UNIVERSITY OF WUPPERTAL
BERGISCHE UNIVERSITÄT WUPPERTAL

EUROPÄISCHE WIRTSCHAFT
UND
INTERNATIONALE MAKROÖKONOMIK

Paul J.J. Welfens

Marshall-Lerner Condition and Economic Globalization

Diskussionsbeitrag 168
Discussion Paper 168

Europäische Wirtschaft und Internationale Wirtschaftsbeziehungen
European Economy and International Economic Relations
ISSN 1430-5445

Paul J.J. Welfens

Marshall-Lerner Condition and Economic Globalization

April 2009

Herausgeber/Editor: Prof. Dr. Paul J.J. Welfens, Jean Monnet Chair in European Economic Integration

EUROPÄISCHES INSTITUT FÜR INTERNATIONALE WIRTSCHAFTSBEZIEHUNGEN (EIIW)/
EUROPEAN INSTITUTE FOR INTERNATIONAL ECONOMIC RELATIONS
Bergische Universität Wuppertal, Campus Freudenberg, Rainer-Gruenter-Straße 21, D-42119 Wuppertal, Germany
Tel.: (0)202 – 439 13 71
Fax: (0)202 – 439 13 77
E-mail: welfens@uni-wuppertal.de
www.euroeiiw.de

JEL classification: F02, F21, F32
Key words: Marshall-Lerner Condition, FDI, Current Account, Globalization

Summary: The analysis considers the impact of FDI inflows and FDI outflows and shows that the presence of (cumulated) FDI requires higher import elasticities in absolute terms than stated in the standard Marshall Lerner condition. One may derive a range for the elasticity of the ratio of exports to imports with respect to the real exchange rate, namely that the sum of the absolute import elasticities at home and abroad must exceed unity plus an addi-tional parameter – for standard special cases the sum of both elasticities must exceed 2 if a real depreciation is to improve the real current account. Not only can one determine a modified Marshall Lerner condition for a world economy with economic globalization, rather one also can get new insights from considering a broader macroeconomic perspective. The insights obtained are highly relevant for the discussion about high deficits of the US and high surplus positions of countries such as Japan, China and Germany. The relevance of real income effects for current account adjustment – much emphasized by McKinnon – is emphasized here in a specific way: there is a direct real income effect of changes of the real exchange rate

Zusammenfassung: Diese Analyse betrachtet den Einfluss von Direktinvestitions-zuflüssen bzw.-abflüssen und zeigt, dass die Präsenz von Direktinvestionsbeständen mit Blick auf die Marshall Lerner Bedingungen höhere absolute Elastizitätswerte verlangt: man kann einen Wertebereich für diese Elastizitäten herleiten, die Bedingung für eine Verbesserung der Leistungsbilanz (Relation Exporte zu Importen) als Folge einer realen Abwertung des Wechselkurses ist. Für eine Reihe von standardmäßig betrachteten Spezialfällen muss die Summe der Importelastizitäten zwei übersteigen, damit eine Verbesserung der Leistungsbilanz eintritt. Man kann vor dem Hintergrund der vorgelegten Analyse bzw. der modifizierten Marshall Lerner Bedingung für eine Weltwirtschaft mit Globalisierung im Sinn von Direktinvestition wichtige neue makroökonomische Einsichten gewinnen. Die Schlussfolgerungen, die sich ergeben, sind unmittelbar relevant für Länder mit hohen Defiziten (z.B. USA) und hohen Überschußpositionen (z.B. Japan, China, Deutschland). Die von McKinnon betonte Bedeutung realer Einkommenseffekte für die Verbesserung der Leistungsbilanz ergibt sich aus der hier vorgelegten Analyse in besonderer Weise bzw. in direkter Verknüpfung mit dem realen Wechselkurs.

I appreciate technical support and comments by Jens Perret and Christian Schröder (EIIW); I am also indebted to discussions with Patrick Messerlin, Sciences Po, Paris: and to my discussions with Ronald McKinnon at an international workshop at Chulalongkorn University, Bangkok. The usual disclaimer applies.

Prof. Dr. Paul J.J. Welfens, Jean Monnet Chair for European Economic Integration, European Institute for International Economic Relations (EIIW) at the University of Wuppertal, Rainer-Gruenter-Str. 21, D-42119 Wuppertal, Phone: +49-202-4391371, Fax: +49-202-4391377

welfens@eiiw.uni-wuppertal.de, www.euroeiiw.de

Marshall-Lerner Condition and Economic Globalization

Discussion Paper 168

Table of Contents

1. Introduction

High current account deficits have been a major challenge for US policy makers since the 1990s; many other countries have also occasionally faced problems with the current account deficit. Such deficits often give rise to protectionism, and it is therefore quite important to understand which policy options exist for correcting a trade balance deficit or a current account deficit. With respect to the US, OBSTFELD/ROGOFF (2005) have raised the problem that even a considerable adjustment of the real exchange rate might be insufficient to cope with the high current account deficit. Instead, the internal relative price – the ratio of tradables to non-tradables prices – would also have to adjust in a way which stimulates net exports of goods and services. The authors also emphasize that the asymmetric structure of the capital account is important, since US investment abroad is mainly in the form of equity investment and foreign direct investment, while the share of foreign investment in the US is dominated by investment in bonds and other assets, which are less risky than equities and therefore carry a relatively low yield. The rate of return from US foreign investment is higher than the average return foreign investors in the US have obtained. While foreign direct investment (FDI) has become a common fact of economic reality, economists have not fully taken account of its implications; one crucial implication concerns international profit transfers from subsidiaries to the parent company. One may add than for many countries in Europe, Asia and Latin America, high cumulated foreign direct investment contributes to a considerable difference between GDP and gross national income – e.g., Ireland transfers more than 1/10 of its GDP in the form of profits to parent companies of foreign MNC subsidiaries. Subsequently, we will show that (cumulated) foreign direct investment affects the reaction of both the trade balance and the current account balance. Modern globalization – characterized by high FDI flows and increasing activities of multinational companies – affects the impact exchange rates have on the external balance.

While economic globalization and FDI have become a common trait of the world economy, economic modeling largely ignores the distinction between GDP and GNP (as an exception see e.g. WELFENS, 2008), and this is not likely only to bring about inconsistent multiplier results, but it also implies a bias in many empirical analysis of import functions, export functions and whole macro systems. (For example, Germany's export function can be estimated with standard approaches in a satisfactory way; however, for many years it its well-known that estimating Germany's import function yields rather poor results.) It is straightforward to show that the traditional derivation of the Marshall-Lerner condition brings inconsistent results for a world economy characterized by economic globalization. One should, however, not overlook that in a broader macroeconomic approach both the real exchange rate and real income will affect the current account – as has been emphasized by McKINNON (2005) in his analysis on the current account of Japan and China. Subsequently it will be argued that the real exchange rate indeed has a direct impact on real income in the home country and the foreign country; with trade depending on GNP at home and abroad on the one hand and, on the other hand, savings and consumption depending on GNP and investment depending on the real exchange rate we get new multiplier results for the case of an FDI-augmented macro model (see the appendix).

The well-known Marshall-Lerner condition states that a real devaluation (a rise of the real exchange rate $q^* := eP^*/P$ where e is the nominal exchange rate, P the price level and * denotes foreign variables) will improve the real current account if the absolute sum of the import elasticities at home and abroad exceed unity. Alternatively, one may define a Marshall-Lerner condition as the reaction of the nominal trade balance to a change in the nominal exchange rate. This definition is useful if one wants to study pricing to market behavior which concerns the case that markups that exporting firms make vary with movements in the exchange rate – the market structure (DORNBUSCH, 1987), the product-demand curve (MARSTON, 1990) and the technology of the firm (BUGHIN/MONFORT, 1993) imply different degrees of exchange rate pass-through so that a change in the home currency leads to between zero and a more-than-proportionate change in the foreign-currency price (BUGHIN, 1996). ROSE (1991) found little evidence that the exchange rate affects the trade balance of five major OECD countries. DEMIRDEN/PASTINE (1994) have argued that J-Curve effects are important, empirical analysis relying on the OLS methodology should be appropriate only for the fixed exchange rate period, while incorporation of feedback effects in a flexible exchange rate environment requires application of VAR analysis.

