The Influence of Different Institutional Settings on Welfare in an Open Economy*

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Abstract:

In this paper we analyze the effects if two countries, with different settings on the labor market, open their capital markets. To do this we follow the ideas of New Institutional Economics in combination with a new model of economic growth. We will use a Leontief production function, where we derive the distribution of income by using an approach stemming from conflict theory, to highlight some new insights into the question whether an open world capital market enhances the overall welfare. First of all, using conflict theory, we will pay some attention to the micro-economic foundation of a Harrod-Domar model. At least we want to analyze what will happen if for e.g.: China opens the capital market to the EU zone, where the institutions in both regions are very different. We will show that this will always lead a race to the bottom from the view of workers in the former developed region.

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I Introduction

In this paper we want to investigate in the effects of a transition from two autarchic economies to a world economy with open capital markets. The approach here is related to the paper of Buiter (1981) who uses a standard Diamond (1965) OLG-model with a neoclassical production function. The difference here is that we take into account the different institutional settings on the labor markets in two regions in a very broad sense. This idea follows the ideas of Acemoglu, Johnson & Robinson (2005). To do that we use a Leontief production function instead of the neoclassical production function.[1] The microeconomic foundation for this approach is given in Stauvermann (2005) and Geerdink & Stauvermann (2005), who analyze a closed economy with an OLG structure and a Leontief production function. Although the results in a closed economy with a neoclassical production function and an economy with an Leontief production function are very similar, except of a few characteristics[2], the results here are very different from the results of Buiter (1981). The results of Buiter (1981) fit very well to the literature like Haaparanta (1989), Persson (1985), MacDougall (1960) and Kemp (1962). All these approaches are embedded in a conventional neoclassical model. The approach here differs much, because here we abstain from that the marginal productivity theory, which defines the distribution of income by technical characteristics of the production function. The first reason to do that is based on the amount of literature (see for example Robinson (1934,1953/54),[3] Pasinetti (1977), Sraffa (1960), Labini (1995)), who criticizes this approach. Or to say it in the words of Joan Robinson Robinson (1934) *"To some writers the theory of marginal productivity appeared as a grand moral principle which showed that what a social class gets is, under natural law, what it contributes to the general output of industry"*

Instead of the marginal productivity theory, we have used an approach from conflict theory, which is based on the work of Hirshleifer (1987a, 1987b, 1988, 1989, 2000) and Skaperdas (1992, 1996) in combination with a Harrod-Domar model. The

[1] In principle we also could use the neoclassical production function, but we do not believe in the idea that the marginal product of employees are observable for anyone.
[2] E.g. on the transition path to the steady state in the model of Stauvermann (2005) unemployment will be always present and in the steady-state, capital will be always over-accumulated.
[3] Robinson (1934) states "To some writers the theory of marginal productivity appeared as a grand moral principle which showed that what a social class gets is, under natural law, what it contributes to the general output of industry"

idea fits very well to the work of New Institutional Economics in the sense of Acemoglu, Johnson & Robinson (2005).

That means that the factor prices are no longer determined by the production technology, but instead on wage negotiations, which are modeled by a conflict success function. In our model unemployment is present until the steady-state will be reached. Additionally, the authors doubt that it is possible to measure the marginal productivity of a labor hour, especially if we take the service sector industry into account. Neither on the firm-level nor an aggregate level it is possible to measure the marginal productivity; we only can measure the average productivity. But if only the average productivity is known, then the marginal product can never be an argument to hire or to fire someone, because it is unknown in general. At next, it seems not very practical to assume that labor can be substituted by capital while using the same technology, because it makes no sense that two secretaries are using only one personal computer or that one secretary should work with two computers at the same time. Of course, if a different technology is available, the efficient labor-capital ratio could be different, but that is not taken into account in this paper.

Because of these reasons, it is not surprising that our results differ from the results of Buiter (1981).[4] We will show that the opening of the international capital market will always harm some people. Buiter (1981) has shown that under specific conditions a long-run welfare improvement in the sense of Pareto could be realized by opening the capital markets. In our model it is never the case. Of course some individuals are better off after opening the capital markets, but also some individuals are harmed. Additionally, in our model it becomes clear how important social standards, like labor laws, labor unions and industrial laws are for determining the factor prices. We will see that two economies with different social standards should not trade which each other in borrowing and lending of capital from one country to another.

