
Globalisation, EU enlargement and income distribution

Fritz Breuss

Research Institute for European Affairs and Department of Economics,
Vienna University of Economics and Business Administration,
Augasse 2-6, A-1090 Vienna, Austria
and
Austrian Institute of Economic Research (WIFO),
P.O. Box 91, A-1103 Vienna, Austria
E-mail: Fritz.Breuss@wu-wien.ac.at
E-mail: Fritz.Breuss@wifo.ac.at

Abstract: Advanced industrial countries have been exhibiting a steady decline of the labour income shares in the last two decades. We explain this phenomenon by resorting to the old Stolper-Samuelson theorem. The conclusions concerning the impact of free trade on the income distribution are unambiguous in a Heckscher-Ohlin world with two countries, two goods and two factors of production (capital and labour). In contrast, the consequences of FDI from the capital abundant country (EU) to the labour abundant CEEC are ambiguous. Both scenarios are investigated theoretically, simulated with a hypothetical two country CGE model, including the EU and the CEEC and then tested empirically. Accordingly, globalisation has contributed to a decline in the labour income shares in the EU and an increase in the CEEC. Additionally, those EU countries which are engaged more in trade with the CEEC ('mini-globalisation' in Europe) can expect a sharper decline in the wage share.

Keywords: globalisation; EU enlargement; income distribution.

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Biographical notes: Fritz Breuss is Jean Monnet Professor for Economics of European Integration at the Vienna University of Economics and Business Administration (WU-Wien). He teaches international economics and international finance as well as European Integration. In teaching as well as in research, the major field of interest is European integration. Numerous articles and books deal with the issue of the economic effects of EU integration.

1 Introduction

'Globalisation and inequality' stands high on the agenda of research of many international institutions in their world economic outlooks. Recently, the International Monetary Fund (IMF, 2007a, 2007b) dealt with this topic repeatedly in its World Economic Outlooks. In the April 2007 issue of the World Economic Outlook (IMF, 2007a, chapter 5), the International Monetary Fund states that, 'over the past two

decades, there has been a continued decline in the share of income that accrues to labour, especially in Europe and Japan. The income share of workers in unskilled sectors has dropped strongly while that of workers in skilled sectors has generally made small gains'. The IMF (2007a) is primarily focusing on the question how the ongoing globalisation of the labour market has affected compensation and employment in the advanced economies. The effective global labour force has risen fourfold over the past two decades. This growing pool of global labour is being accessed by advanced economies through various channels, including imports of final goods, off shoring of the production of intermediates, and immigration. The ongoing globalisation of labour has contributed to rising labour compensation in advanced economies by boosting productivity and output, while emerging market countries have also benefited from rising wages. Nevertheless, globalisation is one of several factors that have acted to reduce the share of income accruing to labour in advanced economies, although rapid technological change has had a bigger impact, especially on workers in unskilled sectors. The analysis finds that countries that have enacted reforms to lower the cost of labour to business and improve labour market flexibility have generally experienced a smaller decline in the labour income share.

The IMF (2007a) in its chapter on 'The Globalisation of Labour' is particularly interested in the following questions in a broad approach, considering a large sample of advanced economies and a full range of transmission channels (competing imports of final products, off shoring of intermediate products, and immigration):

- 1 How rapidly has the global labour supply grown, and which channels of labour globalisation have been most important?
- 2 To what extent can recent trends in labour shares and labour compensation in advanced economies be explained by the changing global labour supply relative to other factors such as technological change and labour market reform? Has the impact been different in skilled and unskilled sectors?
- 3 Which policies can help the advanced economies meet the challenges of further labour market globalisation?

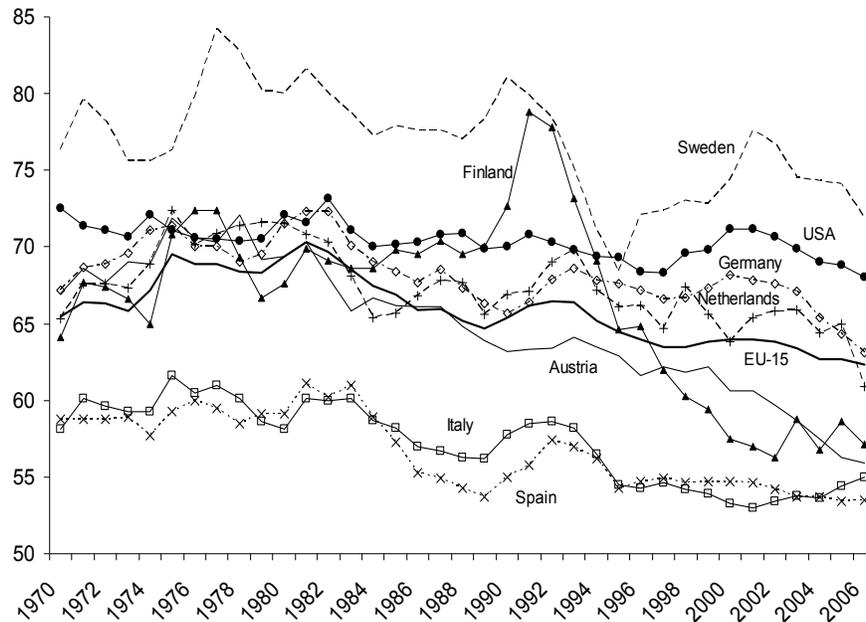
We focus on one stylised fact of this overall picture of globalisation, namely the continued decline in the labour income shares in the European countries over the past two decades. In contrast to the IMF study, we concentrate more on trade and FDI and not on labour migration. The reason is that labour migration within the enlarged EU is handicapped by transitional arrangements. After outlining some stylised facts on the income distribution in Western and Eastern European countries, we start with theoretical explanations for these phenomena by resorting to the traditional Heckscher-Ohlin framework and in particular to the Stolper-Samuelson theorem. Within this theoretical context we also make simulations with a two-country CGE model, considering the EU as a capital abundant country and the Central and Eastern European countries (CEEC) as the labour abundant country. We simulate the consequences of free trade on the income distribution as well as those of FDI from the EU in the CEEC. As even the simple theoretical H-O framework not always results in unambiguous conclusions, we test our hypotheses with a panel-econometric approach.