Denoting real exports, the real exchange rate, and foreign GDP as X, q^* and Y^*, respectively, and assuming – with φ^*being the elasticity of exports with respect to q^* and x representing a positive parameter – the Marshall-Lerner condition can be derived by considering a standard export function $X = q^{*\varphi^*} x Y^*$ and a standard import function $J = q^{*-\varphi} jY$ (J is real imports, φ is the absolute elasticity of J with respect to the real exchange rate and j is a positive parameter). The current account in real terms is $X' = X - q^*J$. It is convenient to derive the Marshall-Lerner condition by taking a look at the equivalent ratio $X'' = X/[q^*J]$: We get the familiar result that $dX''/dq^*>0$ only if $\varphi^* + \varphi>1$. In the standard two-country model (with home country 1 and foreign country 2), the export elasticity φ^* is, of course, equal to the foreign import elasticity.

In the modern world economy, one should, however, not overlook that both foreign direct investment (FDI) flows and multinational companies can considerably change the picture, since a realistic approach will have to consider that savings are proportionate to gross national income (and not to GDP). Moreover, imports of goods and services are proportionate to gross national income and not to GDP – the latter being the standard assumption in models without foreign direct investment. The standard literature indeed puts emphasis on the GDP. It suffices to point out that the IMF-methodology used for calculating equilibrium real exchange rates (FURUQUEE, 1998, p. 56) clearly states that one considers the equilibrium savings-investment balance and the current account balance as a share of GDP and thus implicitly ignores the distinction between GDP and GNP. With foreign direct investment inflows strongly rising relative to GDP in many Newly Industrialized Countries and in many OECD countries since the mid-1980s, one should carefully consider the distinction between GDP and GNP; many OECD countries are both major source countries of foreign direct investment and host countries of FDI at the same time.

These aspects imply that the modified Marshall-Lerner condition stated here – for the case of an economy with FDI and multinational companies – is stricter than the traditional Marshall-Lerner condition. It will be useful to define X" as the ratio of real exports to real imports and to denote the elasticity of X" with respect to the real exchange rate q* as $E_{X",q*}$. For a two-country setup – with both countries producing in accordance with a Cobb-Douglas production function and with two-way foreign direct investment –, one may express the modified condition for an improvement of the current account (with φ, φ* denoting import elasticities in the home country and the foreign country) indirectly as $\varphi^* + \varphi - 1 > E_{X",q*} > \varphi^* + \varphi - 2$. One should note that with foreign direct investment, one has to make a distinction between the reaction of the trade balance with respect to the real exchange rate and the reaction of the current account balance with respect to the real exchange rate as profit income accruing from abroad (or paid to parent companies abroad) is part of the current account; only under the special condition that all profits earned abroad are reinvested could one ignore this distinction. One should also note that the relative size of the home country to the foreign country affects the results. In order to shed more light on the sometimes complex formula, we will consider interesting limit conditions.

With both multinational companies and FDI playing an increasing role in the world economy since the mid-1980s, one may conclude that real exchange rate adjustments might have become rather ineffective in correcting current account imbalances. Given the fact that multinational companies are typically active in technology intensive production in OECD countries, it is almost natural that a real depreciation hardly helps in reducing a current account deficit. This is already obvious if one assumes that multinational companies – dominating trade within the OECD – have specialized on exports of Schumpeterian technology-intensive goods whose price elasticity is relatively low. An offsetting effect might work on the import side if there is an increasing range of intermediate products which can be imported from many producers in many countries worldwide. (If we additionally consider pricing to market, namely that that the foreign price level/the import price P* is a negative function of e, because exporters in country II will want to dampen the loss in market share – associated with a fall of the nominal exchange rate – by lowering the national offer price in national currency units, the problem looks slightly different; considering the negative link between P* and e and the positive link between P and e the nominal depreciation rate required to correct a current account deficit would rise even more.)

The following analysis considers the impact of FDI inflows and FDI outflows and shows that the presence of FDI requires higher import elasticities in absolute terms than stated in the standard Marshall Lerner condition (in the simple setup presented we focus on a two country model where ß stands for the share of profits in GDP of country 1 and ß* for the share of profits in GDP of country 2 – using a Cobb-Douglas function in both countries facilitates the analysis considerably, but the arguments presented can easily be generalized). Following the mathematical derivation in section 2, the final section presents key policy conclusions.

2. FDI, the External Balance and the Real Exchange Rate

With inward FDI and outward FDI, one has to make a distinction between real gross domestic product (Y) and real gross national product (Z). For ease of exposition, the following analysis assumes that both the home country and the foreign country produce on the basis of a Cobb-Douglas function where K denotes capital, L labor and A knowledge. Hence we have $Y=K^{ß}(AL)^{1-ß}$ in country 1 and $Y^*=K^{*ß^*}(A^*L^*)^{1-ß^*}$ in country 2 (* denotes foreign variables; 0<ß<1). It also is assumed that there is competition in goods market and factor markets so that profit income in country 1 (home country) is equal to ßY, in country 2 equal to ß*Y*. Thus we can – denoting the share of country 1' capital stock owned by foreign investors as α* and the share of country 2' capital stock owned by investors from country 1 as α – express Z and Z*, respectively, as follows:

1) $Z^*= Y^*(1-\alpha ß^*) + \alpha^* ßY /q^*$

2) $Z= Y(1- \alpha^* ß)+ q^* \alpha ß^* Y^*$

As ßY stands for profits in country 1 the amount α*ßY will accrue to investors in country 2; profits accruing from 1 – expressed in units of country 2's output – thus is given by α*ßY/q*. A real devaluation will reduce the real GNP in country 2, as real profits (expressed in units of country 2's output) accruing from country 1 have reduced. As regards real gross national income in country 1, we clearly see that a real devaluation will raise Z which in turn stimulates imports of goods if real imports J are proportionate to Z. Note that α is in the interval 0,1; and the same holds for α*.

The next analytical step to consider is the assumption that exports of goods and services depend on the real exchange rate and the real foreign GNP – not on GDP as stated traditionally. Similarly, imports depend on real GNP; we will assume imports are proportionate to real GNP. Thus we will derive a Modified Marshall-Lerner Condition (as a first step in a setup without international profit transfers):

3) $X = X(q^*, (1-\alpha ß^*)Y^* + \alpha^* ßY/q^*)$;

4) $J = J(q^*, Y(1-\alpha^* ß) + q^* \alpha ß^* Y^*)$;

We specify the following modified equations for exports and imports, respectively (x and j are positive parameters as are φ and φ*):

5) $X= q^{*\varphi^*} x [Y^*(1-\alpha ß^*) + \alpha^* ßY/q^*]$

6) $J = q^{*-\varphi} j [Y(1-\alpha^* ß)+ q^* \alpha ß^* Y^*]$

If one computes X"= X/[q*J] and calculates dX"/dq* we get a modified Marshall-Lerner condition. Here it should be noted that a real depreciation reduces real income of the foreign source country and thus dampens exports of goods; conversely, the denominator in X" is raised through the term q* αß*Y*. It therefore will not come as a surprise that the following mathematical derivation shows that the import elasticities in the foreign country and the home countries have to exceed the range defined by the standard Marshall-Lerner condition. It will be straightforward to show that for the special case of a small open home economy and for the case of a dominant home economy the Marshall-Lerner condition reads dX"/dq*>0 if φ* + φ>2; the same condition is obtained for the case of "symmetrical long term FDI involvement” in the sense of $\alpha ß^* = \alpha^* ß$ (while not considering the additional constraint that $Y=Y^*$).

