}+(1-n)P_t^*(f)^{1-\theta}\right]^{\frac{1}{1-\theta}}. \tag{6}$$

The law of one price is assumed to hold for each good with respect to producer prices, that is

$$P_t(z)=E_tP_t^*(z), \tag{7}$$

where E_t stands for the nominal exchange rate, defined as the price of foreign currency in terms of the domestic currency. However, as national price levels have been defined as consumer price indices, purchasing power parity does not apply due to protection. Making use of (7), we restate (5) and (6) as

$$P_t = \{nP_t(h)^{1-\theta} + (1-n)[E_t P_t^*(f)\cdot(1+\tau)]^{1-\theta}\}^{\frac{1}{1-\theta}} \text{ and} \tag{8}$$

$$P_t^* = \left\{ n\left[\frac{P_t(h)}{E_t}\right]^{1-\theta} + (1-n)P_t^*(f)^{1-\theta} \right\}^{\frac{1}{1-\theta}}. \tag{9}$$

If τ were zero (i.e. under free trade), multiplying (9) by E_t would obviously yield (8): $P_t = E_t P_t^*$. Thus, purchasing power parity would apply, because the law of one price would hold for each good with respect to consumer prices and consumers have identical preferences. Price level and demand for good z can be directly derived from the representative individual's intratemporal optimization problem. While the price level results from the minimization of consumption expenditure for a given level of consumption, the solution of the dual problem, i.e. the maximization of consumption for a given level of consumption expenditure, leads to the representative agent's demand function for good z, depending on her overall consumption, the relative (consumer) price of good z, and the price elasticity of demand. Because of the imposition of the tariff, we have to distinguish the representative home agent's demand for the typical domestic product $[Y_t^D(h)]$ from her demand for the foreign product $[Y_t^D(f)]$:

$$Y_t^D(h) \equiv C_t(h) = \left[\frac{P_t(h)}{P_t}\right]^{-\theta} C_t, \tag{10}$$

$$Y_t^D(f) \equiv C_t(f) = \left[\frac{P_t(f)\cdot(1+\tau)}{P_t}\right]^{-\theta} C_t. \tag{11}$$

As for the representative foreign agent, the analogous equations are

$$Y_t^{*D}(h) \equiv C_t^*(h) = \left[\frac{P_t^*(h)}{P_t^*}\right]^{-\theta} C_t^* \text{ and} \tag{12}$$

$$Y_t^{*D}(f) \equiv C_t^*(f) = \left[\frac{P_t^*(f)}{P_t^*}\right]^{-\theta} C_t^*. \tag{13}$$

The population-weighted sum of (10) and (12) represents (world) aggregate demand for domestic output:

$$Y_t = Y_t^D \equiv nY_t^D(h) + (1-n)Y_t^{*D}(h), \tag{14}$$

where we have already made use of the condition that, in equilibrium, domestic output supplied and demanded must be identical. Correspondingly, (world) aggregate demand for foreign output is obtained from taking the population-weighted sum of (11) and (13):

$$Y_t^* = Y_t^{*D} \equiv nY_t^D(f) + (1-n)Y_t^{*D}(f). \tag{15}$$

2.3. Budget Constraint

Turning now to the representative home agent's allocation of wealth, she can choose between two assets, domestic money and a riskless real bond (B). This bond is denominated in terms of the consumption bundle and yields real interest. Free international trade in this bond ensures that the real rate of interest (r) is equalized across countries.[3] The stocks of bonds and domestic nominal money held by the representative home agent entering period t are denoted by B_{t-1} and M_{t-1}, whereas her holdings at the end of period t are indicated by B_t and M_t. The real rate of interest on bonds between $t-1$ and t is represented by r_t. Thus, her budget constraint for period t in real terms is given by

$$B_t + \frac{M_t}{P_t} = (1+r_{t-1})B_{t-1} + \frac{M_{t-1}}{P_t} + \frac{P_t(h)}{P_t}Y_t(h) - C_t - T_t. \tag{16}$$

This equation states that the representative home agent's stocks of bonds and money at the end of period t must be equal to her wealth at the beginning of the period increased by her interest income as well as the revenues from the sale of

3 Of course, the unanticipated imposition of the tariff leads to a deviation from purchasing power parity so that on the assumption of a nominal bond real interest would not be equalized across countries, but only ex post. Since the tariff is permanent purchasing power parity in its relative form holds in subsequent periods implying that our results would not be altered when assuming a nominal bond.

her output, and diminished by her consumption expenditures and non-distortionary net taxes (T). We assume that governments do not purchase any goods and always run balanced budgets.[4] Seigniorage and tariff revenues are transferred to individuals in lump sums. Thus, the home government's budget constraint for period t is

$$\frac{M_t - M_{t-1}}{P_t} + (1-n)\tau \frac{P_t(f)}{P_t} C_t(f) = -T_t. \tag{17}$$

For the foreign government and its citizens corresponding constraints are binding.

