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The welfare state, an impediment to integration?

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**Wirtschaftswissenschaftliche Fakultät
der Eberhard-Karls-Universität Tübingen**

**The Welfare State, an Impediment
to Integration?**

Uwe Walz and Dietmar Wellisch



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The Welfare State, an Impediment to Integration?

by

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Abstract

We investigate the consequences of redistribution policy on migration and trade in a standard two-good Heckscher-Ohlin framework. With free trade and factor price equalization, abolishing migration barriers is redundant. With the introduction of government activity, matters change drastically. Redistributive policies create an incentive to migrate in the country providing higher transfers. We show that in such a world, free migration increases the burden of the welfare program in the rich country and causes suboptimal national redistribution policies in both countries. It is definitively in the interest of the rich country to stop short of a relaxation of migration barriers. Rather, a pure free trade regime without migration proves to be preferable.

Keywords: Trade, Migration, Integration, Redistribution Policy

JEL-Class.: F11, F15, F22, H55

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1 Introduction

Liberalization of trade flows has been the major development in the world economy in the post-war period. Especially through the various GATT rounds, the average level of protection has been reduced sharply. Countries are much more integrated in the international economy via trade than three or four decades ago. A large number of free trade zones has been established. At the same time, countries have been very reluctant to allow free mobility of labor across national borders. A first important example for this reluctant attitude is the North American Free Trade Agreement (NAFTA). One of the arguments in the US discussion about ratification has been that this agreement would eliminate the incentives for Mexican workers to move illegally to the US by increasing the wages in Mexico through trade. However, NAFTA does not even include a proposal for the transition from a free trade zone to a common market with a free movement of workers between the signatory states.

The relationship between Turkey and the EU is a second prominent example. The EU has always been very hesitant to handle the Turkish application for a full membership of Turkey in the EU since this would imply a *de jure* freedom of movement of people (Art. 48 of the Treaty on the EU), leading to an uncontrolled influx of unskilled Turkish workers into the richer EU countries. However, only recently the EU agreed to form a free trade area with Turkey.

This different behavior towards integration steps cannot be adequately explained with standard trade theory based on the Heckscher-Ohlin framework. According to this standard trade model, trade and migration can be regarded as substitutes. In this world, free trade eliminates the incentives to migrate in the long run. A liberalization of trade therefore reduces the incentives to erect barriers to migration. This is, however, not what we observe in reality.

The objective of this paper is to provide an explanation for this observation. We are mainly interested in the transition from a free trade regime to a world with free trade and free migration. We argue that the existence of the modern welfare state, redistributing a large share of national income in developed market economies, acts as an impediment to migration but not to trade. With free trade, countries benefit from specialization gains. Free trade does not distort deliberate redistribution policies

in these countries. In contrast, with free migration and therefore endogenous labor forces in the countries, redistribution policies and labor migration are intertwined. Given that potential migrants are net recipients of the welfare system, they will be attracted by high levels of redistributive transfers. Rich countries pay part of their national income to immigrants. If, however, mobile workers are net payers of the welfare system, they will be displaced by high tax levels to finance the welfare system and countries lose contributors to the system. Additionally, deliberate redistribution policies lead to strategic effects and hence to suboptimal levels of redistribution since governments will take the effects of their policies on migration into account. The latter observation reveals that free migration has welfare costs in the presence of deliberate redistribution policies. In this world, free trade is preferable – at least from an overall point of view – to free migration.

We merge two branches of the literature: trade theory and local public finance. By looking at the implications of government activities in the presence of free trade, we go one significant step beyond the existing literature. On the one hand, existing approaches analyzing government activities in the presence of migration are restricted to a one-good world (cf. e.g. Wildasin (1991), Wellisch (1996), Wellisch/Wildasin (1996), or the survey in Wellisch (1997)). By definition, specialization gains from trade can never occur in these models.¹ On the other hand, in studies looking at the implications of government activities in the presence of trade, especially in the traditional areas of trade theory (cf. e.g. Dixit (1986)), trade policy and tax policy completely leave the implications of government activities on migration aside. In these studies, it can never happen that government activities induce a change in factor endowments of countries. Hence, countries never have to take this effect into account. In a third type of studies which are located in the area of trade theory, too, the question of the relationship between migration and trade has been addressed. The basic issue is whether trade and migration are substitutes or complements (cf. Markusen (1983) and Razin/Sadka (1992)).² In order to provide an explanation for

¹An exception is Wellisch and Walz (1997). However, this approach does not allow for trade and migration simultaneously.

²Another branch of the trade literature examines a question rather closely related to ours, namely the choice of a rich country between capital exports to and labor immigration from a poor neighbor. See, most notably, Bhagwati/Srinivasan (1983), who consider this question in a one-good framework,

the above mentioned puzzle, we take all three aspects into account (trade, migration, and government activities).

In order to outline our basic argument most clearly, we adopt a Heckscher-Ohlin framework to model the resource allocation of two countries in the absence of any technological differences. Without government activity, there are no reasons to erect impediments to migration given that free trade prevails. There are no incentives to migrate since free trade leads to factor price equalization. The international resource allocation is indeterminate. We show that with endogenous redistribution policies, the picture radically changes. Deliberate redistribution policies lead to a unique international resource allocation.

Free trade is preferable to free migration for the rich country. The poor country, that is, the country with the smaller number of high-income, immobile natives, gains via emigration of some low-income households reducing thereby the tax burden to their high-income fellow-countrymen. These gains for the poor country have to be contrasted, however, with the welfare losses due to suboptimal redistribution policies. The net effect of a free migration scheme for the poor country is ambiguous. For the rich country, free migration is definitively not preferable. This country loses through immigration of low-income households and through the suboptimal redistribution policy. For the world as a whole, the transition from free trade to free trade and free migration leads to welfare losses. This is in sharp contrast to the standard trade paradigm in which free migration leads to the maximization of world income and hence to welfare gains. Therefore, we provide a rationale for the observation of an increasing degree of free trade which is not accompanied by a reduction of migration barriers.