2 Stylised facts of income distribution

In the last two decades the advanced economies experienced a steady decline in the labour income shares (see the documentation in IMF (2007a) and OECD (2007)). However, there are differences. The decline in the labour income shares have been more pronounced in some Western European countries (Austria, Germany, Finland, Italy, the Netherlands, Spain and Sweden) with a decline from 1970 to 2006 by three to 11 percentage points, with EU-15 at 3.2 and the USA at 4.5 percentage points (see Figure 1a). The other advanced countries (see Figure 1b) exhibited declines smaller than 3 percentage points; some countries even increased their wage shares (e.g., Belgium, Japan, Portugal and Luxembourg).

In Eastern Europe or the new EU member states, there are available only shorter time series to measure the functional income distribution. Even in the CEEC - contrary to the expectation for a region which is primarily labour abundant - the labour income shares did not increase, but in many occasions we also find a similar picture as that in the advanced economies (see Figure 2). Between 1995 and 2006, the largest decline exhibited Latvia ($-12 \frac{1}{2}$ percentage points, followed by Slovenia (-9.2 percentage points), Bulgaria (-8.4 percentage points), Poland (-7.8 percentage points) and Estonia (-7.3 percentage points). In the other countries there were only minimal declines or some increases (e.g., Cyprus, Lithuania and Malta).

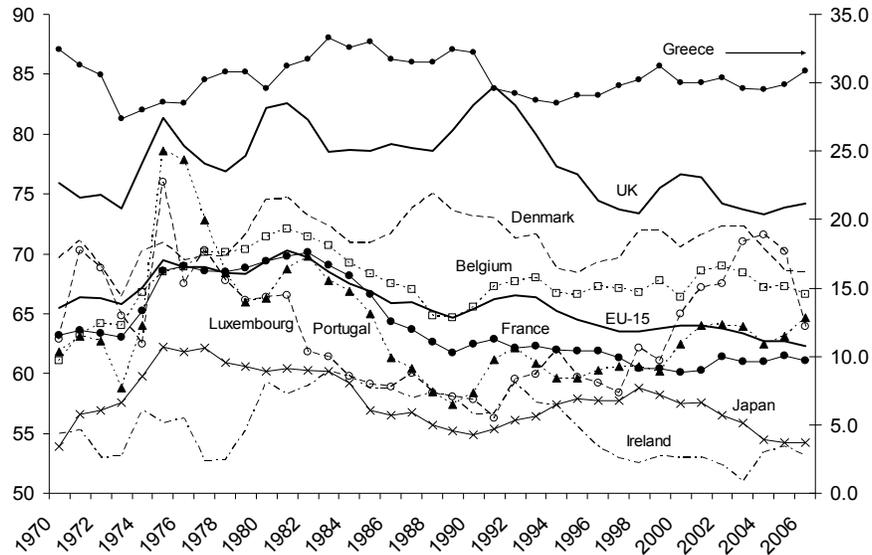
Figure 1a Labour income shares¹ in advanced economies, 1970–2006 (relatively strong decline)



Note: (1) Measured as a % of gross national income (GNI), corrected for the income of other (non employee) categories of workers in the year 1970.

Source: Austrian Institute of Economic Research (WIFO), Vienna

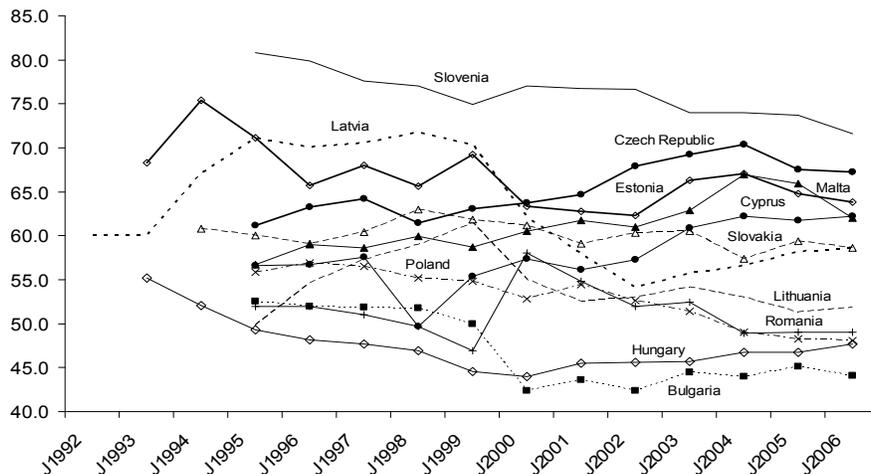
Figure 1b Labour income shares¹ in advanced economies, 1970–2006 (relatively mild decline)



Note: (1) Measured as a % of gross national income (GNI), corrected for the income of other (non employee) categories of workers in the year 1970.

Source: Austrian Institute of Economic Research (WIFO), Vienna

Figure 2 Labour income shares¹ in transition economies, 1970–2006



Note: (1) Measured as a % of gross national income (GNI), corrected for the income of other (non employee) categories of workers in the year 1995.

Source: Austrian Institute of Economic Research (WIFO), Vienna

3 Free trade and income distribution in the Stolper-Samuelson context

In order to explain the phenomenon of declining labour income shares – primarily in the advanced economies – we refer to the Stolper-Samuelson theorem (Stolper and Samuelson, 1941), henceforth abbreviated with S-S. This paper was the first to demonstrate the Heckscher-Ohlin (H-O) theorem in a two goods, two countries, two factors (capital and labour) model. The H-O theorem shows that with identical technologies at home and abroad, the country with the larger endowment of capital relative to labour should export the capital intensive good. By the same reasoning, the country with the larger endowment of labour relative to capital should export the labour intensive good. Although we know from the many attempts to test the H-O theory, demonstrating that the Heckscher-Ohlin theorem holds empirically has proven a lot trickier than anyone expected, but the bottom line is that it is extremely helpful for thinking about trade between countries with widely different capital labour ratios. The major result of the S-S theorem was to confirm the intuitive analysis of Ohlin about who wins and who loses when a country opens up to trade. The answer is that the relatively abundant factor gains and the relatively scarce factor lose, not only in nominal terms but also in real terms. Thus if capital is the relatively abundant factor (compared to the trading partner), then the liberalisation of trade will result in an increase in the return on capital more than proportionately compared to the price of either good, whereas the wage rate will fall relative to the price of either good. Admittedly, many of the simple $2 \times 2 \times 2$ results do not generalise so easily where there are more factors and more goods but they do typically go through in a weaker sense, and the broad intuition remains critical in helping us understand how trade affects welfare.