2.4. Individual Optimization

Given her budget constraint (16) and the demand function for her good h [(10), (12), and (14)], the representative home agent maximizes her present discounted value of lifetime utility (1) over her consumption, holdings of bonds and of real money balances, and output in period t. The resulting first-order conditions (*Euler* equations) are

$$C_{t+1} = \frac{1+r_t}{1+\delta} C_t, \tag{18}$$

$$\frac{M_t}{P_t} = \chi C_t \frac{1+i_t}{i_t}, \tag{19}$$

$$Y_t = \frac{\theta - 1}{\theta \kappa_t} \frac{P_t(h)}{P_t} \frac{1}{C_t}, \tag{20}$$

where i denotes the nominal interest rate, which is related to the real rate of interest by the *Fisher* parity equation.[5] Again, analogous equations can be obtained by solving the representative foreign agent's optimization problem.

4 In this framework with infinitely-lived agents *Ricardian* equivalence holds anyway.
5 Under perfect foresight, the *Fisher* parity equation is given by $1+i_t = (1+r_t)\cdot(P_{t+1}/P_t)$.

Equation (18) is the specific form of the standard consumption *Euler* equation that occurs if the intertemporal elasticity of substitution is one.[6] It states that, at a utility maximum, the marginal utility from consumption must be equal to the marginal utility from saving.[7] In case the real interest rate and the subjective time preference rate are identical, the individual will choose a flat time path of consumption. According to (19), the marginal benefit from holding real money balances and the marginal utility from consumption must be identical in order to maximize utility.[8] This equation can be interpreted as money demand function, or, if one considers aggregate variables and deems M to be the quantity of money supplied, as equilibrium condition for the domestic money market.

Finally, (20) is based on the individual's labor-leisure trade-off. If the representative agent reduces her leisure and increases her labor effort in order to produce another unit of output, she can expand consumption in spending the revenues generated by selling this extra unit of output. Thus, at a utility maximum, the marginal utility from this additional consumption must equal the marginal utility from leisure. As consumption rises, its marginal utility declines, so that, in equilibrium, the marginal utility from leisure must decline as well. Hence, an exogenous increase in consumption must be followed by an expansion of leisure, i.e. a fall in output. To rule out *Ponzi* games, the usual transversality condition applies:

$$\lim_{\vartheta\to\infty}\left(\frac{1}{1+r_{t+\vartheta}}\right)^{\vartheta}\left(B_{t+\vartheta}+\frac{M_{t+\vartheta}}{P_{t+\vartheta}}\right)=0. \tag{21}$$

6 The elasticity of intertemporal substitution is defined as the inverse of the elasticity of marginal utility from consumption.

7 Giving up one unit of present consumption (and holding bonds instead) yields $1+r_t$ units of consumption in the next period. The marginal utility from this future consumption must be discounted in order to obtain its present value.

8 The marginal benefit from holding real money balances consists of two components. First, the representative individual derives direct utility from holding real money balances. Moreover, holding money today enables her to spend it on consumption tomorrow. Of course, one must take inflation into account and discount the marginal utility from future consumption.

2.5. Global Equilibrium

Global equilibrium requires all markets be cleared. The equilibrium condition for the domestic money market is already given by (19). An analogous equation applies to the foreign money market. The international bond market is in equilibrium if

$$nB_t + (1-n)B_t^* = 0, \tag{22}$$

where, in the aggregate, B and B^* refer to the net foreign assets of the home and the foreign country respectively. From this equation we easily derive

$$B_t^* = -\frac{n}{1-n} B_t, \tag{23}$$

so that, assuming a global bond market equilibrium, we can replace B^* by the right-hand side of (23), where it is convenient. In order to clear the global output market, world real consumption and world real income must be equal. Since the domestic and the foreign income from net foreign assets cancel each other, only income from output and tariff revenues matter on the global level. Since real variables are expressed in terms of the consumption bundle, real domestic (foreign) income from output is

$$\frac{P_t(h)}{P_t} Y_t \left[\frac{P_t^*(f)}{P_t^*} Y_t^* \right],$$

and the equilibrium condition for the global aggregate goods market is given by

$$nC_t + (1-n)C_t^* = n\frac{P_t(h)}{P_t} Y_t + (1-n)\frac{P_t^*(f)}{P_t^*} Y_t^* + n(1-n)\tau \frac{P_t(f)}{P_t} C_t(f).^{9} \tag{24}$$

9 This condition is obtained from taking the population-weighted sum of the representative agents' budget constraints.

2.6. Long-run versus Short-run Equilibrium

The economy is assumed to start in a steady state, which is characterized by fully flexible prices, zero net foreign assets, free trade, and constant exogenous variables, implying constant output and consumption as well as the real rate of interest equaling the rate of time preference. It can be shown that this specific steady state is completely symmetric across countries, i.e. domestic, foreign, and world per-capita output and consumption are identical.[10]

Apart from agents' maximization of utility and the clearing of markets, a long-run equilibrium also requires real consumption be covered by real income on the national level. That is, the current account must be balanced in the long run. From the individual budget constraint (16) we derive the current account identities

$$\bar{C} = \delta \bar{B} + \frac{\bar{P}(h)\bar{Y}}{\bar{P}} + (1-n)\tau \frac{\bar{P}(f)\bar{C}(f)}{\bar{P}} \text{ and} \tag{25}$$

$$\bar{C}^{*} = -\delta \frac{n}{1-n}\bar{B} + \frac{\bar{P}^{*}(f)\bar{Y}^{*}}{\bar{P}^{*}}, \text{ [11]} \tag{26}$$

where steady state levels are represented by barred variables.