The paper is organized as follows. In the next section, we outline the basic set-up of our approach. In Section 3, we use this model to derive the international equilibrium with free trade and free migration in the absence of any government activity. Section 4 contains the main part of our analysis. Here, we analyze the international equilibrium with deliberate redistribution policies pursued by the governments of both countries. We distinguish between the free trade regime and a world with free trade and free migration. In Section 5, we discuss an alternative way to model

thereby abstracting from the possibility of international specialization gains via trade in goods.

the redistribution game between the countries, leading to fundamentally different conclusions. The last section contains some final remarks.

2 The Basic Set-Up

We consider a 2-country, 2-factor, 2-good world. In each country i ($i = A, B$), I immobile households reside. They supply inelastically one unit of the immobile factor of production. We will refer to this factor of production in the following as land, but it could equally well be called skilled labor, local private infrastructure, or immobile capital. Moreover, each country is endowed with M_i potentially mobile native households supplying inelastically one unit of (unskilled) labor. All households share identical homothetic preferences with consumption levels of the two consumption goods, X , and Y , being the arguments of the utility function. Using the good Y as numeraire and denoting p_i as the relative price of X in terms of Y , we can describe optimal household behavior by their *individual* expenditure function. The expenditure function, $E^i \equiv E(p_i)$, depicts minimum expenditures for the j -th individual residing in country i to achieve one unit of utility, given the relative price p_i . Since all households of the respective groups are identical, we can write the utility levels of immobile and potentially mobile households as U_i^I and U_i^M , respectively. Households take goods and factor prices as given. Utility maximization yields the following compensated demand functions of j -households (cf. Dixit/Norman (1980))

$$U_i^j E_p^i = c_i^j \quad i = A, B, \quad j = I, M, \quad (1)$$

with c_i^j describing the consumption of good x by households of type j living in country i , and subscripts standing for partial derivatives, $E_p^i \equiv \partial E^i / \partial p_i$. In Eq. (1) we made use of the homotheticity of preferences. The budget constraint of land owners can be expressed by

$$U_i^I E^i = r_i, \quad (2)$$

with r_i denoting land rents in country i . Households spend their entire income for consumption goods implying that minimum expenditures are equal to the households' income.

Accordingly, we describe the budget constraint of workers as

$$U_i^M E^i = w_i, \quad (3)$$

with w_i denoting wages in country i .

The two goods, X and Y , are produced with linear-homogenous production functions. Perfect competition prevails in the production sectors of the two economies. Let L_i denote the number of workers employed in the i -th economy, we can summarize the production sector of each economy by the revenue function, $R^i \equiv R(p_i, I, L_i)$, which reflects the maximal value of production for given factor endowments and goods (and, hence, factor) prices. In the absence of migration, L_i is equal to the number of native workers. In any case, $L_A + L_B \equiv L = M \equiv M_A + M_B$ holds with L being the exogenously given number of workers in both countries.

It proves helpful to derive the output levels from the revenue function. By taking derivatives, we find (see Dixit/Norman (1980)):

$$R_p^i = x_i, \quad (4)$$

with x_i characterizing the output of good x in country i .

Similarly, we can deduce optimal factor demand of firms as

$$R_L^i = w_i. \quad (5)$$

For the immobile factor we find with the help of Euler's theorem:

$$r_i = R_I^i = (R^i - R_L^i L_i)/I. \quad (6)$$

Before we turn to the world equilibrium, let us state two basic assumptions. First, we assume that there are no factor intensity reversals. Land is always used relatively more intense in the production of X than in the Y production. Second, we assume that there are more native workers in country B than in country A, i.e.:

$$M_B > M_A \quad \text{and} \quad \frac{M_B}{I} > \frac{M_A}{I}.$$

That is, country A is *relatively* better endowed with the immobile factor than country B.

3 The World Equilibrium without Government Activity

In this section, we briefly derive the world equilibrium with free trade. Then, we ask for the implications of free trade and free migration in the absence of government activities.

With free trade, goods prices are equalized internationally: $p_A = p_B = p$. In the absence of migration, we find the following clearing condition in the market for good x :

$$\sum_i R_p^i = \sum_i M_i E_p^i U_i^M + I \sum_i E_p^i U_i^I, \quad (7)$$

that is, worldwide production must just be matched by worldwide demand.

With the help of (2) and (3), we can rewrite (7) as

$$\frac{R_p(p, M_B, I) + R_p(p, M_B, I)}{R(p, M_A, I) + R(p, M_B, I)} = \frac{E_p(p)}{E(p)}. \quad (8)$$

Due to identical preferences, the share of aggregate production of good x in the value of worldwide revenues must be equal to each household's consumption share.

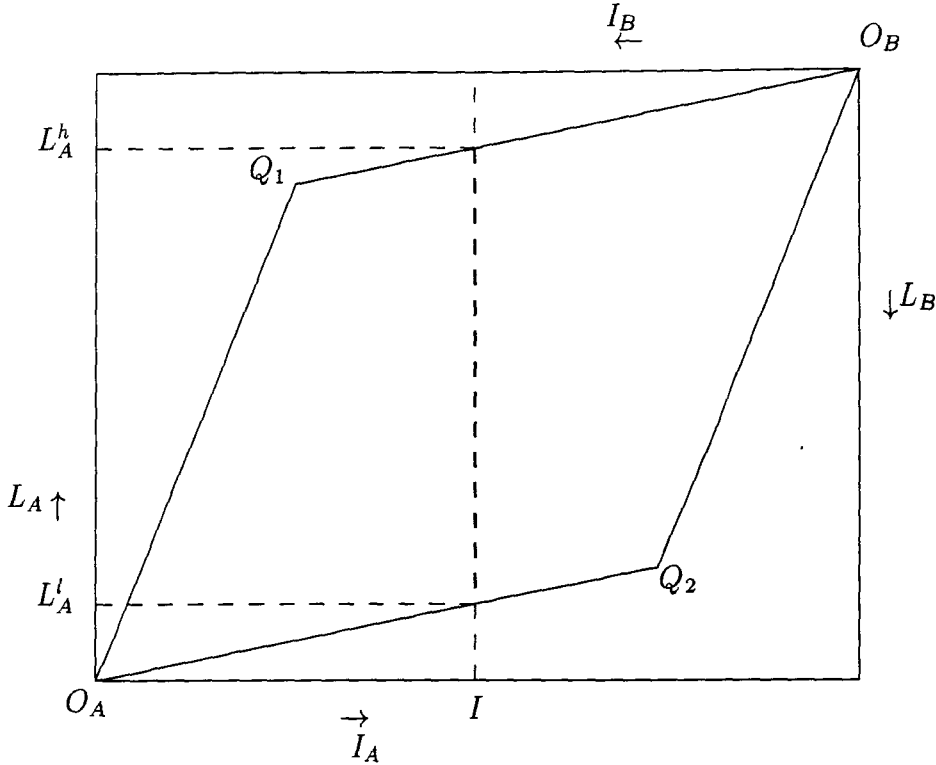
We can solve (8) for the equilibrium price level. Subsequently, we can determine all remaining endogenous variables.

