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International Integration and the Welfare State*

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Abstract

This paper discusses how international integration affects the need and scope for welfare state activities. The first part reviews the main mechanisms, which have been considered in the literature, namely, tax base mobility, risk and race to the bottom effects in welfare policies. The second part considers in more detail the implications that arise via labour market effects, and it is argued that the latter are crucial since product market integration affects the mobility of jobs, even though labour mobility across nations remains small. This may in turn have important consequences for the financing of welfare state activities through taxes levied on labour, but also the need for welfare state activities. The paper ends by discussing some policy options.

Keywords: Risk, welfare policies; taxation; globalisation

Jel: E30, F10, H11

1 Introduction

International integration is a frequently highlighted challenge facing welfare states, not least the extended models developed in Northern European countries. The process of tighter international integration is by some taken to imply that welfare states have to be rolled back, while others point to this as strengthening the need for welfare state activities. These issues are increasingly brought to the forefront in policy debates on the welfare state, but also in many cases shaping views on the pros and cons of international integration.

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It is indisputable that international integration is proceeding at a rapid pace and that it changes economic structures, and therefore in turn both the scope and need for welfare state activities. In the increasing amount of literature on these issues it is possible to identify three different lines of reasoning. One view is that the welfare state will have to be rolled back since it will become increasingly difficult to finance welfare state arrangements through general taxation (see e.g. Tanzi (1999), Wildasin (2000), Sinn (1998)). A contesting view is that the welfare state has developed in response to various changes in society including different family structures, gender equalization but also risks induced by among other things international integration (see e.g. Kvist (2001), Rodrik (1997, 1998)). Countries may differ in how far they have proceeded in this development, but they will eventually all encounter these factors, which necessitate an expansion of welfare state activities. Finally, the development of welfare arrangements are by some seen as primarily reflecting political processes and institutions which in turn exhibit strong forces to preserve existing arrangements and therefore equally strong opposition to changes, and this tends to make differences between countries persist (Esping-Andersen (1999), Boix (1999), Swank (2000). Hence, according to this view few changes in welfare state arrangements are to be expected in a comparative perspective.

This paper addresses the main mechanisms through which international integration affects welfare state activities. The starting point is that changes in the costs and benefits of the activities of the welfare state eventually will affect policies. Hence, even though political processes may influence the particular form and structure of welfare states, it is assumed that it eventually will have to respond to changes in market fundamentals. Accordingly, the paper focuses on identifying the effects international integration may have on the marginal costs and benefits of welfare state activities. The outset is a welfare model of the Scandinavian or universal type where an extensive supply of goods, services and social security arrangements are provided by the public sector and financed by general taxation (see chapter 1).

The remainder of this paper is organised in four parts. To set the scene for the following discussion Section 2 starts out by reviewing a few basic facts on the international integration process. Section 3 offers a brief review of the literature on welfare states and international integration. Section 4 turns to a more detailed analysis of effect arising via the labour market, and

the consequences they may have for both the costs and benefits of welfare state activities. Finally, section 5 considers some policy implications.

2 Basic facts about international integration

European countries are becoming increasingly integrated as a result of both political decisions as well as technological changes reducing trade costs and enhancing information dissemination among countries. This is a continuous process, which in recent years has been accelerated by free trade agreements in the context of GATT and WTO as well as technical advances. The European Union has implied tighter integration among European countries and steps like the internal market (1987-1992) and the Economic and Monetary Union (1999-2001) are meant to strengthen this process even further. This process is extending the market, not only in size but also in scope allowing for more division of production and therefore exploitation of gains from specialization. It is also changing both preferences and the production possibility set. Changing travel patterns and the instantaneous flow of information at a global level is enhancing knowledge concerning norms and habits in foreign countries, which in turn shape new demands. Equally, a speedy transfer of information also affects production possibilities by allowing a more swiftly and less costly flow of knowledge on new production possibilities. Last but not least these changes also affect market interdependencies and thus market forms, and the possibilities of exerting market power. The most visible effects of the process of international integration are found in the areas where transactions across countries can be observed like in financial markets and in international trade, but it affects society through a variety of more or less visible channels.