Having examined only the long run so far, we have based our analysis on prices being fully flexible. In the short run, however, nominal prices of goods are supposed to be rigid in terms of the producers' currency. Following OBSTFELD and ROGOFF, we assume producers set prices a period in advance and can adjust them freely after one period.[12] Under this assumption, we consider three periods. Starting in period 0, the world economy is supposed to be in the symmetric steady as already mentioned. In period 1, the home country imposes a tariff on foreign products and it is hit by both a monetary and a productivity shock, which are unanticipated and permanent. Since prices, determined in period 0, are fixed, a producer's marginal revenue and price are identical. When prices were fully

10 For a more detailed discussion of this symmetric steady state see OBSTFELD and ROGOFF (1996, pp. 667–669).

11 In a long-run equilibrium with constant output and consumption $\bar{r} = \delta$ must hold.

12 As is standard in the literature on the new open economy macroeconomics, OBSTFELD and ROGOFF justify this assumption of predetermined prices by simply referring to the literature on menu costs (MANKIW, 1985) and near-rationality (AKERLOF and YELLEN, 1985a and 1985b).

flexible and exceeded marginal revenue, they were set in order to equate marginal revenue and marginal cost. Thus, marginal revenue exceeds marginal cost in period 1, so that producers are ready to adjust output and output becomes demand-determined for sufficiently small shocks. In period 2, however, prices have been adjusted to the shock, and the economy reaches its new steady state. Hence, period 1 captures the short-run effects, whereas all long-run already materialize in period 2. To keep notations simple, steady state variables are barred, while variables in the initial symmetric steady state are marked by 0 subscript and short-run variables are indicated by absence of any time index. Moreover, the conditions for a short-run equilibrium are not exactly the same as for a long-run equilibrium. Firstly, the first-order condition resulting from the labor-leisure trade-off has been derived under the assumption of flexible prices and diminishing marginal revenues, and it is not binding in the short run. Secondly, national real income needs not necessarily cover national consumption in the short run, so that current account imbalances and international capital movements are possible. Hence, the current account identities [(25) and (26)] are replaced by the balance of payments identities

$$B_t - B_{t-1} = r_{t-1}B_{t-1} + \frac{P_t(h)Y_t}{P_t} - C_t + (1-n)\tau\frac{P_t(f)C_t(f)}{P_t} \text{ and} \tag{27}$$

$$-\frac{n}{1-n}(B_t - B_{t-1}) = -r_{t-1}\frac{n}{1-n}B_{t-1} + \frac{P_t^*(f)Y_t^*}{P_t^*} - C_t^*. \tag{28}$$

Since the previous period is characterized by the symmetric steady state with zero net foreign assets $(B_{t-1} = \overline{B}_0 = 0)$, these equations can be rewritten as

$$B = \frac{P(h)Y}{P} - C + (1-n)\tau\frac{P(f)C(f)}{P} \text{ and} \tag{29}$$

$$-\frac{n}{1-n}B = \frac{P^*(f)Y^*}{P^*} - C^*. \tag{30}$$

Table 1: The Log-linearized Model

	home	foreign
law of one price [(7)]	$p_t(z) = e_t + p_t^*(z)$ (31)	
price level [(8) and (9)]	$p_t = n p_t(h) + (1-n)[e_t + p_t^*(f) + d\tau]$ (32)	$p_t^* = n[p_t(h) - e_t] + (1-n)p_t^*(f)$ (33)
demand for domestic output [(10) and (12)]	$y_t^D(h) = -\theta[p_t(h) - p_t] + c_t$ (34)	$y_t^{*D}(h) = -\theta[p_t(h) - e_t - p_t^*] + c_t^*$ (35)
world demand for domestic output [(14)]	$y_t = y_t^D \equiv n y_t^D(h) + (1-n) y_t^{*D}(h) = -\theta[p_t(h) - n p_t - (1-n)(e_t + p_t^*)] + c_t^w$ (36)	
demand for foreign output [(11) and (13)]	$y_t^D(f) = -\theta[p_t^*(f) + e_t + d\tau - p_t] + c_t$ (37)	$y_t^{*D}(f) = -\theta[p_t^*(f) - p_t^*] + c_t^*$ (38)
world demand for foreign output [(15)]	$y_t^* = y_t^{*D} \equiv n y_t^D(f) + (1-n) y_t^{*D}(f) = -\theta[p_t^*(f) + n(e_t + d\tau - p_t) - (1-n)p_t^*] + c_t^w$ (39)	
consumption *Euler*-equation [(18)]	$c_{t+1} = c_t + \frac{\delta}{1+\delta} r_t$ (40)	$c_{t+1}^* = c_t^* + \frac{\delta}{1+\delta} r_t$ (41)
money demand [(19)]	$m_t - p_t = c_t - \frac{r_t}{1+\delta} - \frac{p_{t+1} - p_t}{\delta}$ (42)	$m_t^* - p_t^* = c_t^* - \frac{r_t}{1+\delta} - \frac{p_{t+1}^* - p_t^*}{\delta}$ (43)
labor-leisure trade-off[13] [(20)]	$\bar{y} = -\bar{c} + \bar{p}(h) - \bar{p} + \bar{k}$ (44)	$\bar{y}^* = -\bar{c}^* + \bar{p}^*(f) - \bar{p}^* + \bar{k}^*$ (45)
bond market equilibrium[14] [(23)]	$\bar{b}^* = -\frac{n}{1-n}\bar{b}$ (46)	
goods market equilibrium[15] [(24)]	$c_t^w \equiv n c_t + (1-n) c_t^* = n y_t + (1-n) y_t^* \equiv y_t^w$ (47)	
current account[16] [(25) and (26)]	$\bar{c} = \delta\bar{b} + \bar{p}(h) - \bar{p} + \bar{y} + (1-n)d\tau$ (48)	$\bar{c}^* = -\frac{n}{1-n}\delta\bar{b} + \bar{p}^*(f) - \bar{p}^* + \bar{y}^*$ (49)
balance of payments[17] [(29) and (30)]	$\bar{b} = y - c - p + (1\text{-}n)d\tau$ (50)	$-\frac{n}{1-n}\bar{b} = y^* - c^* - p^*$ (51)