The Integrated Equilibrium

To derive the international specialization and production patterns, we employ the notion of the integrated equilibrium which describes the worldwide resource allocation with free mobility of all factors of production and free trade. We then ask under which circumstances free trade replicates this equilibrium.

In the integrated equilibrium, the world as a whole produces with the worldwide resource endowment. All factor and goods markets clear. We denote the equilibrium factor prices in the integrated world by r^* and w^* . The question now is for which resource endowment the two countries can replicate the resource allocation of the integrated economy via free trade of goods. That is, we are looking for the factor price equalization set where for both countries the same factor prices prevail in the trading equilibrium.

Figure 1: Production patterns with free trade and free migration



With identical factor prices (w^* and r^*), firms in the two countries employ the same production techniques as in the integrated equilibrium. We characterize the input coefficients in the two sectors by a_{mn} with $m = X, Y$ and $n = I, L$. For example, a_{XI} describes the input of the immobile factor per unit output of the good X . The factor price equilibrium set (FPE-set), which contains resource endowments leading to a trading equilibrium with the same factor reward and production allocations as the integrated equilibrium, can be represented graphically in a simple manner (see Helpman/Krugman (1985)).

For the construction of the FPE-set, we draw the employment vectors of the two sectors using the input coefficients (see Figure 1). $O_A Q_1$ ($O_B Q_2$) represents the employment vector of the Y -sector. Accordingly, $O_A Q_2$ ($O_B Q_1$) delineates the employment vector of the X -sector. The slopes of the employment vectors are derived from the input coefficient for the equilibrium prices w^* and r^* . Note that by virtue

of our assumption, $a_{XI}/a_{YI} > a_{XL}/a_{YL}$, implying a steeper slope of O_AQ_1 compared to O_AQ_2 .

The Trade Equilibrium

Given that the resource endowment point of the two countries is in the parallelogram $O_AQ_1O_BQ_2$, the trade equilibrium is characterized by specialization patterns which enable the two countries to replicate the integrated equilibrium via free trade. In the free trade equilibrium, factor price equalization emerges. The factors in the two countries receive the factor rewards r^* and w^* . Since it replicates the integrated equilibrium, the trading equilibrium maximizes world income. Trade and specialization patterns are determined by relative factor abundance.³

The Migration Equilibrium

Up to now, we have assumed immobility of both factors of production between countries. Mobility of the M -factor was hindered by impenetrable migration barriers. With free trade and the absence of government activities, there does not exist any incentive to migrate even if migration barriers are completely removed. In a free migration equilibrium, mobile workers experience the same level of utility in both countries:

$$U_A^M = U_B^M. \quad (9)$$

With equal goods and factor prices in the two economies, utility is the same for mobile households given that the resource endowment point of the two economies is part of the FPE-set. We find a continuum of migration equilibria which yield the same level of utility for all households. For all distributions of mobile workers along the bold line in figure 1 (i.e. $L_A \in [L_A^l, L_A^h]$), free trade replicates the integrated equilibrium and leads to equal utility of all households. Each point on this line represents an international equilibrium. That is, the international equilibrium allocation is indeterminate. All free migration equilibria must lie inside the FPE-set. To show this, note that with free trade (implying equal goods prices in both countries) and free migration, the factor price of mobile labor must be the same in the two countries in a migration equilibrium (see (3) and (9)). With unequal factor prices, production costs of both

³For a derivation see Helpman/Krugman (1985).

goods are higher in the country with a higher price of the immobile factor. This leaves the factors of production in this country unemployed and cannot constitute an equilibrium with factor market clearing. Hence, the free migration equilibrium must occur inside the FPE-set.

We can establish

Proposition 1 *With free migration and free trade, the international resource allocation is indeterminate in the absence of any government activity. Free trade together with free migration always leads to factor price equalization, independently of the initial distribution of native workers.*

4 Free Trade, Free Migration, and Endogenous Redistribution Policies

We now investigate how matters change if we introduce deliberate redistribution policy. We assume that in the integrated equilibrium $r^* > w^*$, i.e. owners of the immobile factor realize a higher income than workers. This implies that country A is the richer country with the relatively larger number of high-income households. Governments in each country redistribute income from rich to poor households, i.e. from owners of the immobile factor to potentially mobile workers. Let z_i denote the transfer in each country i and t_i the corresponding (lump sum) tax. In case of migration, governments cannot choose a different fiscal treatment of natives and immigrants (e.g. in accordance with the Treaty on the European Union, see Articles 48 and 51). Hence, we can write the balanced budget requirement of each country as:

$$z_i L_i = t_i I. \quad (10)$$

With free trade alone (i.e. without migration), $L_i = M_i$. In the presence of redistribution policies, we have to rewrite the budget constraint of households to

$$U_i^I E^i = r_i - t_i, \quad (11)$$

and

$$U_i^M E^i = w_i + z_i. \quad (12)$$

We suppose that each country i maximizes a social welfare function, $W^i \equiv W(U_i^I, U_i^M)$, by choice of its policy instruments.⁴ We assume that countries choose the tax rate t_i such that z_i adapts to balance the budget.⁵ Note that the individual utility of a representative native worker and a representative native owner of the immobile factor enter the welfare function.⁶

Against this background, we now analyze and compare the implications of deliberate redistribution policies in two different scenarios: one with free trade and impenetrable migration barriers and the other with free trade and free migration.