Like most countries in the world, European countries have experienced a steep increase in international trade with growth rates for trade volumes, which by far exceed growth rates in economic activity. While this process has gone on since trade liberalization was initiated after the second world war, there is no doubt that this process is continuing at a rapid pace. The trade share of the manufacturing sector in EU countries was about 55% in 1970 and towards the end of the 1990's it had increased to about 120%.

There are a number of important facts concerning the increase in international trade, which are of importance to the current discussion. First, while the growth of international trade is

tremendous it tends to be concentrated within Europe. The European area as a whole remains more or less as closed today as it was 30 years ago, with an aggregate trade share being steady at a level slightly above 10% of GDP. Hence, the European integration is proceeding rapidly while the global element in product markets is less strong. In a global context we thus see a concentration in regions, which is reflected in measures of openness for Europe, North America and Asia being remarkably constant over the recent decades despite the increase in international trade (see OECD (1999))[1]. This implies that it to a first approximation makes sense to concentrate on European integration as the main factor influencing welfare state activities. Another implication is that the globalisation threat which is asserted to arise from a large net-import from emerging low wage (and social standard) countries into Europe is not well founded.

Another important fact is that the increase in international trade tends to be concentrated within so-called intra-industrial trade. That is, trade in basically similar or related products, which are differentiated along one or more dimensions, and where producers located in a single or few countries supply several markets with their specific product. Simply put, trade is changing from the traditional (Heckscher-Ohlin) type based on differences in factor endowments to trade being driven by product differentiation, the exploitation of scale economies etc., i.e. the new trade theory (see Krugman (1995)). At the start of the 20th century trade in primary products accounted for about 2/3 of world trade, and by the end of the century the fraction had dropped to 1/4 (Crafts (2000)). This changes the nature of interrelations between European countries since more and more trade is in commodities, which in principle could be produced anywhere in Europe. That is, competitiveness and comparative advantages come to play a larger and larger role for where production and thus employment is placed.

Another increasingly important factor is the enhanced mobility of firms, that is, the incentive of firms to set up foreign production units, to acquire foreign firms or to merge with foreign firms. This is reflected in an increasing number of multinational firms, and increasing

[1] While trade with emerging economies has been increasing absolutely, it has not been increasing faster than trade between industrialised countries. Hence, the market share of low and middle-income countries in trade with OECD countries have remained at a level of about 20% of total imports (OECD (1999)).

levels of foreign direct investments. Although starting out at a very low level, globally foreign direct investments were about 25 times larger in 1996 than in 1970 (OECD 1999).

The internal market has also aimed at removing all obstacles to the mobility of labour within the EU, but the fact is that mobility is fairly low[2]. Labour mobility among EU countries is not at present a major issue. For further discussion of this issue see the chapter in this volume by Pedersen, Roed and Schroeder.

Finally, the liberalizations and subsequent integration of international capital markets is well documented (see e.g. IMF (1999)). Among EU countries participating in the EMU there is effectively one capital market in which exchange rate risk has been removed as an impediment to trade, although, of course, it remains a factor influencing financial transactions with outside areas.

To sum up we can conclude that the European situation today is characterized by strong globalisation of financial markets, strong Europeanisation of product markets, and national labour markets.

3 International integration and the welfare state

The literature on welfare states and international integration is fairly modest but rapidly growing as a reflection of the political importance of these issues. This section considers three basic mechanisms, which have been stressed in the literature, namely, tax base mobility, risk and race to the bottom.

Before turning to the details of this discussion it is useful to point to a basic – though often overlooked – implication of international integration. In general international integration makes room for aggregate welfare improvements although the costs and benefits may not be equally distributed, the net benefits are positive – the gains from free trade argument. The expanded opportunity set created in this way will also be reflected in increased demand for welfare state activities[3]. With a high income elasticity for welfare state activities (usually taken to be close to or

[2] This is so, despite the fact that labour market developments in European countries have been fairly asynchronized.