2.7. The Log-linearized Model

In order to consider short-run as well as long-run deviations from the initial symmetric steady state, we log-linearize the model around this steady state. The linearized model is presented in Table 1.

Throughout the following analysis, a lowercase sans serif letter stands for the percentage deviation of a variable from its initial steady state level: $\mathsf{x}_t \equiv (X_t - \overline{X}_0)/\overline{X}_0$. The long-run deviation is denoted by a bar above the letter, whereas the short-run deviation is indicated by the absence of any time index: $\overline{\mathsf{x}} \equiv (\overline{X} - \overline{X}_0)/\overline{X}_0$, $\mathsf{x} \equiv (X - \overline{X}_0)/\overline{X}_0$.

3. The Macroeconomic Effects of Tariffs

The literature on trade policy generally distinguishes between tariffs and non-tariff barriers. While tariffs are now low in most countries, as evidence on border costs shows, non-tariff barriers increasingly gain importance (Anderson and van Wincoop, 2004). However, due to the fact that non-tariff barriers have a similar impact on international trade as traditional tariff measures, it is possible to calculate tariff equivalents of all trade policy barriers. For example, Messerlin (2001) shows that for 1999 the tariff equivalent of policy barriers in the European Union were 31.7% in agriculture, 71.3% in mining, and 22.1% in textiles. As a consequence, analyzing the macroeconomic effects of a tariff includes those of a non-tariff barrier as well.

We assume that domestic policy makers impose a small tariff on imported foreign products. The effects of monetary shocks, of productivity shocks, and of protection turn out to be purely additive. Thus, the macroeconomic effects of monetary and productivity shocks are standard, so that we can refrain from

13 We define $\overline{\mathsf{k}} = -(\overline{\kappa} - \overline{\kappa}_0)/\overline{\kappa}_0$ and $\overline{\mathsf{k}}^* = -(\overline{\kappa}^* - \overline{\kappa}_0^*)/\overline{\kappa}_0^*$. Thus, a positive productivity shock to the home country is associated with $\overline{\mathsf{k}} > 0$.

14 Because $\overline{B}_0 = 0$, b_t is defined as $\mathsf{b}_t = (B_t - \overline{C}_0)/\overline{C}_0$. Moreover, international capital movements can occur only in the short run, so that $\mathsf{b} = \overline{\mathsf{b}}$.

15 All the price terms and the expression derived from the tariff in (24) cancel out.

16 Since the tariff is initially zero, the change in (real) income from tariff revenues is just given by $(1 - n)d\tau$. See also Fender and Yip (2000, p. 649) on this point.

17 In (50) and (51) we have already made use of the fact that prices are fixed in the short run, thus $\mathsf{p}(h) = \mathsf{p}^*(f) = 0$. Moreover, the previous footnote applies here as well.

discussing them.[18] Rather, we focus on the positive effects of the tariff before analyzing its welfare implications.[19]

3.1. Positive Analysis of Protection

The imposition of a permanent tariff by the home country entails both symmetric and asymmetric effects. The asymmetric effects cancel each other on the global level, whereas the symmetric effects prevail. We consider the symmetric or global effects first. From (32) we obtain

$$\mathrm{p} = (1-n)(\mathrm{e} + \mathrm{d}\tau), \tag{52}$$

as producer prices are predetermined in the short run $[\mathrm{p}(h) = \mathrm{p}^*(f) = 0]$.[20] Thus, the tariff raises the domestic prices of foreign goods by $\mathrm{d}\tau$ and, since the proportion of foreign products in the consumption bundle is given by $1 - n$, the domestic price level rises by $(1 - n)\mathrm{d}\tau$. Because the home country's relative population size is n, the impact of this domestic effect on the global price level is given by $n(1 - n)\mathrm{d}\tau$. As prices increase, real money balances shrink accordingly. Since short-run consumption is tied down by the money-market-clearing condition, global goods demand falls by the same rate. As short-run output is demand-determined, its change is given by the short-run change in global consumption

$$\mathrm{y}^w = \mathrm{c}^w = \bar{\mathrm{m}}^w - n(1-n)\mathrm{d}\tau. \tag{53}$$

In the long run, however, the labor-leisure trade-off becomes relevant within the individual optimization framework. Having suffered the short-run fall in output, agents will partially make up for this reduction in income by substituting labor effort for leisure, thereby cushioning the fall in global output in the long run:

$$\bar{\mathrm{y}}^w = \bar{\mathrm{c}}^w = \frac{\bar{\mathrm{k}}^w}{2} - \frac{n(1-n)}{2}\mathrm{d}\tau.^{21} \tag{54}$$

18 See Obstfeld and Rogoff (1996) for a detailed discussion.

19 The derivation of our results is laid out in an appendix, which can be obtained from the authors upon request.

20 Obviously, the domestic price level is influenced also by the change in the exchange rate. However, this effect is purely asymmetric: Since the exchange rate affects the foreign price level in the opposite direction, both effects exactly cancel each other on the global level.