4.1 Redistribution policy in the presence of free trade

With free trade international goods prices are equalized. We look at a noncooperative Nash tax game between the two countries. Governments face the following problem:

$$\text{Max}_{t_i} \quad W(U_i^I, U_i^M), \quad (13)$$

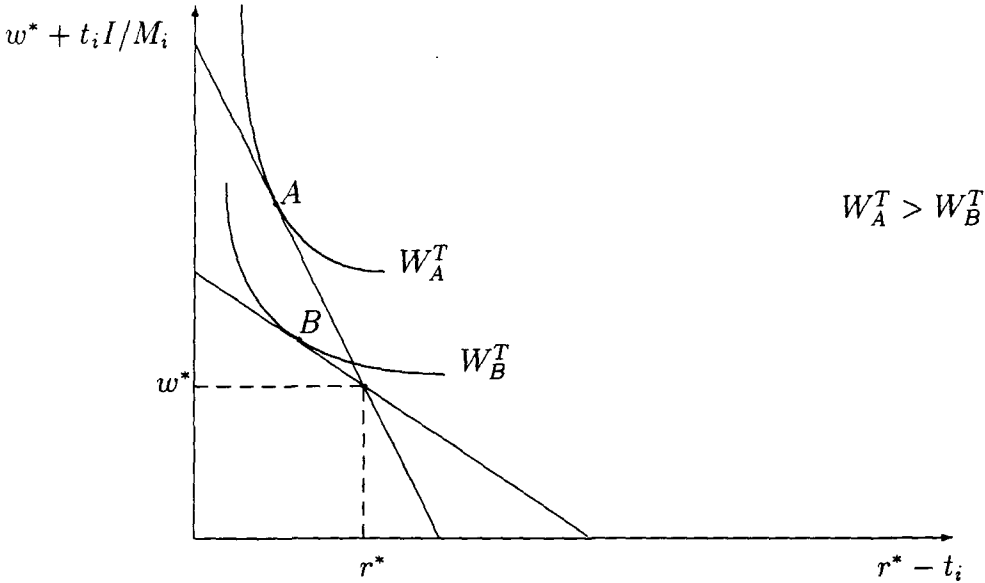
where utility levels of households are given by (11) and (12). We assume that the resource endowment point of the two countries lies within the FPE-set. Due to identical homothetic preferences, the redistribution programs alter incomes, but not the overall demand structure and the level of demand. Hence, governments correctly

⁴This is in line with modern analysis of decentralized income redistribution exemplified by contributions like Stigler (1957), Oates (1968), Pauly (1973), Brown/Oates (1987), Epple/Romer (1991), Wildasin (1991), Burbidge/Myers (1994), and Wellisch (1996) and (1997).

⁵The choice of the tax game between governments enables us to derive a unique equilibrium in the migration case and hence, a simple and tractable analysis. We discuss the case with transfers as strategic variables in Section 5.

⁶Since native residents have to vote for the desired integration scheme, it seems plausible to include only the utility of native individuals in the social welfare function. However, even this argument leaves space for the equally reasonable assumption to include all native individuals in the welfare function. We abstained from this alternative since it eliminates the symmetry between countries and thus makes a comparison between the integration steps difficult. Our approach can be interpreted as weighting each group in the political process depending on its political influence. If, however, social welfare depends on the number of all residents, both natives and immigrants, social welfare increases (*ceteris paribus*) with increases in population, making an extension of a free trade zone for free migration more attractive for rich countries.

Figure 2: Redistribution, free trade and social welfare



anticipate that their policies leave factor rewards and goods prices unchanged. By inserting (11) and (12) with the help of (10) into (13), we get as first-order conditions of the Nash equilibrium

$$MRS_i = \frac{M_i}{I}, \quad (14)$$

with $MRS_i \equiv (\partial W^i / \partial U_i^M) / ((\partial W^i / \partial U_i^I))$ denoting the marginal social welfare gain of the recipient of the transfer measured in units of reduced marginal social welfare of the tax paying representative household. In the optimum, the relative social welfare gains must just be equal to social costs of the redistribution scheme. Social costs are equal to the number of workers relative to the number of immobile households.

Since both governments correctly anticipate that their policy measures simply redistribute income without changing the international allocation, the redistribution programs are socially optimal. Costs as well as gains of redistribution are borne by each country. Policy coordination cannot increase welfare in one country without making the other country worse off. However, welfare of the country with the lower number of recipients of the redistribution scheme is higher. This just stems from lower marginal social costs of redistributing one Dollar from high- to low-income

households. Paying the worker-households the same level of transfer requires a lower tax rate leaving the owner of the immobile factor better off. This can be seen with the help of Figure 2. The axes of the diagram delineate net incomes of the two types of households. In the absence of any government activity, the income distribution (w^*, r^*) results. If redistribution takes place, the slope of the budget lines represent the country-specific costs of redistribution. The slope is equal to the income loss of a representative owner of the immobile factor for paying one additional Dollar to workers, i.e. $-I/M_i$ for country i . The cost curves, intersecting at the combination (w^*, r^*) , are straight lines since international goods and factor prices are unaffected by redistributive measures. Since all households have identical homothetic utility functions, we can also draw social indifference curves, denoted by W_i^T in the free trade regime, in the net income space.⁷

According to (14) the governments of both countries equate the slopes of the cost lines and of the social indifference curves. With redistribution from the owners of the immobile factor to workers, we find an equilibrium to the northwest of the point (w^*, r^*) , i.e. A and B , respectively, leading to a lower (higher) income for the owners of the immobile factor (workers). Points below (to the right of) w^* (r^*) never occur. They only can take place if we reverse the redistribution scheme. This would imply in our illustration negative tax and transfer levels. Note that social welfare is higher the further away the social indifference curve is from the origin. Since social costs are higher in country B than in A, B realizes a lower level of welfare.

We can establish

Proposition 2 *With free trade, uncoordinated redistribution policies in the two countries leave the international allocation unaltered. Redistribution policies are conducted in a socially optimal manner. The country with the smaller number of native workers attains a higher level of social welfare.*

⁷Inserting (11) for U_i^I and (12) for U_i^M into the social welfare function yields $W^i = W([r^* - t_i]/E(p^*), [w^* + (I/M_i)t_i]/E(p^*))$. A social indifference curve thus has a slope of $1/MRS_i$ in the net income space, depending (for a given p^* and hence, for given factor prices) on the net incomes of both households.

4.2 Redistribution policy with free trade and free migration

Now, we look at the implications of redistribution policies after free migration has been established, too. Recall our assumption that countries cannot discriminate against immigrants. Immigrants as well as native workers receive the same level of transfers in each country. With free migration, utilities of migrating workers become equalized in the migration equilibrium.

