
2.1 Globalization, Taxation, Social Security, and Immigration

2.1.1 The Bretschger-Hettich Study

From a theoretical perspective, one should assume that increasing globalization – defined as more trade and higher capital mobility – would bring about lower corporate taxation as the relatively mobile production factor can exploit the more intensive international quest for mobile capital. The definition of capital here is crucial; real estate is not necessarily part of mobile capital. If, however, real estate is available through special financial market products, it may be adequate to consider a broader definition of capital. Basically owners of capital can shift physical assets within the medium term – at the start of the next investment cycle (its length might be 5–8 years in industry) – to other locations abroad, if the required unskilled and skilled labor is available. With respect to workers and employees, one may argue that skilled workers are rather mobile internationally, while part of unskilled labor is rather immobile – often due to international restrictions on immigration that play a critical role in Japan, the USA, the EU, and some other economies. In a broader perspective, globalization brings economic benefits for the countries involved; however, there are also new risks associated with a more open economy. From this perspective, people in OECD countries – or voters – may seek broader protection against risks from economic globalization: Social security expenditures, including unemployment insurance payments, are therefore expected to increase; Cameron (1978) provides empirical evidence for this view. This should call for increasing rates of income tax, or other taxes, unless globalization contributes to much higher output growth which in turn translates into higher government revenue. To the extent that corporate tax rates are reducing under the pressure of economic globalization, one should expect that labor taxes will increase – or possibly taxation on land and other immobile assets.

While several papers in the 1980s and 1990s indicated that economic globalization was not contributing to reducing corporate tax rates, a theoretically

well-founded paper by Bretschger and Hettich (2002) could shed more light on some of the above issues and also present important empirical evidence. The authors come up with evidence which is in line with the international tax competition theory according to which economic globalization should lead to reduced corporate tax rates. The evidence presented by the authors refers to 14 OECD countries and takes a closer look at the period 1967–1996. One may note that liberalization of portfolio capital flows started in the 1970s and that of foreign direct investment flows in the 1980s. Labor taxation is clearly linked to capital taxation and social expenditures through government budget constraint. The authors assume well-behaved utility functions of identical households which depend positively on private consumption goods and the domestic public good – and that each country's public good is provided by the national government. It should be pointed out here that partial provision of public goods at the supranational level in the euro area (or the EU) would make tax competition less intensive in the euro area since one could expect that higher supranational government revenues will then be used to finance the international public good in the euro area – e.g., defense or certain digital universal services. However, this argument is not considered in the paper by Bretschger and Hettich.

The authors come up with a simple model which states that the public good $G = \tau K$ where τ is the proportional capital tax. In the economic optimum, government will choose the tax rate such that the social marginal benefits from the public good MB^{soc} is equal to the marginal costs of taxation MC^{soc} . The authors differentiate the equation $G = \tau K$ and point to the Samuelson rule for the closed economy, namely, $MB^{soc} = MC^{soc}$ with $\tau = \tau^{opt}$ and $G = G^{opt}$. In an open economy, the marginal cost of capital taxation will consist of the marginal individual costs ($K d\tau$ plus the marginal costs of capital outflows). A rise in the corporate taxation rate will create positive international externalities; indeed, for a given world capital stock, an increase in the domestic capital tax rate will stimulate capital outflows and thereby raise the capital tax base in other countries. One may add here that an outflow from country I to country II – in a three country model – could cause additional asymmetries in the case of oligopolistic market structures with interdependent behavior: If country II now attracts more capital from country I, investors from country III might also want to invest more in country II, and hence the tax base in country II is reinforced beyond the effect of the initial capital inflows from higher capital outflows from country I. To the extent that there are flexible exchange rates, there will be a real depreciation of the currencies of country I and country III. This will reduce import demands of countries 1 and 3 so that country II will face an excess supply of tradables which in turn could lead to a fall of price levels in country II; this might even lead to rising unemployment if wages are not fully flexible and if the capital inflows are not strong enough to raise demand for labor sufficiently. The reduced tax base in countries 1 and 3 will lead to a suboptimal provision of the public good – assuming that this is provided exclusively by national governments. This problem might be avoided if it is possible to achieve a political consensus to finance part of the provision of public goods on an international basis or to provide an international or even global public good.

It is noteworthy that the traditional tax competition model has been modified in useful ways. If one moves from a simple model setup with identical small countries to a model with asymmetric countries, one gets an interesting insight from this more realistic approach (Bucovetsky and Wilson 1991) as two different countries – or in different countries – are competing for internationally mobile capital. Bucovetsky and Wilson show that the smaller of the countries considered will face the more elastic tax base and therefore will have a decision which favors a lower capital tax rate in the international equilibrium. By contrast, the larger country will levy a higher capital tax rate because the erosion of its tax base is smaller in per capita terms. Bretschger and Hettich (2002) argue that the conjecture of the two authors, which in the presence of labor taxation, all tax revenues should come from labor taxation, is not valid – at least not in the case of big economies since the larger a country is the lower the elasticity of supply of capital will be. Therefore, the authors state three hypotheses to be tested:

- The more a country is integrated into the world capital market, the lower the capital tax rate will be.
- The more integrated a country is, the higher labor taxation relative to capital taxation will be.
- Given a certain degree of integration in the world economy, smaller countries will have lower capital tax rates than larger countries.

As regards the reality of taxing capital, the authors point out that in most EU countries, taxation is applied according to the residence principle; therefore, one might assume that the capital competition model presented is not adequate. However, in reality the limited information flows between fiscal authorities and banks as well as administrative impediments imply that the residence principle is not enforceable (except in the country with the lowest capital taxation rate – as one might argue). This amounts to saying that the reality of corporate profit taxation follows de facto the source country principle (Tanzi and Bovenberg 1990; Sorensen 1995).

Since the USA, the UK, Germany, France, and Japan are the biggest source countries of foreign direct investment, it seems clear that these five countries largely determine the international benchmark for corporate taxation. The reality of corporate taxation is such that US companies often realize a very low effective corporate tax rate.

Bretschger and Hettich (2002) complete the model by stating (with r standing for the rate of return on capital, A is knowledge) the government budget constraint as follows: $G = \tau r(A, K) K$ which implies $dG = r(d\tau K + \tau dK \text{ outflow} + \tau dK \text{ inflow})$. The latter term reflects the fact that a rise of knowledge will lead to capital inflows and hence the authors control for economic growth in the empirical implementation of the model. Finally, the authors want to consider the role of uncertainty in the sense that globalization is associated with new risks for workers whose demand for social expenditures therefore is likely to rise. This is a kind of compensation theory since the idea is that workers might support economic globalization whose global economic benefits are large enough to compensate those workers for the enhanced risks – e.g., a higher unemployment rate or more frequent unemployment spills.

Finally, the authors consider the role of party preferences for taxation, and they assume that conservative parties have a preference for low tax rates. Hence the authors state three additional hypotheses:

- The higher the growth rate of a country, the lower the capital taxation is likely to be.
- If the government is conservative, the tax rates on capital and labor will be lower than under a social-democratic government.
- The higher the country's integration in the world capital market is, the larger social expenditures of government will be.

A crucial factor for the empirical implementation is the openness variable – reflecting the intensity of globalization; if one takes the sum of exports and imports relative to GDP, there will be a problem with the size of countries since all small countries naturally are more open as measured by the trade-GDP ratio than large countries. Therefore, the authors run a panel regression with the trade-GDP ratio as the endogenous variable and size as the exogenous variable – then only the residuals from the average trend out of that regression equation are considered as an indicator of the trade openness of an economy. According to this approach, Sweden has a degree of openness which is below the size-corrected average, while the USA has a degree of openness which is greater if corrected for the average size impact. Here the authors clearly avoid a common pitfall of many analyses looking at the link between globalization and taxation. Furthermore, the authors use the effective corporate taxation and follow the seminal paper of Mendoza et al. (1994): Their tax rates are calculated by dividing total tax revenue from capital, labor, and consumption by the pretax income of the respective factor and the pretax consumption expenditure. While the effective corporate tax rate for all OECD countries considered has been raised in the late 1960s and early 1970s to more than 40 % – unweighted average – and then has decreased to below 34 % in the period 1991–1996, the average ratio of corporate tax revenue to GDP (used, e.g., by Quinn 1997; Garrett 1995) shows largely different results as it increases until the mid-1980s and thereafter falls very modestly. The empirical results of Bretschger and Hettich (2002) are as follows:

First, we find that national governments lower corporate taxes as a consequence of increased globalisation. Thus, in contrast to recent empirical studies, our empirical results support tax competition theory. The differences between our results and the results of recent studies are mainly caused by the use of different variables and model specifications. In particular, other measures for corporate taxation and openness have been adopted in this paper. These variables explicitly consider tax-base effects and avoid the bias of economy size. Second, as theoretical models of tax competition predict for the case of a given level of public goods, we find a significantly positive relationship between globalisation and labor taxation. Third, we observe that governments' social expenditures are positively related to increasing globalisation as well. The change in the tax-mix from the rather elastic corporate tax-base to the comparatively inelastic labor tax-base supports the efficiency hypothesis of globalisation. On the other hand, the increase in social expenditures supports the compensation hypothesis of globalisation. As a result, the efficiency and the compensation hypotheses are both relevant to explain government behavior, the former for revenues, the latter for expenditures.

Thus, one has a series of important findings on the link between taxation, social expenditures, and economic globalization for industrialized countries. Economic globalization has increased in the 1990s and the first decade of the twenty-first century – at least until the big recession of 2008/2009 in the USA and the EU which was caused by the Transatlantic Banking Crisis. A key question is whether governments of OECD countries will accept an ongoing effective reduction of corporate tax rates. Even the US government is concerned that big US multinationals reduce their effective tax rates, often to below 5 %. Transfer pricing and licensing fees charged by subsidiaries in tax-haven countries are part of the strategy of some companies. At the same time the increasing regional integration in the world economy is undermining the role of ILO labor standards according to the findings of Häberli et al. (2012). Economic globalization seems to change the effective distribution in part of the world economy greatly in favor of capital. Part of this phenomenon is explained simply by the increase of foreign direct investment outflows. An increase in FDI outflows implies that workers in host countries will gain through a rise of real income, while in the host countries, owners of capital will gain from the increase in the rate of return from capital. It is unclear to which extent there is broad international technology transfer; to some extent technology can be understood to be a non-rival production factor. However, countries which are strong innovators will expect to attract increasing foreign direct investment inflows so that the investment-GDP ratio will increase, and this in turn should stimulate economic growth. Higher economic growth in turn should reduce – according to Bretschger and Hettich (2002) – the corporate income tax rate. One should not exclude the fact that some relatively poor countries have high growth rates as a result of a combination of FDI inflows and rapid imitation by all companies who can employ more skilled or better skilled workers.

There are some additional issues to be considered: The role of value-added taxation is one key challenge. Moreover, with more regional integration in the world economy, one may ask which effects regional integration has not only on taxation but also on the vertical political division of labor when it comes to the provision of public goods. As regards the EU, MERCOSUR, ASEAN, and other regional integration schemes, one could ask to what extent fighting global warming could be defined as a (fractional) regional public good whose provision is financed at the supranational level. Military defense and part of the legal system also could be organized at this level. The higher the share of supranational taxation, the more intensive could tax competition be in the remaining fields. Also one has to raise the question whether or not minimum capital taxation could be a substitute for supranational taxation. Tax competition has the function of helping to keep tax rates low – governments should not have easy options to squander taxpayers' money. Minimum corporate tax rates are a poor substitute for the alternative regime to have some limited supranational taxation and full tax competition.

Measuring Economic Openness. The trade-GDP ratio (export plus imports relative to gross domestic product) is not an adequate indicator for measuring economic openness. The share of internationally traded goods always is higher in small

economies than in big economies. Following the Bretschger and Hettich argument, it is adequate to run a regression in which the trade-GDP ratio is explained by the relative GDP size (GDP of country *i* relative to all countries considered). Looking at 3-year averages for 1996–1998, many countries seem to be very open if measured by the indicator trade-GDP ratio (“openness”); however, if one considers the residual from the regression on relative country size, only Belgium, the Czech Republic, Estonia, Ireland, Luxembourg, the Netherlands, Slovak Republic, and Slovenia were relatively open (“open”); the USA was just slightly more open than the average of 31 OECD countries. Australia, Chile, Greece, Italy, Japan, Poland, and Spain were less open than the correction for the average size effect would suggest; Australia and Chile might be a special case because of the considerable role of natural resources; Greece, Italy, Poland, and Spain face a structural problem in true openness and might be unable to fully exploit the benefits from economic globalization (Fig. 2.1).

A lack of big multinational companies might be part of the explanation in these four countries. Germany and France also had a relatively small degree of true openness, but Germany enjoyed a twin benefit: its strong specialization on the export of machinery and equipment implies a low price elasticity of demand for Germany’s exports, and Germany enjoys a structural current account surplus; by contrast, France has a structural current account deficit ratio. Germany is a structural winner in economic globalization, and its current account surplus certainly has benefited from wage restraint over many years. By contrast, France has introduced the 35 h work week, but in reality workers have continued to work 40 h – so that effective holidays became longer and unit labor costs increased which in turn undermined the competitiveness of many French companies. A decade of intensified financial globalization and strong expansion of ICT – roughly the 10 years after 1995 – obviously has reinforced the degree of true openness of the USA: High US foreign direct investment in banking in several EU countries has contributed to strong trade in transatlantic financial services (with Ireland being a strong partner for US investors). In 2005–2007 Germany enjoyed a higher true degree of openness that stands for a structural change which was only partly reversed in the crisis period 2008–2010. Switzerland’s degree of true openness fell during the crisis, and in the period 2008–2010, the country’s openness was below average – once the country sample has been corrected for the size effect. Among the small countries, Estonia was a country whose degree of openness reduced during the crisis. Ireland has maintained a rather high degree of openness in the period 1996–2010. Among the euro crisis countries, Greece, Italy, Spain, and Portugal stood for a relatively low degree of openness. It is remarkable that redistribution in Greece is very weak if one considers the redistribution effect for the lowest quintile. Here we have some starting points for a political reform discussion: Lack of openness, structural current account deficits, a weak position in the World Bank’s Doing Business indicator, and problems with organizing the social security system constitute a mix of key policy challenges which have to be addressed (Table 2.1).

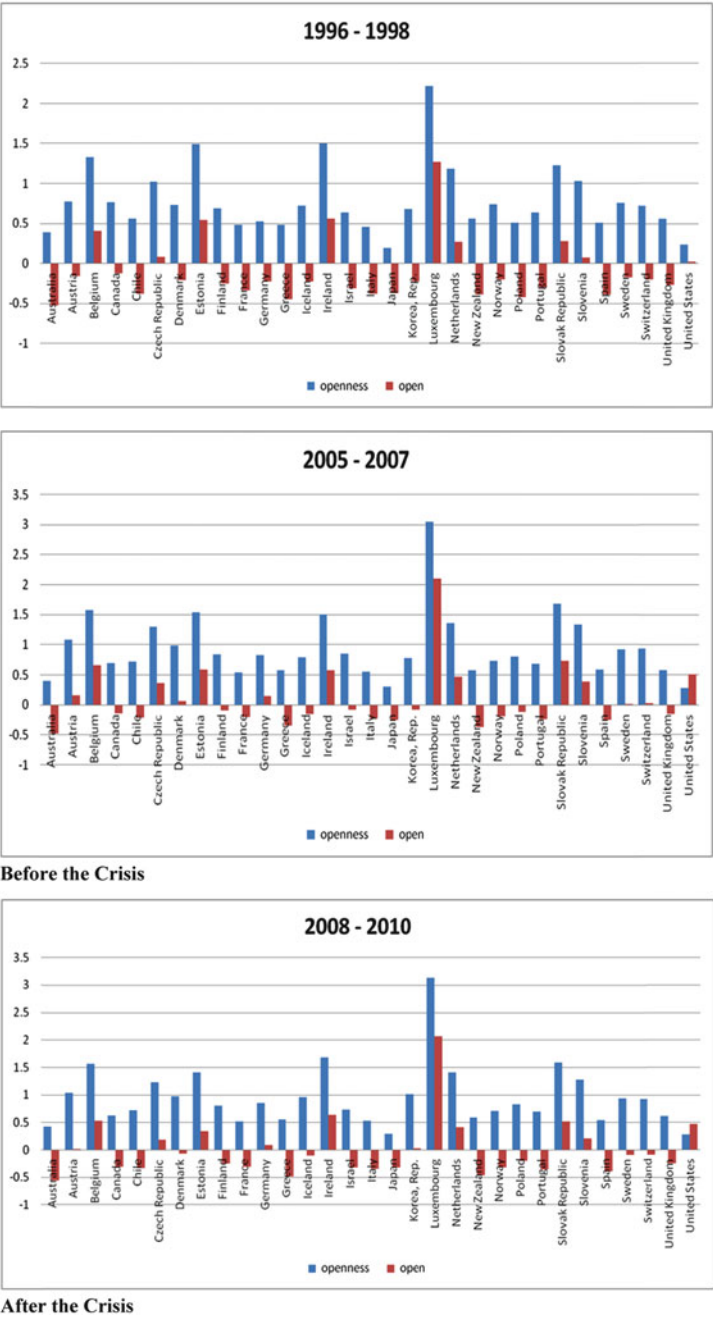


Fig. 2.1 Trade-GDP openness and true openness (corrected for country size effect; 2008–2010 also dummy for crisis included: open) (Source: EIIW)

Table 2.1 World Bank's doing business indicator (2012) for selected countries

Economy	Ease of doing business rank	Dealing with				Protecting investors	Paying taxes	Trading		Enforcing contracts	Resolving insolvency
		Starting a Business	construction permits	Getting electricity	Registering property			Getting credit	across borders		
United States	4	13	17	19	25	4	69	4	22	6	16
Denmark	5	33	8	14	6	23	13	23	4	34	10
United Kingdom	7	19	20	62	73	1	16	1	14	21	8
Finland	11	49	34	21	24	40	23	40	6	9	5
Sweden	13	54	25	9	35	40	38	40	8	27	22
Ireland	15	10	106	95	53	12	6	12	28	63	9
Germany	20	106	14	2	81	23	72	100	13	5	19
Estonia	21	47	35	52	14	40	50	70	7	31	72
Latvia	25	59	113	83	31	4	52	70	16	24	33
Lithuania	27	107	48	75	5	53	60	70	24	14	40
Austria	29	134	75	24	34	23	77	100	26	7	12
Portugal	30	31	78	35	30	104	77	49	17	22	23
Netherlands	31	67	89	67	49	53	29	117	12	32	6
Belgium	33	44	57	82	176	70	75	19	29	18	7
France	34	27	52	42	146	53	53	82	27	8	43
Slovenia	35	30	61	31	83	104	63	17	57	56	42
Cyprus	36	37	80	98	99	53	31	32	18	108	25
South Africa	39	53	39	150	79	1	32	10	115	82	84
Spain	44	136	38	70	57	53	34	100	39	64	20
Slovak Republic	46	83	46	100	8	23	100	117	98	69	38
Hungary	54	52	55	109	43	53	118	128	73	16	70
Poland	55	124	161	137	62	4	114	49	50	56	37