We study the S-S effects of European's mini globalisation in two steps, namely the income distributional effects of trade liberalisation and those of factor movements.

- 1 We study the consequences of the liberalisation of trade between the EU and the CEEC since 1989. In the frame work of the asymmetrical tariff reductions with the Europe Agreements (EAs) the bilateral trade between the EU and the CEEC was liberalised, starting in 1997. Via EU enlargement in 2004 and 2007 the former CEECs were integrated fully into the enlarged customs union of the EU.
- 2 We study the possible consequences of the ongoing process of direct investments from the old to the new EU member states.

Whereas the distributional effects of the trade liberalisation are a clear-cut result of the S-S theorem, the implications of FDIs are not so simple.

In order to demonstrate the S-S theorem we start with the following assumptions. There are two regions – EU15 (EU) and 12 new EU member states (CEEC). The EU is capital abundant, the CEEC is labour abundant. Two goods are produced in both countries – good 1 (cars, produced capital intensively), good 2 (textiles, produced labour intensively). The EU as the capital abundant country has a comparative advantage in the production (and export) of the capital intensive good 1 (cars = C); the CEEC as the labour abundant country has a comparative advantage in the production (and export) of the labour intensive good 2 (textiles = T). The assumptions concerning the different factor abundance in the EU and CEE are not only fictitious, but real. Although there are no

reliable and comparable data on the capital stocks in CEEC, the relative labour abundance in CEEC is manifested in the low wage levels relative to those in the EU, a relationship sometimes in the order of one is to ten (see Eurostat, 2007, pp.180).

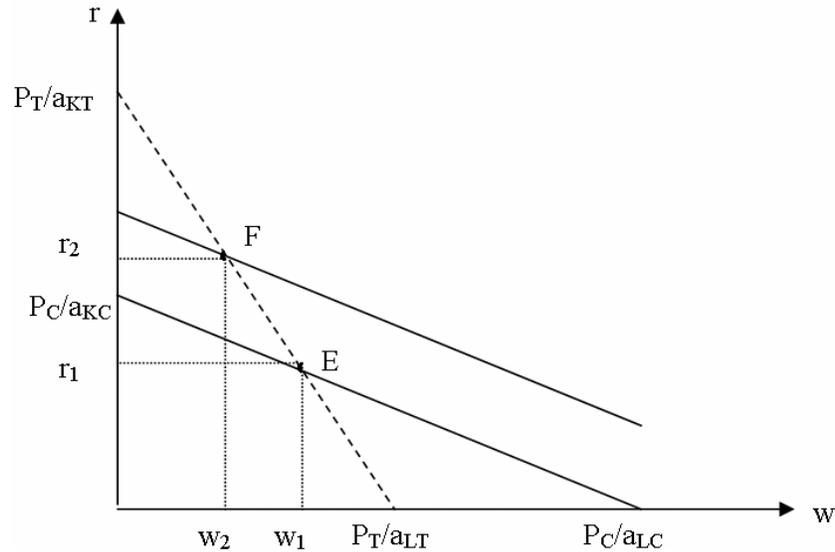
Zero profit conditions in each industry imply the following price equations:

$$P_C = a_{KC}r + a_{LC}w \quad (1)$$

$$P_T = a_{KT}r + a_{LT}w \quad (2)$$

where P_C and P_T are the prices of cars and textiles respectively, w is the wage rate paid on labour and r is the rental rate on capital. a_{ij} are the unit input coefficients, denoting the amount of factor i (capital, K and labour, L) required for unit output of good j (cars, C and textiles, T).

Figure 3 Wage-rental combinations in the two sectors, two factors of production
Heckscher-Ohlin model in the capital abundant country EU



From the price Equations 1 and 2 one can derive the wage-rental combinations for both industries (see Figure 3). Assuming that car industry is capital intensive and the textile industry is labour intensive ($a_{KC}/a_{LC} > a_{KT}/a_{LT}$) the wage-rental curve generating zero profits in the car industry is flatter (thick line) than those in the textile industry (broken line). The only wage-rental combination that can simultaneously support zero profit in both industries is found at the intersection of the two zero-profit lines, in point E . This point represents the equilibrium wage and rental rates that would arise in an H-O model when the price of cars is P_C and the price of textiles is P_T .

We assume unchanged input coefficients a_{ij} . Then, a move from autarky (tariff-ridden scenario) to free trade raises the (relative) price of the capital intensive good (C , cars). The price increase causes an outward parallel shift in the thick zero-profit line for cars as shown in Figure 1. The equilibrium point will shift from E to F causing an

increase in the equilibrium rental rate from r_1 to r_2 and a decrease in the equilibrium wage rate from w_1 to w_2 .

This gives the Stolper-Samuelson theorem: an increase in the price of a good will cause an increase in the price of the factor used intensively in that industry and a decrease in the price of the other factor.

For the mathematical derivation we proceed as follows: When P_c alone changes, we have by differentiating Equation 1

$$a_{KC} \frac{\partial r}{\partial P_c} + a_{LC} \frac{\partial w}{\partial P_c} = 1 \quad (3)$$

and by differentiating Equation 2

$$a_{KT} \frac{\partial r}{\partial P_c} + a_{LT} \frac{\partial w}{\partial P_c} = 0 \quad (4)$$

Putting both together, we have

$$\begin{bmatrix} a_{KC} & a_{LC} \\ a_{KT} & a_{LT} \end{bmatrix} \begin{bmatrix} \frac{\partial r}{\partial P_c} \\ \frac{\partial w}{\partial P_c} \end{bmatrix} = \begin{bmatrix} 1 \\ 0 \end{bmatrix} \quad (5)$$

Assuming that at the initial equilibrium, good C is relatively more capital intensive, i.e., $a_{KC} / a_{LC} > a_{KT} / a_{LT}$. Then we get

$$\frac{\partial r}{\partial P_c} = \frac{a_{LT}}{a_{KC}a_{LT} - a_{KT}a_{LC}} > 0 \quad (6)$$

and

$$\frac{\partial w}{\partial P_c} = \frac{-a_{KT}}{a_{KC}a_{LT} - a_{KT}a_{LC}} < 0 \quad (7)$$

These results are the mathematical statement of the Stolper-Samuelson theorem.