With (10), we can rewrite (12) as

$$U_i^M = \frac{w_i + t_i I / L_i}{E^i}. \quad (15)$$

For given factor prices in the two countries, the country with the higher transfer will attract more mobile workers. With identical wage rates, migration will take place until the transfer payments, z_i , are equalized across countries. By noting that $z_i = t_i I / L_i$, we observe that for $z_A = z_B$, $L_A / L_B = t_A / t_B$. For given tax levels in both countries, a unique solution for L_A and L_B , respectively, emerges. Redistribution policies serve to determine a unique international equilibrium allocation in the FPE-set.

Without coordination in redistribution policies, both governments maximize their social welfare function simultaneously. Due to the endogeneity of the national labor force and the symmetry of the objective function, their optimization problem is symmetric, too. We can write the first-order condition of the maximization problem as

$$\frac{\partial W^i}{\partial U_i^I} \frac{\partial U_i^I}{\partial t_i} + \frac{\partial W^i}{\partial U^M} \frac{\partial U^M}{\partial t_i} = 0, \quad (16)$$

for a given tax rate of the other country. Note that we omitted the index at the utility function of mobile workers in order to take free migration into account. How does the Nash equilibrium of the redistribution game in the presence of free trade and free migration look like? We derive the characteristics of the Nash equilibrium in three steps. We first argue that with equal tax rates in both countries, the indeterminacy of the free migration equilibrium vanishes: one half of the labor force locates in country A, the other half in country B. Second, we show that rational governments do not have to consider any effects of their policies on factor prices. Governments only have to take the migration responses of workers and the effects of migration on the costs

of the redistribution program (via the number of recipients of transfers) into account. Using these facts, we derive the national optimality conditions which prevail in the Nash equilibrium in the third step.

The symmetry of the best response functions (16) implies that in the Nash equilibrium, tax rates are equalized across countries. To derive the nature of the Nash equilibrium, it proves helpful to look at the resulting migration equilibrium for equal tax rates. In this case, free migration leads to an international resource endowment in the FPE-set. In order to see this, suppose the reverse, for example $w_A > w_B$. Free migration then calls for $L_B < L_A$ (see (15) and (9)). This leaves country B with the higher land-labor ratio. Due to concavity of the revenue function, we know that with unequal factor prices, the country with the higher land-labor ratio can never have a lower wage-rent ratio (see Helpman/Krugman (1985, Chapter 1)). But $w_B/r_B \geq w_A/r_A$ implies (with $w_A > w_B$) that $r_B < r_A$. Hence, production costs of both goods are strictly lower in country B than in A. This does not constitute an equilibrium. The Nash equilibrium must be accompanied by a factor allocation in the FPE-set. With factor price equalization and equal tax rates, we can even conclude that $L_A = L_B$ results (see (15) and (9)). Redistributive policies lead to an international resource allocation with a perfectly symmetric distribution of mobile workers. An unequal distribution of workers among the two countries would imply (in the presence of equal national tax rates) lower transfer levels in the larger country, violating thereby the free migration condition with factor price equalization.

We get

Lemma 1 *The existence of redistribution policy leads to a unique international allocation. The indeterminacy of the international equilibrium with free trade and free migration in a pure market economy vanishes.*

In the symmetric Nash equilibrium, governments correctly anticipate that their actions do not influence goods and factor prices. To show this, let us define t_i^N to be the Nash equilibrium tax rate of country i . By definition, it must be optimal to respond to t_j^N ($j = A, B, i \neq j$) by choosing t_i^N . Let us look at different tax rates t_i for a given t_j^N . Tax rates satisfying $t_i > t_i^N$ ($t_i < t_i^N$) attract mobile workers to country i (j). But since the FPE-set is composed not only of the diagonal in Figure 1, the

different factor endowments of the two countries still lead to a resource endowment point in the FPE-set. To illustrate this more clearly, suppose that country A considers deviating slightly from the symmetric Nash equilibrium. This leads either to a larger labor force L_A (for $t_A > t_A^N$) or to a smaller L_A (for $t_A < t_A^N$) compared to the symmetric distribution of mobile workers. In both cases, however, the (sufficiently) small deviation does not lead to an allocation outside the FPE-set. Governments know that the migrants respond to their actions such that the integrated equilibrium will be replicated. Factor rewards are not influenced by governments actions given that we assume a sufficiently large FPE-set. Hence, factor rewards remain the same for the different tax rates t_i . Governments correctly anticipate that their actions leave factor and consequently goods prices unchanged.⁸

The only consequences governments have to take into account when deciding upon their optimal tax rates are the induced migration responses of mobile workers. We concentrate on the points in the FPE-set only, since around the Nash equilibrium, the resource endowment points replicate the integrated equilibrium (see Figure 1). Hence, we can express the migration equilibrium condition as:

$$\frac{t_A I}{L_A} = \frac{t_B I}{L_B}. \quad (17)$$

Totally differentiating this expression and taking $L = L_A + L_B$ into account gives us the migration response $dL_i/dt_i = L_i/(t_i(1 + L_i/L_j)) > 0$. Higher national tax rates imply higher transfers which attract mobile workers. Using the migration responses in the first-order conditions (16) yields (after some manipulations) the Nash equilibrium condition with free migration (see the Appendix for a detailed derivation):

$$MRS_i = \frac{L}{I}. \quad (18)$$

The high-income country, which is the immigration country ($M_A < L/2 < M_B$), experiences two negative effects on social welfare. First, since it cannot discriminate against immigrants, it pays a certain fraction of its national income to immigrants. This is only a cost to this country without corresponding gains. Second, there is a welfare loss due to the anticipated immigration. Since higher redistribution levels

⁸Note that this argument implicitly assumes that a Nash equilibrium in pure strategies exists.

lead, *ceteris paribus*, to immigration and therefore to a positive externality on the other country (the costs of redistributing income decrease abroad), it will redistribute too little income.