In the second section, we introduce an OLG-model with a Leontief production function. In the third section, we introduce a world with two autarchic economies. This is followed by the analysis of the transition from autarky to an open world capital market. Then we will look at the short-run effects of the transition and then we

[4] Buiter (1981), contrary to us, has assumed that two identical countries differs only with respect to the time preference rate, we assume the different savings is based on the institutional setting. In both models only the savings of both countries are different.

look at the long-run effects of the transition. In the last section, we conclude the results and look at possible policy implications.

II The Model

In this section we analyze the effects of international capital mobility in a Harrod-Domar growth model. To do that we assume the following production function:

$$Y_t^i = A\min\left[K_t^i, L_t^i\right] \tag{1}$$

where A is a constant, K_t^i represents the capital stock in country i in period t and L_t^i represents the labor force in country i in period t. We assume that the labor force is constant and normalized to one: $L_t^i = L_{t+1}^i = 1$ (Notice that the variables are also expressed as per capita variables.)

To model the distribution of income we refer to Stauvermann (2005) and Geerdink & Stauvermann (2005), where they base the distribution of income on labor negotiations and the institutional arrangement of labor disputes. That means that capital owners and worker are disputing on the income distribution. To do it formally a contest success function is used. Let us describe the bargaining process.
The workers maximize:

$$w_t^i = \frac{G_L + g_L}{G_C + G_L + g_C + g_L} Y_t^i - g_L = \left(1 - a\left(g_L, g_C\right)\right) A\min\left[K_t^i, 1\right] - g_L \tag{2}$$

where w_t^i is the wage rate in period t, G_L and G_C represent the institutional arrangement, which is given by industrial laws (e.g. minimum wage). These variables are under the control of the government. The function $a\left(g_L, g_C\right)$ is the distribution function. The variables g_L and g_C represent the stakes of the workers and the capital owners (e.g. times of strike and times of lock-out). Consequently, the capital owners maximize:

$$R_t^i K_t^i = \frac{G_C + g_C}{G_C + G_L + g_C + g_L} Y_t^i - g_C = \alpha^i\left(g_L, g_C\right) A\min\left[K_t^i, 1\right] - g_C . \tag{3}$$

[5] Maybe some readers think that it would be better to subtract also the stake of the capital owners, but this would not change the qualitative results.

Here R_t^i is the interest factor in period *t*, where we assume a depreciation rate of 100% per period. The outcome of the labor dispute is in general the following:

$$g_L^* = \tfrac{1}{4}(Y - 4G_L) \tag{4A}$$

and;

$$g_C^* = \tfrac{1}{4}(Y - 4G_C) \tag{4B}$$

To make the analysis as easy as possible, we assume that $\min[G_L, G_C] > \tfrac{1}{4}y$.[6] That means, that the outcome of the labor negotiations only depend on the institutional arrangement in the country, and $g_L^* = g_C^* = 0$. So to say we have an efficient institutional setting. This is easy to see because the income shares for capital and labor are $\alpha^i(g_L^*, g_C^*) = \frac{G_C}{G_C + G_L}$ and $(1 - \alpha(g_L^*, g_C^*)) = \frac{G_L}{G_C + G_L}$

They are only depending on the on the institutional arrangements.

The production in period *t* is given by:

$$Y_t^i = \begin{cases} AK_t^i, \text{if } K_t^i \le 1 \\ A, \text{if } K_t^i > 1 \end{cases}. \tag{6}$$

Because of that the factor prices for labor and capital are given by:

$$R_t^i = \begin{cases} a^i A, \text{if } K_t^i \le 1 \\ \dfrac{a^i A}{K_t^i}, \text{if } K_t^i > 1 \end{cases} \tag{7}$$

and

$$w_t^i = \begin{cases} (1 - a^i) AK_t^i, \text{if } K_t^i \le 1 \\ (1 - a^i) A, \text{if } K_t^i > 1 \end{cases} \tag{8}$$

To make the analysis as easy as possible, we assume that the behavior of an individual born at time *t* is described by a log-linear utility function $u_t = \ln c_t^1 + q \ln c_{t+1}^2$, where c_t^1

[6] That means that the institutional framework of the economy is efficient.