Luxembourg	56	93	33	63	134	159	128	14	32	1	52
Czech	65	140	74	143	27	53	100	120	68	79	34
Bulgaria	66	57	123	128	68	40	49	91	93	86	93
Romania	72	68	129	168	72	12	49	136	72	60	102
Italy	73	84	103	107	39	104	49	131	55	160	31
Greece	78	146	31	59	150	83	117	56	62	87	50
Croatia	84	80	143	56	104	40	139	42	105	52	97
China	91	151	181	114	44	70	100	122	68	19	82
Malta	102	150	167	111	80	176	70	27	34	121	67
Russian Federation	112	101	178	184	46	104	117	64	162	11	53
Brazil	130	121	131	60	109	104	82	156	123	116	143
India	132	173	182	105	94	23	49	152	127	184	116

Source: Word Bank database

Government Budget, Unemployment, Pensions, and the Phillips Curve. The Phillips curve has become a standard analytical element of many macroeconomic approaches. Basically, the specification is as follows (with u^* for the natural rate of unemployment, π for the inflation rate, π^E for the expected inflation rate; Ω is a positive parameter): $u = u^* - \Omega(\pi - \pi^E)$. Hence if the actual inflation rate exceeds the expected inflation rate, the unemployment will be below the natural rate of unemployment. The government budget constraint is – if modified adequately – an additional analytical element in a period of ageing societies and unemployment. It will be assumed that the macroeconomic production function is $Y = K^\beta (AL)^{1-\beta}$ where K , A , and L denote capital, knowledge, and labor, respectively; as markets are assumed (with w and r denoting the real wage rate and the real interest rate) to be competitive, we will have $wL = (1 - \beta)Y$ and $rK = \beta Y$. Let φ denote the replacement ratio of unemployed workers ($0 < \varphi < 1$) and consider that $u := (L' - L)/L$ where L is labor demand and L' labor supply. Moreover, let D and φ' denote the dependency ratio (the ratio of those aged higher than 65 to those working) and the replacement ratio ($D = \text{pensioners}/L$) of pensioners, respectively; that replacement ratio is defined as the average pension relative to the average wage. It will be assumed that the income revenue function is based on nominal income – with some imperfect offsetting coefficient ρ for inflation; this coefficient is in the interval $0,1$. The budget constraint can be written as follows (with P denoting the price level):

$$G + u\varphi wL + D\varphi' wL = \tau(1 + \rho\pi)YP_{t-1} \quad (I')$$

Implicitly, we have assumed (with $\tau = \tau''$; τ'' is the contribution rate) defined contributions to the pension system and the social security system. Alternatively we could replace the right-hand side by $\tau Y + [\tau''(1 - \beta)(1 - u)Y]$; the term in square brackets stands for employed workers' contributions to the pension system. Since $wL = (1 - \beta)Y$, the government budget constraint reads (with $G/Y := \gamma$; for ease of exposition, P_{t-1} is set to unity)

$$\gamma + (u\varphi + D\varphi')(1 - \beta) = \tau(1 + \rho\pi) \quad (II')$$

$$\gamma/(\tau\rho) + (1 - \beta)(D\varphi'/(\rho\tau)) - 1/\rho + (1 - \beta)(\varphi/(\rho\tau))u = \pi \quad (III')$$

In π - u -space the government budget constraint is a schedule with a positive slope, while the Phillips curve is negatively sloped. The intersection of the two curves determines the economic equilibrium. Next, let us assume that the natural rate of unemployment is a positive function of the policy parameter φ : The higher the replacement ratio for the unemployed, the higher will be the natural rate of unemployment.

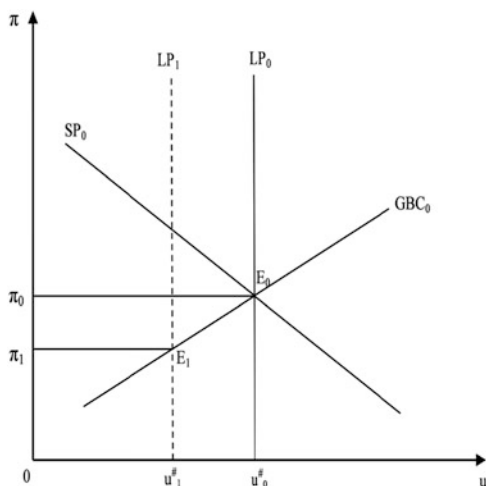
$$u = u\#(\varphi) + \Omega\pi^E - \Omega\pi \quad (IV')$$

If labor market reforms reduce the replacement ratio for unemployed workers, the result will be a leftward shift of the long-run Phillips curve. Hence both the unemployment rate and the inflation rate will fall both in the short run and in the long run. A rise in the dependency ratio will bring about a long-term increase of the inflation rate since this is the natural way to generate additional real government revenues which are necessary with a higher share of pensioners (this holds at least until the government decides to reduce the pension replacement ratio φ'). Ageing democracies may therefore be expected to have a higher long-term inflation rate than before. A country which has a policy parameter $\rho = 0$ will, however, have a different result. Only by coincidence will the budget constraint schedule and the vertical long-run Phillips curve overlap.

To the extent that the equilibrium inflation in societies with a higher dependency ratio is increasing, this will cause adjustment conflicts in partner countries. Moreover, in a system of fixed exchange rates, the ageing country against whose currency the other countries are pegging the exchange rate will generate tensions to the extent that the ageing process in partner countries is not as fast as in the anchor country (and to the extent that stability preferences differ). To the extent that a higher long-run inflation rate undermines innovativeness and research and development efforts, one may anticipate that a lower long-run growth rate has to be expected as a consequence of higher long-run inflation (Fig. 2.2).

The Role of the Dependency Ratio in Modified Branson Models. The dependency ratio has an impact on savings and consumption, respectively. From a theoretical aspect, the impact on savings is likely to be negative – the elderly will have a tendency to sell assets in order to finance consumption in the retirement period. However, the share of government bonds in total wealth will increase in the context of ageing societies since government bonds – at least in (most) OECD countries – clearly are more liquid than stocks or foreign bonds: As selling assets becomes more important for the elderly, the overall demand for domestic bonds should increase; this perspective offers a new explanation why the interest rate did not increase in OECD countries in the two decades after 1990. The equilibrium condition for domestic bonds B can be written (with i denoting the nominal interest rate) as follows $B/P = b(i, i^*, z, D)A'$ where A' is real wealth, namely, the sum of real bonds B/P , the real stock of money M/P (M is the nominal stock of money), foreign bonds eF^*/P (e is the nominal exchange rate, F^* is foreign bonds denominated in foreign currency), and KP'/P (P' is the stock market price index); z is the expected rate of return on physical investment, and $*$ denotes foreign variables; it is assumed that $\partial b/\partial D > 0$; $\partial n'/\partial D > 0$, $\partial n'/\partial D > 0$ and $\partial h/\partial D < 0$ (n' is the desired share of real money in total wealth, and h is the desired share of capital in total wealth); b is a positive function of i and a negative function of i^* and z ; n' is a negative function of i and i^* , but a positive function of z ; f is a positive function of i^* and a negative function of both i and z ; h is a positive function of z and a negative function of both i and i^* . This is a portfolio approach

Fig. 2.2 Phillips curve (Short term is SPC, long term is LP0) and Government Budget Constraint Schedule (GBC)



that is slightly modified in comparison to the standard approach. There is a link between the supply side of the bonds market equilibrium condition and the government budget constraint where government spending now also includes rB/P , namely, government's interest expenditures (in real terms).

$$G + rB/P + u\phi wL + R\phi' wL = \tau(1 + \rho\pi)YP_{t-1} \quad (V')$$

By assumption this medium run formulation of the budget constraint – for a non-growing economy – has a zero budget deficit. Obviously we have

$$B/P = \left(\tau(1 + \rho\pi)YP_{t-1} - G - u\phi wL - R\phi' wL \right) / r \quad (VI')$$

If there is no capital depreciation and profit maximization is considered, namely, $(P'/P)\beta Y/K = r$, one can write (with $G/Y := \gamma$)

$$(B/P) / \left(P'K/P \right) = (\tau(1 + \rho\pi)P_{t-1} - \gamma - u\phi(1 - \beta) - R\phi'(1 - \beta)) / \beta \quad (VII')$$

Defining $(B/P)/Y = b''$ we also have from (V')

$$\gamma + rb'' + (u\phi + D\phi')(1 - \beta) = \tau(1 + \rho\pi) \quad (VIII')$$

$$\gamma + r \left((B/P)/A' \right) \left(A'/Y \right) + (u\phi + D\phi')(1 - \beta) = \tau(1 + \rho\pi) \quad (IX')$$

Defining $(B/P)/A'$, we can solve for the relative supply of bonds relative to wealth and then write the equilibrium condition for the domestic bonds market where demand is $b(r, r^*, z, D)$.

Dependency Ratio in a Modified Open Economy Model. It is quite interesting to consider a modified Branson model – which is a short-term model to determine the interest rate and the exchange rate in an open economy with flexible exchange rates (we drop the stock market for the sake of simplicity):

$$B/P = b(i, i^*, D)(B/P + M/P + eF^*/P) \quad (X')$$

$$M/P = n'(i, i^*, D)(B/P + M/P + eF^*/P) \quad (XI')$$

$$eF^*/P = f(i, i^*, D)(B/P + M/P + eF^*/P) \quad (XII')$$

The adding-up constraint is $b + n' + f = 1$ since the share in desired assets always add up to unity. By implication only two of the three equations are independent. The model can be used to analyze the impact of a change of D (the subsequent table shows D for selected countries and also the change 2012/1990) (Table 2.2).

In the period 1990–2012, the age dependency ratio has increased in several EU countries, most notably in Italy, Germany, Denmark, Finland, France, and Belgium (see subsequent table). It strongly has reduced in Poland and the Slovak Republic, but also in China, Brazil, India, Russia, Mexico, and the USA.

In the context of an ageing society, it is quite interesting to consider the multipliers de/dD and di/dD on the basis of the equilibrium conditions for the foreign bonds market and the domestic bonds market (based on XII' and X', respectively).

$$\begin{pmatrix} \frac{bF^*}{P} & b_i \left(\frac{B}{P} + \frac{M}{P} + \frac{eF^*}{P} \right) \\ \frac{(1-f)F^*}{P} & -f_i \left(\frac{B}{P} + \frac{M}{P} + \frac{eF^*}{P} \right) \end{pmatrix} \begin{pmatrix} de \\ di \end{pmatrix} = \begin{pmatrix} -b_D \left(\frac{B}{P} + \frac{M}{P} + \frac{eF^*}{P} \right) \\ f_D \left(\frac{B}{P} + \frac{M}{P} + \frac{eF^*}{P} \right) \end{pmatrix} (dD)$$

System determinant:

$$\begin{aligned} U &= \det \begin{pmatrix} \frac{bF^*}{P} & b_i \left(\frac{B}{P} + \frac{M}{P} + \frac{eF^*}{P} \right) \\ \frac{(1-f)F^*}{P} & -f_i \left(\frac{B}{P} + \frac{M}{P} + \frac{eF^*}{P} \right) \end{pmatrix} \\ &= -\frac{F^*}{P} \left(\frac{B}{P} + \frac{M}{P} + \frac{eF^*}{P} \right) (bf_i + b_i(1-f)) \end{aligned}$$

Table 2.2 Age dependency ratio (percentage of working-age population)

Country name	1990	1995	2001	2012	2012–1990
Australia	49.54	50.19	49.37	49.11	–0.43
Austria	48.23	49.33	47.97	48.73	0.50
Belgium	49.50	51.50	52.68	52.70	3.21
Canada	46.92	47.78	46.05	45.32	–1.60
Chile	56.45	56.93	53.00	45.10	–11.35
China	54.03	53.16	46.33	36.36	–17.67
Denmark	48.48	48.45	50.28	54.17	5.69
Finland	48.60	49.80	49.45	53.23	4.64
France	51.46	53.54	53.73	55.58	4.12
Germany	45.06	46.59	47.34	52.13	7.07
Greece	49.11	47.21	47.44	51.51	2.40
Hungary	51.29	47.87	46.70	46.34	–4.95
Iceland	55.27	55.43	53.03	49.84	–5.43
Ireland	62.31	55.41	48.30	49.93	–12.39
Israel	67.04	63.22	61.42	61.47	–5.57
Italy	45.77	46.22	48.87	53.53	7.76
Japan	43.40	43.75	47.36	60.03	16.63
Luxembourg	44.41	47.81	49.49	46.06	1.65
Mexico	74.77	67.87	63.22	54.49	–20.28
Netherlands	44.98	46.15	47.52	50.72	5.74
New Zealand	52.28	52.78	52.30	51.27	–1.01
Norway	54.40	54.87	53.96	51.83	–2.57
Poland	54.26	51.51	45.33	40.76	–13.49
Portugal	51.98	48.79	47.98	50.19	–1.80
Russian Federation	49.65	50.20	43.19	39.68	–9.97
Slovak Republic	55.54	50.58	43.93	38.33	–17.21
Spain	50.47	47.06	46.08	48.61	–1.85
Sweden	55.56	57.02	55.01	55.33	–0.23
Switzerland	46.19	47.74	48.52	47.57	1.38
United Kingdom	53.21	54.54	52.93	53.14	–0.06
United States	51.87	52.52	50.42	49.84	–2.03
Brazil	65.97	60.00	53.25	46.78	–19.20
India	70.62	67.02	61.97	52.97	–17.65

Source: World Bank and EIIW calculations

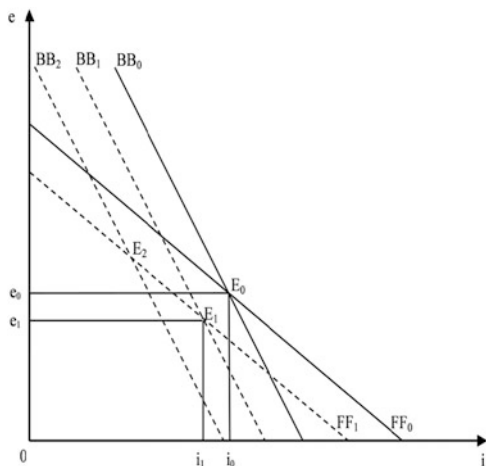
$$\begin{aligned} \frac{de}{dD} &= - \frac{\det \begin{pmatrix} -b_D \left(\frac{B}{P} + \frac{M}{P} + \frac{eF^*}{P} \right) & b_i \left(\frac{B}{P} + \frac{M}{P} + \frac{eF^*}{P} \right) \\ f_D \left(\frac{B}{P} + \frac{M}{P} + \frac{eF^*}{P} \right) & -f_i \left(\frac{B}{P} + \frac{M}{P} + \frac{eF^*}{P} \right) \end{pmatrix}}{\frac{F^*}{P} \left(\frac{B}{P} + \frac{M}{P} + \frac{eF^*}{P} \right) (bf_i + b_i(1-f))} \\ &= - \frac{P}{F^*} \frac{\left(\frac{B}{P} + \frac{M}{P} + \frac{eF^*}{P} \right) (b_D f_i - b_i f_D)}{bf_i + (1-f)b_i} \end{aligned} \quad (XIII')$$

$$\begin{aligned} \frac{di}{dD} &= - \frac{\begin{pmatrix} b \frac{F^*}{P} & -b_D \left(\frac{B}{P} + \frac{M}{P} + \frac{eF^*}{P} \right) \\ (1-f) \frac{F^*}{P} & f_D \left(\frac{B}{P} + \frac{M}{P} + \frac{eF^*}{P} \right) \end{pmatrix}}{\frac{F^*}{P} \left(\frac{B}{P} + \frac{M}{P} + \frac{eF^*}{P} \right) (bf_i + b_i(1-f))} \\ &= - \frac{bf_D + (1-f)f_D}{bf_i + (1-f)b_i} = \frac{n'f_D}{b(f_i + b_i) + n'b_i} < 0 \end{aligned} \quad (XIV')$$

A rise of the dependency ratio will shift the equilibrium schedule for the domestic bonds market to the left since for a given exchange rate, equilibrium can only be maintained if the interest rate i is falling. Since a rise of the dependency ratio reduces the demand for foreign bonds, the nominal exchange rate has to fall – implying a reduction of the supply of foreign bonds – if equilibrium in the foreign bonds market is to be maintained (or for a given exchange rate the domestic interest rate has to fall). The overall effect will be a fall of the nominal interest rate and an appreciation or a depreciation of the exchange rate. In the case that domestic and foreign bonds are close substitutes, the leftward shift of the BB curve will be modest (BB₁) so that we get an appreciation of the currency; if the shift of the BB curve is strong (BB₂), we get a depreciation. If prices abroad and at home are unchanged, the case with BB₁ amounts to a real appreciation and a fall of the real interest rate which in turn should stimulate net imports of goods and services as well as investment in the medium term. Note that a rise of the supply of domestic government bonds (in real terms will) – e.g., due to higher pensions to be paid – shifts the equilibrium schedule BB of the domestic bonds market to the right which implies a rise of the interest rate and a depreciation of the currency (Fig. 2.3).

Finally, it is noteworthy that the dependency ratio can fall due to net immigration or due to a baby boom. In this perspective the baby boom of 2012 in the UK thus could have interesting implications provided that the baby boom is not just transitory. The dependency ratio could increase in some euro crisis countries if the

Fig. 2.3 Role of the dependency ratio in the Branson model: rise of dependency ratio



fertility rate is falling due to the crisis. Increasing emigration of euro crisis countries will not have an effect on the euro exchange rate as long as this emigration stands for immigration into other euro countries. The strong increase of the dependency ratio expected in China around 2040/2050 should bring about a depreciation of the Chinese currency (vis-à-vis the US dollar and the €) and a fall of the interest rate. These new ideas presented in the context of an augmented Branson model with an ageing society should encourage further research along the lines suggested. In an augmented model which includes the stock market, one can consider the effects of a change of the dependency ratio one, i , and the stock market price index P' .