As Dixit and Norman (1980, p.54) point out, an even stronger conclusion is possible using the elasticity of r with respect to P_c . By Euler's Theorem from Equation 1 we have $P_c > a_{KC}r$, and using Equation (6), we get for the capital intensive good in the capital abundant country EU

$$\frac{P_c}{r} \frac{\partial r}{\partial P_c} = \frac{a_{KC}a_{LT}}{a_{KC}a_{LT} - a_{KT}a_{LC}} > 1 \quad (8)$$

As a mirror image one can derive the equivalent elasticity result for the Stolper-Samuelson Theorem in the case of a change of P_T for the labour abundant country CEEC. As assumed the CEEC has a comparative advantage in the labour intensive good. The elasticity of w with respect to the price of good T, P_T is higher than one.

The Stolper-Samuelson theorem was originally derived to analyse the effects of a tariff on factor prices in the context of the H-O model. More generally, however, the theorem tells us the effects on factor prices for any change in the price of an output good for whatever reason. Such price changes can occur as a country opens up to free trade, as growth and investment affect a country's endowments, and many other things.

4 FDI and income distribution in theory

After opening-up of Eastern Europe following the break-down of Communism in 1989 and also after the EU enlargement in 2004 and 2007 the old EU member states protected their labour markets (with a few exceptions like Ireland, Sweden and UK) with seven years transitional arrangements concerning the free movement of labour. Therefore the case of migration of labour is not of interest in our analysis. We concentrate on the other part of the factor movements. Since 1989 direct investments (FDIs) of Western companies in the CEECs experienced a boom. The CEEC abolished existing barriers for capital imports in order to open up for fresh capital to renew its capital stock.

There are at least two possibilities to analyse the effects of FDI abroad. The simple approach implicitly assumes that the income accruing to the capital invested stays in the country where it was invested. Normally, the income accruing to direct investment will be received in the investing country. In practice this may not happen at once, but over time. The theoretical analysis in the context of a Heckscher-Ohlin¹ framework of the effects of FDI follows closely Dixit and Norman (1980, pp.142–146) in his duality approach, i.e., modelling consumer behaviour by means of expenditure or indirect utility functions, and producer behaviour by means of cost, revenue or profit functions.

Suppose the home country (in our case the EU) starts with a vector v^0 of factor endowments, and the foreign country (in our case the CEEC) starts with V^0 . Then the EU invests a vector ξ in the CEEC, yielding factor inputs to production $v = v^0 - \xi$ and $V = V^0 + \xi$ in the two countries. EU's income is the value of its own output, represented by the revenue function $r(1, p, v)$ plus the income $W\xi$ earned by its direct investment in the CEEC, $W = R_v(1, P, V)$ being the vector of factor prices there. The income of the foreign country is the value of its output, $R(1, P, V)$, minus the amount $W\xi$ paid for the services of factors ξ . Both revenue functions depend on the product price vectors p (P) and the factor input vectors v (V) in both countries. Both expenditure functions - e (E) - depend on the product price vectors p (P) and on utility u (U) in both countries. Taking all together, this yields the international equilibrium conditions

$$e(1, p, u) = r(1, p, v) + W\xi \quad (9)$$

$$E(1, P, U) = R(1, P, V) - W\xi \quad (10)$$

$$e_p(1, p, u) + E_p(1, P, U) - r_p(1, p, v) - R_p(1, P, V) = 0 \quad (11)$$

International equilibrium is characterised by a national income identity for each country (Equations 9 and 10), and market-clearing equations for the goods for the two countries taken together, in Equation 11. The Equations (9) and (10) equate expenditures - e (E) - on the left hand side with incomes - r (R) plus/minus income from investing in CEEC -

on the right hand side, in both countries. Equation (11) clears all goods market, in home and abroad, by equating the demand for goods e_p (E_p) with their supplies - r_p (R_p).

Consider a slight change $d\xi$ in ξ . Taking total differentials,

$$e_p dp + e_u du = r_p dp + r_v dv + W d\xi + \xi dW \quad (12)$$

$$E_p dP + E_U dU = R_p dP + R_V dV - W d\xi - \xi dW \quad (13)$$

$$\begin{aligned} e_{pp} dp + e_{pu} du + E_{pP} dP + E_{pU} dU \\ - r_{pp} dp - r_{pv} dv - R_{pP} dP - R_{pV} dV = 0 \end{aligned} \quad (14)$$

These can be simplified using the expressions for factor prices $w = r_v$ and $W = R_V$, those for imports $m = e_p - r_p$ and $M = E_p - R_p$, the definition of $S = e_{pp} + E_{pP} - r_{pp} - R_{pP}$, and the relations $dP = dp$ and $dV = d\xi = -dv$. Further, we begin by considering the special case where the initial value of ξ is zero. Then we have

$$m dp + e_u du = (W - w) d\xi \quad (15)$$

$$M dp + E_U dU = 0 \quad (16)$$

$$S dp + e_{pu} du + E_{pU} dU = (R_{pV} - r_{pv}) d\xi \quad (17)$$

This gives the solution in matrix format:

$$\begin{bmatrix} e_u du \\ E_U dU \end{bmatrix} = \frac{1}{D} \begin{bmatrix} (1 + m S^{-1} C_Y)(W - w) d\xi - m S^{-1} (R_{pV} - r_{pv}) d\xi \\ -m S^{-1} c_Y (W - w) d\xi + m S^{-1} (R_{pV} - r_{pv}) d\xi \end{bmatrix} \quad (18)$$

with the determinant $D = 1 + m S^{-1} (C_Y - c_Y)$. c_Y and C_Y are the derivatives of consumption in the home country, and in the foreign country with respect to income, respectively. There is a difference between private and social desirability of direct investment. The former is governed by the sign $(W - w) d\xi$; if each factor is capable of independent variation we can assume $(W_i - w_i) d\xi_i$ positive for each i where such investment occurs. But this leads to induced changes in outputs depending on the differences in factor intensities between the countries, and these in turn affect prices and therefore utility levels. The outcome is summarised in Equation (18). If the home country's government takes this into account, it may wish to control direct foreign investment.