represents the consumption in the first period of live and c_{t+1}^2 represents the consumption in the second period of live, the factor q represents the time preference. Of course we assume that the individuals live for two periods. In the first period they supply their labor inelastically and in the second period they live from the interest income and savings from previous period. The resulting aggregate savings for each country are given by:

$$S_t^i = sw_t = s\left(1-\alpha^i\right)Y^i{}_t \tag{9}$$

where $0 < s < 1$ is a constant factor. The elasticity of savings with respect to the interest factor is zero due to the log linear utility faction which is used. In general, we get the following result for the aggregate savings:

$$S_t^i = \begin{cases} s\left(1-a^i\right)AK_t^i, \text{ if } K_t^i \le 1 \\ s\left(1-a^i\right)A, \text{if } K_t^i > 1 \end{cases} \tag{10}$$

From that we can calculate the steady-state equilibrium and the transition path to it. Let us first describe the steady-state equilibrium ($K_t^i \ge 1$). The capital market clearing condition, which must be fulfilled in steady state equilibrium, is given by:

$$K_{t+1}^i = S_t^i = s\left(1-a^i\right)Y_t^i = K_t^i = K^{i*} \tag{11}$$

Notice that condition (11) is only fulfilled, if $K_t^i \ge 1$. Then the steady state is given by:

$$K^{i*} = s\left(1-a^i\right)A \tag{12}$$

Of course, we assume that $s\left(1-a^i\right)A > 1$. This equilibrium is globally stable.[7]

Let us now look at the transition path. The economy is on a transition path, if $K_t^i < 1$. If this condition is fulfilled, a positive growth rate will be realized, because:

$$K_{t+1}^i = s\left(1-a^i\right)AK_t^i \tag{13}$$

[7] See Stauvermann (2005) for a general prove.

or alternatively

$$1+G_t^i=\frac{K_{t+1}^i}{K_t^i}=s\left(1-a^i\right)A>1 \tag{14}$$

Here we should note that unemployment is present on the transition path, because $K_t^i<L_t^i=1$. Consequently the unemployment rate is given by $\left(L_t^i-K_t^i\right)/L_t^i$. For simplicity and without loss of generality, we assume that unemployed people will die at the end of the first period. The growth rate depends on the savings rate but also on the institutional setting which determines the factor shares.

III The two Country Case; from Autarky to Capital Mobility

Now we are able to analyze what will happen, if capital is mobile between two countries. We start with autarky and after that we move to capital mobility

The autarchic case.

Let us assume that there are two countries, country 1 and country 2. Additionally, we assume, that due to differences in the institutional setting the income shares also differ, namely $a^1>a^2$. The capital share of income of country 1 exceeds the capital share of income of country 2. Further, let us assume that both countries are in a steady state before the capital market will be opened. Then, the autarchic steady-state equilibria for country 1 and 2 are given by:

$$K^{1*}=s\left(1-a^1\right)A,\qquad R^{1*}=\frac{a^1}{s\left(1-a^1\right)}\text{ and}\qquad w^{1*}=\left(1-\alpha^1\right)A \tag{15}$$

and

$$K^{2*}=s\left(1-a^2\right)A,\qquad R^{2*}=\frac{\alpha^2}{s\left(1-\alpha^2\right)}\text{ and}\qquad w^{2*}=\left(1-\alpha^2\right)A. \tag{16}$$

To make the model more clear take a look at the following figure:

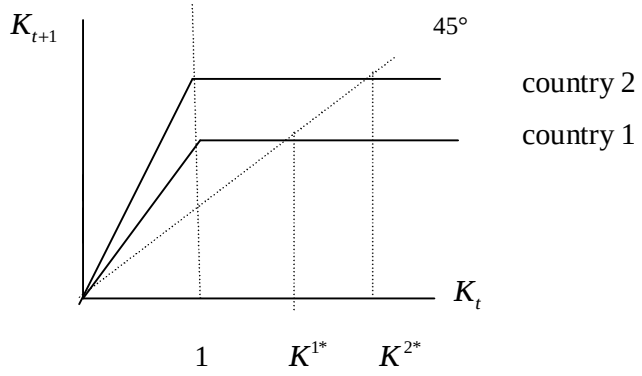

fig. 1

Obviously, figure 1 looks like a stylized neoclassical growth model. However, there are some differences compared to the neoclassical model. At first it should be mentioned, that in both steady states always an over-accumulation of capital is present. In country 1 and 2 the steady state capital stock exceeds the optimal capital stock. In addition, the capital stock in country 2 is higher than in country 1, because we have $K^{2*} > K^{1*} > 1$[8] The same holds for the wage rates. Only the interest factor in country 1 is higher than in country 2. This over-accumulation of capital is present, because the aggregated individual savings are bigger then the optimal capital stock. This is caused by the fact that the individual savings are not coordinated.[9]

Capital mobility

After opening of the capital market, the following non-arbitrage condition must hold, as long as both countries exist.

$$R^1_{t+1} = R^2_{t+1}. \tag{17}$$

Starting from a steady-state equilibrium in period *t*, the capital stocks in period *t*+1 after opening of the capital markets are given by the following considerations.