21 The fraction 1/2 in (54) is due to the elasticity of disutility from output that has been set to two in (1).

The real interest rate is tied down by the intertemporal allocation of consumption through the consumption *Euler* equation [(40) and (41)]. As long-run world consumption exceeds short-run world consumption according to (53) and (54), the global real interest rate must rise in the short run:

$$\mathrm{r}=\frac{1+\delta}{\delta}\left[-\overline{\mathrm{m}}^{w}+\frac{\overline{\mathrm{k}}^{w}}{2}+\frac{n(1-n)}{2}\mathrm{d}\tau\right]. \tag{55}$$

Comparing the symmetric effects of a tariff with the symmetric effects of a monetary and a productivity shock might be illuminating. The long-run impact of a tariff on global output and consumption resembles the impact of a negative productivity shock. For it lowers the return on labor effort for domestic agents, since it raises the domestic price level and, thereby, reduces their real income.[22] Thus, agents substitute leisure for labor effort, compared to the initial steady state. However, short-run output and consumption are unaffected by a productivity shock, as it changes only the first-order condition governing the labor-leisure trade-off, which is not binding in the short run. By contrast, a tariff reduces domestic real money balances by raising the domestic price level. Hence, the short-run effects of a tariff resemble the effects of a negative money shock.[23] Of course, the neutrality of money holds on the global level in the long run with prices being fully flexible.

The asymmetric effects can be attributed to the change in the exchange rate triggered by the tariff. We can determine this change by using two relationships between the percentage change in the exchange rate and the change in relative domestic consumption. The first one is derived from the consumption *Euler* equations [(40) and (41)] and the money-market-clearing conditions [(42) and (43)]:

$$\mathrm{e}=(\overline{\mathrm{m}}-\overline{\mathrm{m}}^{*})-(\overline{\mathrm{c}}-\overline{\mathrm{c}}^{*})-(1-n)\mathrm{d}\tau=\overline{\mathrm{e}}. \tag{56}$$

22 As for foreigners, one can argue that a tariff lowers their return on working as well, since it depresses demand for their products. However, this direct effect on demand will be masked by a terms of trade effect on demand. On the one hand, the worsening of the foreign country's terms of trade induces world demand to switch in favor of foreign goods. On the other hand, it also means that they will receive fewer domestic goods for their output. Hence, the return on labor effort for foreigners is also reduced by a tariff.

23 This is true for the short-run effects both on the real interest rate and on output as well as consumption.

Due to (56), the imposition of the tariff results in an appreciation of the domestic currency. The intuition behind this is as follows. The relative change in the exchange rate is determined by the changes in the proportions between the domestic and the foreign money supply on the one hand as well as between the foreign and the domestic money demand on the other hand.[24] Since the tariff raises domestic consumer prices of foreign goods in the short run, the home country's real money supply falls, whereas the foreign real money supply remains unaffected. Therefore, the exchange rate must be lower for every proportion between money demands. Note that the short-run and the long-run change in the exchange rate must be identical, because all shocks are permanent and agents maximize utility intertemporally $(\mathrm{e}=\overline{\mathrm{e}})$. A second relationship is derived from equilibrium conditions for the balance of payments and the current account:

$$\mathrm{e}=\frac{2\theta+\delta(\theta+1)}{\delta(\theta+1)(\theta-1)}(\overline{\mathrm{c}}-\overline{\mathrm{c}}^{*})-\frac{1}{\delta(\theta+1)}(\overline{\mathrm{k}}-\overline{\mathrm{k}}^{*}) -\frac{n\theta[2+\delta(\theta+1)]-(1-n)(\theta-1)}{\delta(\theta+1)(\theta-1)}\mathrm{d}\tau. \quad (57)$$

The impact of the tariff on the exchange rate via current account and balance of payments equilibrium conditions is ambiguous, with the direction of the impact depending on the relative size of the home country, on the price elasticity of demand, and on the rate of time preference. By combining (56) and (57), we obtain the relative change in the exchange rate:

$$\mathrm{e}=\frac{2\theta+\delta(\theta+1)}{\theta[2+\delta(\theta+1)]}(\overline{\mathrm{m}}-\overline{\mathrm{m}}^{*})-\frac{(\theta-1)}{\theta[2+\delta(\theta+1)]}(\overline{\mathrm{k}}-\overline{\mathrm{k}}^{*}) -\frac{\theta[2+\delta(\theta+1)]-(1-n)(\theta-1)[1+\delta(\theta+1)]}{\theta[2+\delta(\theta+1)]}\mathrm{d}\tau. \quad (58)$$

Hence, the imposition of a tariff by the home country leads unambiguously to an appreciation of the domestic currency, which can be mainly attributed to its

24 In this respect, the model resembles the monetary approach to exchange rates. However, the approaches differ in the money demand equations: Here, money demand depends on consumption, whereas it depends on output in the monetary approach.