There is an element of coincidence of private and social desirability at the world level: adding Equations (15) and (16) we have

$$e_u du + E_U dU = (W - w) d\xi$$

Therefore if direct investment is privately desirable, both countries cannot simultaneously lose by it, and it is possible that they both gain. Once again we see from Equation (16) that the foreign country gains if and only if the terms of trade shift in its favour, i.e., against the home country.

Equation (18) is illustrated in the case where there are only two goods, and only one factor is moving from the home country to the foreign country. Assuming $D > 0$, and private desirability, i.e., $(W - w) > 0$, we have the condition for the home country to benefit

$$S + m \left\{ p c_y - \frac{p}{W - w} \frac{\partial(W - w)}{\partial p} \right\} < 0 \quad (\text{C home})$$

while for the foreign country to benefit we need

$$m \left\{ p C_Y - \frac{p}{W - w} \frac{\partial(W - w)}{\partial p} \right\} > 0 \quad (\text{C abroad})$$

The interpretation is not simple. Dixit-Norman (1980, pp.144–145) work out the results for special cases. But these cases do not generalise. Lastly one is left without clear qualitative conclusions. Calculations of effects of direct investment would have to be made for specific case, using the Equation (18).

We did a numerical calculation for reasonable parameter settings and get the following results for *one special case* with the following parameterisation: $p = 1$; $W = 0.7$; $w = 0.5$; $c_y = 1.0$; $C_Y = 0.4$; $m = -1.5$; $S = 0.5$; the elasticity of the wage rate differential with respect to prices is 0.5. It follows that the condition for home (C home) to benefit from FDI outflows is -0.25 and that for abroad (C abroad) to benefit from FDI inflow is 0.15 . From the assumed parameter constellation the value for the determinant is $D = 2.8$, Equation (18) results in the following changes of utility: $du = 2.32$ in home and $dU = 2.68$ in foreign. Hence, both countries would benefit from the factor movements of capital from home (EU) to foreign (CEEC), given that the earnings of this direct investment are repatriated to the investing country (EU). However, each other parameterisation could lead to other outcomes.

Because of this theoretical ambiguity we first make simulations with a two country computable general equilibrium (CGE) model with fictitious parameterisation and then we test the theoretical predictions with a panel econometric approach.

5 Free trade, FDI and income distribution in a two-country CGE model

In order to quantify the effects of free trade and FDI on income distribution we apply a fictitious symmetric two country, two factors of production and two goods computable general equilibrium (CGE) model. The basic set-up of calibration is taken from Breuss (2003, Appendix 4.1: Heckscher-Ohlin model). We interpret this symmetric CGE world as existing of two countries, the EU and the CEEC. The former is relatively capital abundant (capital is 150 units; labour 100 units) and the latter is relatively labour abundant (capital 100 units; labour 150 units), leading to a mirror-inverted two-country world. In the baseline both countries are tariff-ridden, i.e., both countries impose a 10% ad valorem tariff on their imported goods. One could also start with an autarky scenario. This, however, is not very realistic when portraying the situation of the opening up of Eastern Europe since 1989. The tariff-ridden scenario results in the following factor price relation: wages are higher in the EU ($w_{EU} > w_{CEEC}$), whereas the rates for renting capital are lower in the EU ($r_{EU} < r_{CEEC}$). The differential in the capital rental rates inspires EU

firms to invest directly in the CEEC. We do not only look at the factor prices but on the consequences for the labour income shares in particular. The labour income (or wage) share is calculated as the wage sum (wage rate multiplied by the number of workers) relative to GNI (including factor income from FDI from abroad), which is the most common indicator of functional income distribution.

We consider on the one hand the change from a tariff-ridden situation to free trade. On the other hand we consider FDI flows out of the EU to the CEEC because of the differential in capital rents. FDI outflows from the CEEC are – for the time being – negligible and, hence are not considered here. We assume that 25 units of capital are invested by EU firms in the CEEC. This reduces the capital stock in EU down to 125 and increases capital in CEEC up to 125. As in the theoretical specification in the previous chapters, we assume that the income of the capital invested in the CEEC is repatriated to the EU.

Overall, we consider four scenarios

- S1 baseline is the tariff-ridden economies in EU and CEEC
- S2 tariff-ridden plus FDI from EU to CEEC
- S3 free trade (without FDI)
- S4 free trade plus FDI from EU to CEEC.

The results are collected in Table 1 and can be summarised as follows:

- 1 The free trade scenario yields the Stolper-Samuelson (S-S) results: Comparing the free trade scenario (S3) with the tariff-ridden scenario (S1), in the capital abundant EU nominal and real rental prices increase. The labour income share goes down by 5.8 percentage points, utility increases. In the labour abundant CEEC we also get the Stolper-Samuelson effects: nominal and real wage rates increase and utility improves; the labour income share goes up by 5.8 percentage points. Overall, in this symmetric two-country world the change from protectionism to free trade leads to total factor price equalisation. Wage rates decrease (increase) in the EU (CEEK) to 0.543. Rental rates of capital increase (decrease) in the EU (CEEK) to 0.543, respectively. The assumed symmetry of the CGE model is reflected in the mirror-inverted results concerning the changes of factor prices and utility.
- 2 The FDI scenarios are – as expected theoretically - not so clear-cut, as far as the S-S effects are concerned and also concerning the performance of utility.
 - 2a Comparing the tariff-ridden plus FDI scenario (S2) with the tariff-ridden scenario (S1) we get as a net result the FDI effects in a tariff ridden environment. In this scenario one receives clear S-S effects in the EU, but not in the CEECs. In the EU, nominal and real rental rates of capital increase (S-S effect), but the labour income share and also utility decline considerably. In the CEEC, surprisingly nominal and real wages decline and also the labour income share goes down. However, utility improves.
 - 2b Comparing the free trade plus FDI scenario (S4) with the tariff-ridden plus FDI scenario (S2), in the EU we get the theoretically plausible S-S effects and a decline of the labour income share by 5.5 percentage points and a deterioration of utility. In the CEEC we also get the S-S effects in factor prices, an increase in the labour income share and an improvement in utility.