This suboptimality can be seen explicitly by looking at the outcome of a coordinated redistribution policy performed by both countries. The two countries jointly maximize their social welfare function. By noting the symmetry of the objective function for both countries, we can simply look at the identical tax rate which maximizes the social welfare function of one country. The problem of coordinated redistribution policy is:

$$\begin{aligned} \text{Max} \quad & W(U_i^I, U_i^M). \\ t_i = t_j \end{aligned} \tag{19}$$

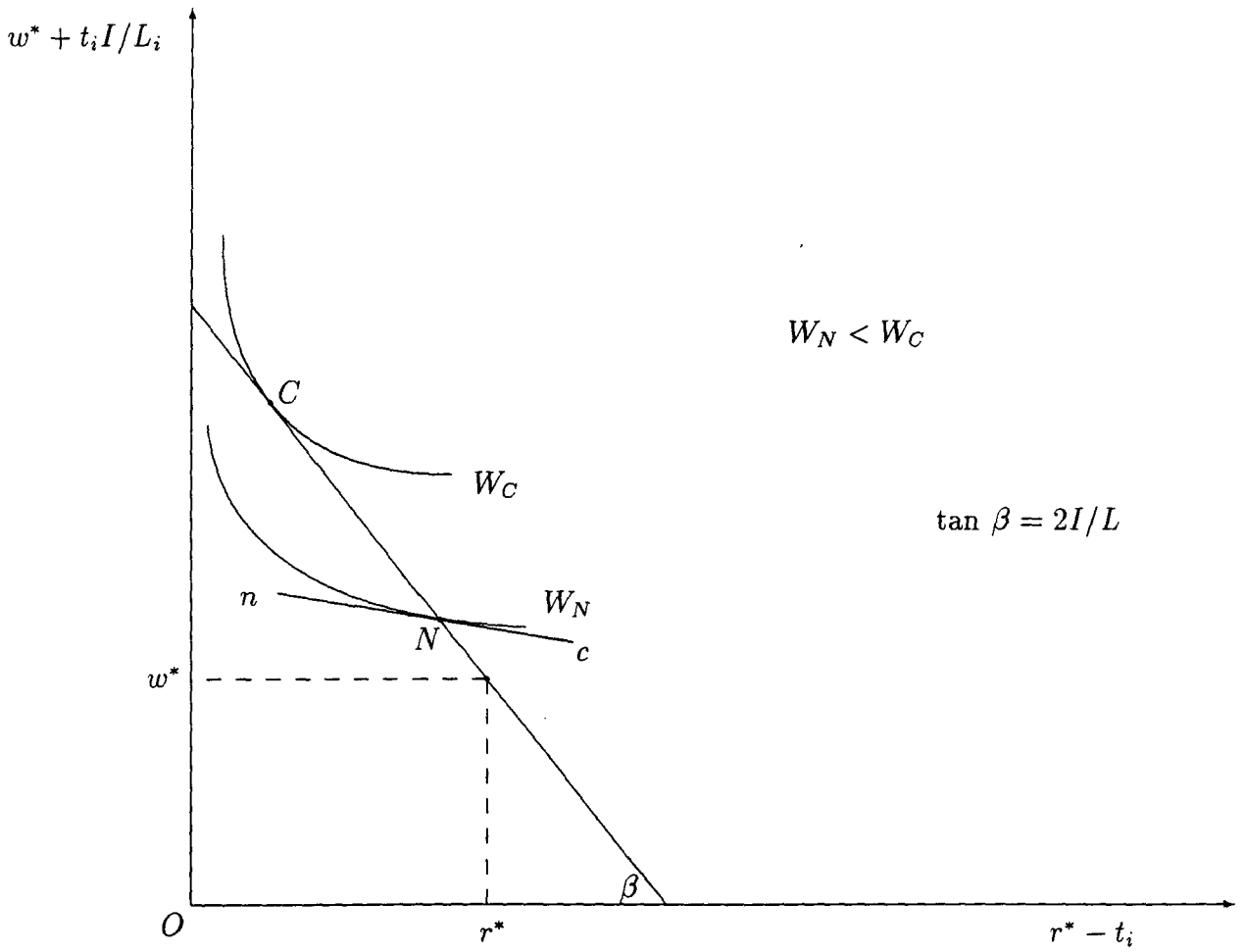
With identical tax rates, governments do not have to worry about migration responses. We get as a first-order condition for the optimal coordinated redistribution policy:

$$MRS_i = \frac{L}{2I}. \tag{20}$$

Comparing (20) with (18) reveals the suboptimality of uncoordinated redistribution policies in the case of free migration. Due to endogenous migration, perceived costs of redistributing one Dollar from high-income households to low-income households are higher with uncoordinated policies. Governments anticipate that increasing taxes leads to an inflow of foreign migrants. Figure 3 illustrates this effect.

Using the social cost line with the slope $-2I/L$, we find the equilibrium with coordinated redistribution policy at point C . The redistribution cost line with non-coordinated government policies is depicted by nc . It represents the perceived benefits of raising the tax rate marginally. The precise slope is $-I/L$ as given by (18). The equilibrium in the case of uncoordinated redistribution policy is indicated by point N . Due to the symmetry of the Nash equilibrium ($t_A = t_B$), N has to lie on the budget line for symmetric countries with a slope of $-2I/L$. This can be seen by referring to the budget constraint of each of the symmetric countries: $z_i L/2 = t_i I$. In contrast to the cooperative equilibrium, however, the optimality condition of the individual government in the noncooperative equilibrium calls for a tangency between perceived marginal costs of redistribution and the social indifference curve. This calls for a

Figure 3: Redistribution, free migration, and social welfare



lower marginal rate of substitution of the social welfare function in the noncooperative compared to cooperative case. National governments anticipate that a marginal increase in t_i attracts immigrants leading to a smaller transfer level than in a situation with coordinated policies.

We can establish

Proposition 3 *With free migration, uncoordinated redistribution policies lead to too little redistribution. With coordinated government activities, social welfare is higher since the positive external effects caused by migration responses can be internalized.*

Both countries are worse off with uncoordinated redistribution efforts compared to a situation where they coordinate their activities.