[3] This can easily be seen by turning to the so-called Samuelson rule for the optimal level of public consumption. Let aggregate welfare be $U(b) + V(G)$ where the first term denotes utility from private consumption (b) and the last term utility from public consumption (g). The optimal level of public consumption is determined by the condition

above one), it follows that welfare state activities will grow by the same or a higher growth rate as e.g. private consumption. Accordingly, international integration has basic effects tending to expand welfare state activities. However, other effects may be at stake, which may change the costs and benefits of welfare state activities, and we will turn to these next.

3.1 Tax Base Mobility

Most of the debate on international integration and the welfare state has centred on the possibilities of financing welfare state activities collectively when economies integrate. Mobility is a key issue since it is facilitated by international integration, which therefore also makes the tax base more mobile. Accordingly, there will be a tendency that the tax base moves to the areas, which offer the most favourable tax treatment[4]. The mobility of various sources of taxation varies substantially. Obviously, financial capital is highly mobile (to which may be added intensified control problems) and the same applies to goods although explicit or implicit trade costs make an important distinction between tradeable and non-tradeable commodities. Firms are also increasingly mobile – in principle it is possible to supply the European market from any place in Europe. While labour in principle could be equally mobile, there is – at least at present – not much labour mobility within Europe and cultural and linguistic barriers are likely to preserve this situation for the foreseeable future (except for specialized groups – highly educated people)[5]. Finally, natural resources are obviously an immobile tax base.

Accordingly, countries with high tax levels will have a choice between either accepting that economic activity moves out of the country, which erodes the tax base and thus revenue, or

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$V'(g)=U'(b)(\frac{\delta b}{\delta g})$ where the LHS gives the marginal benefits and the RHS the marginal costs of public consumption.

Clearly, an increase in b will other things being equal lower the marginal utility of private consumption and thus the marginal costs of public consumption, implying that the optimal level of public consumption increases. See Andersen (2001a).

[4] Items on the expenditure side can also affect the mobility of firms, say infrastructure investments.

[5] A separate question is that of social shopping or mobility, that is, the extent to which individuals and households relocate across European countries to take advantage of differences in taxation systems and social security arrangements. For evidence for the US see Brueckner (2000).

reducing the tax rate to maintain the tax base, but still the loss of revenue cannot be escaped. This is a losers' game seen relative to the need to finance welfare state activities to which the policy maker can react by trying to shift the tax burden to other tax bases, or to cut welfare state activities. The former strategy raises the issue of shifting taxes from mobile to less immobile tax bases (Christensen, Hagen and Sandmo (1994)). The immobile tax bases include natural resources, real estate, but also possibly labour since labour is relatively little mobile across countries (see however section 4.2. below). For further discussion see the chapter in this volume by Norman and Huber.

The policy dilemma arising due to mobility of tax bases is considered in Rodrik (1997) in a context where increasingly mobile real capital is taxed to finance transfers to immobile labour. Immobile labour is imposed to risk via terms of trade variations (exogenous) and the issue is whether it via taxation of mobile real capital is possible to compensate immobile workers for this risk effect. Improved mobility for real capital may increase the exposure of immobile labour to terms of trade risk, but also make it more difficult to tax the mobile capital, the net result being that for sufficiently mobile real capital immobile workers are unambiguously worse off. While the need for welfare state activities increases, the constraint set by tax mobility implies that welfare state arrangements will have to be rolled back.

Wildasin (1995) also considers the issue of taxing mobile factors of production (capital, or highly skilled) to finance transfers to immobile factors of production, but adds that mobility is not only a response to differences in taxes but also to variations in the return to the mobile factors of production. Increased mobility for the mobile factors of production is therefore not unambiguously bad for the immobile factors of production, since the return to the latter tends to be stabilized by the mobility of the former. The basic point is thus that there is a social insurance mechanism involved, and increased mobility may reduce the need for social insurance since mobility works as a buffer. Accordingly, integration may reduce the possibility for taxing mobile factors of production, but the need may also be reduced.