The aggregate savings of the two countries after opening of the capital markets are given by $S_t = s(1-\alpha^1)A + s(1-\alpha^2)A$ At the same time the aggregate capital accumulation becomes, $K_{t+1} = K^1{}_{t+1} + K^2{}_{t+1}$. In period *t*, the interest factor in country

[8] The optimal capital stock would be equal to one, because if it is bigger the wage rate will be not increased and the interest factor is lower than in equilibrium where the capital stocks equal one. See Geerdink & Stauvermann (2006) for a prove.

[9] Please take note, that is not caused by the assumed log-linear utility function.

1 is higher than in country 2. That means, that capital will be transferred from country 2 to country 1. Because of the fact that country 1 is importing capital and country 2 is exporting capital, country 1 realizes a current account deficit $B_t^1 < 0$ and country 2 realizes a current account surplus B_t^2. Of course the following holds by definition: $-B_t^1 = B_t^2$. Country 1 will be in equilibrium but we have $K_{t+1}^1 > K^{1*} > 1$ Therefore it is clear that the interest factor in country 1 will be $R_{t+1}^1 = \frac{a^1 A}{K_{t+1}^1}$.

There are 3 possibilities for country 2:

Case 1 it will be in a steady state equilibrium and, $1 < K^2{}_{t+1} < K_{t+1}^{2*}$, than we have the interest factor, $R_{t+1}^2 = \frac{a^2 A}{K_{t+1}^2}$ .and

Case 2 it is out of a steady state equilibrium but on the growth path, $K^2{}_{t+1} < 1 < K_{t+1}^{2*}$, then the interest factor in country 2 is $R_{t+1}^2 = a^2 A$

Case 3 it will be in a steady-state equilibrium with $K^2{}_{t+1} = 0$. The interest factor will be then $R_{t+1}^2 = 0$

Now we can conclude that after opening the capital market, both countries are again in an equilibrium in period t+1. The equilibriums of both countries differ from the equilibria in period *t.*

Let us first analyze case 1. In any case, the following non-arbitrage condition holds; $\frac{a^1 A}{K_{t+1}^1} = \frac{a^2 A}{K_{t+1}^2}$. From this we can derive the relation between the capital stocks in the two countries.

$$K^1{}_{t+1} = \frac{a^1}{a^2} K^2{}_{t+1}, \qquad \text{where } K_{t+1}^1 > K_{t+1}^{1*} > 1 \text{ and } K_{t+1}^2 > 1 \tag{18}$$

After opening of the capital market, aggregate savings should be equal to aggregate capital accumulation ($S_t = K_{t+1}$). This results in the following capital stocks of country 1 and 2 ;

$$K^1_{t+1} = \frac{a^1}{a^1 + a^2} S_t \qquad \text{and } K^2_{t+1} = \frac{a^2}{a^1 + a^2} S_t \tag{19}$$

This means that as long as $S_t > 1 + \frac{a^1}{a^2}$ holds, both countries will be in equilibrium after opening of the capital market

In case 2, the appropriate non-arbitrage condition is given by;

$$a^2 A = \frac{a^1 A}{K^1_{t+1}}. \tag{20}$$

Reformulation of (20) gives directly the capital stock in country 1:

$$K^1_{t+1} = \frac{\alpha^1}{\alpha^2}. \qquad \text{where } K^1_{t+1} > K^{1*}_{t+1} > 1 \quad \text{and } K^2_{t+1} \le 1. \tag{21}$$

Actually we have the following restriction on capital formation for country 2; $S_t \le K^1_{t+1} + K^2_{t+1}$. We can derive the capital stock of country 2 as a residual of aggregate savings and the capital stock of country 1. This leads to;

$$K^2_{t+1} = S_t - \frac{a^1}{a^2} \le 1. \tag{22}$$

If $0 < K^2_{t+1} \le 1$ than country 2 is on a growth path This is the case when the following holds; $\frac{\alpha^1}{\alpha^2} \le S_t \le 1 + \frac{\alpha^1}{\alpha^2}$.