For the special case of a symmetric world economy – with equal size of countries ($Y=Y^*$ and the initial q^* being unity) and symmetric cumulated FDI involvement of both countries ($\alpha ß^* = \alpha^* ß$) – the modified Marshall-Lerner condition looks rather similar to the standard Marshall-Lerner condition: The elasticity $E_{X'',q^*} = \varphi^* + \varphi - 1 - 2\alpha^* ß$. Considering that the output elasticity of capital typically is 1/3 and that the ratio of α (or of α^*) rarely will exceed 0.5 the implication is that in this extreme case we have to consider that E_{X'',q^*} will be positive if $\varphi^* + \varphi > 1{,}33$.

Before we turn to the formal analysis, one should note that FROOT/STEIN (1991) have argued that foreign direct investment – in a world of imperfect capital markets – should positively depend on q^*; the authors have presented empirical evidence for the US that the ratio of FDI inflows to GDP positively depends on the real exchange rate. A fortiori one may consider the case that α and α^* depend on q^*. In the formal analysis, we will ignore the FROOT/STEIN argument at first and only later we will take into account that α^* is a positive function of the real exchange rate while α is a negative function of q^*.

Formal Analysis:

The formal analysis starts by considering the ratio of real exports to real imports and taking logarithms. We then calculate the elasticity of X” with respect to q^* (see equation 10). It should be noted that we will refer to the relative size of the foreign economy through the parameter $\Omega := Y^*/Y$. One may indeed use such a parameter here while a general equilibrium approach – in which Y and Y^* also would depend on q^* – does not require us to stipulate any given ratio Y^*/Y. The interesting point in deriving the subsequent modified Marshall-Lerner condition is that the limit case of Ω approaching infinity represents the case of a small of economy (Y relative to Y^* is very small), while the case of Ω approaching zero means that we consider a setup in which the home economy is dominant (Y^* is very small relative to Y). The first step in our analysis is to consider the effect that real exports are proportionate to foreign GNP; and that real imports are proportionate to real GDP – an aspect which already has been raised in WELFENS (2008) in the context of an asymmetric general equilibrium model (FDI flows only in one direction). As $X'' := X/(q^*J)$ we have:

$$7)\quad X'' = \frac{q^{*\varphi^*}\, x\, [Y^*(1-\alpha ß^*) + \alpha^* ß Y/q^*]}{q^{*1-\varphi}\, j\, [Y(1-\alpha^* ß) + q^* \alpha ß^* Y^*]} = q^{*\varphi^*+\varphi-2}\, \frac{x\, [q^* Y^*(1-\alpha ß^*) + \alpha^* ß Y]}{j\, [Y(1-\alpha^* ß) + q^* \alpha ß^* Y^*]} < 0$$

Using the parameter Ω from the implicit definition Y*= ΩY gives:

$$\ln(X") = \ln\left(q^{*\varphi^*+\varphi\text{-}2}\right) + \ln\left(x\ [q^*Y^*(1\text{-}\alpha ß^*) + \alpha^*ßY]\right) - \ln\left(j\ [Y(1\text{-}\alpha^*ß) + q^*\alpha ß^*Y^*]\right)$$

$$= (\varphi^*+\varphi\text{-}2)\ln(q^*) + \ln(x) - \ln(j) + \ln\left(q^*Y^*(1\text{-}\alpha ß^*) + \alpha^*ßY\right)$$
$$- \ln\left(Y(1\text{-}\alpha^*ß) + q^*\alpha ß^*Y^*\right)$$

8)
$$= (\varphi^*+\varphi\text{-}2)\ln(q^*) + \ln(x) - \ln(j) + \ln\left(q^*\Omega Y(1\text{-}\alpha ß^*) + \alpha^*ßY\right)$$
$$- \ln\left(Y(1\text{-}\alpha^*ß) + q^*\alpha ß^*\Omega Y\right)$$
$$= (\varphi^*+\varphi\text{-}2)\ln(q^*) + \ln(x) - \ln(j) + \ln\left(q^*\Omega - \alpha ß^*q^*\Omega + \alpha^*ß\right)$$
$$- \ln\left(1\text{-}\alpha^*ß + q^*\alpha ß^*\Omega\right)$$

The elasticity $E_{X",q^*}$ is calculated using the equivalence:

9) $$E_{X",q^*} = \frac{d\ln(X")}{d\ln(q^*)} = \frac{d\ln(X")}{dq^*}\left(\frac{d\ln(q^*)}{dq^*}\right)^{-1} = \frac{d\ln(X")}{dq^*}q^*$$

10) $$E_{X",q^*} = \varphi^*+\varphi\text{-}1 + \left[\frac{1-\alpha ß^*}{1-\alpha ß^* + \frac{\alpha^*ß}{q^*\Omega}} - \frac{\alpha ß^*}{\frac{1\text{-}\alpha^*ß}{q^*\Omega} + \alpha ß^*} - 1\right] < \varphi^*+\varphi\text{-}1$$

The inequality holds because [.] is negative:

$$\frac{1-\alpha ß^*}{1-\alpha ß^* + \frac{\alpha^*ß}{q^*\Omega}} - \frac{\alpha ß^*}{\frac{1\text{-}\alpha^*ß}{q^*\Omega} + \alpha ß^*} - 1 < 0$$

$$\frac{1-\alpha ß^*}{1-\alpha ß^* + \frac{\alpha^*ß}{q^*\Omega}} < 1 + \frac{\alpha ß^*}{\frac{1\text{-}\alpha^*ß}{q^*\Omega} + \alpha ß^*}$$

$$\frac{1\text{-}\alpha^*ß}{q^*\Omega} + \alpha ß^* \text{-} \frac{1\text{-}\alpha^*ß}{q^*\Omega}\alpha ß^* \text{-}\ \alpha ß^*\alpha ß^* < \left(\frac{1\text{-}\alpha^*ß}{q^*\Omega} + 2\alpha ß^*\right)\left(1 - \alpha ß^* + \frac{\alpha^*ß}{q^*\Omega}\right)$$

$$\alpha ß^*\text{-}1 < \frac{1\text{-}\alpha^*ß}{(q^*\Omega)^2} + 2\frac{\alpha^*ß}{q^*\Omega}$$

$$0 < \frac{1\text{-}\alpha^*ß}{(q^*\Omega)^2} + 2\frac{\alpha^*ß}{q^*\Omega} + (1 - \alpha ß^*)$$

10’) With α=0 this gives: $E_{X",q^*} = \varphi^*+\varphi\text{-}1 - \dfrac{1}{1 + \frac{q^*\Omega}{\alpha^*ß}}$

10’’) With α*=0 this gives: $E_{X",q^*} = \varphi^*+\varphi\text{-}1 - \dfrac{1}{1 + \frac{1}{\alpha ß^*q^*\Omega}}$

For $1 - \alpha^*ß - \alpha ß^* > 0$ it also holds that $\varphi^* + \varphi\text{-}1 > E_{X",q^*} > \varphi^* + \varphi\text{-}2$ as:

$$\frac{1\text{-}\alpha^*ß}{q^*\Omega\alpha ß^*} > \frac{\alpha^*ß}{\left(1-\alpha ß^*\right)q^*\Omega}$$

$$\left(1\text{-}\alpha^*ß\right)\left(1-\alpha ß^*\right)q^*\Omega > q^*\Omega\alpha ß^*\alpha^*ß$$

$$q^*\Omega - \alpha^*ßq^*\Omega - \alpha ß^*q^*\Omega > 0$$

$$1-\alpha^*ß-\alpha ß^* > 0$$

For the limit processes $\Omega \to \infty$ and $\Omega \to 0$ it holds that:

11) $E_{X'',q^*} = \varphi^*+\varphi\text{-}2$

In the case of $\alpha\beta^* = \alpha^*\beta = 0.5$ the elasticity is as well given as:

12) $E_{X'',q^*} = \varphi^*+\varphi\text{-}2$

Let us also consider the special case of two rather similar countries with symmetrical two-way FDI. In the case of $q^*\Omega = 1$ and $\alpha\beta^* = \alpha^*\beta$ the elasticity is given by:

13) $E_{X'',q^*} = \varphi^*+\varphi\text{-}1\text{-}2\alpha\beta^*$

So far we have analyzed a setup in which there is a distinction between GDP and GNP, namely because there is foreign direct investment. Implicitly, however, we have focussed on a situation in which there are no effective international profit transfers (so all profits obtained abroad are invested in the host country). Alternatively, we could say that the conditions derived so far refer to the reaction of the trade balance to the real exchange rate. Let us now consider the current account in the case that there are international profit transfers. In the following analysis, we want to consider profit transfers received (and transferred to the source country) as an explicit element of overall exports X (and similarly on the import side) so that X is substituted by $\tilde{X}$

14) $\tilde{X} = q^{*\varphi^*}$ x [Y*(1-αß*) + α*ßY/q*] + αß*Y*/q*

15) $\tilde{J} = q^{*-\varphi}$j [Y(1-α*ß)+ q*αß*Y*] + q*α*ßY*

This gives a new condition for the ratio of overall exports to overall imports:

16) $$X''' = \frac{q^{*1+\varphi^*} \text{ x } [Y^*(1\text{-}\alpha ß^*) + \alpha^*ßY/q^*]+\alpha\beta^*Y^*}{q^{*2\text{-}\varphi} \text{j } [Y(1\text{-}\alpha^*ß)+ q^*\alpha ß^*Y^*]+q^{*3}\alpha^*\beta Y^*} > 0$$

17) $$\ln\left(X'''\right) = \ln\left(q^{*1+\varphi^*} \text{ x } [Y^*(1\text{-}\alpha ß^*) + \alpha^*ßY/q^*]+\alpha\beta^*Y^*\right) - \ln\left(q^{*2\text{-}\varphi} \text{j } [Y(1\text{-}\alpha^*ß)+ q^*\alpha ß^*Y^*]+q^{*3}\alpha^*\beta Y^*\right)$$

18) $$E_{X''',q^*} = \frac{\left(1+\varphi^*\right)q^{*\varphi^*}\text{x } Y^*(1\text{-}\alpha ß^*)+\varphi^*q^{*\varphi^*\text{-}1}\alpha^*ßY}{q^{*1+\varphi^*} \text{ x } [Y^*(1\text{-}\alpha ß^*) + \alpha^*ßY/q^*]+\alpha\beta^*Y^*} - \frac{\left(2\text{-}\varphi\right)q^{*1\text{-}\varphi}\text{j } [Y(1\text{-}\alpha^*ß)+ q^*\alpha ß^*Y^*]+q^{*2\text{-}\varphi}\text{j}\alpha ß^*Y^*+3q^{*2}\alpha^*\beta Y^*}{q^{*2\text{-}\varphi}\text{j } [Y(1\text{-}\alpha^*ß)+ q^*\alpha ß^*Y^*]+q^{*3}\alpha^*\beta Y^*}$$

In the case of Y*= ΩY and α*=0 this gives:

19) $$E_{X''',q^*} = \left(1+\varphi^*\right)q^{*-1}\frac{1}{1+\frac{\alpha\beta^*}{q^{*\varphi^*\text{-}1}\text{x }(1\text{-}\alpha ß^*)}} - \left(2\text{-}\varphi\right)q^{*-1} + q^{*-1}\frac{1}{\frac{1}{\alpha ß^*q^*\Omega}+1}$$

If $Y^* = \Omega Y$ and $\alpha=0$ this gives:

$$20)\ E_{X''',q^*} = \frac{(1+\varphi^*)\,x\,\Omega + \varphi^* q^{*-1}\alpha^*ß}{x\,[q^*\Omega + \alpha^*ß]} - \frac{(2-\varphi)\,q^{*-1-\varphi} j\,(1-\alpha^*ß)+3\alpha^*\beta\Omega}{q^{*-\varphi} j\,(1-\alpha^*ß)+\alpha^*\beta\Omega}$$

Even considering purely asymmetric cases does not yield clear results.

The FROOT-STEIN Aspect

FROOT/STEIN (1991) have argued that in a world of imperfect international capital markets, foreign direct investment inflows will be a positive function of the real exchange rate, and international bidding games are influenced by the amount of equity capital a foreign bidder can put up – the higher the amount is, expressed in units of the host country's currency, the higher the loan which can be obtained for a leveraged international mergers & acquisition. A real depreciation of the host country currency implies that foreign bidders will have more equity capital and thus are more likely to take over firms in country 1 (host country). Let us go back to equation (10) and assume that indeed α and α^* are a function of q^*. Note that considering the FROOT/STEIN (1991) effect, namely that α is a negative function of q^* and α^* is a positive function of q^* only slightly modifies the result obtained.

$$21)\ E_{X'',q^*} = \varphi^* + \varphi - 2 + \frac{\Omega - \alpha ß^*\Omega - \alpha_{q^*}ß^* q^*\Omega + \alpha_{q^*}\beta}{\Omega q^* - \alpha ß^* q^*\Omega + \alpha^* ß} - \frac{-\alpha^*_{q^*}ß + \alpha ß^*\Omega + q^*\alpha_{q^*}ß^*\Omega}{1-\alpha^*ß + q^*\alpha ß^*\Omega}$$

The general case with FDI inflows and FDI outflows is, however, quite cumbersome. Even the simple case of asymmetric FDI outflows does not yield straightforward analytical results so that empirical analysis will have to shed more light on the results derived.

3. Policy Conclusions

Taking into account foreign direct investment and the role of multinational companies implies a modified Marshall-Lerner condition. Compared to the original Marshall-Lerner condition one may state the general finding that the sum of the absolute elasticities must exceed unity by an additional term. This is an interesting insight, but it should not be considered a general implication that real exchange rate movements will be less powerful in a world of globalization – a two country model with FDI – than in a world without factor mobility. No such implication can be stated without looking at least a simple macro model (this is done in the appendix, namely for a specific parameter constellation). However, it is clear that in a consistent Mundell-Fleming model with FDI a real depreciation (appreciation) would shift the IS curve less to the right (left) than the traditional Mundell-Fleming approach suggests. The effectiveness of fiscal policy and monetary policy under alternative exchange rate regimes thus will be affected.

As regards the need to modify the Marshall Lerner condition in a world with foreign direct investment – and international profit transfers – a general analysis with inward FDI and outward FDI does not easily yield unambiguous results. More straightforward are the analytical findings for certain special parameter constellations.

The special case of asymmetric pure FDI outflow (and no profit repatriation) has shown that the requirements for the sum of the import elasticities in the home and the foreign countries are sharper than the original Marshall Lerner condition. This case is approximately represented by the combination US and non-OECD countries (as country 2) so that a real depreciation of the US currency would have to be stronger than the traditional Marshall Lerner condition suggests (also the EU in combination with non-OECD countries are a similar case). Interestingly, a sharper condition than the original Marshall Lerner requirement also holds in the case of a rough internationalization symmetry, which roughly is the US and the EU. If the US current account deficit is largely vis-à-vis Asia and the EU – as is the case in reality –, the elasticity requirements are clearly sharper than Marshall Lerner suggests. There is, however, no reason for a general elasticity pessimism. While it is true that modern economic globalization brings about a larger role for both FDI and multinational companies, one should also consider the growing role of an international splitting up of the value-added chain, which includes a rising share of intermediate products exported by Newly Industrialized Countries (e.g. Mexico, Brazil, Asian NICs). Since exporters from developing countries and NICs can hardly pursue pricing to market behavior – as opposed to innovative exporters of final products in OECD countries –, the changing international division of labor could lead to an increase in import price elasticities. With respect to the US, there is considerable evidence that pricing to market behavior has weakened – and US import price elasticities have increased – in the context of rising imports from Mexico in the period 1985-2005 (BUSSIERE/PELTONEN, 2008, 24). The BUSSIERE/PELTONEN analysis highlights several influences on the import elasticities and comes up with several key insights, namely that the elasticity of trade prices in NICs is not significantly higher than in OECD countries; elasticities are mainly determined by macroeconomic influences such as the inflationary environment and the exchange rate regime – product differentiation also plays a role. Moreover, elasticities are found to be strongly correlated across countries. Exchange rate pass-through to import prices has reduced in the US and in some other countries, which is consistent with an increase in pricing-to-market in several NICs and particularly with a change in the geographical composition of imports of the US.