If one considers a closed economy with bonds, stocks, and money, one can consider a simple portfolio model which determines the stock market price index P' and the interest rate. Looking at a closed economy model makes sense if we are interested in understanding the effect of a rising global dependency ratio on the world economy – the world economy is the only closed economy that exists in reality; after 2050 the world economy is facing global ageing. The stock market price equilibrium line has a negative slope in $P' - i$ space ($P'P'$ schedule). The slope of the bonds market equilibrium line has a positive slope. A rise of the dependency ratio will shift the $P'P'$ schedule to the left and the BB schedule – portraying equilibrium in the bonds market – upwards.

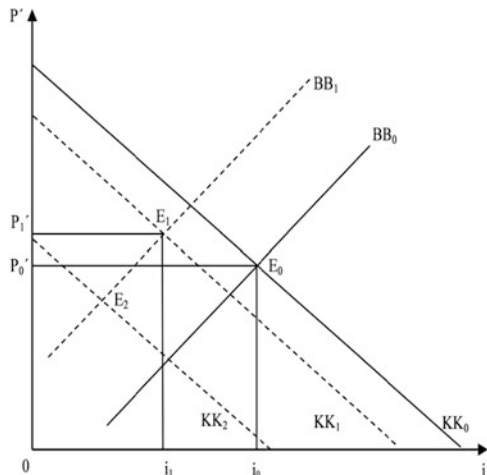
$$B/P = b(i, z, D) \left(B/P + M/P + P'K/P \right) \quad (XV')$$

$$M/P = n'(i, z, D) \left(B/P + M/P + P'K/P \right) \quad (XVI')$$

$$P'K/P = h(i, z, D) \left(B/P + M/P + P'K/P \right) \quad (XVII')$$

$$b + n' + h = 1 \quad (XVIII')$$

Fig. 2.4 Impact of a rise of the dependency ratio on the stock market price index and the interest rate in a closed economy



This is the adding-up constraint in the new setup of the model. There clearly will be a fall of the interest rate and of the stock market price index (and hence a reduction of medium-term investment if one follows the logic of Tobin's Q-approach). In the world economy, the medium-term perspective is characterized by a decline of the dependency ratio, notably driven by the USA and the BRICs. By contrast, the situation in the eurozone is characterized by a rise of the dependency ratio. After 2050 this should be also the general tendency in the world economy (Fig. 2.4).

The multipliers for dP'/dD and di/dD are shown subsequently on the basis of XV' and XVII'.

$$\frac{dP'}{dD} = -\frac{P}{K} \frac{\left(\frac{B}{P} + \frac{M}{P} + \frac{P'K}{P}\right)(b_D h_i - b_i h_D)}{b h_i + (1-h)b_i} \quad (\text{XIX}')$$

$$\frac{di}{dD} = -\frac{b h_D + (1-h)h_D}{b h_i + (1-h)b_i} = \frac{n'^{h_D}}{b(h_i + b_i) + n' b_i} < 0 \quad (\text{XX}')$$

The multiplier di/dD is negative if we follow the standard assumption that the own-price elasticity exceeds the cross-price elasticity for the interest rate. This assumption also guarantees $di/dD < 0$ for the Branson model. If $|b_D h_i| > |b_i h_D|$, the sign $dP'/dD > 0$. Empirical analysis can shed further light on the critical conditions. The new insights for the impact of a change in the dependency ratio are crucial for Europe and the world economy, respectively.

2.1.2 Social Market Economy and Economic Globalization

A social market economy combines the allocation of resources in competitive markets with income redistribution and social policies which mainly refer to

Table 2.3 Redistribution of income in EU-countries (net-transfers as a percentage of net-income in 2009)

Ireland	61.7	−6.9	Great Britain	39.5	−23.8	Cyprus	33.8	2.7
Finland	53.9	−20.6	Bulgaria	38.9	1.0	Malta	29.3	−13.2
Denmark	50.1	−36.4	Portugal	38.3	−10.8	Slovakia	27.4	−1.7
Sweden	45.8	−23.4	Latvia	37.8	−5.1	Luxembourg	26.5	−11.6
Germany	45.7	−17.3	Hungary	37.1	−9.3	Spain	23.0	−4.3
Belgium	45.2	−19.5	Slowenia	36.0	−19.5	Lithuania	22.9	−5.1
Czech Republic	42.3	−15.5	Austria	35.7	−18.4	Poland	17.3	−11.8
Estonia	42.2	−9.2	Netherlands	35.4	−38.4	Italy	13.2	−8.7
France	39.8	2.6	Romania	34.3	−4.8	Greece	11.1	−15.3

Source: Judith Niehues: Staatliche Umverteilung in der Europäischen Union, in: IW-Trends 1/2013, Cologne (Institut der Deutschen Wirtschaft)

How to read the table

Most people pay taxes and social security contributions – at the same time they obtain transfers from government. The net effect differs across countries: net transfer accounts for 46 % of net income for the bottom-quintile in Germany. The top-quintile has net payments of 17 % of net income

XX Bottom income quintile of the population

XX Top income quintile of the population

Taxes and social security contributions: Income taxes and social security contributions (share of employers); Transfers: pensions, unemployment insurance and social security payments related to sickness plus family allowances, also other social security payments (original data from Eurostat)

unemployment insurance, pension payments, and health insurance. As regards redistribution policies, it is remarkable that three EU countries effectively have a redistribution policy in favor of the top income quintile of the income pyramid: France, Bulgaria, and Cyprus. As regards redistribution in favor of the poorest quintile, Ireland, Finland, Denmark, Sweden, and Germany were the top 5 countries in 2009: In Ireland net transfers accounted for 61.7 % of the net income of the poorest 20 % in society, and in France and Denmark, the figures were 53.9 % and 50.1 %, respectively. In Sweden and Germany, these figures were 45.8 % and 45.7 %, respectively. At the bottom line of income redistribution for the bottom quintile were Spain, Lithuania, Poland, Italy, and Greece. In Greece net transfer accounted only for a very modest 11.1 % of net income for the bottom quintile (see subsequent table) (Table 2.3) (Figs. 2.5 and 2.6).

The rate of unemployment has an impact on the risk of poverty; in the euro crisis countries, unemployment rates have strongly increased – with Spain and Greece at the top of unemployment rates, namely, close to 25 % in 2013. The risk of poverty is relatively high in Portugal, Spain, Poland, Italy, Ireland, Greece, and EU Eastern accession countries (see the table above). As regards the social security system in Europe, health insurance is not linked to the job as in the USA. Those who become unemployment still have health insurance in Europe.

The social security system is a crucial element of a social market economy. In the EU some 95 % of the population is covered by health insurance, and in the USA, that figure was less than 70 % before the Obama administration raised the share to about 85 % in 2013. Progressive income taxation is a way to reduce after tax income

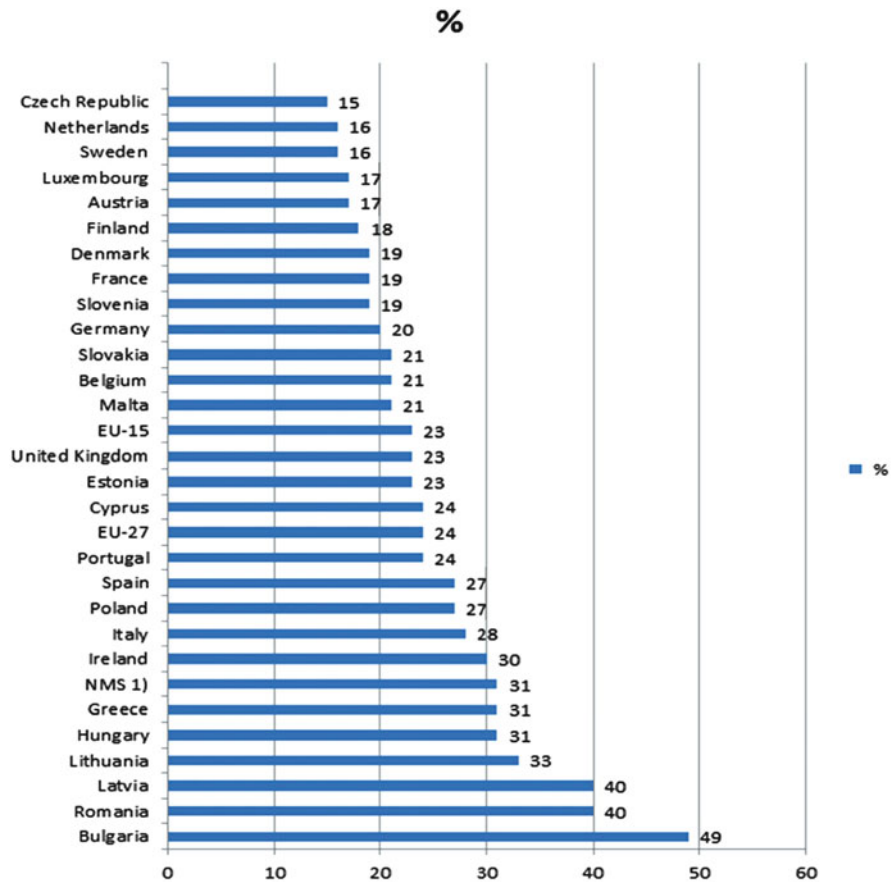


Fig. 2.5 Risk of poverty or social exclusion in Europe (Share of those at risk of poverty (AROPE) expressed as percentage in the year 2010/2011). New Member States (EU-27 without EU-15) (Sources: Eurostat; Institut der Deutschen Wirtschaft, Cologne)

differentials, but taxation comes with considerable costs in most cases: There are tax collection costs for the government and the costs of avoiding taxes on the side of the business community and private households. Some taxes and social security contributions are necessary to finance a social market economy. In most OECD countries, the ratio of government consumption to GDP is close to 20 % and so is the ratio of social security expenditures to GDP. In ageing societies there could be a tendency towards higher social security contributions relative to GDP since pension costs relative to output could increase and since some 50 % of health-care costs occur in the last few years of human life. However, the switch from a classical industrialized economy to a knowledge society has the advantage that even elderly people have the potential for a high level of labor productivity provided that

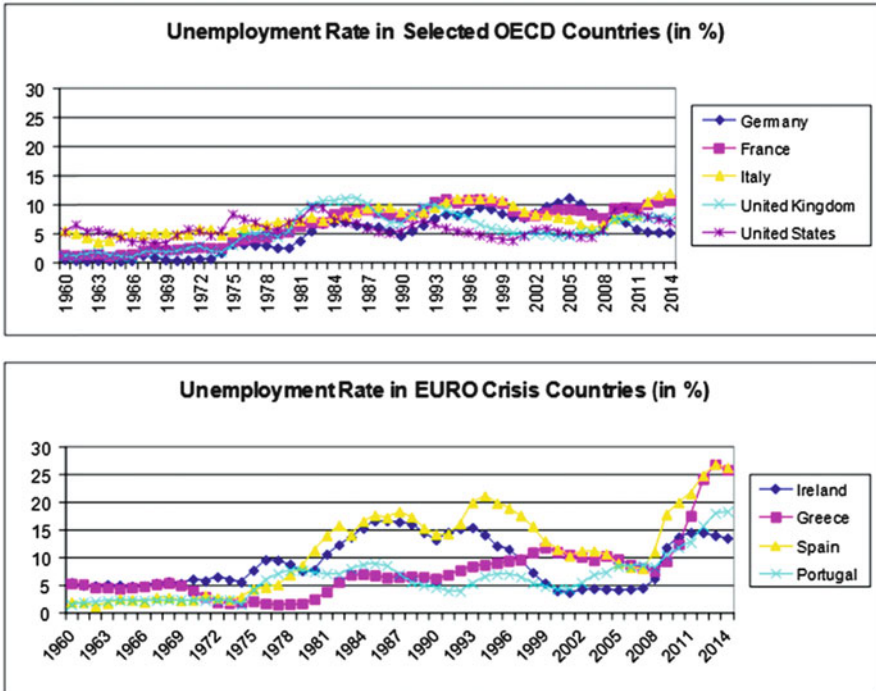


Fig. 2.6 Unemployment rate in selected OECD countries and in EURO crisis countries (in %) (Source: AMECO (before 1990 West German Data are used))

lifelong learning is taken seriously. Higher life expectancy is not a major problem for the economic system if people work longer and if labor markets are flexible.

In a social market economy, key challenges concern the structure of revenues. This is not only referring to the split between corporate taxation and labor taxation; the role of value-added taxation also is crucial. In Germany the revenue from value-added taxation exceeded in 2012 the revenue from all other types of taxation. Besides the revenue impact, the main effect of value-added taxation is that the income tax rate can be reduced on the one hand – this follows from government budget constraint – and that exports are stimulated as domestic demand for tradable goods will reduce after an increase of the VAT rate. In a small open economy, the excess supply in the tradable market is equal to the current account surplus.

As regards the aim of a rational tax system to minimize negative distortions, the best approach should be to introduce environmental taxation and other taxes designed to internalize negative external effects. The revenue should be used to finance subsidies for innovations and research and development, respectively, namely, to the extent that positive external effects are internalized. If there should remain “surplus revenue” from environmental taxation, this could then be used to finance public goods, and only for the remaining gap, income taxes and value-added

taxes should be considered. Social security contributions are necessary to finance unemployment insurance and the health-care system as well as part of the pension system. In principle it would be desirable to give tax incentives to households so that private households could realize a higher savings rate for private pension plans; capital-funded private pension systems could not only reflect individual preferences adequately but also generate higher savings which could contribute both to a higher level of the growth path and to a higher growth rate – the latter holds true provided that part of private savings is used to finance research and development and innovations, respectively. However, the Transatlantic Banking Crisis has largely undermined the confidence of millions of households in the banking system, and the effect might well be a reduction of the private savings rate. This in turn could generate pressure leading governments in Europe to raise social security expenditures on retirement and pensions, respectively. If, however, the social security contribution rates should be raised, there could follow negative distortions in labor markets: The unemployment rate could increase as a consequence of higher effective labor costs. In an ageing society, it is important to gradually raise the retirement age in order to avoid a critical rise in social security contribution rates and the unemployment rate, respectively.

During the euro crisis the increasing divergence in ratings of government bonds has made clear that promised future public pension payments have different probability. A country with public debt default will almost always cut pension payments. These differences in pension payment probability in turn should affect migration in the EU. Countries with top ratings such as Germany, Austria, Luxemburg, and Finland plus France and a few other countries should be able to attract more immigrants in the future, while countries with a sharp decline in ratings of government bonds should attract a reduced number of immigrants. To the extent that economic growth in euro crisis countries will recover and consolidation policies are successful, one may anticipate only temporary changes in international immigration. As regards economic growth, there is also the considerable role of information and communication technology whose expansion, however, creates its own problems (beyond all the positive effects on output and growth, respectively). The expansion of the Internet reinforces globalization since there are truly global Internet market which often are very competitive; the obvious exceptions are certain software markets and search engines as well as social media networks where economies of scale and network effects overlap in a way which undermines competition. The expansion of the Internet makes application of value-added taxation more difficult and part of value-added – with households effectively involved in the production process as “prosumers” (consumer is also producer, e.g., think about the online-booking of a holiday) – is not covered in official statistics.

Income Distribution Effects: Two Sides of the Digital Revolution. The digital revolution brings many economic advantages. However, for bank clients there often is a particular disadvantage since banks apply scoring models for market segmentation. Most banks give loans on the basis of some computer-based rating system,

and this is a fine system for banks to largely appropriate the “consumer surplus” in the loan market. This typically means that poor people pay much higher interest rates than people with a high per capita income. Poor people’s financial literacy has a tendency to be relatively modest which is often a reason why the effective interest rate of a loan obtained is much higher than for the same loan amount obtained by those in the well educated, high-income strata. A classical point of silent additional profit generation is life insurance policies which are sold to people who want a bank loan. Since governments in most EU countries do not give the bank’s client the right to buy the life insurance part of a loan in a separate market, the profit rates in banks’ life insurance business is extremely high, and a lot of cross-subsidization occurs in order to sell private households a “low interest loan” with an extremely expensive life insurance policy. Governments should, of course, not allow banks to sell such bundled financial services – this is clearly uncompetitive and will reinforce the inequality in society.

The owners of banks which benefit from the extra profits generated by such artificially bundled financial products will raise their relative income position at the expense of the majority of bank clients. It is surprising that in the EU, the European Commission would not allow Microsoft Office products to be sold with an exclusive search engine of Microsoft – an example of the unnecessary bundling of products. However, the combination of a loan and a life insurance product from the same bank must be accepted although there is no reason for such bundling. While it is true that in many EU countries banks will not automatically sell in-house insurance to those clients seeking a loan, there are many big banks and banking groups, which typically push their respective clients to buy in-house life insurance. In 2008 the German foundation Stiftung Warentest/Finanztest ran a test with 29 insurance companies relating to the insuring of a (remaining) loan of €100,000 in 2008 where the cheapest life insurance was €661 for women and €863 for men; Axa was the most expensive insurance company and charged €1,979 for women and €3,334 for men. Such massive price differences should be a reason for government’s consumer protection to become active here and push for more tests – every 6 months or so – and even the creation of new neutral platform from which to publish results for a wider audience.

In an economy with a competitive banking system, one should expect that real interest rates are important signals for households and investors, respectively; in the presence of a stable banking system, this could raise the savings rate. The role of private saving should not be overlooked in the context of social security aspects and the social market economy, respectively. If the government increases social expenditures relative to GDP, one should expect an increase of the deficit-GDP ratio; with a given trend growth rate of the production potential, this implies, however, that the long-term debt-GDP ratio will increase (as shown in the well-known Domar debt model), and a higher debt-GDP ratio could in turn bring about a decline of the rating of government bonds. It is unclear how rating affects private savings. In an open economy, a weaker rating of government bonds (e.g., moving close to C) will typically bring about an increasing demand for foreign bonds of a country with a top rating; a reaction which is known as the safe haven effect.