Let us look at the cases 3, where $K^2_{t+1} = 0$. This is the case, if $S_t < K^1_{t+1}$. Using equation (21) it is easy to see that this will hold if $S_t < \frac{\alpha^1}{\alpha^2}$, actually if the capital stock reduces to zero, country 2 ceases to exist economically.

From these considerations above, we can summarize and conclude, that

$$K_{t+1}^1 = \begin{cases} \dfrac{a^1}{a^1 + a^2} S_t, \text{if } S_t > 1 + \dfrac{a^1}{a^2} \\ \dfrac{a^1}{a^2}, \text{if } \dfrac{a^1}{a^2} \le S_t \le 1 + \dfrac{a^1}{a^2} \\ S_t, \text{if } S_t < \dfrac{a^1}{a^2} \end{cases} \tag{23}$$

and

$$K_{t+1}^2 = \begin{cases} \dfrac{a^2}{a^1 + a^2} S_t, \text{if } S_t > 1 + \dfrac{a^1}{a^2} \\ S_t - \dfrac{a^1}{a^2}, \text{if } \dfrac{a^1}{a^2} \le S_t \le 1 + \dfrac{a^1}{a^2} \\ 0, \text{if } S_t < \dfrac{a^1}{a^2} \end{cases} \tag{24}$$

It should be clear that country 1 is now indebted to country 2. Now we are able to calculate the worldwide interest factor:

$$R_{t+1} = \begin{cases} \dfrac{\alpha^1 A}{K_{t+1}^1} = \dfrac{\alpha^2 A}{K_{t+1}^2}, \text{if } S_t > 1 + \dfrac{\alpha^1}{\alpha^2} \\ \alpha^2 A, \text{if } \dfrac{\alpha^1}{\alpha^2} \le S_t \le 1 + \dfrac{\alpha^1}{\alpha^2} \\ \dfrac{\alpha^1 A}{K_{t+1}^1}, \text{if } S_t < \dfrac{\alpha^1}{\alpha^2} \end{cases} \tag{25}$$

Additionally, we can calculate the wage rates in both countries:

$$w_{t+1}^1 = \begin{cases} \left(1 - a^1\right) A, \text{if } S_t > 1 + \dfrac{a^1}{a^2} \\ \left(1 - a^1\right) A, \text{if } \dfrac{a^1}{a^2} \le S_t \le 1 + \dfrac{a^1}{a^2} \\ \left(1 - a^1\right) A, \text{if } S_t < \dfrac{a^1}{a^2} \end{cases} \tag{26}$$

and

$$w_{t+1}^2 = \begin{cases} \left(1 - a^2\right) A, \text{if } S_t > 1 + \dfrac{a^1}{a^2} \\ \left(1 - a^2\right) A \left(sA\left(2 - a^1 - a^2\right) - \dfrac{a^1}{a^2} \right), \text{if } \dfrac{a^1}{a^2} \le S_t \le 1 + \dfrac{a^1}{a^2} \\ 0, \text{if } S_t < \dfrac{a^1}{a^2} \end{cases} \tag{27}$$

Given these results for period t+1, we are able to look at the welfare effects of capital market integration for both countries.

IV Short-Run Welfare Effects

Before we do that, it should be noted that we measure welfare in the sense of Pareto. If any generation is harmed it means a decrease of welfare. To do that we only must look at the factor prices along the line of an indirect utility function which can derived from the direct utility function and the budget constraint. We will see that we should not make use of the utility function, because always only one of the factor prices will change within one country. So the welfare analysis is very easy.

To look at the short-run welfare effects, we must look at three cases, depending on the aggregate savings of both economies. To discriminate between autarky and open capital markets we indicate the equilibrium values of the closed economy with an asterisk.

Case 1: Both countries are in equilibrium after opening the capital market. The following condition about aggregate savings has to hold; $S_t > 1 + \frac{a^1}{a^2}$

At first, we look at the wage rates. The wage rates in autarky in country 1 and country 2 are given by equation

$$w_t^{*1} = (1-\alpha^1)A \text{ and } w_t^{*2} = (1-\alpha^2)A \tag{28}$$

If we compare these results with equations (25) and (26), we see that nothing has changed ($w*^1_t = w^1_{t+1}$ and $w_t^{*2} = w^2_{t+1}$) The wages rates are not influenced through the opening of the capital markets. The wage rates are unchanged, because here the over-accumulation of capital is so high, that both countries stay in their original steady states.