Wildasin (2000) endogenizes skill acquisition and finds in the case of a complete capital market, that increased mobility implies efficiency gains for both skilled and unskilled labour. However, if capital markets are incomplete and education is financed via taxation the situation is

different, since the tax burden is shifted on to immobile (unskilled) workers and the level of human capital investment tends to be too low. Andersson and Konrad (2000) point to the fact that mobility may reduce a time-inconsistency problem in taxation leading to excessive taxation of the return to human capital. With complete private insurance markets improved mobility is welfare improving, whereas with incomplete insurance markets they find that it is ambiguous how education subsidies are affected, although education effort increases. These issues are further analysed in the chapter in this volume by Andersson and Konrad.

The quantitative importance of tax base mobility is open for discussion. It is indisputable that tax base mobility is increasing, but the strength of the mechanism is unclear. The knowledge on how tax base mobility can be affected by taxation is scant, but Gorter (2000) finds that a typical EU country increases its FDI position in another country by about four percent if the latter decreases its effective corporate tax rate by one percent. For labour the mobility has not so far shown to be very sensitive to variations in taxation. For a further discussion see the chapter in this volume by Pedersen, Roed and Schroeder.

Even if the mobility of certain tax bases like capital income or corporate taxation is going to be substantial the consequences should be seen in perspective of the importance of these forms of taxation for overall public sector revenue. For most countries the revenue raised via corporate taxation is contributing only a minor fraction of overall public sector revenue, cf. table 1, and the primary burden rests on taxes levied directly or indirectly on labour income. This may reflect that the tax structure already from the outset is fairly robust to integration, or that other issues are more important for taxation of corporations and capital income.

Table 1: Public sector revenue and distribution on sources – EU countries 1996

		Of which in %				
	Total taxes % of GDP	Personal taxes	Social security	Corporate taxes	Indirect taxes	Other
AUT	47.0	20.9	31.8	4.7	28.6	14.1
BEL	49.6	31.0	29.5	6.8	27.0	5.8
DNK	57.5	53.2	3.2	4.6	32.7	6.3
FIN	55.3	35.0	24.7	6.7	30.1	3.5
FRA	50.2	14.1	39.6	3.8	27.3	15.2
DEU	45.2	24.7	38.1	3.8	27.9	5.5
GRC	35.7	12.4	30.6	6.3	42.8	7.9
IRL	33.9	31.3	12.7	9.6	39.7	6.6
ITA	44.9	25.1	30.5	9.2	25.9	9.3
LUX	47.5	22.0	23.0	16.0	27.7	11.2
NLD	49.7	17.5	31.8	9.5	28.6	12.6
PRT	41.7	18.9	24.0	9.5	42.6	5.1
ESP	39.9	23.0	31.1	5.9	29.2	10.8
SWE	62.7	35.3	29.4	5.6	22.8	6.9
GBR	38.4	25.9	16.8	10.5	35.2	11.6
EU	46.6	26.0	26.4	7.5	31.2	8.8

Source: OECD (2000)

3.2 Risk

Modern economic theory has shown (see chapter 1, and the chapter in this volume by Pestieau) that it is useful to think about welfare state activities as mechanisms to achieve various forms of implicit or social insurance. To evaluate how international integration affects the need for welfare state activities it is therefore natural to start by turning to the relation between international integration and various forms of risk calling for insurance mechanisms.

A key assumption is that the capital market is incomplete leaving market failures in risk diversification, and that these market failures are not significantly reduced as a consequence of capital market integration. It is well established that risk diversification achieved via international capital markets falls short of the implications of complete capital markets (see Lewis (1999)). Moreover, basic market failures relate to human capital, and it is not obvious through which routes international integration should reduce these market failures caused by basic information and incentive problems for individual decision-making.