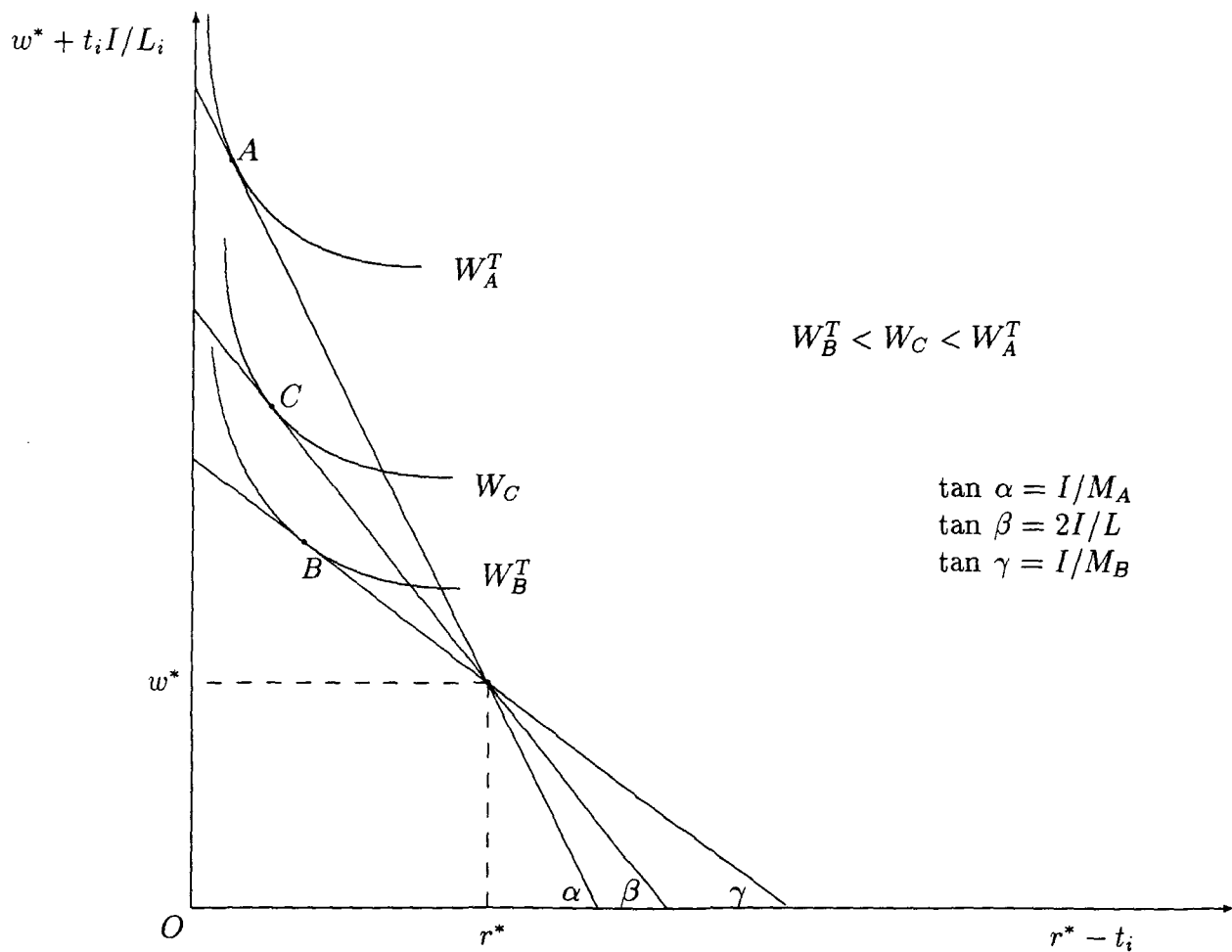
Let us now compare the welfare effects of free trade and free migration when countries coordinate their policies. This comparison allows us to infer the incentives of the rich countries to extend a free trade zone since the outcome with uncoordinated redistribution policy must even be worse.

The comparison between the two integration regimes for the case of coordinated policies is undertaken in Figure 4 where we simply redraw the equilibria with only free trade and with trade and migration in the case of coordination.

Figure 4 shows the transfer effect occurring with free migration. Mobile workers migrate to the rich country increasing there the costs of redistribution from immobile households to workers. The poor country, that is, the emigration country, experiences a positive transfer effect via emigration of beneficiaries of the transfer system. Emigration of mobile natives from B lowers the social costs of redistribution leading to a higher level of B's social welfare.

The rich country is definitively better off if it stops to integrate further after free trade has been established. The poor country gains if integration proceeds and countries coordinate their redistribution policies. The basic reason for this is that it loses beneficiaries of its welfare system. If, however, countries do not coordinate their policies, further integration has an ambiguous effect for the poor country. On the one hand, redistribution becomes less expensive due to emigration of low-income individuals. On the other, due to strategic effects, redistribution is performed suboptimally. In summary, we can state

Figure 4: Social welfare, free trade, and free migration



Proposition 4 *Free migration is not in the interest of the high-income country. It experiences a drop in social welfare. Even with coordinated redistribution policies, the high-income country loses with free migration due to the increase in beneficiaries of its redistribution scheme.*

Finally, it is of interest to look at the situation of different types of households in each country. Note that, for a given number of transfer recipients, the higher the costs of redistribution the lower the tax rate and therefore the larger the income of the owners of the immobile factor. Allowing for free migration is in the interest of the owners of the immobile factor. Land owners in the high-income country gain most from the transition from free trade to free migration with a uncoordinated redistribution policy. This can be deduced in a straightforward manner from Figures 3 and 4. The equilibrium allocation with free migration (N) is closest to the pure market equilibrium at r^* (in the high-income country A). The equilibrium allocation with free trade in country A (point A) is the farthest away from the pure market distribution of income. Hence, taxes are the highest in the latter situation whereas they are at their lowest level with free migration and uncoordinated redistribution policy. In contrast to the society as a whole, the owners of the immobile factor are interested in a full membership of country B in, say a common market, ensuring free mobility of labor across national borders as long as they are not altruistic towards native mobile workers. They anticipate correctly that the level of redistribution and therefore of taxation will be reduced significantly with endogenous migration.

The reverse is true for mobile natives of country A who are best off in the pure free trade regime and definitively lose via free migration. But even mobile households in B might have an incentive to opt against free migration if they expect uncoordinated redistribution policies and the impact of the strategic effect on redistribution levels is sufficiently pronounced (see Figures 3 and 4).

5 Discussion

In our preceding analysis, we concentrated on the implications of redistribution in a tax-setting game. Governments choose tax rates in order to maximize national

welfare. The transfer levels result via the governments' budget constraints, i.e. they display simply a residual.