If we compare the interest rates in autarky with the world interest rate, we come to the result, that the capital owners of country 2 will gain and that the capital owners of country 1 will realize a reduced capital income, because of the lower interest factor. This last effect is caused by the capital transfer from country 2 to country 1. This can be seen by comparing the interest rates in autarky for the two

countries with the interest rate in case of open capital market. In autarky the interest factor equals (inserting the optimal capital stocks in equation (15) and (16));

$$R_{t+1}^{*1} = \frac{a^1 A}{K_{t+1}^{*1}} = \frac{a^1}{s(1-a^1)} \text{ and} \tag{29A}$$

$$R_{t+1}^{*2} = \frac{a^2 A}{K_{t+1}^{*1}} = \frac{a^2}{s(1-a^2)} \tag{29B}$$

The interest factor in case of opening the capital market is;

$$R_{t+1} = \frac{(a^1 + a^2)}{s\{(1-a^1)+(1-a^2)\}}. \tag{30}$$

Comparing this interest factor with the two interest factors in the autarchic situation it is easy to see that $R_t^{*2} < R_{t+1} < R_t^{*1}$ So only the interest factors and the distribution of capital is different from autarky.

Case 2: Country 1 is in steady-state equilibrium but country 2 is on a growth path. This situation holds, because the following condition is met: $\frac{\alpha^1}{\alpha^2} \leq S_t \leq 1 + \frac{\alpha^1}{\alpha^2}$

In this case, the over-accumulation in autarky is lower than in case 1. This means that only country 1 remains in a steady state and that country 2 is out of its original steady state. The wage rate in country 1 remains unchanged ($w_{t+1}^{*1} = w_{t+1}^1$). The wage rate in country 2 is lower than in autarky because,

$w^{*2}{}_t = (1-\alpha^2)A > w^2{}_{t+1} = (1-a^2)A\left(S_t - \frac{a^1}{a^2}\right)$, and there will be an increase of unemployment in country 2[10].

The world interest factor is higher than the interest factor in country 2 under autarky. We see this by comparing the interest factors. $R_{t+1} = \alpha^2 A > R^{*2}{}_t = \frac{\alpha^2 A}{K^{*2}{}_t}$, because in the autarchic equilibrium holds $K^{*2}{}_t > 1$. The interest factor in country 1 is obviously lower than in autarky.

[10] This is caused by the fact, that the capital stock in country 2 is now lower than in country 1 and this implies unemployment.

Case 3: $S_t < \frac{a^1}{a^2}$ where Country 1 is in equilibrium but country 2 economically ceases to exist.

From equation (25) the interest factor can be calculated. Inserting the equilibrium capital stock of country 1 gives us the following interest factor for the open capital market;

$$R_{t+1} = \frac{\alpha^1 A}{K^1_{t+1}} = \frac{\alpha^1}{s\{(1-\alpha^1)+(1-\alpha^2)\}} \tag{31}$$

If we compare the interest factor with the autarchic situation of country 1 (equation (29A) and (31)), we conclude that $R_{t+1} < R^{*1}_t$, because $\{(1-\alpha^1)+(1-\alpha^2)\} > (1-\alpha^1)$ and therefore the capital owners will realize an loss in income. The wage rate in country 1 is unchanged.

The wage rate in country 2 equals zero after opening the capital market and so the wage income equals also zero, which is of course a very bad scenario. The interest factor of country 2 in autarky is lower than the interest factor with an open capital market. Therefore, the capital owners of country 2 gain from opening the capital markets.

Country 1

	Autarchic equilibrium values	Equilibrium values in an open capital market in the short run
Wages	$(1-\alpha^1)A$	1.case $(1-\alpha^1)A$
		2.case $(1-\alpha^1)A$
		3.case $(1-\alpha^1)A$
Interest factor	$\frac{\alpha^1}{s(1-\alpha^1)}$	1. case: $\frac{\alpha^1+\alpha^2}{s\{(1-\alpha^1)+(1-\alpha^2)\}}$
		2. case : $\alpha^2 A$
		3.case: $\frac{\alpha^1}{s\{(1-\alpha^1)+(1-\alpha^2)\}}$

Table 1

However, after this period country 2 will vanish from an economic point of view, because there is no longer any production. Let us summarize and compare the results in the tables below;

We see from table 1 that the wage rate will be unchanged and the interest factor will belower than in autarky. So the old generation is harmed in this period.