As regards the role of international profit transfers, one may, on the one hand, consider periods of tranquility in which a normal share of profits made abroad is repatriated. On the other hand, periods of crisis in which firms in FDI source countries – facing a liquidity shock – tend to reduce new outward FDI might therefore want to repatriate a larger share of profits. (In periods of tranquility profits abroad, this will typically be reinvested to a large extent.)

The case of asymmetric pure FDI inflow (and not profit repatriation) implies weaker elasticity requirements than the Marshall Lerner condition. A typical case of such an asymmetric FDI inflow pattern is China. By implication, real exchange rate adjustments by China should be a relatively powerful instrument to affect China’s current account.

There are several issues which could be crucial in future research: (i) Calculating a fundamental equilibrium exchange rate will have to take into account – current and cumulated – FDI inflows and FDI outflows. (ii) In a macro model with rational expectations and a fixed exchange rate regime economic agents will want to anticipate the time path of all policy variables. This, however, creates a difficult problem, since it is doubtful that nominal exchange rates can be credibly fixed on the one hand. On the other hand, one would have to anticipate both the time path of the foreign price level relative to the domestic price level, which in turn puts the focus on domestic monetary policy and monetary policy in the anchor country. Moreover, there also could be a certain probability of a change in the exchange regime, which makes modeling rather complex – at the same time this raises new empirical issues. (iii) The enormous asymmetry of the world economy in terms of inward (cumulated) FDI-GNP shares and outward (cumulated) FDI-GNP shares raises some doubts about the notion of a real effective exchange rate, since this is related only to geographical patterns of trade but does not consider relative FDI stocks.

Key concepts in international macroeconomics – e.g., the fundamental real equilibrium exchange rate – will have to reconsidered in the modified context emphasized here. Export functions should be stated in a way that the quantity of exports depends of real foreign GNP (not on foreign GDP) and imports should be considered as depending on real GNP. Finally, one may note that FDI is typically linked to international technology transfer and future research might look into these aspects. For example, it is quite interesting to consider an asymmetric, two country model – with country 1 being the only source country – in which the level of technology abroad (A^*) is a positive function of α. Such a perspective corresponds to the FDI approach of DUNNING (1977) and is also in line with empirical findings for some countries (e.g GÖRG ET AL, 2006). As FDI outflows will reflect ownership-specific advantages (read: technology advantages) of the respective firms in the source country, FDI inflows in country 2 will bring about an international technology transfer. Finally, one may note that within a macro model, capital flows and certain model parameters affect trade dynamics in several important ways: (1) the net asset position of the private sector may affect savings, imports and exports; (2) the structure of capital flows – the share of FDI in total capital flows – will be affected by the real exchange rate (FROOT-STEIN argument); and the parameters of the money demand function and the adjustment speed of learning in the equation describing exchange rate expectations – e.g., in the context of the DORNBUSCH model – will affect the degree of nominal and real exchange rate overshooting. If there is an excessive, temporary depreciation, this will bring about higher FDI inflows, which in turn will affect both GDP and GNP. Thus there is a broad array of new issues to be considered in further theoretical and empirical research.

Appendix: Macro Model with FDI

The role of multinational companies has increased in the global economy over many years, and hence foreign direct investment (FDI) has therefore become an increasingly important aspect of real economic life. As multinational companies are major drivers of technological progress, FDI is not only affecting capital formation in host countries but also international technology transfer and supply-side dynamics. In the presence of FDI, one has to make a distinction between real gross domestic product (Y) and real gross national income (Z). The difference can be considerable as is known from countries such as Ireland, Hungary or China, which represent small countries and a large country, respectively, ranking among leading host countries – with not much outward FDI. The US, Germany, France, the UK and the Netherlands as well as Switzerland are key players in both a host country perspective and a source country perspective. A simplified model with asymmetric FDI (the home country is the only source country) brings out some new ambiguities with respect to the multiplier analysis: The modified Mundell Fleming model with FDI looks more complicated than the traditional setup.

In a simple, two-country model – where both countries produce according to a Cobb-Douglas function, namely $Y = K^{ß}(AL)^{1-ß}$ and Y* = – with K, A, L and *denoting capital, knowledge, labor and foreign variables, respectively (0<ß<1) – the GNP of the single source country 1 (home country) is Z= Y+ αß*Y*q*; here α is the share of country 2's capital stock owned by investors from country 1 and q* is the real exchange rate eP*/P where e is the exchange rate and P the price level. It has been assumed that in both countries there is competition in goods markets and labor markets so that production factors are rewarded in accordance with the marginal product rule, and hence profits from abroad, expressed in units of country 1's output, are ß*Y*q*. If one wants to understand the role of FDI inflows, it is crucial to point out that GNP is given by Z= Y(1- α*ß), where α* is the share of the host country's capital stock owned by investors from country 2; again for the sake of simplicity the setup is asymmetric so that we consider only capital inflows in country 1. Does FDI make a difference in terms of the Mundell Fleming model? It does for various reasons where one assumption adopted here is that investment is a positive function of the real exchange rate q*; this link between the real exchange rate and FDI inflows was pointed out in the context of an approach with imperfect capital markets by FROOT/STEIN (1991) who presented positive empirical evidence for the US. Moreover, one has to consider that consumption is proportionate to GNP and that imports are proportionate to GNP; and one has to add an additional element, namely that net capital imports are a positive function of q* so that the augmented Mundell-Fleming model reads for the case of a non-inflationary world (τ is the tax rate, b, b' and b" as wll as j and x are positive parameters, G is government consumption; by assumption real exports X= jZ*/q* so that the elasticity of X with respect to q* is unity and real imports J= jZ/q* so that the respective elasticity is minus one:

(I) Y= c(1-τ)(1-α*ß)Y+[bq*–b'r+b"(ßY/K-ß*Y*/K*)]+

+G - q*jY(1-α*ß)/q*+xq*[Y*+α*ßY/q*] (goods market equilibrium)

(II) M/P = hY – h'r (money marke equilibrium)

(III) $n'r - n'r^{*'} + [b''(ßY/K – ß^*Y^*/K^*) + n''q^*] = q^*jY/q^* - xq^*[Y^*+\alpha^{**}ßY]$
(equilibrium condition for the foreign exchange market/external equilbrim)

The consumption function thus is $C=c(1-\tau)(1- \alpha^*ß)Y$, the investment function $I=I(q^*,r,\Omega)$ where r is the real interest rate and Ω the differential between the domestic marginal product of capita Y_K ($Y_K=ßY/K$) and $Y^*_{K^*}$ (abroad $Y^*_K=ß^*Y^*/K^*$). As regards the demand for money, it has been assumed that the real demand for money is proportionate to real GDP and a negative function of the interest rate; an alternative specification would be the case that the money demand is not proportionate to Y but to Z. The modified investment function – taking into account the arguments of FROOT/STEIN with respect to the link between FDI inflows and q* - implies that a real depreciation will bring about a stronger rightward shift of the new IS curve than the standard Mundell Fleming model; a real depreciation will not only affect net exports of goods but also raise FDI inflows. With respect to the medium term there is, however, a theoretical caveat which concerns the distinction between international mergers and acquisitions – the type of FDI emphasized by FROOT/STEIN – and greenfield investment. (q* also will affect FDI inflows here because acquiring land for building a new factory is facilitated if there is a real depreciation of the currency of the host country, but the medium term effect could be rather a future excess supply in the goods market – if the capacity effect of investment were considered.)

Real net capital inflows are assumed to be a positive function of r-r*' (r*':= r*+a' where a' is the expected depreciation rate of the currency which is assumed to be zero; n' and n' are positive parameters) and a positive function of both q* and Ω; the square bracketed term on the left hand side of the equilibrium condition for the foreign exchange market stands for FDI inflows while n'(r-r*) represents portfolio capital inflows.