impact on the domestic price level and real money supply. Since producer prices are fixed in the short run, the relative fall in the exchange rate yields an equivalent short-run improvement in the home country's terms of trade:

$$\text{tot} = -\text{e}. \tag{59}$$

As in the traditional Mundell Fleming framework, this terms of trade effect shifts world demand in favor of foreign goods. Of course, this effect on the demand structure is hampered to some extent by the direct impact of the tariff on the domestic prices of foreign goods:

$$\text{y} - \text{y}^* = \theta(\text{e} + n\,\text{d}\tau). \tag{60}$$

Nevertheless, the terms of trade effect is dominant, and as output is demand-determined in the short run, relative domestic output falls in the short run:

$$\begin{aligned} \text{y} - \text{y}^* = {} & \frac{2\theta + \delta(\theta+1)}{2+\delta(\theta+1)}(\bar{\text{m}} - \bar{\text{m}}^*) - \frac{\theta - 1}{2+\delta(\theta+1)}(\bar{\text{k}} - \bar{\text{k}}^*) \\ & -(1-n)\frac{(1+\delta)(\theta+1)}{2+\delta(\theta+1)}\text{d}\tau. \end{aligned} \tag{61}$$

Indeed, one can show that, under the given parameterization, foreign output actually rises in the short run, even though world output shrinks. Moreover, the fall in the exchange rate creates a deficit in the home country's current account, so that domestic residents enjoy consumption exceeding real income and accumulate net foreign debts in the short run:

$$\bar{\text{b}} = (1-n)\left[\frac{2(\theta-1)}{2+\delta(\theta+1)}(\bar{\text{m}} - \bar{\text{m}}^*) - \frac{(\theta-1)}{2+\delta(\theta+1)}(\bar{\text{k}} - \bar{\text{k}}^*) - \frac{(1-n)(\theta-1)}{2+\delta(\theta+1)}\text{d}\tau\right]. \tag{62}$$

Consequently, domestic residents must make interest payments to foreigners in each subsequent period. This tends to reduce the fall in relative domestic output as well as the improvement in the home country's terms of trade in the long run:

$$\overline{\mathrm{y}}-\overline{\mathrm{y}}^{*}=-\frac{\delta(\theta-1)}{2+\delta(\theta+1)}(\overline{\mathrm{m}}-\overline{\mathrm{m}}^{*})+\frac{1+\delta\theta}{2+\delta(\theta+1)}(\overline{\mathrm{k}}-\overline{\mathrm{k}}^{*})-(1-n)\frac{1+\delta}{2+\delta(\theta+1)}\mathrm{d}\tau, \tag{63}$$

$$\overline{\mathrm{tot}}=\frac{\delta(\theta-1)}{\theta[2+\delta(\theta+1)]}(\overline{\mathrm{m}}-\overline{\mathrm{m}}^{*})-\frac{1+\delta\theta}{\theta[2+\delta(\theta+1)]}(\overline{\mathrm{k}}-\overline{\mathrm{k}}^{*}) + \frac{n\theta[2+\delta(\theta+1)]+(1-n)(1+\delta)}{\theta[2+\delta(\theta+1)]}\mathrm{d}\tau. \tag{64}$$

Due to intertemporal consumption smoothing, the short-run and the long-run change in relative domestic consumption must be identical. The long-run change in relative domestic consumption depends on the change in the proportion between the domestic and the foreign long-run real income. This relation is affected by several opposing forces. On the one hand, tariff revenues, the effect of the fall in the exchange rate on prices, and the direct effect of the tariff on domestic demand for foreign goods increase this proportion. On the other hand, interest payments, the effect of the fall in the exchange rate on output, and the direct effect of the tariff on the domestic price level decrease it.[25] Hence, the impact of a tariff on relative domestic consumption is ambiguous:

$$\mathrm{c}-\mathrm{c}=\overline{\mathrm{c}}-\overline{\mathrm{c}}^{*}=\frac{\delta(\theta+1)(\theta-1)}{\theta[2+\delta(\theta+1)]}(\overline{\mathrm{m}}-\overline{\mathrm{m}}^{*})+\frac{(\theta-1)}{\theta[2+\delta(\theta+1)]}(\overline{\mathrm{k}}-\overline{\mathrm{k}}^{*}) + \frac{n\theta[2+\delta(\theta+1)]-(1-n)(\theta-1)[1+\delta(\theta+1)]}{\theta[2+\delta(\theta+1)]}\mathrm{d}\tau. \tag{65}$$

Correspondingly, as price levels are determined by (42) and (43), the change in the relation between the home and the foreign price level, both in the short run and in the long run, is ambiguous as well.

25 Since demand is assumed to be elastic, the effect of the change in the exchange rate on output must outweigh its effect on prices.

3.2. Normative Analysis of Protection

Turning now to welfare aspects of protection,[26] we assume that the parameter χ is sufficiently small so that we can neglect the impact of real money balances on utility and welfare respectively.[27] Thus, we consider only the utility derived from the real components (U_t^R) in (1):

$$U^R = \log C - \frac{\overline{\kappa}}{2} Y^2 + \frac{1}{\delta}\left(\log \overline{C} - \frac{\overline{\kappa}}{2} \overline{Y}^2\right). \qquad (66)$$

In the initial steady state, output and consumption have already been suboptimally low due to the inefficiencies caused by monopolistic competition.[28] Since the tariff reduces world output and consumption, as is stated in (53) and (54), global welfare must be diminished even further. However, at least the short-run decrease in world output and consumption that is due to the money market impact of rising price levels could be prevented by an accommodating money supply expansion. In the long run the fall in global welfare is cushioned somewhat as agents forgo leisure and increase their labor efforts in order to compensate the loss of income.