The theoretical and empirical research on the savings rate naturally will consider the medium-term goods market equilibrium condition and therefore implicitly explain the savings rate in a general equilibrium context. Since with I' standing for gross savings, G for government consumption, T for tax revenues, X for real exports, q^* for the real exchange rate, and J for real imports, savings $S = I' + (G - T) + (X - q^* J)$. If one assumes that $T = \tau Y$ (with τ denoting income tax rate; Y is real GDP) and that exports $X = x q^*{}^\eta Y^*$ (η is the export elasticity with respect to q^* , $*$ for foreign variable, $x > 0$) and imports $J = j Y^* q^*{}^{1-\eta}$. Considering that $I' = I(r, g_Y) + \delta K$ (where δ is the depreciation rate and I denotes net investment; r is the real interest rate, and g_Y is the growth rate of output which is a proxy for the expected yield on investment). Defining $G = \gamma Y$ ($0 < \gamma < 1$) and dividing the equilibrium condition for the goods market by Y , we have an implicit equation for the savings rate of private households. Considering a macroeconomic production function $Y = K^\beta L^{1-\beta}$ (K is capital, L labor, $0 < \beta < 1$), the marginal product of capital is equal to $\beta Y/K$. Note that $\delta K/Y$ can be written – with $\beta Y/K - \delta = r$ (reflecting profit maximization) as $\delta \beta / (r + \beta)$. From this perspective private saving relative to GDP should be a negative function of the real interest rate and a positive function of the deficit-GDP ratio and the current account surplus-GDP ratio. Add to this, the standard life-cycle perspective of savings according to which young workers are saving in order to provide for their retirement, while retired workers are living off accumulated wealth: A rising share of older people in total population – a rise of the dependency ratio – will thus go along with a smaller ratio of aggregate saving to GDP. The important empirical paper of Masson et al. (1998) on private saving in industrialized countries and developing countries shows that the ratio of private saving to GDP is a negative function of the government surplus ratio and the dependency ratio; their paper in the World Bank Economic Review shows also that the ratio of saving to GDP is a positive function of the current account ratio, the real exchange rate, and the GDP growth rate as well as a few other functions. The theoretical considerations presented have so far not considered the impact of the savings rate on per capita income and the capital intensity, respectively; however, this can be done in the context of a simple neoclassical growth model which can also accommodate the relevance of knowledge and the role of learning and the Internet society, respectively.

A Simple Growth Model with Knowledge and Digital Progress. Long-run economic growth and capital accumulation plus learning costs can be analyzed within a modified growth model. In a modern economy, knowledge (A) is important for production. New knowledge, however, cannot be implemented without training workers at some training costs. Thus, savings are necessary not only to finance gross capital formation $dK/dt + \delta K$ (K is the capital stock, t is time, and δ is the capital depreciation rate) but also to upgrade the skills of workers at some cost for training. Let us assume that these are proportionate to real per capita income $y := Y/L$ (Y is real GDP, L is labor): Innovation managers who have to train workers in using more advanced technologies will have a salary which is proportionate to the average per capita income, y , so that real upgrading costs are a

positive function of real per capita income. However, it also is assumed that the costs of labor upgrading are inversely related to knowledge and that the production function can be written as $y' := Y/(AL) = k'^{\beta}$ where $k' := K/(AL)$ and $0 < \beta < 1$. AL is labor in efficiency units. The real upgrading costs U for implementing dA/dt with all workers in the whole economy therefore are given by (with λ standing for a positive learning curve parameter)

$$U = (dA/dt)\lambda Ly/A = (dA/dt)\lambda Lk'^{\beta} \quad (I)$$

In an open economy with a balanced government budget and a balanced current account, the equilibrium condition for the goods market reads

$$S = dK/dt + \delta K + (dA/dt)\lambda Lk'^{\beta} \quad (II)$$

Dividing by AL and considering that $dk'/dt = (dK/dt)/(AL) - (a + n)k' -$ with a and n denoting the growth rate of knowledge and labor, respectively – we can write

$$S/(AL) = dk'/dt + (a + n + \delta)k' + a\lambda k'^{\beta} \quad (III)$$

By assumption savings $S = s(1 - \tau)Y$ where Y is real income, τ the income tax rate, and $0 < s < 1$ (s is the savings rate) so that we have a simply savings function $S/(AL) = s(1 - \tau)k'^{\beta}$. Hence the differential equation for dk'/dt reads

$$dk'/dt = (s(1 - \tau) - a\lambda)k'^{\beta} - (a + n + \delta)k' \quad (IV)$$

The steady-state (#) solution for k' # therefore is

$$k' \# = ((s(1 - \tau) - a\lambda)/(a + n + \delta))^{1/(1-\beta)} \quad (V)$$

As a parameter restriction, it is assumed that $s(1 - \tau) > a\lambda$. The learning curve parameter λ now reduces the level of the growth path. New learning or innovation technologies relevant for the learning process can reduce the parameter λ , and the Internet is a good example for such a new technology. The steady state for y' thus is given by

$$y' \# = ((s(1 - \tau) - a\lambda)/(a + n + \delta))^{\beta/(1-\beta)} \quad (VI)$$

The learning curve parameter λ will reduce the level of y' and hence the level of the growth path in the steady state. As (with e' standing for the Euler number) $A(t) = A_0 e'^{at}$ and $L(t) = L_0 e'^{nt}$, the growth rate of output in the steady state is given by $(a + n)$, and the level of the growth path is determined by the expression

$$A_0 L_0 ((s(1 - \tau) - a\lambda)/(a + n + \delta))^{\beta/(1-\beta)} \quad (VII)$$

Some refinement with the progress function is adequate: Consider a progress function (with $\lambda' > 0$; the exogenous progress rate is denoted by a_0) where the income tax rate has a negative effect on the progress rate, while the export ratio x

and the import ratio j (parameter $\mu > 0$; $\mu' > 0$, * for foreign variable) as well as a^* have a positive impact on the growth rate of knowledge

$$a = a_0 - \lambda' \tau + \lambda'' x + \mu j + \mu' a^* \quad (\text{VIII})$$

In an empirical implication for countries i ($i = 1, 2 \dots N$; with the exception of the USA), the variable a^* might be proxied by the US progress rate and the total factor progress rate, respectively; an alternative could be to consider the growth rate of international patent of US firms.

It has been implicitly assumed here that all exports and all imports contribute to new knowledge – if only a share of exports and imports, respectively, contribute to new knowledge, one could adjust the relevant parameters λ'' and μ adequately. Given the definition of $a := (dA/dt)/A$, we can write

$$dA/dt = (a_0 - \lambda' \tau + \lambda'' x + \mu j + \mu' a^*) A \quad (\text{IX})$$

A more open economy in the sense of a higher x and j , respectively, will raise dA/dt and hence raise the speed of knowledge accumulation. This also holds for an increase of a^* which is the foreign progress rate. One may consider the role of foreign direct investment for international technology spillovers. Letting α^* denote the share of capital in country I owned by investors from country II, one may replace μ' by $\mu'' \alpha^*$ where $\mu'' > 0$: a higher share of foreign ownership of the capital stock which goes along with a more intensified international technology transfer. Note, however, that the equilibrium condition for the goods market has to be adjusted also since savings of private households in country I are assumed to be proportionate to gross national income (not to GDP); in addition there is investment of foreign subsidiaries so that one can write $S = s(1 - \tau)(1 - \alpha^* \beta)Y + s'(1 - \tau) \alpha^* \beta Y$; here β is the share of capital income in an economy with competitive goods and labor markets and hence real GDP $= (1 - \alpha^* \beta)Y$, and s' is the investment ratio of foreign subsidiaries in country I.

$$\begin{aligned} dk'/dt = & (s(1 - \tau) - a\lambda)(1 - \alpha^* \beta)k'^\beta + \left(s'(1 - \tau) - a\lambda \right) \alpha^* \beta k'^\beta \\ & - (a + n + \delta)k' \end{aligned} \quad (\text{X})$$

Hence the steady-state solution is given by

$$k' \# = \left(\left((s(1 - \tau) - a\lambda) + (s' - s)(1 - \tau) \alpha^* \beta \right) / (a + n + \delta) \right)^{1/(1-\beta)} \quad (\text{XI})$$

If $s' > s$ cumulated foreign direct investment inflows will raise the level of the growth path. However, looking at the progress function $a = a_0 - \lambda' \tau + \lambda'' x + \mu j + \mu' a^*$.

Moreover, one may consider that a share $\Omega(0 < \Omega < 1)$ of the workers is employed for producing new knowledge. The production function is then $Y = K^\beta(A(1 - \Omega)L)^{1-\beta}$

The differential equation now reads

$$\begin{aligned} dk'/dt = & (s(1 - \tau) - a\lambda)(1 - a * \beta)(1 - \Omega)^{1-\beta}k'^{\beta} \\ & + \left(s'(1 - \tau) - a\lambda \right) (1 - \Omega)^{1-\beta} a * \beta k'^{\beta} - (a + n + \delta)k' \end{aligned} \quad (XII)$$

The parameter Ω has a negative impact on the level of the growth rate; however, one has to further consider the role of Ω in the progress function. The knowledge production function is assumed to be given (with a positive parameter Ω') by

$$dA/dt = \left(a_0 - \lambda' t + \lambda'' x + \mu j + \mu' a * + \Omega' \Omega \right) A \quad (XIII)$$

Hence the growth rate $d \ln A / dt$ is given by

$$a = a_0 - \lambda' \tau + \lambda'' x + \mu j + \mu' a * + \Omega' \Omega \quad (XIV)$$

The parameter Ω has a positive effect on the trend growth rate in the steady state, and this effect will clearly dominate in the very long run the negative impact on the level of the growth path. If the efficiency of researchers with respect to the progress rate is rising – indicated by a higher Ω' – the trend growth rate is raised. The expansion of the ICT sector might indeed bring about such a rise of the parameter Ω' . A true endogenous growth model would have to explain the parameter Ω on the basis of companies' optimization decisions and some relative price, respectively; but this can be left for further research.

The main impact of ICT on economic growth from an analytical perspective in a simple enhanced quasi-neoclassical growth model comes from four elements:

- ICT can increase trade, the export intensity, and the import intensity, respectively ([Jungmittag and Welfens 2009](#)).
- ICT could reduce the learning costs (see the parameter λ).
- ICT could reinforce the international innovation spillover effect – the typical finding in the literature that innovation spillovers have a rather limited radius (about 300 km or so is relevant here); however in the Internet, distance should play a more limited role for the creation of innovations and for the diffusion and spillover processes.
- Innovators can have a higher impact on the progress rate since digital R&D is associated with efficiency gains in innovation.

Growth Model and Revenue Maximization: New Insights. Let us consider a simple neoclassical growth model and the role of taxation. Basically, one may assume that bureaucrats want to maximize the budget and hence want to maximize

the tax revenue; this could hold for both a right-wing government and a left-wing government.

Let us consider an economy with a given population L and a given stock of knowledge A (A_0 is the knowledge in the initial period). The rate of capital depreciation is δ and the savings rate of private households is s and private savings $S = s(1 - \tau)Y$ where τ is the income tax rate and Y is real gross domestic product. If (with K denoting the capital stock) the production function is $Y = K^\beta(AL)^{1-\beta}$, the gross capital accumulation dynamics is determined by $dK/dt + \delta K$ and the goods market equilibrium $S = dK/dt + \delta K$, respectively, namely, for a closed economy with a government that has a balanced government budget. From the accumulation equation $S/(AL) = (dK/dt)/(AL) + \delta k'$ – with $k' := K/(AL)$ – and the production function $y' := Y/(AL) = k'^\beta$, we have the steady-state condition (# for steady state):

- (i) $k' \# = (s(1 - \tau)/\delta)^{1/(1-\beta)}$
- (ii) $y' \# = (s(1 - \tau)/\delta)^{\beta/(1-\beta)}$
- (iii) $y := Y/L = A_0(s(1 - \tau)/\delta)^{\beta/(1-\beta)}$
- (iv) $Y \# = A_0 L_0 (s(1 - \tau)/\delta)^{\beta/(1-\beta)}$

Assume that the government wants to maximize income tax revenue which then is spend on a public good or social security, respectively. It will be shown subsequently that the revenue-maximizing tax rate is given by $\tau^{\max} = 1/(1 + \beta/(1 - \beta))$. This revenue-maximizing rate approaches zero as β approaches unity and will approach unity if β approaches zero. In many empirical studies, β is assumed to be close to $1/3$. In this case the revenue-maximizing income tax rate is equal to $\tau^{\max} = 0.67$. This figure seems to be very high compared to average tax rates in OECD countries. Some refinements thus could be considered.

Let us look at the solution of the revenue-maximizing problem. The long-run income tax revenue $T = \tau Y \#$ is (for $A_0 = 1$; this assumption is not affecting the generality of the solution presented)

$$(v) \quad T = \tau L_0 (s(1 - \tau)/\delta)^{\beta/(1-\beta)}$$

Chose the income tax rate τ such that the government maximizes T or equivalently $\ln T$ – the latter being the more convenient approach.

- (vi) $\ln T = \ln \tau + (\beta/(1 - \beta))(\ln s + \ln(1 - \tau)) + \ln L_0 - (\beta/(1 - \beta))\ln \delta$
- (vii) $d \ln T / d \tau = 1/\tau - \beta/(1 - \beta)(1/(1 - \tau)) = 0$

The second derivative is negative, and hence the subsequent solution derived is maximizing the income tax revenue.

- (viii) $(1 - \tau)/\tau = \beta/(1 - \beta)$
- (ix) $1/\tau = 1 + \beta/(1 - \beta)$
- (x) $\tau^{\max} = 1/(1 + \beta/(1 - \beta)) = 1 - \beta$

The revenue-maximizing income tax is in the range between 0 and unity: If β approaches 0, the income tax rate is unity, and if β approaches unity, the income tax rate is zero. Hence, a rise of the output elasticity of capital – e.g., in the context of the accumulation of more “digital capital” and information and communication capital or in the context of economic globalization – will generate pressure in the

political economy setup chosen to reduce the income tax rate. The basic reason is that output per capita in the steady state is a positive function of β .

Next, let us consider an open economy with a balanced government budget and a balanced current account – plus full capital mobility. If the production function abroad (in country II) is similar in country I, the foreign production function reads $Y^* = K^* \beta^* (A^* L^*)^{1-\beta^*}$. The revenue-maximizing income tax rate therefore is for country II:

$$(xi) \tau^{*max} = 1/(1 + \beta^*/(1 - \beta^*))$$

If we have free capital mobility, the net marginal product of capital will be the same in both countries. If technologies indeed are the same in both countries (in line with the Heckscher-Ohlin assumption of identical technologies), we must have $\beta = \beta^*$ and also $A = A^*$. However, in reality income tax rates differ across countries. It is clear that in an open economy, it has to be considered that foreign direct investment outflows could occur. Moreover, one may assume that in both countries, there are two parties; in each country there is a left-wing party which wants to maximize tax revenue, and there is a right-wing party which wants to maximize per capita consumption and therefore wants to realize the golden rule and the respective tax rate. If countries are of different size, there will be some tax autonomy for the big country; the small country can only choose to have a lower income tax rate or to have the same income tax rate as abroad. Thus, a change in government abroad will bring about some adjustment in the small country as well (for simplicity assume that the government wants to have the same tax rate as τ^*), and there could be investment cycles caused by tax rate changes. A reduction of the income tax rate brings a higher steady-state capital intensity and hence a temporary investment boom in the transition stage; if there is international labor mobility, this could bring about changes in L and L^* , respectively, and it also could affect unemployment rates in both countries. If there is international political asymmetry of governments – e.g., a left-wing government in country I and a right-wing government in country II – the global economic equilibrium will differ from a situation of political symmetry. Hence we have an interesting new starting point for international political business cycles.

To the extent that G stands for the provision of a national public good, a government strategy of tax revenue maximization amounts to the maximum provision of a public good. If countries with generous provision of public goods can attract more immigrants than countries with a modest provision of public goods, there could be interesting side effects of a government strategy which aims at maximizing government revenue. Finally, it should be noted that a setup with the government and government debt ($b'' := (B/P)/Y$ where B is nominal debt and P is the price level; r is the real interest rate; the demand for government bonds relative to income b''^d is assumed to be a positive function of r) implies a budget constraint – with $G/Y := \gamma$ – in the form of $\gamma + rb''(r) = \tau$. The growth model determines the steady-state value of the capital intensity k and of k' , respectively; and profit maximization determines r and hence b'' . So if the government wants to determine the income tax rate, the ratio G/Y is endogenous. As regards the golden rule in a setup with population growth (n) and a growth rate of knowledge (a), it is clear that

we must have $(1 - \tau + r(\lambda + \lambda''r))\beta k^{\beta-1} = a + n + \delta$; the parameter λ'' is positive, and the term $(1 + \lambda''r)$ is used here as the demand function of b'' . Profit maximization determines r via the condition $(\beta k^{\beta-1} - \delta)(1 - \tau) = r$.

Becker et al. (2012) argue in an empirical analysis that economic globalization has no significant effect on the structure of taxation – or that the findings are inconclusive for the period 1990–2005. Fixed effects cover time-invariant country-specific effects, and in addition the authors consider the role of GDP, GDP per capita, and the membership in the EU (as dummy variable) plus the impact of various globalization variables; in the publication the authors show only the fixed effects and the proxy of the globalization variable. While Bretschger and Hettich (2002) found that the corporate tax rate has reduced for a sample of OECD countries, the findings of Becker et al. (2012) are rather different where part of the differences is related to a modified analytical focus in both studies. However, the rather broad study by Becker et al. (2012) is doubtful since the authors use the trade-GDP ratio as a proxy for globalization – as well as some other alternative variables for globalization (“KOF globalization indicator”; CHINN-Ito Index which largely puts the focus on nonexistence of multiple exchange rates and the barriers for trade and capital flows). Bretschger and Hettich (2002) had pointed out to the problems associated with the trade-GDP ratio as a measure of globalization. A serious caveat also concerns the issue whether one can analyze the tax revenue from corporate taxation (or income taxation) without simultaneously considering the role of value-added taxation. As Becker et al. (2012) consider both income taxations, corporate taxation and value-added taxation – relative to GDP – one has to carefully consider some theoretical points before the empirical analysis can start. Clearly, value-added taxation revenue T' is obtained from multiplying the value-added tax rate τ' with consumption. In an open economy with foreign direct investment, one should carefully specify the consumption function C : Here consumption C in real terms is assumed to be proportionate to real gross national income Z . If one considers VAT revenue, we can write – assuming that real consumption $C = c(1 - \tau)Z$ (here c is the marginal consumption ratio which is in the interval $0,1$). If $Y = K^{\beta}(AL)^{1-\beta}$ and the share of foreign investors in the capital stock is $\alpha *$ (α is the share of investors of country I in the capital stock of country II) and considering that in a competitive economy, the share of profits in gross domestic product is β , one can (with $q * := eP */P$ where e is the nominal exchange rate) write for the real GNP:

$$(xi) \quad Z = Y(1 - \alpha * \beta) + \alpha \beta * Y * q *$$

Hence the VAT revenue is given by

$$(xii) \quad T' = \tau'c(1 - \tau)(Y(1 - \alpha * \beta) + \alpha \beta * Y * q *)$$

The ratio of T' to Y is thus given by the expression

$$(xiii) \quad T'/Y = \tau'c(1 - \tau)((1 - \alpha * \beta) + \alpha \beta * Y * q */Y)$$

T'/Y is a positive function of the VAT rate τ' and a negative function of the income tax rate τ (here the income tax rate is equal to the tax revenue relative to GDP); it is obvious that an empirical estimation of the VAT revenue relative to GDP and of the income tax revenue relative to GDP cannot be made in an isolated way – as is done by Becker et al. (2012) – rather there is an interdependency

between the two revenue shares. Moreover, T'/Y is a negative function of the globalization variable α^* and is a negative function of α ; cumulated inward foreign direct investment and cumulated outward FDI thus are important variables which have to be considered in an analysis on taxation and globalization. To the extent that globalization is accompanied by ageing, there are additional effects to be considered; a rise of the dependency ratio raises the average income tax rate required to balance the budget. If one also wants to consider that c is a negative function of the VAT rate, we may specify $c = (1/(1 + \lambda\tau'))$; we can use here the approximation $c(\tau') = 1 - \lambda\tau'$ where it has been assumed that $\lambda\tau'$ is close to zero; and the savings rate then is a positive function of the VAT rate: $s = \lambda\tau'$.