It is only for the sake of simplicity that we consider the simple case that the absolute elasticity of imports with respect to q* and the elasticity of goods exports with respect to q* are assumed to be unity. Next let us solve for the special case of exports inelastic with respect to q* for the real exchange rate (in this case any real exchange rate change will leave net exports of goods unaffected) so that we get:

(IV) $q^* = [n'r^{*'} - n'r + b''ß^*Y^*/K^* - xY^*]/n'' + [(j+ x\alpha^*ß - b''ß/K)/n'']Y$

If one considers only the foreign exchange market and ignores the goods market equilibrium condition, the implication is that the real exchange rate is a positive function of Y – provided that $j+ x\alpha^*ß > b''ß/K$ – and a negative function of Y*; the latter holds if $x>b''ß^*Y^*/K^*$. It is noteworthy that the slope of the balance of payments equilibrium line EE – not shown here – could have a zero slope in r-Y space, namely if n'' approaches infinity (the traditional case) and if $j+ x\alpha^*ß = b''ß/K$. The latter case implies that a marginal rise in goods imports generated by a rise in Y – net of the effect of higher exports generated by the rise of GNP abroad – would automatically be offset by rising FDI inflows, which will react to a higher Y as (at given K) this represents a rise in the marginal product of capital.

Note that in principle, a real depreciation not only affects net goods imports but also net capital inflows. If the parameter n'' is relatively large, there is a strong financing impact of a real depreciation, since not only a rise in q* will dampen net imports of goods and services, but net imports of capital will increase at the same time through higher FDI inflows. Subsequently we summarize the whole set of equations and derive the multipliers.

$$Y = c\left(Y\left(1-\alpha^*\beta\right)+\alpha\beta^* q^* Y^*\right)+c''\tau'\left(G',G''\right)Y\#+I\left(r,q^*,\beta Y/K-\beta^* Y^*/K^*,\Omega'\right)$$
$$+G'+G''+x\left(q^*\right)\left(Y\left(1-\alpha^*\beta\right)+\alpha\beta^* q^* Y^*\right)-q^* j\left(q^*\right)\left(Y\left(1-\alpha^*\beta\right)+\alpha\beta^* q^* Y^*\right)$$

$$\frac{M}{P}=h\left(Y\left(1-\alpha^*\beta\right)+\alpha\beta^* q^* Y^*\right)-h'r$$

$$Q\left(r,r^{*\prime},q^*,\beta Y/K-\beta^* Y^*/K^*,\Omega'\right)=q^* j\left(q^*\right)\left(Y\left(1-\alpha^*\beta\right)+\alpha\beta^* q^* Y^*\right)$$
$$-x\left(q^*\right)\left(Y\left(1-\alpha^*\beta\right)+\alpha\beta^* q^* Y^*\right)$$

$$\begin{pmatrix} k_3 & -I_r & k_4 \\ -h\left(1-\alpha^*\beta\right) & h' & -h\alpha\beta^* Y^* \\ k_5 & Q_r & k_6 \end{pmatrix}\begin{pmatrix} dY \\ dr \\ dq^* \end{pmatrix}=\begin{pmatrix} c''\tau'_{G'}+1 & c''\tau'_{G''}+1 & k_1 \\ 0 & 0 & h\alpha\beta^* q^* \\ 0 & 0 & k_2 \end{pmatrix}\begin{pmatrix} dG' \\ dG'' \\ dY^* \end{pmatrix}$$

$$k_1 = c\alpha\beta^* q^* - \beta^* I_{Y^*}/K^* + x\left(q^*\right)\alpha\beta^* q^* - q^* j\left(q^*\right)\alpha\beta^* q^*$$

$$k_2 = \beta^* Q_{Y^*}/K^* - x\left(q^*\right)\alpha\beta^* q^* + q^* j\left(q^*\right)\alpha\beta^* q^*$$

$$k_3 = 1-c\left(1-\alpha^*\beta\right)-I_Y\beta/K-x\left(q^*\right)\left(1-\alpha^*\beta\right)+q^* j\left(q^*\right)\left(1-\alpha^*\beta\right)$$

$$k_4 = -c\alpha\beta^* Y^* - I_{q^*} - \left(x_{q^*}\alpha\beta^* q^* Y^* + x\left(q^*\right)\alpha\beta^* Y^*\right)$$
$$+\left(j\left(q^*\right)\left(Y\left(1-\alpha^*\beta\right)+\alpha\beta^* q^* Y^*\right)+q^* j_{q^*}\left(Y\left(1-\alpha^*\beta\right)+\alpha\beta^* q^* Y^*\right)+q^* j\left(q^*\right)\alpha\beta^* Y^*\right)$$

$$k_5 = Q_Y\beta/K - q^* j\left(q^*\right)\left(1-\alpha^*\beta\right)+x\left(q^*\right)\left(1-\alpha^*\beta\right)$$

$$k_6 = Q_{q^*} + \left(x_{q^*}\alpha\beta^* q^* Y^* + x\left(q^*\right)\alpha\beta^* Y^*\right)$$
$$-\left(j\left(q^*\right)\left(Y\left(1-\alpha^*\beta\right)+\alpha\beta^* q^* Y^*\right)+q^* j_{q^*}\left(Y\left(1-\alpha^*\beta\right)+\alpha\beta^* q^* Y^*\right)+q^* j\left(q^*\right)\alpha\beta^* Y^*\right)$$

$$U = \det\begin{pmatrix} k_3 & -I_r & k_4 \\ -h\left(1-\alpha^*\beta\right) & h' & -h\alpha\beta^* Y^* \\ k_5 & Q_r & k_6 \end{pmatrix} =$$
$$= k_3 h' k_6 + I_r h\alpha\beta^* Y^* k_5 - k_4 Q_r h\left(1-\alpha^*\beta\right) + k_3 h\alpha\beta^* Y^* Q_r - k_4 k_5 h' - I_r h\left(1-\alpha^*\beta\right)k_6$$

We assume U is positive.

$$\frac{dY}{dG'}=\frac{1}{U}\det\begin{pmatrix} c''\tau'_{G'}+1 & -I_r & k_4 \\ 0 & h' & -h\alpha\beta^* Y^* \\ 0 & Q_r & k_6 \end{pmatrix}=\frac{\left(c''\tau'_{G'}+1\right)\left(h'k_6+h\alpha\beta^* Y^* Q_r\right)}{U}>0$$

$$\frac{dY}{dG''}=\frac{1}{U}\det\begin{pmatrix} c''\tau'_{G''}+1 & -I_r & k_4 \\ 0 & h' & -h\alpha\beta^* Y^* \\ 0 & Q_r & k_6 \end{pmatrix}=\frac{\left(c''\tau'_{G''}+1\right)\left(h'k_6+h\alpha\beta^* Y^* Q_r\right)}{U}>0$$

$$\frac{dY}{dY^*}=\frac{1}{U}\det\begin{pmatrix} k_1 & -I_r & k_4 \\ h\alpha\beta^* q^* & h' & -h\alpha\beta^* Y^* \\ k_2 & Q_r & k_6 \end{pmatrix}=$$
$$=\frac{k_1 h' k_6 + I_r h\alpha\beta^* Y^* k_2 + k_4 Q_r h\alpha\beta^* q^* + k_1 h\alpha\beta^* Y^* Q_r - k_4 k_2 h' + I_r h\alpha\beta^* q^* k_6}{U}<0$$

$$\text{if } k_1 h' k_6 < 0$$

References

BUGHIN, J.; MONFORT, P. (1993), Exchange rate pass-through under capacity constraints (with an application to Belgian manufacturing, *Centre d'Èconomie Mathematique et d'Économetrie, Discussion paper* ser. 93-108, Free University of Brussels.

BUGHIN, J.R.J. (1996), Exchange Rates, Pricing-to-Market Strategies, and the Marshall-Lerner Condition, *Review of International Economics*, 4(2), 211-217.

BUSSIÈRE, M. ; PELTONEN, T. A. (2008), Exchange Rate Pass-Through in the Global Economy: The Role of Emerging Market Economies, *ECB Working Paper 951*, Frankfurt.

DEMIRDEN, T.; PASTINE, I. (1995), Flexible exchange rates and J-Curves: An alternative approach, *Economic Letters,* 48, 1995, 373-377.