The basic question is whether more openness and tighter international integration lead to a more risky environment, which in turn can be countered by social insurance provided by public

sector activities? If so, one would expect that more open economies also have larger public sectors. Rodrik (1997,1998) presents empirical evidence to support that more open economies (measured by the trade share) tend to have larger public sectors (measured relative to GDP), and that risk related to trade (terms of trade risk) is causing this relationship.

The relationship between openness and public sector size has been extensively discussed in the political science literature starting with Cameron (1978) pointing to the positive correlation between the two for a sample of OECD countries. In the political science literature this is explained from a power structure perspective according to which political support for further integration can only be ensured if proponents of more international integration are willing to offer compensation to groups suffering from this, and the latter tend to require an expansion of the public sector (see also Pierson (1998), Boix (1999)). In the economics literature Rodrik (1997, 1998) has introduced the risk aspect as a possible explanation. If correct, this hypothesis has important policy implications since it implies that the need and demand for welfare activities will increase along with international integration.

The hypothesis has two links, first that international integration enhances the exposure to risk, and second that various welfare state activities can diversify or mitigate the consequences hereof. Rodrik (1998) presents an illustrative model in which integration is assumed to imply more terms of trade variability, and where an expansion of the public sector can be used to mitigate the consequences of this risk, because resources are moved from the private sector exposed to market risk to the public sector, which by definition is insulated from these risks.

The two links are considered jointly in Andersen (2001a) where risk is related explicitly to product market interaction, and international integration is modelled as reduction of trade frictions in product markets. The basic source of risk is shocks to production at home or foreign, and trade is driven by product specialization. Lower trade frictions are shown to imply more risk in private consumption. While more exposure to foreign shocks is straightforward, it might be conjectured that the exposure to domestic shocks is reduced when markets get more integrated, and therefore the net effect on risk should be ambiguous. This is not the case, and the reason is that the trade friction works as a buffer between income and consumption, and the less the friction the more income can be transferred to final consumption, and accordingly private consumption becomes

more exposed to risk when markets integrate. However, the mean level of consumption also goes up capturing the welfare gains from integration. The enlarged exposure to risk can be mitigated by state contingencies in public consumption and taxes (automatic stabilizers), and it can be shown that product market integration makes the optimal contingencies larger, that is, the optimal policy response to increased integration is to expand social insurance mechanisms. A possible outcome is thus that product market integration implies a reduction in the optimal level of public sector activities, at the same time as there is a need for stronger contingencies in public sector activities.

A long list of authors (see e.g. Cameron (1978), Rodrik (1997, 1998), Boix (1999), and Fatas and Mihov (1999)) have tried to explain country differences in public sector sizes by including variables such as country size, political power structure, institutions, income per capita, geographical position etc. Along this list, openness (defined as the average of import and exports to GDP) has been included, and usually this variable is found to have a positive effect on public sector size. Rodrik (1997, 1998) includes a variable[6] capturing terms of trade risk and finds that this has a positive effect on public sector size. This has been taken as support for the hypothesis that openness creates a need for a larger public sector.

There are several problems related to interpreting this as evidence supporting the risk-hypothesis, see also Alesina and Wacziarg (1997) and Iversen and Gusach (2000). Firstly, openness may be correlated with other variables (country size), and the correlation found in the studies referred to above may be spurious. Secondly, openness is a poor measure of the degree to which international integration affects economies – increasing international integration may have large effects without equally large effects on the trade share. Thirdly, when considering the timing of increasing international integration and public sector expansion, it is not obvious that the hypothesis can be supported for many countries since a large part of public sector growth is concentrated in a period from some time in the 1960s to the late 1970s, while international integration has been an ongoing process before and after the major expansion in public sector activity. This is concealed by studies based on average values over long sample periods. Fourthly, the results may depend critically on the included set of countries. Among EU countries there is

[6] This variable is defined as the trade share multiplied by the standard deviations of the terms of trade. It is not obvious that this is the theoretically correct measure since it disregards the sensitivity of exports and imports to relative prices.

hardly any relation (Andersen (2001a)). Finally, and most importantly, these studies do not test whether more open economies actually have more volatility in key macro variables such as production, consumption and employment.