Country 2

	Autarchic equilibrium values	Equilibrium values in an open capital market in the short run
Wages	$(1-\alpha^2)A$	1.case : $(1-\alpha^2)A$
		2.case : $(1-\alpha^2)A\left[sA\{(1-\alpha^1)+(1-\alpha^2)\}-\frac{\alpha^1}{\alpha^2}\right]$
		3.case : 0
Interest factor	$\frac{\alpha^2}{s(1-\alpha^2)}$	1. case : $\frac{\alpha^1+\alpha^2}{s\{(1-\alpha^1)+(1-\alpha^2)\}}$
		2. case : $\alpha^2 A$
		3. case : $\frac{\alpha^1}{s\{(1-\alpha^1)+(1-\alpha^2)\}}$

Table 2

We see that the interest factor with exception of the second case is higher than in autarky and with exception of the first case the wage rates are lower than in autarky. So in the cases 2 and 3 the workers are harmed and the old generation or capital owners are better off, except case 2.

V Long-run Welfare Effects

In this section we come to the long-run welfare effects. We must once again differentiate between 3 cases. In the first case, both economies are in a steady state equilibrium. The only differences compared with autarky are that the interest factors are different and the capital stocks are different The results are the same as in the short-run equilibrium. In the second case, the economy of country 1 remains in the same steady state as in autarky. The economy of country 2 is now on a growth path

and the economy will remain there in the best case[11] or the economy will realize a negative growth rate. This decrease is caused by the fact, that the aggregate world savings are lower than the aggregate savings in autarky. The reasoning is as follows: the savings in country 2 will decrease, because of the lower wage rates and the savings in country 1 remain unchanged, because the wage rates also remains constant. Let us proof that.

We only must show that the capital stock of country 2 in period t+2 is smaller than the capital stock in period t+1. The capital stock of country 2 in period t+1 is given by equation (22) and the capital stock of country 2 in period t+2 is given by:

$$K^2_{t+2} = S_{t+1} - \frac{\alpha^1}{\alpha^2} = s(1-\alpha^1)A + s(1-\alpha^2)A\left(S_t - \frac{\alpha^1}{\alpha^2}\right) - \frac{\alpha^1}{\alpha^2}. \qquad (32)$$

Now we show that $K^2_{t+2} \leq K^2_{t+1}$.

Total savings in period t+1 equals $S_{t+1} = sw^1_{t+1} + sw^2_{t+1}$. Substituting the values for the wage rates in period t+1 (equation(26) and (27)) and comparing this with the previous period t leads to;

$$s(1-a^1)A + s(1-a^2)A\left(S_t - \frac{a^1}{a^2}\right) - \frac{a^1}{a^2} \leq s(1-a^1)A + s(1-a^2)A - \frac{a^1}{a^2} \qquad (33)$$

This is true because by assumption we have $\left(S_t - \frac{a^1}{a^2}\right) \leq 1$

In this case the interest factors are different from the autarchic interest factors of the original steady states. The world interest factor is in the long run the same as in autarky in country 2 and lower than the interest factor in country 1 in autarky. In the long run, the wage rate in country 2 is lower than in autarky. These statements are right as long as the aggregate world savings are bigger than $\frac{\alpha^1}{\alpha^2}$. But we know that the aggregate world savings will decrease from period to period and at least we will end up in case as in the third case. Here the long-run effects are clear, country 2 has

[11] This is the case, if $S_t = 1 + \frac{a^1}{a^2}$. If the aggregate savings is lower, then the capital stock in country 2 will decrease.

lost all its capital and no investments are made. In addition, country 1 will end in the same steady state as in autarky.

Country 1

	Autarchic equilibrium values	Equilibrium values in an open capital market in the long run
Wages	$(1-\alpha^1)A$	1.case $(1-\alpha^1)A$
		2.case $(1-\alpha^1)A$
		3.case $(1-\alpha^1)A$
Interest factor	$\frac{\alpha^1}{s(1-\alpha^1)}$	1. case: $\frac{\alpha^1+\alpha^2}{s\{(1-\alpha^1)+(1-\alpha^2)\}}$
		2. case : $\frac{\alpha^1}{s(1-\alpha^1)}$
		3.case: $\frac{\alpha^1}{s(1-\alpha^1)}$

Table 3

We see from table 3 that the wage rates will be unchanged and the interest factor will be lower than in autarky in case 1 and unchanged in the remaining cases. So every old generation is harmed in case 1. In cases 2 and 3 the welfare remains unchanged in country 1.