DORNBUSCH, R. (1987), Exchange Rates and Prices, *American Economic Review*, 27, 107-122.

DUNNING, J.H. (1977), Trade, Location of Economic Activities and the Multinational Enterprise: A Search for an Eclectic Approach, in: OHLIN, B.; HESSELBORN, P.O.; WIJKMAN, P.M., eds., The International Allocation of Economic Activity, London: Macmillan.

FARUQEE, H. (1998), Methodology for calculating equilibrium exchange rates and question of global consistency, ISARD, P.; FARUQEE, H., eds.: *IMF Occasional Paper 167,* Washington, DC.

FROOT, K.A.; STEIN, J.C. (1991), Exchange Rates and Foreign Direct Investment: An Imperfect Capital Markets Approach, *Quarterly Journal of Economics*, November, 1191-1217.

GÖRG, H.; HIJZEN, A.; MURAKÖZY, B. (2006), The Productivity Spillover Potential of Foreign-Owned Firms: Firm-Level Evidence for Hungary, *GEP Discussion Paper* 2006/08, University of Nottingham.

MARSTON, R. (1990), Price behavior in Japanese manufacturing, *Journal of International Economics*, Vol. 29, 217-236.

McKINNON, R. (2005), Exchange rate or wage changes in international adjustment? Japan and China versus the United States, *International Economics and Economic Policy*, 2, 261-274.

OBSTFELD, M; ROGOFF K. S. (2005), Global Current Account Imbalances and Exchange Rate Adjustments, *Brookings Papers on Economic Activity*, 36, 67-146.

ROSE, A. K. (1991), The role of exchange rates in an popular model of international trade, Does the 'Marshall-Lerner' condition hold? , *Journal of International Economic,* 30, 1991, 301-316.

WELFENS, P.J.J. (2008), Innovations in Macroeconomics, 2nd revised and enlarged edition, Heidelberg and New York: Springer; 3rd edition forthcoming in 2009.

EIIW Discussion Papers

ISSN 1430-5445:
Standing orders (usually 13 issues or more p.a.): academic rate 95 Euro p.a.; normal rate 250 Euro p.a.
Single orders: academic rate 10 Euro per copy; normal rate 20 Euro per copy.

Die Zusammenfassungen der Beiträge finden Sie im Internet unter:
The abstracts of the publications can be found in the internet under:

http://www.euroeiiw.de

No. 100 **Gavrilenkov, E**: Macroeconomic Situation in Russia - Growth, Investment and Capital Flows, October 2002

No. 101 **Agata, K.**: Internet, Economic Growth and Globalization, November 2002

No. 102 **Blind, K.; Jungmittag, A.**: Ausländische Direktinvestitionen, Importe und Innovationen im Dienstleistungsgewerbe, February 2003

No. 103 **Welfens, P.J.J.; Kirn, T.:** Mittelstandsentwicklung, BASEL-II-Kreditmarktprobleme und Kapitalmarktperspektiven, Juli 2003

No. 104 **Standke, K.-H.**: The Impact of International Organisations on National Science and Technology Policy and on Good Governance, March 2003

No. 105 **Welfens, P.J.J.:** Exchange Rate Dynamics and Structural Adjustment in Europe, May 2003

No. 106 **Welfens, P.J.J.; Jungmittag, A.; Kauffmann, A.; Schumann, Ch.:** EU Eastern Enlargement and Structural Change: Specialization Patterns in Accession Countries and Economic Dynamics in the Single Market, May 2003

No. 107 **Welfens, P.J.J.:** Überwindung der Wirtschaftskrise in der Eurozone: Stabilitäts-, Wachstums- und Strukturpolitik, September 2003

No. 108 **Welfens, P.J.J.:** Risk Pricing, Investment and Prudential Supervision: A Critical Evaluation of Basel II Rules, September 2003

No. 109 **Welfens, P.J.J.; Ponder, J.K.:** Digital EU Eastern Enlargement, October 2003

No. 110 **Addison, J.T.; Teixeira, P.:** What Have We Learned About The Employment Effects of Severance Pay? Further Iterations of Lazear et al., October 2003

No. 111 **Gavrilenkov, E.:** Diversification of the Russian Economy and Growth, October 2003

No. 112 **Wiegert, R.:** Russia's Banking System, the Central Bank and the Exchange Rate Regime, November 2003

No. 113 **Shi, S.:** China's Accession to WTO and its Impacts on Foreign Direct Investment, November 2003

No. 114 **Welfens, P.J.J.:** The End of the Stability Pact: Arguments for a New Treaty, December 2003

No. 115 **Addison, J.T.; Teixeira, P.**: The effect of worker representation on employment behaviour in Germany: another case of -2.5%, January 2004

No. 116 **Borbèly, D.:** EU Export Specialization Patterns in Selected Accession Countries, March 2004

No. 117 **Welfens, P.J.J.:** Auf dem Weg in eine europäische Informations- und Wissens-gesellschaft: Probleme, Weichenstellungen, Politikoptionen, Januar 2004

No. 118 **Markova, E.:** Liberalisation of Telecommunications in Russia, December 2003

No. 119 **Welfens, P.J.J.; Markova, E.:** Private and Public Financing of Infrastructure: Theory, International Experience and Policy Implications for Russia, February 2004

No. 120 **Welfens, P.J.J.:** EU Innovation Policy: Analysis and Critique, March 2004

No. 121 **Jungmittag, A.; Welfens, P.J.J.:** Politikberatung und empirische Wirtschaftsforschung: Entwicklungen, Probleme, Optionen für mehr Rationalität in der Wirtschaftspolitik, März 2004

No. 122 **Borbèly, D.:** Competition among Cohesion and Accession Countries: Comparative Analysis of Specialization within the EU Market, June 2004

No. 123 **Welfens, P.J.J.:** Digitale Soziale Marktwirtschaft: Probleme und Reformoptionen im Kontext der Expansion der Informations- und Kommunikationstechnologie, Mai 2004

No. 124 **Welfens, P.J.J.; Kauffmann, A.; Keim, M.:** Liberalization of Electricity Markets in Selected European Countries, July 2004

No. 125 **Bartelmus, P.:** SEEA Revision: Accounting for Sustainability?, August 2004

No. 126 **Welfens, P.J.J.; Borbèly, D.:** Exchange Rate Developments and Stock Market Dynamics in Transition Countries: Theory and Empirical Analysis, November 2004

No. 127 **Welfens, P.J.J.:** Innovations in the Digital Economy: Promotion of R&D and Growth in Open Economies, January 2005

No. 128 **Welfens, P.J.J.:** Savings, Investment and Growth: New Approaches for Macroeconomic Modelling, February 2005

No. 129 **Pospiezna, P.:** The application of EU Common Trade Policy in new Memberstates after Enlargement – Consequences on Russia’s Trade with Poland, March 2005

No. 130 **Pospiezna, P.; Welfens, P.J.J.:** Economic Opening up of Russia: Establishment of new EU-RF Trade Relations in View of EU Eastern Enlargement, April 2005

No. 131 **Welfens, P.J.J.:** Significant Market Power in Telecommunications: Theoretical and Practical Aspects, May 2005

No. 132 **Welfens, P.J.J.:** A Quasi-Cobb Douglas Production Function with Sectoral Progress: Theory and Application to the New Economy, May 2005

No. 133 **Jungmittag, A.; Welfens, P.J.J:** Institutions, Telecommunications Dynamics and Policy Challenges: Theory and Empirical Analysis for Germany, May 2005

No. 134 **Libman, A.:** Russia's Integration into the World Economy: An Interjurisdictional Competition View, June 2005

No. 135 **Feiguine, G.:** Beitritt Russlands zur WTO – Probleme und Perspektiven, September 2005

No. 136 **Welfens, P.J.J.:** Rational Regulatory Policy for the Digital Economy: Theory and EU Policy Options, October 2005

No. 137 **Welfens, P.J.J.:** Schattenregulierung in der Telekommunikationswirtschaft, November 2005

No. 138 **Borbèly, D.:** Determinants of Trade Specialization in the New EU Member States, November 2005