The latter issue has been considered in the open macroeconomics literature. Smaller countries tend to have more volatility in various measures for aggregate activity (Lumsdaine and Prasad (1997) and Zimmermann (1997)). This may reflect that they have a less diversified production structure than larger countries. If international integration reinforces specialization then one may expect more volatility. However, empirical studies have also found a significant "international component" in business cycle fluctuations reflecting that shocks are transmitted between countries through various linkages highlighted in the open macroeconomics literature. This may suggest that with more international integration the "domestic component" comes to matter less. In an attempt to assess the strength of the "specialization effect" relative to the "transmission effect" Frankel and Rose (1998) find in an important study a positive relation between international trade and the co-movements in business cycles among countries. The "transmission effect" seems to dominate, and this indicates that more international integration will lead to more similar business cycle developments[7]. This result is contested by Kalemi-Ozcan, Sørensen and Yosha (2000) who find a positive relation between industrial specialization and asymmetry in fluctuations. Since capital market integration seems to explain specialization, this suggests that more integration leads to more specialisation and more dissimilar business cycle developments.

However, none of these results indicate whether risk will increase or decrease, but only that business cycles will become more similar across countries. Empirical studies do find a weak negative correlation between openness and macroeconomic volatility (measured by the standard deviation of some measure of business cycle variations in aggregate activity). However, comparisons over longer time periods do not make it possible to conclude whether international integration leads to more or less aggregate volatility (Romer (1999)). It is therefore an open question how quantitatively important the aggregate risk link is.

[7] This may reduce the scope for risk diversification within the EU.

3.3 Race to the bottom

There is a widespread fear that international integration releases competitive forces causing a race to the bottom in which social standards and welfare state arrangements are depreciated. This arises through interdependencies between countries, causing a process where countries by successive undercutting perceive that they can improve their relative position. However, if all act in this fashion the end result is an unchanged relative position and lower social and welfare standards. From the outset it is worth pointing out that the term "race to the bottom" is not used here in the narrow sense of implying a drastic reduction in social and welfare standards, but in the more broad sense of a downward trend which can lead to inefficiently low levels.

The primary example of a potential race to the bottom process is tax competition induced by the mobility of tax bases. Given this mobility, a country may perceive that if it sets its tax rate on mobile source of income below that of other countries it may gain, since the direct revenue loss is compensated by an inflow, which will have beneficial effects not only for tax revenues but also for economic activity and employment in general. Taxation of corporate income is a primary example of this, since a low tax may induce companies to locate in the country. The importance of this is reflected in a tendency towards lower taxation of corporations[8], and the case of Ireland is often highlighted as an example of a country, which has exploited this mechanism with some success[9]. However, other countries cannot passively accept an outflow of companies, and will have to react by eliminating the tax motive for mobility, that is, effective taxation will have to be lowered. In the end this may lead to inefficiently low levels of taxation (as pointed out by see e.g. Zodrow and Miekovsky (1986) and since by many others – see references in Sørensen (2000)). If tax rates are inefficiently low (seen relative to the cooperative case) it follows that tax revenues (from this source of taxation) are inefficiently low, and therefore potentially that welfare state activities are inefficiently low. In an interesting quantitative evaluation Sørensen (2000) finds in an analysis of

[8] This has, however, be accompanied by an expansion of the tax base, hence tax reductions are not proportional to reductions in the rates.

[9] The Primarolo-group (2000) considered 271 arrangements for the taxation of cooperations in EU and associated areas, and found 66 cases in which the principle of non-tax competition was broken.

capital and corporate income taxation that tax rates in the non-cooperative case tend to be about 15 percentage points below the cooperative level. The aggregate welfare consequences are, however, modest among other things because these taxes are not important sources of revenue (see table 1 above). However, there may be important adverse distributional consequences since the position of low-income groups might be worsened since they tend to bear more of the burden of adjustment when tax revenues are reduced.