- 2c Comparing the scenarios (S4) with (S3) we get as a net result the FDI effects under free trade. In the EU, again we get the S-S effects on factor prices as well as the expected decline in the labour income share; also utility declines considerably. In the CEEC, the S-S effects are implausibly negative and also the labour income share declines. However, utility improves strongly.

Table 1 Free trade and FDI – Stolper-Samuelson effects and implications for income distribution and utility (Simulation results in a stylised two country CGE model)

	EU			CEEC		
	S3-S1	S4-S1	S4-S3	S3-S1	S4-S1	S4-S3
	<i>Changes between scenarios</i>					
Wage rate (w)	-0.0985	-0.0006	-0.1035	0.0375	-0.0005	0.0324
Rental rate of capital (r)	0.0375	0.0011	0.0495	-0.0985	0.0000	-0.0854
rp^j	0.0375	0.0005	0.0426	-	-	-
w/p^j	-	-	-	0.0375	-0.0005	0.0324
Labour income share ²	-5.83	-1.16	-5.48	5.83	-0.07	5.08
Utility	0.48	-11.51	-0.46	0.48	6.72	0.43

Notes: S1 = baseline is the tariff-ridden economies in EU and CEEC

S2 = tariff-ridden plus FDI from EU to CEEC

S3 = free trade (without FDI)

S4 = free trade plus FDI from EU to CEEC

1 = Deflated in both countries with its export prices (where they have comparative advantages).

2 = Labor income (or wage) share, calculated as a percent of gross national income (GNI), including factor income from FDI in CEEC.

Source: Own simulations with the CGE-Heckscher-Ohlin model by Breuss (2003, Appendix 4.1)

6 Econometric evidence on the implications of free trade and FDI on income distribution

The theory – at least in the framework of Heckscher-Ohlin – is unambiguous concerning the effects of free trade on factor prices. The resulting labour income share is usually the consequence of a complicated general equilibrium process. In countries which have comparative advantages in capital intensive goods (in our case we subsume the whole block of the EU countries to be relatively capital abundant) under free trade their rental price of capital will increase. That means that the labour income share in GNI declines. In countries with comparative advantages in labour intensive goods (in our case we assume that the country block of the CEEC is relatively labour abundant) when opening up to free trade their wages will increase. Usually, this implies that also the labour income share in GNI increases. These factor changes in relation to price changes are the classical Stolper-Samuelson effect described above. Whereas the S-S results are clear-cut in the case of free trade, the effect of direct investment on the income distribution is not so clear. So we try to decide empirically which forces are working behind in determining the labour income share in the EU and in the CEEC, respectively.

We know that the Heckscher-Ohlin world is nicer in theory than in praxis. Therefore we test the theoretically derived predictions. Accordingly, the capital abundant EU should have suffered a decline in the labour income share (as a result of the S-S effect), whereas the labour abundant CEEC should have increased its labour income share. The hypothesis is tested by a panel regression separately for the member states of the EU and for some of the CEEC over the period 1992–2005 and 1995–2005, respectively.

We estimate the following equations:

For the EU:

$$LSE_{it} = c + \alpha NTE_{it} + \beta ETC_{it} + \gamma FDINETE_{it} \quad (19)$$

For the CEEC:

$$LSC_{it} = b + \delta NTC_{it} + \gamma CTE_{it} + \mu FDINETC_{it} \quad (20)$$

where LSE (LSC) are the labour income shares of EU and CEEC respectively; i (t) are the country and time sample included (see Tables 2 and 3). NTE (NTC) are the variables for total net trade of the EU and CEEC respectively, implying revealed comparative advantages after the multilateral trade liberalisation of the Uruguay Round since 1995. Both net trade variables are interpreted as ‘globalisation’ variables because they relate to trade of both regions with the rest of the world. ETC (CTE) represents the trade shares of the EU with CEEC and the CEEC with the EU respectively. These variables represent the ‘mini-globalisation’ in Europe as a consequence of the opening-up of Eastern Europe since 1989 and the continuing liberalisation of bilateral trade via the Europe Agreements (EAs) and later via the EU enlargement in 2004 and 2007. $FDINETE$ ($FDINETC$) are the variables for net FDI of the EU with the rest of the world and the FDI inflow of CEEC respectively. As the FDI outflow of CEEC is negligible we look only on FDI inflow of CEEC. c (b) are the constants (inclusive the fixed country effects). The theoretically expected signs of the parameters are as follows: $\alpha < 0$; $\delta > 0$; $\beta < 0$; $\eta > 0$; $\gamma < 0$; $\mu > 0$.

Table 2 The determinants of labour income shares in the EU and in the CEEC

<i>Dependent variables: Labour income shares (LSE (LSC))</i>		
	<i>EU</i> ¹	<i>CEEC</i> ²
Constant ³	64.00 (218.17)	68.86 (25.60)
Net trade <i>NTE (NTC)</i> ⁴	-0.28 (-6.00)	0.27 (3.84)
Trade with CEEC (<i>ETC</i>) ⁵	-0.14 (-7.01)	-
Trade with EU (<i>CTE</i>) ⁵	-	-0.46 (-3.06)
FDI net <i>FDINETE (FDINETC)</i> ⁶	-0.08 (-2.98)	0.12 (1.72)
R ² (unweighted)	0.97	0.89
<i>Number of observations:</i>		
Time	14	11
Countries	16	10
Total pool observations	224	110

Notes: t-statistic in parenthesis; panel estimation with fixed country effects and with cross-section weights

1 Includes Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Portugal, Spain, Sweden, UK, and two non-EU industrial counties, like Japan and the USA.

Period: 1992–2005; estimates without Japan and USA do alter the coefficients only marginally.