Country 2

	Autarchic equilibrium values	Equilibrium values in an open capital market in the long run
Wages	$(1-\alpha^2)A$	1.case : $(1-\alpha^2)A$
		2.case : 0
		3.case : 0
Interest factor	$\frac{\alpha^2}{s(1-\alpha^2)}$	1. case : $\frac{\alpha^1+\alpha^2}{s\{(1-\alpha^1)+(1-\alpha^2)\}}$
		2. case :0
		3. case :0

Table 4

We see from table 4 that country 2 only in the first case has a positive wage rate that is equal to the wage rate in autarky. In the first case the world interest factor is higher than in autarky in the long run. In cases 2 and 3 the production in country 2 will be zero, because all capital went to country 1. That means that opening the capital markets could harm the welfare of all generations in country 2, because the wages are decreasing and in cases 2 and 3 the unemployment rates are increasing in time until the production is zero.

VI Results and Policy Implications

We have analyzed the transition from two autarchic economies to one world economy with capital mobility, where the two countries differs regarding the institutional setting of labor disputes. In principle, that means, that we have assumed different social standards. The results are different from the standard OLG-model, where under some circumstances an increase of the world welfare is possible in the long run.[12] In this model, one economy will probably vanish, if it does not change its labor market institutions, so that the wage rates will decrease and the interest factor will increase. The economy with the higher social standards is compelled to reduce its standards for survival. Assuming the behavior of Bertrand, this competition to the bottom of social standards will end up in a situation, where the workers only receive their subsistence level of income and both economies will vanish. This of course coincides with the analysis of Marxian theorists, that capitalist economies will ruin themselves. That is of course a long-run welfare loss. The opening of the world capital market does never create a Pareto improvement, because in the best case, the wage rates remain unchanged and the world interest factor lies between the interest factors in autarky. This means that the capital owners in capital-poor country are harmed and the capital owners in the capital-rich countries are better off. This case will only be the result, if the over-accumulation is sufficient big enough. If this is not the case the country with the higher labor share will be harmed in the short and long run.

The only way to avoid these unsettling results is to change the institutional arrangements in the labor market. That means that the government in country 2 must decrease the labor share so that the incentive to export capital will vanish. It will be a

race to the bottom. However, this kind of policy also means that the inhabitants of country 2 will be harmed, because the long run steady state will be lower than in autarky.[13] In addition, if we assume that a high labor share reflects a high social standard in an economy[14] then this policy analysis means that a competition of social standards will be the result.

Maybe, some reader is disappointed with the assumption, that the savings function is independent of the interest factor. If we would change this assumption to a savings function, which depends positively on the interest factor the results will be qualitatively unchanged, because in most cases the interest factor will be constant or lower than in autarky.[15] Additionally, we should note that we could substitute the Leontief production function without any problem by a AK-production function, which is part of the new growth theory (see for example Frankel (1962), Rebelo (1991), Romer (1983) and its use in an OLG-model Stauvermann (2002)). The main results will still hold also in this model frame work.

In conclusion, we only can say that we must be very careful, before we as economists recommend to open the capital markets. Or to say it in other words, the EU should not open the capital markets to countries, where the employees have no rights and where the human rights are ignored. It is impossible to compete with countries like China or India, where child labor is present and where employees are exploited. If the developed world ignores this advice, the authors agree with Marx and also with Acemoglu, Johnson & Robinson (2005), who assume that under such conditions a revolution could take place.

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[12] See Buiter (1981) or Stauvermann (1991).
[13] Maybe, a competition between both countries will arise with regard to the distribution of income.
[14] According to the SNA 1993 the labor share includes: wages, piece payments, salaries, tips, bonuses, fringe benefits, commissions, and employer contributions to social security programs, pension schemes, health plans and other social benefit packages. If we look at the table 1 of de la Escosura & Roses (2003) we see that the percentage of salaries and wages has increased in most developed countries between 1856-1992 (e.g. UK from 50.4%-57.4; France: 36%-52.5%; US: 40%-60.4%, The Netherlands 45.5%-53.3%) and the same has happened in Germany and Japan between 1913-1992 (Germany 47%-52.1%; Japan 42.5%-56.4%). These are some of the countries with the highest social standards.
[15] See for an interest dependent savings function Stauvermann (2005).

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