Dividing by $(1 - \alpha^* \beta)$ results in the following expression:

$$(xiv) \quad T'/(Y(1 - \alpha^* \beta)) = \tau'c(1 - \tau)(1 + \alpha\beta^* Y^* q^*/(Y(1 - \alpha^* \beta)))$$

If one assumes that $\alpha\beta^* Y^* q^*/(Y(1 - \alpha^* \beta))$ is very small and indeed close to zero, we obtain the following approximation from taking logs:

$$(xv) \quad \ln(T'/Y) = -\alpha^* \beta + \ln\tau' + \ln c(\tau') - \tau + \alpha\beta^* Y^* q^*/(Y(1 - \alpha^* \beta))$$

The ratio T'/Y and the logarithm of T'/Y , respectively, are a negative function of the income tax rate; and it is a positive function of the VAT rate provided that $1/\tau' > (1/c)(\partial c/\partial \tau')$; this should hold until to a critical level the VAT rate. If globalization leads to a fall of the income tax rate, the ratio of VAT revenue to GDP will increase. The effect of the globalization parameter α^* is unambiguous as is the impact of α .

The impact of α^* can be derived from the equation

$$(xvi) \quad d\ln(T'/Y)/d\alpha^* = -\beta(1 + \alpha\beta^* Y^* q^*/(Y(1 - \alpha^* \beta)^2)) < 0$$

$$(xvii) \quad d\ln(T'/Y)/d\alpha = \beta^* Y^* q^*/(Y(1 - \alpha^* \beta)) > 0$$

One might additionally want to consider the impact of the domestic income tax rate and the foreign income tax rate on α and α^* . Thus, one can get a better theoretical understanding of the key links between taxation and economic globalization. Besides the issue of the role of capital flows it is important to shed light on the role of immigration.

2.1.3 Immigration

An interesting analysis related to the unemployment system and immigration has been developed by Kemnitz (2009), and some aspects just mentioned indirectly play a role in his analysis which raises some doubts that immigration of skilled workers always has positive welfare effects for the host country. In the public this view is widely held since it seems obvious that immigration of skilled workers will raise gross domestic product; and often skilled immigrants – or their children – might become entrepreneurs who contribute to the creation of new jobs for both skilled workers and unskilled workers (the latter aspect is, however, not considered in the analysis of Kemnitz). The general view in the literature is that immigration of skilled workers generates considerable benefits for the receiving countries (e.g., OECD 2002), while there is a broader debate about brain drain

effects for the source countries (e.g., Bhagwati and Hamada 1974; Mountfort 1997; Eggert et al. 2007; Haupt and Janeba 2009; emigration might also give an incentive for pupils in potential source countries to be more ambitious and eager in school – and perhaps only a minority of the young people will leave the country later – and this will have a positive impact on productivity and real income of the source countries). However, there are few papers, which raise critical questions on the generally positive perception of skilled immigration. Michael (2006) presents a full employment model in which immigration of high skilled workers could generate additional low skilled immigration – namely, on such a scale that the positive fiscal effects of the high skilled immigration groups will be dominated by the negative fiscal effect of unemployed unskilled workers. Kemnitz (2009) presents a different approach which considers flexible labor markets for skilled workers and labor markets of unskilled workers whose wages are determined by trade unions which maximize in the respective firm where the union's objective is Ω is determined by the equation:

$$\Omega = \ln\left(\left(1 - t'\right)w'' - v\right) + \ln L \quad (2.1)$$

Here t' denotes the contribution rate to unemployment insurance, v is the unemployment benefit of unskilled workers, and w'' is the real wage rate of unskilled workers; the volume of work of unskilled labor is L . Aggregate output Y in the economy considered is assumed to be described by a simple CES function

$$Y = A(\lambda H^\beta + (1 - \lambda)L^\beta)^{1/\beta} \quad (2.2)$$

where H denotes skilled labor; A is knowledge and λ and β are positive parameters. The respective marginal product of H and L is positive, and the cross-elasticity also is positive so that we have gross substitutability of skills. The native population consists of skilled workers NH and unskilled workers NL , and the number of high skilled immigrants is MH . For simplicity, all immigrant workers are assumed to be skilled workers. Unions determine – following a standard union monopoly model (Layard et al. 1991) – the wage of low skilled workers in accordance with maximizing net per capita income and firm's employment, namely, according to the equation

$$\Omega = \ln\left(\left(1 - t'\right)w'' - v\right) + \ln L \quad (2.3)$$

Firms hire both types of labor in accordance with the respective marginal product conditions

$$\partial Y / \partial H = w' \quad (2.4)$$

$$\partial Y / \partial L = w'' \quad (2.5)$$

Both L and w' will adjust for equilibrium. With respect to the skilled wage w' , the condition $H = N^H + M^H$ must be met for equilibrium in the skilled labor market: The demand for skilled workers must be equal to the sum of native skilled workers plus immigrants. Trade unions will anticipate the behavior of firms and therefore maximize the objective function subject to the hiring conditions of firms, and this leads to the following first-order condition:

$$(1 - t') / ((1 - t')w'' - v) = E_{L, w''} \quad (2.6)$$

Here $E_{L, w''}$ is the elasticity of unskilled labor with respect to w'' and the wage setting equation and thus – taking into account that the aggregate low skilled labor demand cannot exceed aggregate supply – can be expressed as

$$W'' = (1 - t')w''(1 + EL, w'') - vEL, w'' < 0 \text{ (or } = 0) \quad (2.6')$$

The unskilled net wage therefore is a markup of the unemployment benefit term v . Since a higher labor demand elasticity will bring about higher employment losses from a given wage increase, the markup – read the gross wage – is inversely related to $E_{L, w''}$.

The elasticity of unskilled labor demand with respect to wage is given by the expression $E_{L, w''} = (\lambda H^\beta + (1 - \lambda)L^\beta) / ((\beta - 1)\lambda H^\beta)$. Low skilled labor demand is always elastic with respect to w'' but is the less elastic the more high skilled workers are available ($\partial E_{L, w''} / \partial H > 0$). From the perspective of the small unions active at the firm level, the unemployment benefit term v is exogenous; however, at the level of the overall economy, it has, of course, to be financed for all those who are unemployed. Since this financing constraint is $v(N^L - L) = t'w''L + \delta't'w'$, one obtains that

$$v = t'w''L / (N^L - L) \left(1 + \delta'\lambda / (1 - \lambda)(H/L)^\beta \right) \quad (2.7)$$

If δ' is positive, this could be considered as actuarial unfair since skilled workers are contributing to the unemployment insurance system, but this is the typical setup of a public unemployment insurance system in OECD countries; in a Rawlsian perspective, it still could be considered as fair and politically desired by a majority. As a further comment: One may well consider different reform options for unemployment insurance systems; incentives for unskilled workers to invest in training and skill upgrading so that the share of unskilled workers is falling and that of skilled workers is rising could be introduced by the government. It also is noteworthy from the empirical literature that the rate of return on training/skill upgrading

for unskilled workers is roughly the same as for skilled workers in Germany – but the barriers for unskilled workers to engage in training/skill upgrading is much larger than for skilled workers who have more experiences with such activities and with examinations, respectively (IZA paper).

It can be shown in the Kemnitz model that there can be one labor market equilibrium for unskilled workers or several equilibriums. Moreover, Kemnitz (2009) shows that high skilled immigration reduces low skilled native employment: With skilled immigration, the low skilled labor demand becomes less elastic, and this raises the markup for a given benefit so that trade unions will demand higher wages so that unskilled employment will fall. Moreover, a rising population share of the skilled workers will raise their contribution relative to that of low skilled workers, and this will generate a higher fiscal redistribution via unemployment insurance – the increase in unemployment benefit causes a further rise in wage demands for unskilled workers. A further interesting finding of the model is that skilled immigration reduces the income of the native skilled workers and has an ambiguous effect on the expected earnings of the native low skilled.

A general caveat which can be raised against the basic findings in the interesting paper of Kemnitz (2009) is that there is no consideration about the links between the share of skilled workers and the level of technology A . Typically, a positive link would be expected, and this then would bring about more favorable findings on the welfare effects of skilled immigration.

Let us focus on some additional aspects. Consider the production function again, namely, in the form

$$Y^B = A(\lambda H^B + (1 - \lambda)L^B) \quad (2.8)$$

Dividing by L^B gives (defining $y := Y/L$; $h := H/L$)

$$y = A(\lambda h^B + (1 - \lambda))^{1/B} \quad (2.9)$$

Assuming that $\lambda(h^B - 1)$ is close to zero so that we can use the approximation $\ln(1 + x) = x$ (for x close to zero), we can write

$$\ln y = \ln A + (1/B)\lambda(h^B - 1) \quad (2.10)$$

If we Assume that $A=h^B$, we get the production function

$$\ln y = \beta' \ln h + (1/B)\lambda(h^B - 1) \quad (2.11)$$

From this it follows that an increase of the ratio of skilled labor to unskilled labor will increase the ratio Y/L . The next point is to analyze to which extent a rise of Y/L translates into a rise of w'' . Another issue to be raised concerns foreign direct investment and the role of physical capital, respectively. This makes the production function, of course, more complex, and at the same time, one might want to consider the role of foreign direct investment inflows on technology. Moreover,

in the presence of cumulated foreign direct investment, one might witness a higher demand for skilled labor, but multinational companies might also be active in training and skill upgrading so that a side effect of foreign direct investment inflows could be a rise of the ratio of skilled workers to unskilled workers, namely, through a fall of the number of unskilled workers. At the same time, one might have to consider supply side crowding-out effects from the presence of MNCs (naturally, here the focus is on greenfield investment); if some of the domestic firms will have to close down – firms (with a modest product quality) which may be assumed to employ a relatively high share of unskilled workers – the number of unemployed might transitorily increase.

Globalization and Foreign Direct Investment. Two key elements which have contributed to rising global economic growth are rising foreign direct investment (FDI) – this implies a increasing role of multinational companies – and the growing role of the Internet and information and communication technology (ICT). The Internet creates a higher degree of global transparency about investment conditions, on the one hand, while on the other hand, it also conveys better information worldwide about differences in living standards; and this in turn – along with differences in unemployment rates (across countries or regions) – will stimulate outmigration; migration can be temporary or it could be a long-term phenomenon. The Internet has also created new digital markets and indeed many digital markets are global markets; thus the Internet is part of the broader globalization dynamics. A particular aspect is that the Internet and ICT, respectively, make services more tradable. It is no longer true that services are difficult to trade. Rather, the share of services in global trade is rising and new OECD input–output tables, available since early 2013, indeed have revealed that the share of services trade – based on true value-added in exports and imports, respectively (i.e., correcting traditional export figures for imported intermediate products contained in these products) – is higher than traditionally thought: Its share in total world trade is about 50 % in 2010 and thus was more than double the traditional figure of about 20 %.

The traditional textbook view of international trade is that countries (or rather firms in country I and country II – in the context of a two-country textbook model) specialize after opening up in accordance with comparative advantage. While Ricardo has emphasized international differences in productivities across countries, the Heckscher-Ohlin approach assumes that technology across countries is identical; in such a setting – and assuming that there is no international factor mobility (neither labor mobility nor capital mobility) – the standard finding in a $2 \times 2 \times 2$ model with 2 countries, 2 goods, and 2 production factors (typically capital K and labor L) is that opening up of the two small countries considered will lead to specialization in both countries so that output of good 1 in country I will relatively increase; by contrast, in country II the production of good 2 will relatively increase – and it will be exported in exchange of good 1 imported from country I; note that the small country assumption implies that world market prices, once economies have

opened up, will not change as export volumes or import volumes are changing. In the end opening up brings structural change and specialization gains in both countries, and this implies real income gains through free trade. The assumption here is that relative factor endowment differs across countries, namely, that country I is relatively capital abundant so that the capital intensity K/L is higher than K^*/L^* (* for foreign variables). It has been assumed here that good 1 is relatively capital intensive in production and good 2 relatively labor intensive in both countries; according to the Heckscher-Ohlin approach, the country with the relatively high capital intensity will increasingly specialize on the production of that good which is relatively capital intensive in production; hence after economic opening up, country I will specialize more on the production of good 1 – say automobiles (assumed to be capital intensive in production) – while country II will specialize more on good 2 – say textiles (assumed to be labor intensive). One can show that in a setup with competition in both countries which drives prices down to the respective marginal costs the level of consumption can be increased in both country I and country II so that a positive welfare effect is realized in both countries. Hence trade brings about an increase in the standard of living in both countries. The only exception covered in textbooks concerns immiserizing growth (first analyzed by Jagdish Bhagwati) which brings about a fall of the real income in a big country which is opening up and subsequently – in the context of economic growth which reinforces specialization patterns – suffering from a fall of the relative price of the good which it is exporting; indeed, for the big country, one cannot assume that opening up goes along with a constant world market price. Indeed, with respect to reality, immiserizing growth obviously is very rare and economic policymakers certainly could try to influence structural change over time and to indeed avoid the problem of immiserizing growth. Ignoring this rare special problem of immiserizing growth, we turn back to the Heckscher-Ohlin approach and should emphasize one more implication, namely, that trade will bring about a convergence of relative factor rewards – e.g., as measured by the real wage rate w relative to the real interest rate r (taken here to be the rate of return to capital). If country I is relatively capital abundant – capital intensity k ($k := K/L$) will then exceed K^*/L^* – it will initially, before economic opening up, hold that $w/r > w^*/r^*$. Indeed, the relative wage rate in country I is relatively high because capital intensity is relatively high. To put it differently, as in the context of a Cobb-Douglas production function (with Y denoting GDP) per worker production $Y/L := y = k\beta$ ($0 < \beta < 1$), the fact that $k > k^*$ (while $\beta = \beta^*$ which is in line with the assumption of identical production technologies in both countries) implies that the marginal product of labor Y_L in country I exceeds the marginal product of labor $Y_{L^*}^*$ in country II – and this holds in both sectors since workers are mobile within each countries between sector 1 and sector 2 so that nominal wages are equal in both sectors. Since competition in goods markets and factor markets will bring about $Y_L = w$ in country I and $w^* = Y_{L^*}^*$ in country II, we have $w > w^*$ in the initial situation of economic opening up; indeed, one can show that $w/r > w^*/r^*$. However, economic opening up will bring about a situation in which country I will import textiles – read labor intensive

products – while firms from country I will export capital-intensive goods; hence country II imports automobiles. As country I (say the EU) is importing labor-intensive goods, the effective supply of labor – partly embodied in the goods imported by country I – is rising in country I, while the import of capital-intensive goods in country II implies that the effective supply of capital is rising abroad (say in China). The medium-term effects of trade thus are that the relative effective scarcity of labor and capital is changing through trade: In country I the factor price ratio w/r will fall in the context of the import of labor-intensive goods, while w^*/r^* will rise as r^* is declining in the context of the import of capital-intensive goods in country II. Thus, under free trade there is a tendency towards international factor price equalization, and indeed we will have $w/r = w^*/r^*$ once that aggregate capital intensity $k = k^*$. If population growth rates are equal in both countries and if the savings rate $s = s^*$, it can indeed be shown that in the long run, we will have $k = k^*$. Thus, we have a good explanation why trade brings about international economic convergence in the sense of an equalization of real wages and real interest rates, respectively. In reality one may raise doubts whether or not technologies are equal across all countries; that is, while technologies might be the same across OECD countries, it is doubtful that a general proposition that technologies across countries are identical across countries. To some extent one may support a general argument for identical technologies across countries, namely, to the extent that the type of machinery and equipment used in the tradable sector in most countries probably is very similar. However, there also is a role of the non-tradable sector – including many services – and here technologies differ across countries.

In a broader perspective – assuming that capital is mobile across countries (and hence capital costs are equal across countries) – the international competitiveness of countries depends on product innovations and unit labor costs. A country which has many innovative firms which launch new products – thus fetching temporarily monopoly prices in domestic markets and foreign markets – will fetch relatively high prices abroad. Hence the marginal value product of labor (marginal product of labor times the product price) will be raised through the “Schumpeterian monopoly price” which is, however, only a temporary phenomenon. At the aggregate level of the economy, unit labor costs is the ratio of the nominal wage costs WL to output (Y) or to put it differently: $W/(Y/L)$ so that nominal unit labor costs is equal to the ratio of the nominal wage rate W to average labor productivity. If the offer price of firms is unit labor cost times $(1 + m')$ – where m' is a markup factor – the offer price $p = (W/(Y/L))(1 + m')$; the foreign offer price will be $p^* = (W^*/(Y^*/L^*))(1 + m'^*)$.