But, as Wildasin (1988) pointed out with strategic interactions among public decision-makers, the choice of strategic variables matters. Hence, it is necessary to discuss our framework for a situation in which governments choose transfer levels as their decision variables. We argue that in this case, the analysis changes drastically, but our main insight remains in place.

With free migration and transfer levels as the strategic choice variables of governments, incomplete specialization and factor price equalization does not constitute an equilibrium anymore in a two-goods-two-factors world. With incomplete specialization (and factor price equalization), the migration equilibrium calls for $z^A = z^B$ (see (9) and (12)). It is, however, in the interest of at least one government to deviate from a situation with equal transfer levels. To see this, suppose that country A 's government marginally undercuts z_B . This induces migration from A to B until complete specialization occurs. That is, country A experiences a discrete fall in the number of mobile workers from a point along the line $L_A^l L_A^h$ to a point below L_A^l .⁹ This in turn implies a discrete drop in the taxes immobile households in country A have to pay in order to finance transfers. Since the factor price frontiers in each industry are continuous, wages and rents change only marginally. Hence, welfare of mobile workers changes only marginally, too. In contrast, welfare of immobile households in the deviating country increases discretely. Combining these two effects demonstrates that social welfare in the deviating country unambiguously increases. A situation with incomplete specialization does not display a Nash equilibrium if governments use transfer levels as their strategic variables.

If there is a Nash equilibrium in the transfer game, it always leads to complete specialization and unequal factor prices.¹⁰ Transfer levels differ between the two countries (this is an immediate implication of unequal factor rewards and the migration equilibrium). The country with higher transfer levels will attract more mobile

⁹If L_A is already close to L_A^l , we can employ this argument for country B .

¹⁰Proving the existence of such an equilibrium would require a much more detailed and technical discussion as well as further restrictive assumptions. We consider it as being beyond the scope of the present paper.

workers and hence, specialize in the labor-intensive industry. Wages (rents) are lower (higher) in this country than in the one with the smaller transfer level.

But even in such an equilibrium, our basic result remains in place: Free migration leads to lower levels of social welfare for the rich country compared to free trade. This is due to two effects. First, unequal factor rewards lead to a less efficient production pattern. Countries do not face the factor prices of the integrated equilibrium, and they will therefore employ different technologies than in the integrated equilibrium. Since with the latter type of technology world output is maximized, production techniques are less efficient than in the integrated equilibrium (i.e. than with free trade). Second, both countries are identical with free migration. Consequently, they must have the same level of welfare. This implies together with Proposition 2 that the high-income country realizes a lower level of social welfare due to migration of mobile workers. Combining these two effects reveals that the high-income country definitely prefers free trade over free migration.

The fact that government activities may lead to complete specialization among identical countries or regions is reminiscent of Wilson (1987a,b). Whereas Wilson focuses, however, on the large number of regions case, we look at the strategic interaction among two countries. This leads to potentially different implications with respect to the structure and the existence of the equilibrium. Furthermore, he looks at taxation of mobile capital (Wilson (1987b)) and the provision of local public goods (Wilson (1987a)) rather than on the implication of redistribution policies. The third main difference of our work compared to his work is the fact that we address basically a positive issue, namely to explain the puzzle of the reluctance of high-income countries to accept free migration whereas Wilson's analysis focuses on the efficiency properties of the resulting equilibrium.

6 Conclusion

In this paper we investigated the relationship between free trade, free migration, and government activities. We have shown that there exists a strong incentive for countries to stop the integration process short of a removal of migration barriers. It is in particular in the interest of rich countries to trade freely but avoid full integration

(via formation of a common market). The low-income country partially benefits from migration since it loses beneficiaries of its transfer program. The national tax revenues in the low-income country are distributed among a smaller number of recipients. We provided an explanation for the observable reluctance of countries to remove barriers to migration but their obvious willingness to trade with each other.

Another remarkable result of our analysis is that it may even not be in the interest of potential migrants to remove barriers to migration. These barriers delineate an implicit commitment which makes (potentially) mobile workers in both countries better off. This is a feature which does not arise in other explanations for the reluctance of high-income countries to remove barriers to migration (like the existence of nontraded goods and the absence of factor price equalization). Our results are also in sharp contrast to the regime ranking in Wong (1983). In his neoclassical trade model without government activities but with technological differences among the countries, free trade and free migration lead to a higher welfare level for the small home country than free trade alone.

Our specific argument with respect to redistribution policies can be extended to other government activities as well. For example, if some (quasi-) private goods are publicly provided (public goods with high congestion costs like education), governments attract mobile workers to the respective country. The same mechanism as in our analysis of redistribution policy applies. That is, our model, rather than being limited to redistribution policy is applicable to other government activities as well.

The basic mechanism is that government activities influence migration decisions. In the absence of migration barriers decentralized government activities causes international externalities. Free trade, however, provides for the full gains of specialization while avoiding distortions due to factor movements. The modern welfare state acts as an impediment to full integration.

Appendix

This Appendix contains a more detailed derivation of (18).

Plugging (11) and (15) into (13) and differentiating this with respect to t_i gives us:

$$\text{MRS}_i = -\frac{\partial U_i^I / \partial t_i}{\partial U_i^M / \partial t_i} = \frac{1/E}{\partial U_i^M / \partial t_i} \quad (\text{A.1})$$

Using (15) we find for $\partial U_i^M / \partial t_i$:

$$\frac{\partial U_i^M}{\partial t_i} = \frac{I}{L_i E} + \frac{\partial \left(\frac{t_i I}{L_i E} \right) dL_i}{\partial L_i dt_i}. \quad (\text{A.2})$$

Inserting the expression for the migration response given in the text (below eq. (17)), we can rewrite (A2) to:

$$\begin{aligned} \frac{\partial U_i^M}{\partial t_i} &= \frac{I}{L_i E} - \frac{t_i I}{(L_i)^2 E} \left(\frac{L_i}{t_i(1 + L_i/L_j)} \right) \\ &= \frac{I}{L_i E} - \frac{I}{EL_i} \left(\frac{L_j}{L} \right) \\ &= \frac{I}{EL}. \end{aligned} \quad (\text{A.3})$$

Reinserting (A3) into (A1) yields (18).

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