2 Includes Bulgaria, Czech Republic, Estonia, Latvia, Lithuania, Hungary, Poland, Romania, Slovakia and Slovenia.

Period: 1995–2005

3 General constant has to be corrected with the country-specific fixed effects (not reported here).

4 Net trade refers to total commodity exports minus total imports in % of GDP.

5 Commodity exports to CEEC or to EU, respectively in % of total exports.

6 FDI net means FDI outflow minus FDI inflow; in the case of CEEC it only refers to FDI inflow.

Source: 1 Labour income shares: wages as a percent of gross national income (GNI), corrected for the income of other (non employee) categories of workers in the year 1970 (in the case of EU) and in the year 1995 (in the case of CEEC); calculations by WIFO based on data from the AMECO database of the European Commission.

2 Net trade: OECD: Foreign trade monthly statistics (FTMS).

3 Trade with CEEC (with EU): OECD: Foreign trade monthly statistics (FTMS).

4 FDI net: Source OECD, OECD Fact book 2007 and National Accounts statistics (interactive).

Our test is not only restricted to the hypothetical two-country H-O world as typified in chapter 5. The EU trades primarily with itself (most of its trade is intra-area trade) and with the other industrial countries and only to a minor degree with the CEEC. Most of the intra-EU trade is intra-industrial trade, for which – as we know – the H-O model is not the proper explanation. Therefore we also capture the trade involvement with the CEEC as an extra variable.

- 1 The results for the EU: The labour income share decreases – as expected – as a consequence of globalisation in general (see Table 2, first column). The influence is measured by total net trade of the EU² with the rest of the world (including intra-EU trade). An increase of total net trade of the EU of one percentage point of GDP decreases the labour income share in the EU by 0.28 percentage points. Also the mini-globalisation (the involvement in trade with the CEEC) results in a decrease of the labour income share. An increase of the share of EU's trade with the CEEC by one percentage point decreases the labour income share by 0.14 percentage points. Globalisation in the form of net FDI net outflow also depresses the labour income share in EU. An increase of the FDI net outflow of the EU of one percentage point of GDP decreases the labour income share on average by 0.08 percentage points. These results nicely confirm the theoretical expectations for the EU countries.
- 2 The results for the CEEC: Here we expect that the labour income share is influenced positively by overall net trade and also positively by trade with the EU. From Table 2 (second column) we see that the former is confirmed, whereas the latter is not. Trade with the EU leads to a decline of the labour income share in the CEEC. We saw that the theory is ambiguous as far as the effects of income distribution of the FDI inflow into CEEC are concerned. Here, FDI inflow has a (weak) positive impact on the labour income share in the CEEC.

Digression

When testing the short-term changes of the labour income share, depending on business cycle indicators, like annual GDP growth and the change in the unemployment rate, we get the following results for our two country blocs EU and CEEE (see Table 3). In our panel for the EU we get similar results as Marterbauer and Walterskirchen (2003) received for a single times series analysis for Austria. However, one should admit that the variables GDP growth and unemployment rate are linked via Okun's law, and therefore one should expect multicollinearity when regressing changes in the labour income shares on both variables together. Nevertheless, both variables have a negative influence on the change in the labour income share (see Table 3, first column). The negative sign on real GDP growth is interpreted by Marterbauer and Walterskirchen (2003) as a lagged adjustment of real wages to productivity improvements. And unemployment exerts a pressure on wage bargaining (like in the Phillips curve); therefore they get a negative influence also from the change in the unemployment rate. In addition, OECD (2007, chapter 3) argues that workers became increasingly vulnerable due to the impact of globalisation. That means globalisation leads to an erosion of the power of national trade unions. Whereas these relations hold quite well in the advanced economies of the West (EU), in the case of the transformation economies of the CEEC all relevant variables are insignificant (see Table 3, second

column). This is not easy to interpret: on the one hand, the time period is shorter as in the case of the EU. On the other hand wage bargaining may be less influenced by trade unions, which are probably not yet as strong as in the old EU member states. Rather than the wage level seems to be set by foreign investors more according to their international performance and less so depending on the general business cycle considerations in a specific CEEC.

Table 3 The determinants of the change in labour income shares in the EU and in the CEEC

<i>Dependent variable: Change in labour income shares</i>		
	<i>EU¹</i>	<i>CEEC²</i>
Constant ³	0.43 (2.89)	-0.27 (-0.59)
GDP growth in %	-0.29 (-5.51)	-0.04 (-0.37)
Change in unemployment rate	-0.47 (-4.78)	-0.11 (-0.74)
R ² (unweighted)	0.17	0.04
Observations:		
Time	13	11
Countries	16	10
Total pool observations	208	104

Notes: t-statistic in parenthesis; panel estimation with fixed country effects and with cross-section weights

1 Includes Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Portugal, Spain, Sweden, UK, and two non-EU industrial counties, like Japan and the USA.

Period: 1992–2005; estimates without Japan and USA do alter the coefficients only marginally.

2 Includes Bulgaria, Czech Republic, Estonia, Latvia, Lithuania, Hungary, Poland, Romania, Slovakia and Slovenia.

Period: 1995–2005

3 General constant has to be corrected with the country-specific fixed effects (not reported here).

Besides the mere focus on overall labour income shares in two categories of economies, as we did so far, there is a large literature on wage inequalities in the context of globalisation. Wood (2002) tries to find a synthesis of at least three theories, explaining the wage inequalities (the wage gap between skilled and unskilled workers) resulting from globalisation:

- 1 Heckscher and Ohlin
- 2 Feenstra and Hanson
- 3 Tang and Wood.

Wood (2002, p.79) summarises the main insights of the three theories: Heckscher and Ohlin show how the reduction of barriers to trade, by causing production in both regions to become more specialised, tends to increase wage inequality in the North and to reduce wage inequality in the South. Feenstra and Hanson show how the transfer of production activities from the North to the South, by increasing the skill intensity of output in both regions, tends to widen wage gaps between skilled and unskilled workers both in the North and in the South. Tang and Wood show how cheaper travel and communication, by enabling highly skilled Northern workers to cooperate more extensively with Southern workers, widen the wage gap between highly skilled workers and other Northern workers.

If one substitutes ‘North’ with ‘EU’ and ‘South’ with ‘CEEC’ we can apply the same conclusions for the trade relations between East and Western Europe, hence we should expect similar effects as a result of Europe’s mini-globalisation scenario. Some empirical studies have already dealt with such questions.