In a multi-country world, firms will be able to sell in the world market only if the offer price is below or equal to the given world market price (hence the firms are considered as price-takers which implies that here, we are not considering a setup with product innovations): If the markup factor m'_i is roughly equal to m'_j (with i and j denoting two different countries), there is a risk of firms from country i to lose international market share once that $W/(Y/L)$ exceeds $W^*/(Y^*/L^*)$. If firms from

country I are competitive this means that $W/(Y/L)/(W^*/(Y^*/L^*))$ is equal to unity or below unity; international competitiveness is maintained if the growth rate of the nominal wage rate is parallel to the growth rate of labor productivity. In an international comparison, relative wage growth – and hence W/W^* – can differ as can relative productivity development $(Y/L)/(Y^*/L^*)$. If labor productivity growth is similar across countries, a strong rise of the wage rate W relative to W^* implies a critical loss of competitiveness. The reflections presented so far refer to a setup with full employment in both countries. However, there are many countries with temporary or structural unemployment. A rise of unemployment can bring about a rise of average labor productivity, namely, to the extent that firms will lay off at first the least productive workers. At the same time, unemployment insurance has to be financed which effectively amounts to an induced rise of the nominal wage rate and the effective wage costs, respectively. The total wage rate $W' = W(1 + h)$ where h is the social security contribution rate; h will have to be raised if the unemployment rate is rising. Thus, rising unemployment rates could negatively affect international competitiveness which is now determined by the ratio $(W'/(Y/L))/(W'/(Y^*/L^*))$. Social policies in OECD countries concern contributions to unemployment insurance as well as for pensions and for health care; in some countries – e.g., in Scandinavia – pensions are largely not financed through social security contributions which raise wage costs and thus undermine international competitiveness, rather public pensions are mainly financed through high value-added taxes. A high value-added tax is not only indirectly reducing relative unit labor costs – as social security contribution rates will be low in countries which finance social security mainly via value-added taxation – but it also is dampening the domestic demand for tradable. Assume that in country I (the home country), a rise of the VAT is implemented by policymakers. The result will be that the domestic prices of tradables will increase which amounts to a dampening of domestic demand for tradables. In a small open economy, the difference between production and domestic demand is equal to net exports. Hence a rise of the VAT rate implies an improvement of the current account, namely, as exports are increasing and as imports are falling; the latter is related to the fact that the increased VAT rate will be imposed on the net foreign offer price – this holds at least for the current VAT system in the EU.

Trade theory combined with traditional growth theory implies international convergence of per capita incomes so that $y = y^*$ in the long run; as $y = Y/L$, one could also argue that there will be convergence of labor productivity across countries. The empirical evidence clearly suggests that free trade has contributed to international convergence of per capita income; however, there is also the fact that within countries, income differentials have increased in the context of economic globalization (Jaumotte et al. 2008); here globalization is defined as the combination of free trade plus free capital flows plus the expansion of information and communication technology. The empirical evidence for the global sample of countries considered by Jaumotte et al. indeed shows that there is convergence of

per capita income across countries but that income inequality within countries is rising. The latter is a paradox at first sight, but as the authors show, this is not so surprising if one takes into account the role of both financial globalization and ICT, respectively. The expansion of ICT across countries clearly brings a bias in the demand for skilled labor; this demand is rising relative to the demand for unskilled labor in almost all countries. Hence the ratio of the wage rate of skilled labor relative to that of unskilled labor is rising (at least until technology dynamics in ICT are such that new software is no longer requiring the use of more skilled labor – this basically points to the crucial role of further standardization in software packages). Moreover, financial globalization of the two decades after 1990 implies that the price of loans has declined worldwide; read the real interest rate has fallen. Hence households can obtain loans at lower interest rates than before financial globalization; however, to get a loan from a bank, one needs either collateral (say, you already own some real estate) or one should have a well-paid job which amounts to emphasizing a high wage income through skilled labor. Hence the skill-biased technological change is twice in favor of skilled workers: they can fetch a wage premium in each country, and they can more easily obtain access to loans at favorable terms than unskilled workers. Thus, we can explain international convergence of per capita income across countries through increasingly free trade and the rising role of the GATT/WTO, respectively; at the same time in each country, there are rising income differentials between skilled workers and unskilled workers – and this largely is the consequence of financial globalization and the role of technology (read the increasing role of ICT; it is noteworthy that the skill premium also increased in the first decade of the nineteenth century when the electrical industry expanded in industrialized countries, but in the 1920s, the skill premium sharply fell in the USA as standardization in electrical industry reduced the relative demand for skilled workers; see Aghion et al. 2009, *The Economics of Growth*, p. 205).

Hence, economic globalization does not generally bring about international economic convergence across countries; however, this is not due to trade but rather to the role of financial globalization and the impact of information and communication technology. Income inequality in open economies has been explained along three different theoretical lines (for a broader discussion see Jansen 2003):

- Manasse and Turrini (1999) have considered a model with goods that are differentiated in a horizontal and a vertical way. Workers have different skill levels, and highly skilled workers have a relatively high income under autarchy. The authors assume that exporting requires some fixed cost. Opening up thus implies that only high-quality goods will be traded – only such goods can earn the required fixed cost of international market entry. Therefore, only high skilled workers benefit from trade, and the rising intraindustrial trade then leads to a rising ratio of skilled workers' wages to unskilled workers' wages.
- Duranton (1999) puts the focus on the role of intermediate products that are produced by skilled workers and unskilled workers. Skilled workers produce high-quality intermediate products. It is possible that under autarchy, skilled labor is so scarce that high-quality intermediate products are not produced at all. Opening up gives access to a high range of high-quality intermediate products

that are used in the production of high-quality goods. With opening up the share of high-quality products in overall production will increase, and hence the demand for skilled workers will increase. This in turn will raise the wage ratio of skilled workers to unskilled workers.

- A different model of trade has been developed by Grossman (1999). There are two sectors that differ in the way of organization of production. In one sector (a sophisticated sector), firms can pay their respective workers according to talents, whereas the firms in the other sector cannot identify individual marginal products – only an average productivity across workers. Hence the best workers all are employed in the sophisticated sector (e.g., software sector). Comparing two countries under autarchy that have different degrees of workers' heterogeneity leads to the finding that the country with the more heterogeneous labor force will produce more software than the other country. Opening up will then bring a structural change, namely, the software sector will expand in the country with the relatively homogenous labor force. Hence income inequality in the country with the more heterogeneous labor force will further increase opening up for trade – in the country with a more homogeneous labor force, income inequality is reduced as a consequence of trade.

Robert Lawrence (Lawrence 2007) has argued that in the USA, wage inequality has not increased as a consequence of globalization; the wages of the lowest 10 % – standing for unskilled workers – have kept pace with median wages in the 15 years after 1990. The main inequality in the USA stems from the strong increase of profits and the wages of the richest Americans, namely, managers. Lawrence (2007) notes:

Moreover, since 1999, while real wage growth in general has been sluggish, most US relative wage and compensation measures indicate little evidence of increased inequality. This is true when workers are distinguished by skill, education, unionization, occupation and major sectors.

Apparently, the shocks from trade (or immigration) have not increased conventional wage inequality. This is surprising given the growing scale of the competition from low wage countries. There are two lines of explanation.

One is that the goods that the US imports are actually very sophisticated and produced in the US by relatively skilled workers. While it may cause displacement and could put downward pressure on wages generally, therefore, this competition does not increase wage inequality.

A second more benign view is that a significant amount of what America imports today is no longer produced domestically. Thus declining import prices simply yield consumer benefits but do not exert downward pressure on US wages nor cause dislocation of US workers. Paradoxically, globalisation is actually causing less inequality because specialisation is more advanced.

It appears that US trade today combines these two elements in proportions that are hard to disentangle, particularly at levels of disaggregation that allow for a sufficiently precise matching of products and the wages earned in producing them. At relatively high levels of aggregation the data indicate that manufactured imports overall, and even those from developing countries such as China, are concentrated in US manufacturing sectors which pay significantly higher than average US wages. This means that import displacement does not fall disproportionately on less skilled workers. While there has been considerable displacement from trade during this period, it has not increased wage inequality. At more disaggregated levels, however, the data suggests that goods imported from developing

countries such as China are associated with relatively less skilled labor inputs and – judging by their unit values – qualitatively different from those produced by developed countries such as the US. This provides support for the view that much of this trade reflects more complete specialisation and as such does not result in either wage inequality or downward pressure on wages generally.

One may, however, emphasize that globalization is strongly shaped by increasing foreign direct investment outflow from the USA – and the EU, Japan, and some newly industrialized countries. From the standard McDougall model, it is well known that wages in the host country will increase, but what is more important in the case of the USA as the world's most important source country of FDI is the fact that US foreign investors will record higher profits, while wages in the host country will fall. Could US FDI inflows – from Europe, Japan, Russia, China, etc. – change the picture of a rising income discrepancy between workers and capital owners in the USA? Not really, since most FDI inflows into the USA is in the form of international mergers and acquisitions. Therefore, US owners of capital will benefit from a premium on stock market prices in the USA, and this often stand for capital gains that are hardly taxed. The fact that the USA has been the no. 2 country – behind China – as a host country of FDI inflows in the two decades after 1990 can partly explain why median wages in the USA have not decreased and why stock market prices have increased so much in real terms. Since remuneration of managers typically is proportionate to the value of the respective company's assets, it is not surprising that the wages of top income earners have increased very strongly. It also should not be overlooked that in the two decades after 1990, profits of banks have increased overproportionately in the USA – and among banks the investment banks have paid the highest remunerations – sometimes based only on bonus payments. At hindsight this system has not been rational, and part of the investment banks' activities has represented negative value-added and negative international external effects.

An interesting element that the EU and the USA have in common is the fall of import prices; these often have concerned imported electronic products from Asia. The fall of tradable prices is part of the globalization process, and this phenomenon amounts to a rise of the real wage rate. Even if the wage rate of unskilled workers have fallen in some EU countries, one cannot rule out that the overall impact of economic globalization has been positive – this is the case if the fall of tradable prices is stronger than the fall of wages.

As regards international income differences, one should not overlook the role of the increase in trade in intermediate products. Companies that are operating at the end of the value-added chain typically enjoy a higher profit rate than intermediate product producers. This implies that the US share in global profits will increase if US manufacturing industry reinforces global outsourcing – and this indeed was observed in the decade after 1995. Establishing global value-added chains went along with a strong increase of the imports of intermediate products in the USA; with a time lag the number of jobs in US manufacturing has declined strongly, while profits of US subsidiaries abroad increased from about \$ 60 billion in 2000 to some \$ 160 billion in 2008 (IMF 2011, p. 64).

The US share in global profits also should increase if the US product innovation dynamics increase relative to the world economy: In such a setting, there will be a broadening first stage of product cycle trade in many sectors, and the current account deficit should transitorily reduce.

So far we have focused mainly on a setting with full employment (in both countries); however, there also are periods of unemployment and economic or political shocks. The more economic globalization goes along with negative temporary shocks, the more people will be interested in a kind of political insurance system – and the social market economy can be considered to represent such a system. Hence there is a combination of unemployment insurance and other form of public insurance systems, including pension systems. It should be emphasized that there can be temporary periods of extreme economic hardship – including rising and high youth unemployment rates – which are faced in some countries, but often the reasons for this is not due to the economic system and international economic shocks, respectively; For example, in the case of the euro crisis, the tragic case of Greece stands for an irresponsible government behavior: in the election year 2009, the government notified a deficit-GDP ratio of 4 % to the European Commission; however, the true figure was 15.6 % as the government spend lavishly in many fields and hired new civil servants without having good reasons for this – except the political favoritism implemented for good friends of the ruling party. The consequence of this political fraud was that Greece (already facing a debt-GDP ratio of 110 % in 2009) lost access to international capital markets, and interest rates on Greek government bonds skyrocketed in 2010–2012; moreover, Greek firms became the victim of this irresponsible government behavior – interest rates sharply increased, investment had to be cut, and hence growth sharply reduced so that unemployment rates strongly increased. The Greek government could have easily avoided this economic disaster, if they have followed to the rules of the Stability and Growth Pact, which requires that all countries obey a limit of a maximum deficit-GDP ratio of 3 % and a maximum government debt-GDP ratio of 60 %. Ireland was another case of disaster as the Irish government had for many years not applied EU prudential supervision rules; not surprisingly, greedy bankers neglected basic risk diversification strategies and showed favor in investing in US structured debt products and in big real estate projects in Ireland and elsewhere; bank assets relative to GDP more than doubled between 2004 and 2011, and when many ailing banks had to be rescued and recapitalized by the Irish government in 2009/2010, it was no surprise that the deficit-GDP ratio reached 31 % in 2010 – of which 2/3 was accounted for by the government rescuing costs of banks. So Ireland also lost access to international capital markets in 2010; just half a year later, the same had happened to Greece. The best counterexamples for a successful long-term catching-up process are countries in Asia, including China. It is, however, true that ASEAN countries faced a serious financial market crisis in 1997/1998 followed by a massive recession and temporarily high unemployment rates. For many people in Asia, the Asian crisis was a shock without much government support mechanisms existing; the unemployment insurance system in Asian countries generally is much weaker than in the EU.

Social policy is a key element of economic policy in European market economies where social security consists of three pillars:

- **Unemployment insurance:** The system in most countries is run by the government (except for Denmark where trade unions and the employer federation administer the unemployment insurance system), but it does not rely much on principles typical of insurance companies. One should normally expect that risk profiles of the insurance policyholder plays a crucial role for the premium to be paid, but this is not the case. Rather a uniform insurance premium applies.
- **Health insurance:** The system is mandatory for workers and employees, but not always covering the self-employed. In some countries, e.g., Switzerland, the government-organized system covers basic health-care services, while individual private insurance is required in certain fields, e.g., dental health-care services. Such differences across European countries make comparing living standards difficult: Looking at disposable income is misleading if one compares say Germany and Switzerland since the public health insurance in Germany includes coverage of dental health-care services. Swiss workers might have to spend 0.5 % of his disposable income on private dental health insurance, while his German counterpart does not. As regards a comparison between the USA and Europe, one may emphasize that the USA under the Obama administration has tried to move closer to the systems in EU countries with a rather broad coverage of the population. A major problem in the USA is not only that about 15 % of the population have no health-care insurance but that health insurance is related to a job: Becoming unemployed means in 50 % of all cases that one no longer has health insurance. In some states there is a relatively broad state-based public health insurance system; For example, in Massachusetts about 90 % of the population is covered by the public health-care system. As Asian countries are major challengers for the OECD countries (here including Japan), it is noteworthy that health-care insurance in most Asian countries is rather incomplete and typically covers only those working in the public sector and some other strata of the population. Hence private savings is higher than in OECD countries, and in many countries, one also will find close family ties as part of an informal family based insurance systems. It also is noteworthy that none of the big reinsurance companies is located in Asia.
- **Public pension schemes:** In many EU countries, pay-as-you-go financing within the framework of public retirement schemes has been realized until the end of the twentieth century; however, the rising ratio of retired people to gainfully employed people has brought about a massive discussion about sustainability of public finances and priorities of government expenditures. In ageing societies – with a rising ratio of retirees to gainfully employed people – the social security contribution rates would have to increase over time strongly so that labor costs would increase considerably which in turn reinforces unemployment problems. Moreover, with a majority of voters being in the age bracket 55+ in EU countries in 2015, there is some risk that government funds (effectively additional transfers) increasingly will be shifted towards financing retirement, while more important strategic fields, such as education or support for financing innovation,

would be neglected. If growth-enhancing policies were neglected, however, there is a considerable risk of unsustainable public finances: The long-term debt-GDP ratio D/Y (with D denoting debt and Y denoting aggregate real income) is determined by the deficit ratio d' – the government deficit relative to national income – and the growth rate of real income g_Y (g denotes the growth rate in % per year): The formula $D/Y = d'/g_Y$ has been derived by Domar (1944). One may add here that the trend growth rate g_Y is a negative function of the trend deficit ratio d' . Therefore, it holds that a rising government deficit ratio – reflecting here rising transfers to retirement households – will raise the debt-GDP ratio for two reasons: There is a direct impact from the rise of the structural deficit ratio d' on D/Y in the nominator and an indirect impact in the denominator as a rise of the structural deficit ratio will reduce the trend growth rate. The mechanism linking the deficit ratio and the growth rate in a negative way basically refers to the fact that a rise of the structural deficit ratio d' will bring about a future rise of the income tax rate which in turn discourages savings and investment, respectively. With a fall of the ratio net investment to national income, there will be a fall in the long-run growth rate of income. Governments in many EU countries and also in newly industrialized countries have adopted reforms of the public pensions systems and have tried to encourage rising private retirement savings. However, the Transatlantic Banking Crisis has discouraged disappointed private households in Germany (Deutsche Postbank 2009) and in many other EU countries. Thus, the Transatlantic Banking Crisis might undermine long-term economic growth in Europe through undermining the reforms in favor of more private retirement savings.

Given the many reforms adopted in OECD countries and in transition countries in the field of social policy throughout the 1990s, it is clear that in ageing societies of industrialized countries, traditional pay-as-you-go pension systems will continue to play a smaller role in the future. With capital-funded systems becoming a more important pillar of overall pension systems in many EU countries, stable and efficient financial markets and banks are quite important for long-term social security. However, there are two key problems with capital-funded systems:

- In countries where governments have encouraged capital-funded public systems, there is a structural political risk, namely, that governments with high debt-GDP ratios, might want to appropriate the funds accumulated. Hungary stands for a problem here as the government in 2010 has decided to appropriate the funds of the capital-funded pension system; in Poland there is a similar problem.
- Capital-funded systems can be expected to play an increasing role only if there is confidence in financial markets and banks. The Transatlantic Banking Crisis has undermined confidence in OECD capital markets, and the slow pace of consolidation of OECD countries in 2010/2011 is likely to further undermine confidence in financial markets: Debt-GDP ratios reaching 100 % or more in 2011/2012 stand for a very delicate situation, not least in the USA, in Italy, Greece, Ireland, and Japan. The world market economy is – by the nature of capitalism – a cyclical system, and this system can only be stabilized if monetary policy and fiscal policy have room to maneuver. However, the USA in 2010 had lost its

room to maneuver in monetary policy as the central bank rate was close to zero, and further valuation was possible only through quantitative easing which in turn is likely to stimulate inflation. With a deficit-GDP ratio of roughly 10 % in 2010 and 2011, the US economy faces shockingly high deficits; moreover, the high debt-GDP ratio of the USA leaves fiscal policy without a very thin room to maneuver so that there is an increased risk of cyclical instability in the future in the USA. In a medium-term perspective, the increased debt-GDP ratio of OECD countries implies that risk premium for bonds of countries with relatively high debt-GDP ratios will further increase. This in turn will put pressure on governments to cut expenditures on social security and to raise taxes. In such a setting, maintaining confidence and nurturing confidence in the social market economy are rather difficult.

Taking into account the US banking crisis of 2008/2009 and the instabilities and problems which have arisen in several EU countries' banking systems, one should emphasize that enhanced financial market regulation is crucial for sustained pension reforms which aim at combining elements of the traditional pension system with a new or broader pillar of a capital-funded system for retirement financing. Pension funds in the USA and in the UK face major problems in the context of the Transatlantic Banking Crisis of 2007 and 2008, which brought with it a massive fall of stock market prices and many other asset prices worldwide. Workers who had expected to obtain relatively high payments from privately funded pension funds face considerably reduced payments and have thus fallen victim to the US and global financial market crisis at the end of the first decade of the twenty-first century. The associated uncertainty for workers in the USA and parts of Europe could lead to new social conflicts and a postponement of necessary social security reforms in many OECD countries, where demographic ageing requires adding privately funded additional pillars in the overall pension system to a shrinking pay-as-you-go financed pillar of social security. The standard arguments in favor of such reforms are valid despite the banking crisis. Moreover, one may emphasize that capital-funded pension systems in open economies are quite important for many EU countries, as prospects for broadening pension payments in the future through current account surpluses are interesting. This is particularly the case for mirror net foreign direct investment outflows, which will generate (net) dividend payments from abroad in the future. To the extent that rising foreign direct investment is a key element of economic globalization (and taking into account that the yield from foreign investment exceeds that from portfolio investment), one may thus argue that economic globalization can help EU countries with a structural current account surplus to construct implicit pension systems which will help to avoid sharp and sudden reforms of pay-as-you-go systems. Such aspects were not considered all that much in the traditional debate about EU social policies in the late 1990s (Heise 1998; Schulte 1998).