Apart from these symmetric effects, domestic welfare is also affected by asymmetric effects. In particular, domestic residents enjoy consumption in excess of income, improved terms of trade, and, as output drops, an increase in leisure in the short run. Therefore, the short-run asymmetric effect on domestic welfare is clearly positive. But in the long run, both the improvement in the terms of trade and the fall in output are diminished, because domestic residents must transfer interest payments to foreigners and, thus, increase production compared to the short run. Hence, the long-run asymmetric effect on domestic welfare turns out to be ambiguous.

Combining this ambiguous asymmetric effect with the negative global effect on steady state welfare, we derive an overall long-run impact on domestic welfare which is still ambiguous:

26 Here, we present only the resulting welfare effects, while the algebraic derivations are provided by the authors on request.

27 This assumption is standard in the new open economy macroeconomics. See, for example, Obstfeld and Rogoff (1996, p. 684), and Betts and Devereux (2000, p. 238).

28 In a general equilibrium framework the inefficiency of monopolostic competition known from partial equilibrium models is enhanced by an aggregate demand externality. See Blanchard and Kiyotaki (1987) on this point.

$$\frac{\partial U_{long}^{home}}{\partial \tau} = (1-n)\frac{n(2\theta-1)[2+\delta(\theta+1)]-(1-n)2\theta\delta(\theta-1)}{2\theta\delta[2+\delta(\theta+1)]}. \tag{67}$$

By contrast, Fender and Yip (2000) predict that the imposition of a tariff unambiguously raises the steady state welfare of the imposing country in case the price elasticity of demand exceeds the intertemporal elasticity of consumption.[29] The reason for this contradiction is that the Fender Yip model does not account for short-run current account imbalances and the resulting long-run effects. Since the tariff creates a short-run deficit in the domestic current account, any positive impact of the tariff on the steady state welfare of the home country is dampened by domestic residents' need to pay interest to foreigners. Thus, our analysis suggests that neglecting the intertemporal linkages provided by current account imbalances may result in misleading welfare implications of tariffs.[30]

However, if we add up the ambiguous long-run asymmetric effect on domestic welfare and the positive short-run asymmetric effect, the latter clearly dominates:

$$\frac{\partial U_{asymm}^{home}}{\partial \tau} = n(1-n)\frac{1+\delta}{\delta} > 0. \tag{68}$$

This result stands in contrast with the corresponding finding for a country-specific monetary shock. Within the Obstfeld Rogoff framework a unilateral monetary expansion generates short-run and long-run asymmetric effects on

29 By formulating a log utility function in eq. (1) we set the intertemporal elasticity of consumption equal to one, while the price elasticity of demand is restricted to be higher than one, so that this condition is met.

30 On the other hand, the specific form of the utility function that we assume precludes the possibility that a tariff may make a country worse off, which has been emphasized by Fender and Yip (2000). However, even their specification might not be general enough, since they still assume the elasticity of substitution between a domestic good and a foreign product to be identical to the elasticity of substitution between any two goods produced in the same country. But, as Tille (2001) pointed out with respect to the macroeconomic effects of a money shock, the deviation of the cross-country substitutability from the within-country substitutability is a key determinant of the direction and size of current account imbalances and their welfare effects. Of course, such a generalization comes at the cost of much higher complexity of the model and less analytical tractability. Here, our focus is on showing that the incorporation of the intertemporal linkages provided by current account imbalances does indeed matter for the macroeconomic effects of a tariff.

welfare which go in opposite directions. But the intriguing finding of Obstfeld and Rogoff is that these asymmetric effects exactly cancel each other, so that only the symmetric effect prevails.[31] As is well-known by now, this feature can be attributed to the presence of just a single economic distortion in the Obstfeld Rogoff model, namely monopolistic competition. Consequently, a shock that raises global output will enhance both domestic and foreign welfare equally. By contrast, in considering the imposition of a tariff, we simultaneously introduce a second distortion into the economy.

Eq. (68) states that the tariff unambiguously shifts the relation between domestic and foreign welfare in favor of the home country. In order to assess the overall change in domestic welfare, the negative impact of the tariff on global welfare must be taken into account as well. Indeed, one can show that the positive asymmetric effect outweighs the negative symmetric effect on domestic welfare. Thus, the imposition of a tariff by the home country leads to an unambiguous increase in domestic welfare on the whole:

$$\frac{\partial U^{home}}{\partial \tau} = n(1-n)\frac{2\theta - 1 + 2\delta(\theta - 1)}{2\delta\theta} > 0. \tag{69}$$

As for foreign welfare, both the symmetric and the asymmetric effect go in the same direction. That is, the imposition of a tariff by the home country lowers foreign welfare unambiguously. Thus, our findings confirm the results from partial equilibrium models. The imposition of a tariff raises domestic welfare, whereas it lowers both global and foreign welfare.