Baldwin and Krugman (2000) have contested that tax competition causes a race to the bottom, arguing that agglomeration effects do not make core and periphery countries symmetric, and therefore the scope for periphery countries to compete via low taxes (and other measures) for the location of firms supplying the core market is modest.

Another argument for a "race to the bottom" effect runs via the activity effects of public sector activities, e.g. in relation to employment policies. It is a widespread view that public sector activities in open economies are inefficiently low due to the import leakage implied by such activities, that is, expanding public activity will via imports benefit trading partners and this makes policy makers choose a too low level of public activity. This line of reasoning is often motivating calls for coordinated fiscal expansions among the major economies. However, this view does not have unequivocal support in economic theory, and it turns out the opposite situation has support in a wide range of circumstances. The reason is the following: An expansion of public sector activity tends to improve the terms of trade, that is, foreign goods become cheaper relative to domestic goods, and this has a positive real income effect for domestic residents. Hence, in planning public sector activities each country perceives that it can change the terms of trade to its advantage, and this adds to the benefits of expanding public sector activities. However, if all countries act in this way the terms of trade effect will be eliminated, and the end results is an inefficiently (seen relative to the cooperative case) large level of public activity. This result has been demonstrated for public activities in the case of full employment (see e.g. Chari and Kehoe, (1990, Devereux (1991), Turnovsky (1988) and van der Ploeg (1987,1988)), imperfect competition and individual involuntary unemployment (Andersen, Rasmussen and Sørensen (1996)), and in relation to the tax structure by Holmlund and Kolm (2000).

Another source of race to the bottom effect is through social standards (unemployment benefits, work rules etc), which can be lowered either to improve competitiveness or prevent inward mobility of people wanting to benefit from more generous welfare arrangements. Brueckner (2000) considers the latter issue and shows that if mobility is sensitive to social standards, there is a tendency for countries to choose inoptimal low levels of social standards to prevent inward mobility. Evidence is presented for the US, which indicates that this mechanism is shaping welfare policies, if for nothing else because policy makers act under the perception that this is an important mechanism. However, the relevance for Europe is less obvious both because mobility is low (although mobility of a few groups heavily dependent on social welfare can be a burden to any potential host country) and because EU rules have been designed to prevent this form of "social mobility" by making free mobility contingent on employment, that is, it is not possible to move to take advantage of differences in social standards for e.g. unemployed.

4 Integration, labour markets and the welfare state

This section turns to labour market implications of international integration for two reasons. First, labour market issues are core to the welfare state, and it is therefore essential to consider the labour market implications of international integration. Second, it is sometimes wrongly asserted that the labour market consequences are minor since labour mobility across countries is very small. As shall be argued below there are important consequences even if labour mobility remains modest. To develop this idea the following completely disregards mobility of workers.

4.1 Job mobility

The way in which labour markets function depends critically on product market structures for the simple reason that the latter shapes labour demand. It is a basic insight of international trade theory that trade in products can be a substitute for factor mobility between countries. According to the factor price equalization theorem, trade may even be a perfect substitute for factor mobility under idealized conditions including perfect competition in product and factor markets, and identical

technologies. In the current European situation the factor price equalization theorem is not directly applicable, but still it points to important effects.

International integration is likely to have two major effects on product markets (see Andersen, Haldrup and Sørensen (2001)). The first is more intensive competition because various forms of frictions are reduced and this improves the terms at which foreign producers can compete for market shares in the domestic market and vice versa. Second, more integrated markets also enhance the mobility of firms, since it becomes easier to service a given national market from a production unit placed where the most profitable production conditions are available. This applies in particular to goods, which underlies intra-industrial trade, which has become the dominant source of international trade, cf. section 2. This mobility may show up in terms of foreign direct investments, outsourcing etc.

Both of these effects have one basic consequence for labour markets, namely, that they tend to make labour demand more sensitive to the wage rate (the numerical value of the labour demand elasticity increases). This is potentially important since this elasticity is critical for the distortions arising from taxation of labour income, that is, the costs of financing welfare state arrangements can be critically affected even though labour is not mobile across countries.