No. 139 **Welfens, P.J.J.:** Interdependency of Real Exchange Rate, Trade, Innovation, Structural Change and Growth, December 2005

No. 140 **Borbély D., Welfens, P.J.J.:** Structural Change, Innovation and Growth in the Context of EU Eastern Enlargement, January 2006

No. 141 **Schumann, Ch.:** Financing Studies: Financial Support schemes for students in selected countries, January 2006

No. 142 **Welfens, P.J.J.:** Digitale Innovationen, Neue Märkte und Telekomregulierung, März 2006

No. 143 **Welfens, P.J.J.:** Information and Communication Technology: Dynamics, Integration and Economic Stability, July 2006

No. 144 **Welfens, P.J.J.:** Grundlagen rationaler Transportpolitik bei Integration, August 2006

No. 145 **Jungmittag, A.:** Technological Specialization as a driving Force of Production Specialization, October 2006

No. 146 **Welfens, P.J.J.:** Rational Regulatory Policy for the Digital Economy: Theory and EU-Policy Options, October 2006

No. 147 **Welfens, P.J.J.:** Internationalization of EU ICT Industries: The Case of SAP, December 2006

No. 148 **Welfens, P.J.J.:** Marktwirtschaftliche Perspektiven der Energiepolitik in der EU: Ziele, Probleme, Politikoptionen, Dezember 2006

No. 149 **Vogelsang, M.:** Trade of IT Services in a Macroeconomic General Equilibrium Model, December 2006

No. 150 **Cassel, D., Welfens, P.J.J.:** Regional Integration, Institutional Dynamics and International Competitiveness, December 2006

No. 151 **Welfens, P.J.J., Keim, M.:** Finanzmarktintegration und Wirtschaftsentwicklung im Kontext der EU-Osterweiterung, März 2007

No. 152 **Kutlina, Z.:** Realwirtschaftliche und monetäre Entwicklungen im Transformationsprozess ausgewählter mittel- und osteuropäischer Länder, April 2007

No. 153 **Welfens, P.J.J.; Borbély, D.:** Structural Change, Growth and Bazaar Effects in the Single EU Market, September 2008

No. 154 **Feiguine, G.:** Die Beziehungen zwischen Russland und der EU nach der EU-Osterweiterung: Stand und Entwicklungsperspektiven, Oktober 2008

No. 155 **Welfens, P.J.J.:** Ungelöste Probleme der Bankenaufsicht, Oktober 2008

No. 156 **Addison J.T.:** The Performance Effects of Unions. Codetermination, and Employee Involvement: Comparing the United States and Germany (With an Addendum on the United Kingdom), November 2008

No. 157 **Welfens, P.J.J.:** Portfoliomodell und langfristiges Wachstum: Neue Makroperspektiven, Portfolio Modelling and Growth, November 2008

No. 158 **Welfens, P.J.J.:** Growth, Structural Dynamics and EU Integration in the Context of the Lisbon Agenda, November 2008

No. 159 **Welfens, P.J.J.:** Portfolio Modelling and Growth, December 2008

No. 160 **Islami, M.:** Interdependence Between Foreign Exchange Markets and Stock Markets in Selected European Countries, December 2008

No. 161 **Welfens, P.J.J.**: Portfolio Modelling and Growth, January 2009

No. 162 **Bartelmus, P.**: Sustainable Development – Has It Run Its Course?, January 2009

No. 163 **Welfens, P.J.J.:** Intégration Européenne et Mondialisation: Défis, Débats, Options, February 2009

No. 164 **Welfens, P.J.J.:** ЭКОНОМИЧЕСКИЙ РОСТ, ИННОВАЦИИ И ПРИРОДНЫЕ РЕСУРСЫ, February 2009

No. 165 **Welfens, P.J.J.; Vogelsang, M.:** Regulierung und Innovationsdynamik in der EU-Telekommunikationswirtschaft, February 2009

No. 166 **Welfens, P.J.J.:** The International Banking Crisis: Lessons and EU Reforms, February 2009

No. 167 **Schröder, C.:** Financial System and Innovations: Determinants of Early Stage Venture Capital in Europe, March 2009

EIIW Economic Policy Analysis:

No. 1 **Welfens, P.J.J.:** Globalisierung der Wirtschaft und Krise des Sozialstaats: Ist die Wirtschaftswissenschaft am Ende?, April 1997

No. 2 **Welfens, P.J.J.:** Nach der D-Mark kommt die E-Mark: Auf dem Weg zur EU-Währungsunion, Juli 1997

No. 3 **Welfens, P.J.J.:** Beschäftigungsförderliche Steuerreform in Deutschland zum Euro-Start: Für eine wachstumsorientierte Doppelsteuerreform, Oktober 1998

Fordern Sie den EIIW Newsletter an: www.euroeiiw.de

Please subscribe to EIIW Newsletter: www.euroeiiw.de

Weitere Beiträge von Interesse:
Titels of related interest:

Most recent books also see the last page.

WELFENS, P.J.J.; RYAN, C.; CHIRATHIVAT, S.; KNIPPING, F. (2009), EU-ASEAN, Facing Economic Globalisation, Heidelberg: Springer.

WELFENS, P.J.J. (2009), Transatlantische Bankenkrise, Stuttgart: Lucius & Lucius.

WELFENS, P.J.J.; WOLF, H.C.; WOLTERS, J. (eds., 2008), International Economics and Economic Policy, Heidelberg: Springer.

WELFENS, P.J.J.; WALTHER-KLAUS, E. (eds., 2008), Digital Excelence, University Meets Economy, Heidelberg: Springer.

WELFENS, P.J.J. (2008), Digital Integration, Growth and Rational Regulation, Heidelberg: Springer

WELFENS, P.J.J. (2007), Innovation in Macroeconomics, Heidelberg: Springer

WELFENS, P.J.J.; WESKE, M. (eds., 2007), Digital Economic Dynamics, Innovations, Networks and Regulations, Heidelberg: Springer.

WELFENS, P.J.J., WESKE, M. (eds., 2006): Innovations, Digital Economic Dynamics and Regulatory Policy, Heidelberg: Springer

WELFENS, P.J.J., KNIPPING, F., CHIRATHIVAT, S., RYAN, C. (eds., 2006): Integration in Asia and Europe: Historical Dynamics, Political Issues and Economic Perspectives, Heidelberg: Springer

BROADMAN, H.G., PAAS, T., WELFENS, P.J.J. (eds., 2006): Economic Liberalization and Integration Policy Options for Eastern Europe and Russia, Heidelberg: Springer

BORBÉLY, D. (2006): Trade Specialization in the Enlarged European Union, Heidelberg/Berlin: Springer

JUNGMITTAG, A. (2006): Internationale Innovationsdynamik, Spezialisierung und Wirtschaftswachstum in der EU, Heidelberg: Physica

WELFENS, P.J.J., WZIATEK-KUBIAK, (eds., 2005): Structural Change and Exchange Rate Dynamics – The Economics of EU Eastern Enlargement; Heidelberg: Springer.

WELFENS, P.J.J., ZOCHE, P., JUNGMITTAG, A. (et al. 2005): Internetwirtschaft 2010 (final Report for the German Federal Government; joint study EIIW and Fraunhofer Institute for System Dynamics and Innovation, Karlsruhe), Heidelberg: Physica.

GRAHAM, E., ODING, N., WELFENS, P.J.J., (2005): Internationalization and Economic Policy Reforms in Transition Countries, Heidelberg: Springer.

GAVRILENKOW, E., WELFENS, P.J.J., (2005): Infrastructure, Investments and Economic Integration: Perspectives for Eastern Europe and Russia, Moscow: HSE.

APOLTE, T.; CASPERS, R.; WELFENS, P.J.J. (2004), Ordnungsökonomische Grundlagen nationaler und internationaler Wirtschaftspolitik, Stuttgart: Lucius & Lucius.

GAVRILENKOV, E.; WELFENS, P.J.J.; WIEGERT, R. (2004), Economic Opening Up and Growth in Russia, Heidelberg and New York: Springer.