Economic globalization – largely shaped by a larger role of both foreign direct investment and multinational corporations – has reinforced locational competition as well as system competition across countries. This, in turn, could undermine the position of labor in OECD countries, particularly with respect to unskilled workers

who face broad and more intense competition from the South. Longer working hours, lower wages or declining real wage growth, and declining work safety standards are key challenges for many workers in Europe. Weak work safety standards in developing countries, where one finds a much higher mortality rate of workers and a higher rate of injuries in workplace accidents, are a parallel problem in the South; this problem is not only associated with negative welfare effects for the workers affected in the context of such incidents and accidents, but rather one may assume that many people in OECD countries are also concerned about the well-being of people in the South so that international preference interdependence implies a direct interest of the North in certain fields of social policies of the South. One of the key issues considered here concerns the question as to whether a broader perspective of international social policy – meaning that institutions active in shaping social security of the North becoming actively interested in progress in some fields of social security in the South – is not useful for improving long-term social security in both the North and the South. Moreover, the question of whether the EU's trade policy could not play a more active role for global social progress is addressed; for many years, the EU's trade policy has emphasized open markets as well as liberal trade worldwide (through multilateral, bilateral, and unilateral policy action) in combination with promoting democracy, sustainable development, and labor standards.

With a rising role of multinational companies, increasing relocation of industries and international outsourcing have become key challenges for EU countries. However, this does not simply reflect a larger geographical area which has become open for investment and trade, but it also has a technological dimension. Information and communication technology (ICT), which has strongly expanded in the world economy since the 1990s, has facilitated fragmentation of value-added chains. Therefore, one can witness increases in the splitting up of the value-added chain across geographic space, and thus there is a broad dynamics of international outsourcing and offshoring – this includes the European ICT industry itself (Meijers et al. 2008).

Offshoring clearly reinforces the role of multinational companies, whose expansion is related to ownership specific advantages which often consist of technology leadership and strong innovation dynamics (Dunning 1977). Dunning's OLI paradigm argues that firms considering the alternative of serving foreign markets through trade, licensing, or foreign direct investment will decide in favor of FDI if they can combine ownership specific advantages with locational advantages in host countries as well as internalization advantages. The latter basically means that firm-internalize transaction costs – this includes intracompany trading costs – are lower than transaction costs in the market (the respective marginal conditions determine the boundary between the multinational firm and transactions through markets). Given the long-term increase in expenditures on R&D – relative to national income – in OECD countries and many newly industrialized countries, one should therefore expect a rising role of multinational companies. Particularly since 1985, this is the case as the annual World Investment Reports of UNCTAD testify.

The ICT dimension of foreign direct investment dynamics is, however, not always considered. Both in industry and in the services sector, multinational companies from the EU, the USA, Japan, and some other countries increasingly have considered international outsourcing and offshoring – production in foreign subsidiaries – as attractive strategic options. The worldwide diffusion of ICT is a crucial element of economic globalization. The Internet is part and parcel of such globalization dynamics and has indeed contributed not only to new forms of electronic trade, but it also makes the world more transparent with respect to the dynamics of institutional changes, on the one hand, and economic changes, on the other hand. An important issue is whether the expansion of ICT itself is affecting the relative wage of unskilled labor and to which extent digital globalization is thus affecting labor markets.

The challenges of social security and globalization have been discussed in the literature in various respects; this concerns the impact of social security reforms in open economies and particular aspects of the pension system (Roeger (2007), Mackellar et al. (1999, 2000), De Grauwe/Polan (2005), Asher and Nandy (2006)). An important aspect also concerns working conditions in firms; economic globalization has put pressure on many companies to increase profitability, and this leads in turn to a pressure to cut costs. This might negatively affect occupational health and safety standards.

In a historical perspective, one can distinguish between a first wave of globalization between 1860 and 1914, when interindustrial trade was dominant along with trade in commodities and agricultural products (Baldwin and Martin (1999)). By contrast, modern globalization is characterized mainly by intraindustrial trade, on the one hand, and a high share of intracompany trade in multinational companies, on the other. Multinational companies and FDI indeed characterize modern globalization to a large extent. Vertical foreign direct investment places a crucial role on trade with intermediate products due to outsourcing and offshoring. Outsourcing and offshoring contribute to productivity growth, while at the same time, one cannot rule out that this goes along with biased technological progress in favor of skilled labor. In the empirical approach of De Grauwe and Polan (2005), it is interesting to note that competitiveness and social spending are not necessarily contradictory. (It is also noteworthy to mention that RCAs of poor countries/ accession countries have considerably changed over time and indeed illustrate that in the case of Hungary and Poland, economic opening up and EU membership seem to support a Schumpeterian graduation process: see appendix.) There could be a measure of causality that runs from competitiveness to social spending; countries which are highly competitive will generate high income in domestic and foreign markets. High competitiveness in turn could be related to high Schumpeterian volatility of output as innovation is linked to competitiveness (there can be waves of innovation, an argument not considered in De Grauwe/Polan). Such dynamics lead to a higher demand for social insurance, which will indeed be provided by democratically elected governments. The second perspective runs as follows (De grauwe and Polan, p 119):

A second explanation identifies causality as going from social spending towards competitiveness. We argued that the competitiveness of a nation depends on the absence of prolonged social conflicts, the quality of government and domestic institutions and the quality of human capital. It can be argued that the human capital of a nation is improved by a well-functioning system of social services. Such a system makes it possible for the workers to feel less insecure, and gives them a feeling of belonging to the system. Such a sense of belonging leads to stable societies with a strong sense of cohesion. In addition, a well functioning system of social services may lead people to be willing to start more risky projects, knowing that failure will not condemn them to poverty. In short, a well functioning social system creates a 'risk-taking social capital' that ultimately leads to an improvement of the productivity of a nation.

Subsequently we will not discuss whether globalization has gone too far or whether this process should specifically be encouraged (Rodrik 1998; Addison and Welfens 2003). We will simply assume that globalization in the sense of rising trade intensity and a rising share of stocks and bonds owned by foreigners – as well as the expansion of the Internet – will continue. With the expansion of the Internet, differences in labor standards across countries will become more visible, and the pressure on southern countries to sign ILO core labor standards and other protection rights might increase. Labor standards in the South are likely to affect the labor standards in the North, namely, to the extent that weakening standards in the South could put pressure on countries in the North to accept weaker standards in order to cope with enhanced international locational competition, which is strongly shaped by multinational companies. If labor standards should be weakened through globalization worldwide, one could expect the position of workers generally to be undermined, thus affecting wage negotiations as well as social security protection.

As regards the link between core labor standards and globalization, the OECD (2000) has presented a study on 78 countries – the study was a follow-up on research results presented already 4 years earlier. Per capita income as well as foreign direct investment inflows had a positive effect on the realization of core labor standards. (It is useful to make a distinction between these core labor standards and other labor protection measures.) Kucera (2002) found that human capital formation, stable institutional frameworks, and economic growth had a significant effect on the expansion of labor standards in the South. To the extent that sustained FDI inflows stimulate human capital formation, the development of a consistent institutional setup and output growth, one may conclude that economic globalization is conducive to enhancing labor standards in the South over time. Flanagan (2002) also considers the link between globalization and labor standards; FDI inflows are assumed to raise the terms of trade and to contribute to human capital formation (or to stimulate human capital formation). It is interesting to note that improved terms of trade and human capital formation – with a focus on export sectors – are found to have a positive significant impact on labor standards. Indirectly clear property rights and a low public consumption affect labor standards, since property rights and government size affect FDI inflows. Busse (2003) has also looked at the links between FDI inflows and labor standards in developing countries and FDI stimulated application of labor standards in the South. The political behavior of countries in terms of ratification of ILO conventions turned out to be

insignificant. Schmidt (2005) has analyzed the links between FDI stock variables and the application of core labor standards. The presence of multinational companies' subsidiaries reinforces the application of core labor standards. However, with respect to least-developed countries, there is a negative link between globalization and other labor protection measures.

Subsequently, theoretical key aspects will be highlighted as well as policy options for maintaining social security; while some problems faced by the standard social security systems in continental EU countries seem to be related to the globalization process, one should emphasize that social security systems are particularly undermined in the first place by ageing and demographic forces rather than by economic globalization. A more important aspect of the debate about globalization and social security systems concerns an often negative attitude of the public, including sometimes that of key experts. Berger (2003) maintains that many arguments of historical globalization in the period from 1870 to 1914 look similar to those of the modern debate in the OECD countries, while it is unclear to which extent certain statements are solid and consistent. In the historical globalization period, for example, many experts had argued that in a setting with the gold standard, free trade, and liberalized capital flows, it would be impossible to impose income taxes. In reality, it was possible for several countries to adopt new systems of financing government expenditures, including income taxation. Part of the answer why reality was characterized by a kind of pro-income taxation dynamics can be explained by the simultaneous introduction of income taxation in the USA, Germany, France, Austria, and the Netherlands; in a system of liberalized capital flows, the relative yield on return was, of course, quite important. As the emphasis on relative yield of return indicates, it might well be that countries have similarly high tax rates or similarly low tax rates – whether high or low, the relative ratio is not influenced much.

In the following analysis, we will take a look at some key statistics and the relevant economic implications (section 2) before turning to theoretical considerations (section 3) and the key policy issues (section 4). The key issue is to which extent economic globalization can be reconciled with maintaining social security systems which basically entail health insurance, unemployment insurance, pension systems, and high occupational health and workplace safety standards. The latter aspect has largely been neglected in the literature, despite its unquestionable importance for workers in all OECD countries and in newly industrialized countries/developing countries as well. The analytical position here often will not be that of a small open economy, which indeed is inadequate if one considers the EU or the eurozone as a policy actor – instead, the focus will partly be on the integration perspective and the role of the EU's trade policy. At the same time, one may emphasize that China's economic opening up is also not reflected in the case of a small open economy, as rising exports of China will affect both international goods prices and factor prices (at least in those fields within which Chinese exports reach a considerably high market share in global markets). We emphasize that liberal trade can usefully be combined with a broader international quest for diffusion of ambitious workplace safety standards; in addition, stricter financial

market regulation is needed to maintain confidence in long-term pension reforms with the growing role of capital-funded pension systems.

2.2 Globalization Dynamics

Globalization means that trade and capital flows have intensified, and in addition to this, there is an increasing use of information and communication technology – in particular of the Internet. The traditional dominance of intra-OECD trade has reduced as has the dominance of intra-OECD foreign direct investment. As regards trade, Asia has become increasingly important and here the economic weight of China plays a crucial role. The graph shows that Asian exports (excluding Japan) have grown much faster than exports from Europe and the USA, and this suggests – along with increasing trade of the EU with China and of the USA with China – that the relative factor price adjustment in the USA and the EU is increasingly shaped by impulses from Asia. To the extent that China has specialized in low-technology products and in medium-technology products, it is obvious – using unskilled labor intensively – that one should expect wages of unskilled labor to come under pressure in the EU and the USA. Given the large and growing bilateral current account surplus of China vis-à-vis both the EU and the USA, one may expect a stronger adjustment pressure than would occur in the steady state of a balanced current account. (This somewhat simplified view considers the EU and the USA effectively as one synthetic country I, while China – in the logic of the standard two-country model – is country II.) However, a current account balance is actually not the natural long-run external position of China since we have to consider highly asymmetric FDI flows according to which China's inward stock of FDI will be about \$1500 bill. in 2010 (extrapolating UNCTAD FDI figures), which requires a net export of goods and services of almost 100 bill. if the rate of return is 7 %; compared to the inward cumulated FDI position of China, the outward FDI position of China is very low. This FDI perspective has two implications:

- China's specialization is not only in sectors with low capital intensities and hence with low-technology intensity; the high capital inflows imply pressure towards a real appreciation of the currency in the short run which is reinforced by the trade balance surplus – and this exchange rate pressure stimulates long-term upgrading in Chinese products in terms of quality and technology intensity.
- The equilibrium real exchange rate of the Chinese currency is affected both by trade dynamics and by FDI; one-day net inflows might fall below profits of subsidiaries transferred to parent companies abroad, and this will then bring about a real depreciation of the currency (in a rational expectations model market participants will consider all future expected flows).

The following table shows the relative weight of the USA, Japan, the eurozone, China, India, and some other countries (Table 2.4).

Often the discussion in the public of EU-15 countries has emphasized that Eastern enlargement of the EU and globalization both undermine the prosperity and social cohesion in high wage countries. Since the 1990s, there has been an

Table 2.4 Role of large economies in the global economy (percentage of global total)

	GDP		At market exchange rates				Merchandise trade				Stock market capitalization	
	At PPP exchange rates		At market exchange rates				Exports		Imports		2001–2005	
	1971–1975	2001–2005	1971–1975	2001–2005	1971–1975	2001–2005	1971–1975	2001–2005	1971–1975	2001–2005	2001–2005	2001–2005
United States	22.5	20.5	27.9	30.1	15.7	11.6	15.6	19.7	15.6	19.7	44.4	44.4
Euro area ^a	21.3	15.7	20.2	21.9	21.2	18.5	21.2	16.9	21.2	16.9	15.3	15.3
Japan	8.0	6.7	7.5	11.6	8.5	7.4	7.9	5.8	7.9	5.8	9.4	9.4
United Kingdom	4.3	3.1	3.7	4.9	6.9	4.7	7.9	5.6	7.9	5.6	7.5	7.5
China ^b	3.0	14.0	2.6	4.6	1.2	7.2	1.3	6.2	1.3	6.2	1.9	1.9
Canada	2.1	1.9	2.7	2.4	5.7	4.4	5.5	4.0	5.5	4.0	2.8	2.8
Mexico	1.7	1.8	1.3	1.8	0.5	2.7	0.8	2.9	0.8	2.9	0.5	0.5
Russia ^c	–	2.4	–	1.3	–	1.6	–	1.3	–	1.3	–	–
Korea	0.6	1.6	0.3	1.7	0.7	3.1	0.9	2.7	0.9	2.7	1.1	1.1
India	3.5	5.7	1.7	1.6	0.7	1.0	0.8	1.2	0.8	1.2	0.8	0.8
Brazil	2.7	2.7	1.2	1.5	1.3	1.2	1.9	0.9	1.9	0.9	0.8	0.8

Source: IMF (2007, pp. 122/123)

^aExcluding intra-euro area trade^bData in 1971–1975 columns are for 1976–1980^c2007 for Russia; according to World Development Indicators; in 2008 the World Bank has published revised PPP standards which imply somewhat smaller GDP PPP figures for China

ongoing debate in EU countries about declining social security standards and long-term pressure on trade unions and workers to accept a worsening of working conditions. Particularly unskilled labor has suffered from rising working hours and intensified demand for more flexibility and regional mobility – often in parallel with rather modest increases in disposable earnings. The OECD has emphasized flexicurity as an important approach for labor markets: workers should accept more flexibility to maintain the core of social security. In a European perspective, social security comprised of four pillars:

- Insurance against work accidents and high occupational health and safety standards
- Health insurance
- Unemployment insurance
- Pension systems

A serious problem concerns reforms of the pension system, for which introduction of capital-funded elements and individual retirement accounts are crucial. In a model with uncertainty of consumption, Fehr and Habermann (2007) have highlighted important macroeconomic implications as well as results of welfare analysis for such capital-funded elements. In the context of an overlapping generation model, households maximize a consumption function in a closed economy – this is the basic version of the model – according to which budget constraint includes taxation of capital/income, consumption taxes, and contributions to capital-based retirement system in which interest income is accumulated tax-free, while benefits are paid in the form of annuities. Those who die early during retirement leave an unanticipated bequest to subsequent retiring generations; the government must accept in the model budget deficits which might occur in the retirement system. Besides intergenerational redistribution effects, the author considers intragenerational redistribution of various reform options and parameter changes. A somewhat surprising key result is that shifting the tax burden from consumption taxation towards the progressive income tax is not necessarily associated with a negative welfare effect. While it is true that the effect of labor supply and capital supply is negative, there is an offsetting effect from the insurance effect of progressive taxation; in an economy with income uncertainty, it is obvious that this effect must be considered. Therefore, it follows that the general tendency of most OECD countries to switch more towards consumption taxation is not generally a superior solution to existing systems in which progressive income taxation plays a crucial role (one may, however, emphasize that the fact that a large minority of poor households pays no income taxes could undermine the argument slightly). As regards income uncertainty, it is unclear which effects globalization has.

While economic globalization might affect the last two pillars in various ways, it is obvious that problems in continental European countries' pensions systems are mainly related to demographic factors: The combination of rising longevity and lower fertility implies – disregarding immigration – that the standard pay-as-you-go pension systems in most EU countries face considerable adjustment pressure. In light of this, cutting benefits, increasing the number of working years, or raising

contribution rates are the three basic policy options, and policymakers must indeed decide in line with voters' preferences how a balanced pension reform should look. The latter might include a gradual increase of the role of private savings for pension and a greater role of firm-based pension systems. Capital-funded systems generally may be expected to play a greater role in the future and indeed could be useful with a strategic approach that effectively aims at generating a current account surplus in the medium term – coupled with foreign direct investment outflows – so that long-run pension benefits partly can be financed through future long-term dividends accruing from abroad (thus the long run will have a current account deficit). In this context the distinction between gross domestic product (Y) and gross national product (Z) is crucial; and (with L and L^* denoting population; $*$ for foreign variables) indeed the distinction between $Y/L =: y$ and $Z/L =: z$ and y^* and z^* , respectively. In a two-country model in which both countries produce according to a Cobb-Douglas function $Y = K^\beta L^{1-\beta}$ and $Y^* = K^{*\beta} L^{*1-\beta}$, the assumption of competition in goods and factor markets and of fully asymmetric capital ownership, namely, that the whole capital stock K^* (in country II) is owned by investors from country I, implies in the case that $L = L^*$, $K = K^*$ and $Y = Y^*$ – thus $\beta = \beta^*$ – and hence $y = y^*$ that for the case of $\beta = 0.33$, the ratio $z/z^* = 2 : 1$. This is because in this simple setup, national income in the home country – the source country of FDI – is given by the sum of gross domestic product and profits accruing from abroad (βY^*), that is, $Z = Y + \beta Y^*$; and we have $Z^* = Y^* - \beta Y^*$ (note that $\beta = 0.33$ is often considered as a realistic parameter value in OECD countries).