4. Conclusion

This paper analyzes the effects of a tariff in a two-country intertemporal model with imperfect competition and intertemporal optimization. In contrast to Fender and Yip (2000), our model incorporates a fully integrated bond market that allows for short-run current account imbalances and wealth redistributions. Within this setting, the imposition of a permanent tariff entails both symmetric

31 This is also true for a country-specific productivity shock, if one is willing to neglect the direct impact of a change in productivity on welfare for a given output and to focus on the welfare effects of the subsequent changes in output and consumption only.

and asymmetric effects. Since output is demand-determined in the short run, the tariff depresses demand via money market imbalances so that world output and consumption decrease. Thus, the short-run symmetric or global effects are compatible with the standard Mundell Fleming analysis. In the long run, however, this decline in output and consumption is diminished, as agents substitute labor effort for leisure. Because long-run output and consumption are higher than in the short run, the global real interest rate must rise in the short run.

As for the asymmetric effects, proponents of protection often promote tariffs as a means of extending domestic output and improving the current account balance. Intriguingly, our analysis contradicts this widespread notion on both accounts. In the short run, nominal prices of goods are supposed to be fixed in terms of the producers' currency. Assuming that the home country levies a tariff on foreign products, the tariff raises the domestic prices of foreign goods and, thereby, the domestic price level directly. This reduces the home country's real money supply and causes an appreciation of the domestic currency. Thus, similar to the standard Mundell Fleming approach (Krugman, 1982), our model generates a contrarian terms of trade effect, that switches world demand away from domestic products towards foreign goods. In our case, however, the terms of trade effect unambiguously dominates the demand diversion caused by the domestic price increase of foreign products which can be directly attributed to the tariff. This conclusion remains valid even when persistent unemployment is considered (Shi, 1999). As a result, the tariff reduces domestic output and creates a short-run deficit in the home country's current account. This accumulation of foreign debt in the short run requires that domestic residents pay interest to foreigners in the long run. To this end domestic output must increase in the long run compared with its short-run level, so that the fall in domestic output is dampened in the long run. Correspondingly, the improvement in the home country's terms of trade must be smaller in the long run than it is in the short run as well.

In general, the welfare implications of our model are in line with the traditional perfect competition framework (Corden, 1971). The imposition of a tariff raises domestic welfare, while lowering foreign as well as global welfare. The positive effect on domestic welfare can be attributed mainly to the short run, as home residents enjoy better terms of trade, less labor effort, and consumption exceeding real income, whereas foreigners suffer from the opposite. In the long run, the asymmetric welfare effect becomes ambiguous, as the improvement in the terms of trade declines and the trade balance reverses.

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SUMMARY

In this paper a two country new open economy macroeconomics model is applied to analyze both the short-run and the steady state macroeconomic effects of protection. Similar to the traditional Mundell Fleming approach we find that the imposition of a permanent tariff entails a demand diversion effect and a contrarian terms of trade effect, that switches world demand away from domestic towards foreign output. In our case however, the negative terms of trade effect on domestic output unambiguously outweighs the positive effect of demand diversion. Moreover, our analysis reveals that protection raises domestic welfare in the short run, while lowering foreign as well as global welfare. The positive

effect on domestic welfare is due to a terms of trade improvement, less labor effort, and consumption exceeding real income, whereas foreigners suffer from the opposite.

ZUSAMMENFASSUNG

Dieser Beitrag untersucht die kurz- und langfristigen Effekte eines Zolls im Rahmen eines Zweiländermodells der Neuen Makroökonomie offener Volkswirtschaften. Wie im traditionellen Mundell Fleming-Ansatz resultiert in unserem Modell aus der Einführung eines permanenten Importzolls sowohl ein Nachfrageumlenkungseffekt als auch ein terms of trade-Effekt. Die negative Wirkung des terms of trade-Effektes übersteigt dabei die positive Wirkung des Nachfragumlenkungseffektes auf Produktion und Beschäftigung im Inland. Da inländische Wirtschaftssubjekte kurzfristig über mehr Freizeit verfügen und von verbesserten terms of trade profitieren, erhöht sich ihr Wohlstand zu Lasten des Auslandes. Das gestiegene Konsumniveau der Inländer wird kurzfristig über ein Leistungsbilanzdefizit finanziert, was langfristig Zinszahlungen an das Ausland impliziert. Im steady state müssen die Inländer deshalb ihren Arbeitseinsatz erhöhen, so dass die langfristigen Wohlstandswirkungen ambivalent ausfallen.

RÉSUMÉ

Cet article analyse l'effet à court et à long terme d'une douane dans un modèle pour deux pays dans le cadre de la nouvelle macroéconomie d'économie ouverte. Comme dans le modèle traditionnel de Mundell et Fleming une douane permanente sur les importations implique un détournement de la demande et un effet sur les termes de l'échange. L'effet négatif sur les termes de l'échange dépasse l'effet positif du détournement de la demande sur la production et l'emploi. Puisque les agents économiques du pays disposent à court terme de plus de temps libre et profitent des termes de l'échange, la prospérité du pays augmente au détriment de l'étranger. L'augmentation à court terme de la consommation des agents économiques du pays est financée par un bilan négatif des paiements courants, ce qui implique à long terme des paiements d'intérêts à l'étranger. C'est pourquoi à long terme les agents économiques du pays doivent travailler plus, ce qui implique que l'évaluation des effets sur la prospérité restent ambivalent.