Egger and Egger (2002) investigate the effects of outsourcing (measured by intermediate goods trade in CEEC manufacturing) on real wages in CEEC over the period 1993–1998. In the wage regressions for a panel of NACE two-digit industries in seven CEEC (Bulgaria, Czech Republic, Hungary, Poland, Romania, Slovakia and Slovenia) the authors distinguish between final goods trade and intermediate goods trade at the industry level and find a significantly negative impact of intermediate goods exports on wages in CEEC manufacturing. In contrast, the effect of intermediate goods imports is significantly positive.

Onaran and Stockhammer (2006) test the influence of FDI and trade openness on wages in the CEEC in the post-transition era with a one-digit level panel data for manufacturing industry for five transitional economies (Czech Republic, Hungary, Poland, Slovakia, Slovenia) over the period 2000–2004. The results suggest that the increases in productivity are reflected in wages only to a modest extent, even in the long-term, leading to a steady decline in the share of labour in manufacturing industry in almost all sub sectors in all countries. Meanwhile, the high significant and negative effect of unemployment on wages shows that the labour market is characterised by wage flexibility. FDI has a positive effect on wages only in the capital and skill intensive sectors. The results also show that the increase in trade with EU did not lead to positive prospects for wages in manufacturing industry, contrary to the expectations of pro-market policies and traditional trade theory. The long-term net effect of exports and imports on manufacturing wages is negative, suggesting that integration of CEEC to EU via trade liberalisation have worked at the expense of labour.

7 Conclusions

The advanced industrial countries have been exhibiting a steady decline of the labour income shares in the last two decades. We try to explain this phenomenon by resorting to the old Stolper-Samuelson theorem. The conclusions of the impact of free trade on the income distribution are unambiguous. In a Heckscher-Ohlin world the capital abundant EU gains by specialising on capital intensive goods. As a consequence the factor prices for capital increases and those for labour decreases, and hence also the labour income share declines. As a mirror image the labour abundant CEEC should have a comparative advantage in labour intensive goods. The liberalisation of trade between the EU and the

CEEC since 1989 should have led to wage increases and capital rental decreases, and hence to an increase in the labour income share. Both countries gain in terms of utility by free trade. The consequences of FDI are ambiguous. In the country investing in the CEEC, the labour income share might decline, whereas it might increase in the CEEC. Utility must not necessarily increase in both countries; most probably it increases in the CEEC. In order to decide which channels are working in praxis, panel regressions are undertaken to explain the declining tendency of labour income shares in the EU and their possible increase in the CEEC. Globalisation, measured by an increase in global net trade (a simple measure of revealed comparative advantages) has contributed to a decline in the labour income shares in the EU. Additionally, those countries which are engaged more in trade with the CEEC can expect a sharper decline in the labour income share. Global net FDI outflow also exerts a negative influence on the labour income share in the EU. In the CEEC global net trade exerted a positive influence on the labour income share, trade with the EU, however, decreased it. FDI inflow contributed to an increase in the labour income share in the CEEC.

References

- Breuss, F. (2003) *Reale Außenwirtschaft und Europäische Integration*, Peter Lang Verlag, Frankfurt am Main-Berlin-New York.
- Dixit, A. and Norman, V. (1980) *Theory of International Trade: A Dual, General Equilibrium Approach*, James Nisbet and Co. Ltd. and Cambridge University Press, Welwyn-Cambridge.
- Egger, H. and Egger, P. (2002) 'How international outsourcing drives up Eastern European wages', *Review of World Economics* (Weltwirtschaftliches Archiv), Vol. 138, No. 1, pp.83–96.
- Egger, P., Larch, M. and Pfaffermayr, M. (2007a) 'On the welfare effects of trade and investment liberalisation', *European Economic Review*, Vol. 51, Issue 3, April, pp.669–694.
- Egger, P., Larch, M. and Pfaffermayr, M. (2007b) 'Bilateral versus multilateral trade and investment liberalisation', *The World Economy*, Vol. 30, Issue 4, April, pp.567–596.
- Eurostat (2007) *Europe in Figures: Eurostat Yearbook 2006–2007*, Luxembourg.
- IMF (2007a) *World Economic Outlook April 2007: Spillovers and Cycles in the Global Economy*, World Economic and Financial Surveys, International Monetary Fund: Washington, D.C., April.
- IMF (2007b) *World Economic Outlook October 2007: Globalization and Inequality*, World Economic and Financial Surveys, International Monetary Fund: Washington, D.C., October.
- Markusen, J.R. (2002) *Multinational Firms and the Theory of International Trade*, The MIT Press, Cambridge, Massachusetts-London.
- Marterbauer, M. and Walterskirchen, E. (2003) 'Bestimmungsgründe der Lohnquote und der realen Lohnstückkosten', *WIFO-Monatsberichte*, Vol. 2, 2003, pp.151–159.
- OECD (2007) *OECD Employment Outlook 2007*, Paris.
- Onaran, Ö. and Stockhammer, E. (2006) 'The effect of FDI and foreign trade on wages in the Central and Eastern European countries in the post-transition era: a sectoral analysis', *Vienna University of Economics and B.A.* (WU-Wien), Working paper No. 94, June.
- Stolper, W.F. and Samuelson, P.A. (1941) 'Protection and real wages', *The Review of Economic Studies*, Vol. 9, November, pp.58–73.
- Wood, A. (2002) 'Globalization and wage inequalities: a synthesis of three theories', *Review of World Economics* (Weltwirtschaftliches Archiv), Vol. 138, No. 1, pp.54–82.

Notes

- 1 Departing from general equilibrium with full competition on gets even more complex results. This is demonstrated by Markusen (2002) with a variety of capital knowledge models with imperfect competition and the distinction between skilled and unskilled labour. The implications for income distribution depend on the configuration of the models (vertical or horizontal type multinational companies) and can vary considerably. When extending the Markusen-type models on three countries and three factors of production the palette of results concerning the income distribution is even larger (see such exercises for the three-factors knowledge and physical capital model of trade and multinational activity by Egger et al. (2007a, 2007b).
- 2 The results are nearly unchanged when excluding Japan and the USA from the sample.