The role of foreign direct investment (FDI) also needs to be considered in the context of the hypothesis of Feldstein-Horioka (1980) whose empirical research suggested that international capital mobility is relatively modest: domestic savings largely determines domestic investment. However, one may point out that recent empirical analysis for the EU has shown that capital mobility has increased (Jungmittag and Untiedt 2002).

Considering the role of FDI, one may state that full international convergence in terms of labor productivity still implies non-convergence in terms of per capita income. To put the illustrative analysis in a simple North–south context, the standard of living in the North will remain higher than in the South if the North can accumulate sufficiently high outward FDI stocks. Since FDI dynamics are clearly a part of globalization, one may emphasize here that globalization can indeed help the North maintain social security at a high level in the long run, higher in actuality than without globalization.

In open economies the issue of social security in a period of economic globalization is partly related to the development of voters' preferences and partly related to competition and international investment dynamics. Globalization means in economic terms:

- More competition and more competition in goods and factor markets will bring about productivity gains and higher innovation dynamics, but potentially also more fear of sudden adjustment pressure – e.g., as a consequence of the EU's

high wage countries facing increasing competition from China and other Asian countries.

- A higher role of foreign direct investment and hence more international mobility of capital in the long run. Enhanced capital mobility will drive down corporate tax rates and hence the government will impose higher taxes on workers and/or consumers. Falling tax rates (corporate tax rates or income tax rates) are not necessarily an economic problem, although the government will have to cut expenditures if lower tax rates should be implemented. In some OECD countries, tax rates are relatively high and globalization simply gives useful impulses for bringing taxation more in line with voters' preferences.
- Enhanced locational competition brings about a greater role of international benchmarking and thus should stimulate efficiency-enhancing diffusion of best practice social security systems. In this context the emphasis of the European Commission that open coordination is useful – with emphasis on benchmarking and encouragement of EU member countries to pick up some of the best institutional reforms and innovations – has been an interesting approach. However, if the most successful EU member are not explicitly mentioned and relatively weak countries not encouraged to actively consider imitating the best performers, the open coordination method will not be very promising.

Economic globalization can directly contribute to higher economic welfare, namely, if competition is reinforced at the global level and if “excessive” profits rates are reduced while prices are falling. More competition in health care and better education systems in EU countries probably lead most in the medium term: It is noteworthy that more import competition as well as more foreign direct investment inflows typically contribute to more innovation if one follows the standard theoretical approach of Bertschek (1995). However, governments in many EU countries have not really opened up the health-care sector for foreign competitors.

As regards health insurance, this is partly related to demographic factors, namely, in the sense that in an ageing society – with a gradually increasing share of old people – the health-care expenditures relative to GDP will increase, as typically the last year of life amounts to roughly $\frac{1}{2}$ of lifetime health-care expenditures. In a health insurance perspective, one may emphasize that this second half of lifetime expenditures comes later in a society with increasing longevity which is, of course, important in the context of discounting future health-care expenditures and defining adequate insurance premiums. Besides this caveat, it is true that the rise in expenditures within the health insurance system is strongly driven by demographic dynamics in Europe. One should, however, not overlook that health problems also are partly related to unemployment dynamics: high unemployment rates and in particular a high share of long-term unemployed in overall unemployment is known to raise health costs since such unemployment brings about increased frequencies of illness and psychological problems.

A more complex problem is unemployment insurance and health/safety standards in combination with insurance against work accidents. These two aspects will mainly be analyzed in the following sections, as this seems to be particularly important for EU countries and the South. The perspective adopted here is a

North–south perspective of economic globalization and raises the issue as to what extent institutional innovations can bring about higher welfare in the overall world economy. As can be shown, this means that both the North and the South will benefit in terms of more favorable social security developments.

2.3 Pension Reform Problems and Occupational Health Standards

Considerable problems in pension systems can be found in many EU countries at the beginning of the twenty-first century. At the same time, one may emphasize that considerable reforms in the pay-as-you-go systems of most EU countries had been adopted by 2007 and many countries had introduced or reinforced capital-funded pensions systems as an additional or broadened pillar of social security financing. For simplicity we will disregard the demographic problems of a declining birth rate, but in the subsequent approach, one finds in a nutshell many key ingredients of standard pension financing. Let us define lifetime Z as the sum of the years in childhood/school, active working years L , and the retirement period N . We assume that children get public services (schools, infrastructure, health-care services) for free and that such services amount to x percent of the per capita payments y'' obtained during retirement age. Ignoring discounting issues for the sake of simplicity and denoting the per capita income of working-age population as y and the tax rate as τ – this is a composite tax rate which includes the social security contribution rate – we can write the budget constraint of society as follows:

$$N'xy'' + Ny'' = \tau Ly \quad (i)$$

Thus, we obtain for an income tax regime

$$\tau = (y''/y) \left\{ [xN' + N]/L \right\} \quad (ii)$$

A more realistic approach would have to consider that y is a negative function of τ . A one-off rise of t thus will raise y''/y which implies that the effective income tax rate must be raised more strongly than without the effect indicated through $y(\tau)$.

Note that in the simple formula the bracket term $\{ \dots \}$ is the effective nonworking time of the representative economic actor. The required tax rate is thus the product of the desired ratio (y''/y) and the effective relative nonworking time $\{ [xN' + N]/L \}$. If the number of years in retirement is raised, the tax rate can be maintained only if the relative retirement ratio $\lambda = y''/y$ is reduced accordingly. To dub the latter option as benefit cutting is a static and inadequate view, the fall in y''/y simply is compensating for the rise of N , and in a democratic society, parliament will have to take the respective choices. An alternative is that people can make individual decisions; this, however, requires setting up individual retirement

accounts of the type used in the USA and the UK for decades – and more recently also in some EU countries.

An alternative approach could be that income is not taxed but instead consumption, where the tax rate is τ^c ; we assume that consumption $C = c(\tau^c)Y$ so that the budget constraint reads (with c' as per capita consumption)

$$N'_{xy}'' + N_y'' = \tau^c L c'(\tau^c)/c \quad (\text{iii})$$

If people are myopic, this equation can be used to derive optimum growth in a modified neoclassical growth model. Note that in an open economy, a consumption tax which comes as a value-added tax rate will raise net exports of goods and services since imports become more expensive, while the domestic demand falling on tradables is reduced. This causes exports – and thus net exports – to rise and will also increase output provided that there was unemployment in the initial situation.

While ageing largely is a demographic phenomenon which cannot be blamed on globalization, one should not overlook that ageing takes place in a world economy with globalization and hence with effects on capital accumulation, wages, income, and pension financing. This requires a multi-regional model in which the relatively fast ageing OECD countries are combined with a group of developing countries where ageing is rather slow (but in China ageing will be relatively fast after 2050 which is a mirror effect of the adoption of the one-child policy in the last quarter of the twentieth century). An important aspect concerns the mixture of the retirement financing system, namely, the role of the public pay-as-you-go system – with payments to retired persons indexed on wages – and the role of private defined benefit schemes where payments are not linked to wages. Mackellar et al. (2000) have presented a basic model; other refined studies are Röeger (2007), Börsch-Supan (1996); Cutler et al. (1990); Turner et al. (1998); Masson and Tyron (1990).

Key insights are found in the Mackellar/Ermolieva/Reisen model which is a rather simple approach with production factors capital and labor within a neoclassical two-country model. Two scenarios are considered: (i) autarchy vs. (ii) globalization (i.e., full capital market integration). In the globalization scenario, the North faces reduced capital intensity and hence lower wage growth over a certain time, but as the relative share of retired people is rising, real wages increase. The South benefits from an increase of the capital intensity and hence strongly rising wages. In the North the wealth owners – relatively old people – will benefit from high profit rates realized in the South and increased rates of return in the North as well; compared to the baseline scenario, the working-age population of the North is a loser of globalization. The baseline project results amount to a slowdown of economic growth. The disposable income of the elderly fall relative to that of the working-age population, while the ratio of the assets of the elderly to that of the working-age population rises over an initial period before starting to fall again. In the globalization alternative scenario, the North develops at first high current account surpluses: net foreign assets of the North rise from 2.6 % of GDP to over 80 % of GDP and gross foreign assets relative to gross total assets increase from 1 % to 50 % over time.

A more complex model which, however, puts the focus on a small open economy has been developed by Fehr and Habermann (2007) whose simulations highlight a number of critical points. An important finding is that raising tax rates on relatively less tax-elastic assets brings about better welfare results than uniform tax rates in all sectors. This is, of course, not surprising from an economist's perspective, but it is rather at odds with the standard view of many lawyers and the courts in EU countries. However, it would be quite useful to have a more economically sound approach in tax policies.

Social security to a considerable extent refers to pension systems; continental EU countries are largely on a pay-as-you-go-system at the end of the twentieth century. Facing the ageing of societies and slower growth of the population in Europe at the beginning of the twenty-first century – and baby boomers facing retirement in the 2010s and thereafter – there is increased pressure for reforms of the pension system. For demographic reasons the current pay-as-you-go system (PAYG) implies for EU countries a considerable rise of social security contributions in the long run as the ratio of retired workers to the active working population will increase; life expectancy also is expected to rise. The impact can be summarized as follows (Roeger 2007): The growth rate of GDP per capita will reduce, while the structural unemployment rate will increase. The ratio of pensions to GDP will roughly double between 2004 and 2050, and in the same period, social security contributions will increase from 14.9 % to 26.5 %. The key problem is the rise of the unemployment rate which largely reflects the combined impact of lower GDP per capita growth and rising wage costs, respectively. Such developments call for a closer look at options for rising productivity growth on the one hand and for switching to a mixed social security system in the field of pension financing – a capital-funded pillar should support the traditional PAYG pillar whose role will shrink (Table 2.5).

With a stronger role of a capital-funded pillar in pension reforms, there will be a stronger role of capital markets. The international banking crisis of 2007/2008 has, however, raised some doubts about the stability of the US banking system and the international financial system, respectively. One may assume that the US administration will impose broad reforms in terms of more and better regulation of banks and capital markets, respectively, so that international capital markets can be stabilized in the long run.

The ratio of public social expenditures to GDP was about 6 % in China (and also in Korea) in 2003, while figures for Germany and France were close to 26 % (Adema 2006, p. 13). China's small share of social expenditures is, however, not sustainable, namely, for two reasons:

- Continuing urbanization will undermine the traditional family network so that government social expenditures will become more important over time.
- Graying of population in China will bring about strong pressure on rising expenditures on government-financed pension systems – although one should not exclude that China's future pensions systems will emphasize not so much

Table 2.5 Baseline scenario: keeping generosity of PAYG

	2004	2010	2020	2030	2040	2050
GDP per capita	1.7	1.7	1.6	1.5	1.3	1.2
Private investment/GDP	15.5	16.5	18.1	19.3	19.3	19.0
Unemployment rate	8.1	8.3	9.0	10.0	11.3	12.8
Real interest rate	4.9	4.6	4.0	3.4	3.0	2.9
Retiree Cons./worker Cons.	1.8	1.7	1.7	1.6	1.6	1.6
Pension/GDP	9.7	10.3	11.6	13.3	15.4	17.3
Social security contributions	14.9	15.8	17.8	20.4	23.5	26.5

Source: Röeger (2007, p. 314)

public pay-as-you-go systems but rather more private retirement savings plans. In 2050 the share of the population about age 65 will be 24 % in China (and the median age similar to that of France), up from 7 % in 2000; this compares to France and Germany with 16 % in 2000 and about 28 % in 2050 – the UN projections for the USA is 21 % for 2050, up from 12 % in 2000.

From this perspective it follows that continental EU social market economies – facing the economic rise of China – will not come under sustained pressure to trim radical social security expenditures; this holds at least to the extent that the urbanization and graying of China both should work to raise social expenditures in China in the long run. As regards the UK and the USA, there could be continued pressure on EU continental countries in the long run since the share of 65+ in the population in the UK also will remain lower than in large continental EU countries: 23 % is the projection for the UK in 2050, up from 16 % in 2000. Both Japan and Italy will face high adjustment pressure in pension reforms since projections for both countries suggest that the share of 65+ in the population will reach 36 % in 2050, up from about 18 % in 2000. The policy options for reducing the “graying pace” in Italy are mainly related to government financial incentives for young families and to a more liberal immigration policy – the latter could focus both on Eastern European accession countries and on Mediterranean countries. As Japan traditionally has a rather restrictive immigration policy, the country probably will find it very difficult to avoid fast graying of its population.

As one may assume that the international division of labor implies that the South (including China) will have a high – and in some cases rising – long-term share of industrial output while the graying Europe will record a long-term rise of the share of the services sector output, the challenges in the field of social security financing are manageable for the EU. As the physical pressure on employees in the services sector are not as intense as the physical stress for workers in the industrial sector, one may anticipate that the working-age period in the EU countries will rise more than in the South in the long run. This in turn should allow the EU to avoid serious problems in social security financing and in international competitiveness, respectively. The higher the share of global industrial output that is produced in the South, the more important will be other

impacts of labor markets, namely, occupational health and safety standards. Subsequently we take a closer look at some key issues which are of interest for both people in the South and in the North – with the North often being a major net importer of industrial goods on the one hand and with people in the North generally interested in living conditions of people in the developing world.

2.3.1 Occupational Health and Safety Standards

A greater role of capital markets in OECD countries will reinforce adjustment pressure in goods markets to the extent that the required rate of return is raised in EU countries and elsewhere which could raise adjustment pressure on labor in terms of accepting lower wages and stagnating or worsening employment conditions, e.g., concerning occupational health and safety standards.

As regards selected OECD countries, there is some cross-country variation of serious accidents at work (see the following figures), but considering some EU countries, there is no general pattern of improvement as one should expect in the course of structural change towards a service society in which the share of jobs in manufacturing industry – often with a relatively high incidence of accidents at work – declines so that occupational health and safety standards improve: the number of accidents per person employed has not much changed in Estonia and Lithuania, and it has even increased in Poland and Slovenia in the period 2001–2004; one might argue that relatively poor countries are likely to face relatively strong pressure on workers to accept relatively dangerous working condition. Moreover, low-income countries often have a relatively high share of employment in manufacturing industry. A weak role of trade unions in poor countries might add to this problem.

The indicator for serious accidents is surprisingly high in the UK in 2001–2003, although it is one of the EU's leading countries in terms of having a high share of employment in the services sector. As regards fatal accidents at work, there is considerable variation across countries, where Slovenia, Lithuania, and Latvia as well as Germany were above the EU25 average in several years of the period 2001–2004; Germany has a high share of manufacturing industry in GDP which might explain the high value for Germany. The UK, the USA, and Japan also were above the EU25 average; weak trade unions in all three countries could be part of the explanation of this finding. The statistics on occupational accidents raise the issue to which extent there is pressure from economic globalization undermining progress in the improvement of occupational safety. Countries which are strongly shaped by capital markets – that is, have a strong role of stock markets (see the US and the UK) – seem to have a relatively weak performance in terms of occupational health and safety

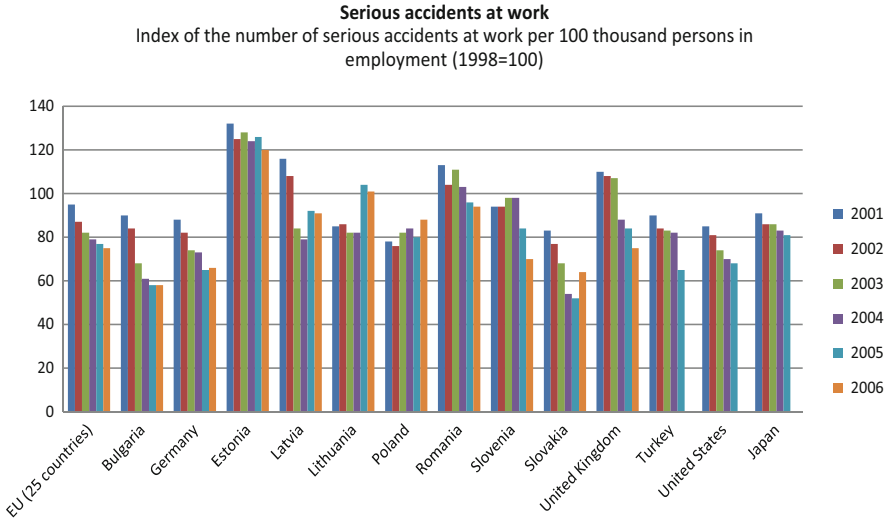


Fig. 2.7 Serious accidents in selected countries (Source: EUROSTAT (2007) <http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&language=en&pcode=tsdph400&plugin=1>)

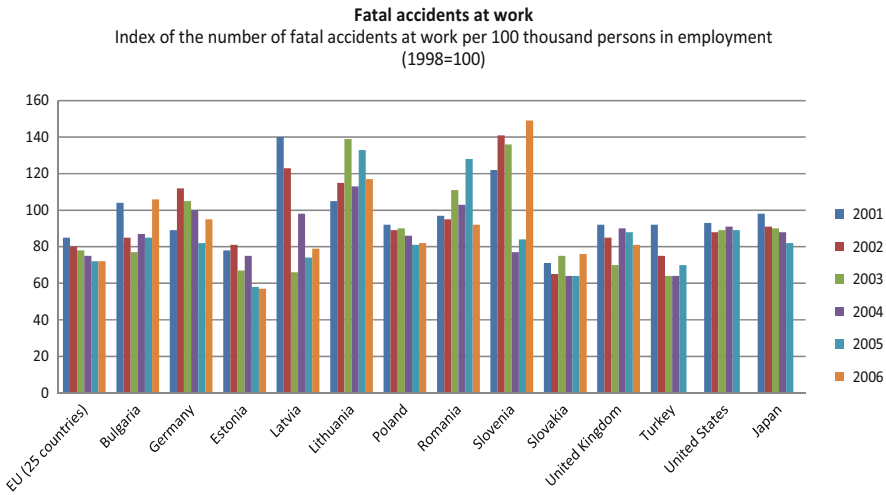


Fig. 2.8 Fatal accidents in selected countries (Source: EUROSTAT (2007) <http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&language=en&pcode=tps00183&plugin=1>)

standards. Hämäläinen et al. (2006) have shown for a large group of countries – including developing countries – that indicators on occupational accidents and fatality rates are correlated with per capita income (Figs. 2.7 and 2.8).

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