The effect on the employment level is in general ambiguous since more integrated markets both offer opportunities for export which tend to improve labour market conditions, but also a threat from imports with the opposite effects. This is, however, not a zero sum game between countries since product market integration also affects market power both in product and labour markets, and under wide circumstances the net effect is an overall increase in employment. However, equally important is the fact that the opportunities and threats are not necessarily equally distributed across countries and different groups in the labour market, and this may be critical for the need for welfare state activities.

4.2 Tax distortions

Despite the differences in the specific organisation of the welfare state in various EU countries it is a fact that the larger part of welfare state activities are financed by taxes or social security contribution levied on labour, cf. table 1. As a consequence, all EU countries have a rather high tax

burden on labour measured by the tax-wedge, cf. figure 1. However, there are also substantial variations, which suggest that labour tax issues may become an important competitive parameter. With more integration it follows that the competition for jobs becomes more intensive due to the effects discussed above, and therefore the effects of labour taxation change.

Figure 1: Implicit tax rate on labour

Note: Measure includes direct taxes, social security contribution and indirect taxes. Calculated on the basis of implicit tax rate on employed labour and implicit tax rate on consumption.
Source: Own calculation based on EU (2000)

The basic channel through which this works is that the higher the labour taxation, the higher the wage, and therefore – ceteris paribus – the worse the competitive position of a given country. There are two basic insights from the labour market literature on taxation of relevance for the present discussion. First, most models for imperfectly competitive labour markets predict that an increase in the average tax burden on labour will increase wages (for a survey see Pissarides (1998)). The reason being that an increase in the average tax lowers the compensation to workers, which under very general conditions would lead to an upward wage pressure. The degree to which wages respond to a tax change depends on the specific labour market model. Second, the effects are stronger the more decentralized the labour market (see Summers, Gruber and Vegara (1993),

Andersen (2001b)). The reason is an externality running via the public budget. A tax levied on labour is going to finance expenditures, which are beneficial to workers as a group, but a collective financing method creates the problem that there to the individual or small sub-group is no direct relation between the tax paid and the services offered by the public sector. With fully centralized wage bargaining the public sector budget would be internalised, and there is no distortion. However, the more decentralized the wage formation process the less the budget effect is internalised in the wage formation process and the more taxes are shifted over into wages, that is, tax distortions are increasing in the degree of decentralization in the wage formation process.

There is a fairly voluminous empirical literature on wage formation and the responsiveness of wages to taxes. Summaries have been provided by OECD (1994) and Sørensen (1998) and the general finding is a positive spillover from average taxes to wages, but with substantial variations in the elasticities across countries. This could be explained by the fact that the studies do not control for the institutional structure of the labour market. This is done in Alesina and Perotti (1998) and Daveri and Tabellini (2000) and both studies find that the elasticity of wages wrt to average taxes is smaller in countries with centralized wage formation relative to more decentralized wage setting.

These results indicate that the costs of financing welfare state activities through general taxation can be significantly affected by international integration. However, assessing the quantitative importance of this is complicated not only by the fact that knowledge on how elasticities are affected by international integration is very scant, but also by the fact that the wage formation process will not be unaffected. A change in the labour demand elasticity will in general affect wage setting, and a more elastic labour demand will moderate wage demands.

Appendix A presents a simple framework within which to assess how the costs of financing welfare state activities through labour income taxation are affected by international integration. The costs are measured by the marginal costs of public funds, which are a monetary metric of the total costs of raising revenue to the public sector, that is, it includes both the direct resource use and the distortions. In the special case where expenditures can be financed by lump-sum taxes the marginal costs of public funds is one, but with distortionary taxes the marginal costs of public funds are larger than one.

The model has international integration affecting product markets via a reduction in trade frictions, which makes product demand and therefore in turn labour demand more price elastic, and a wage relation which can capture the effect of both taxation and integration.

Table 2 summarizes the results of numerical evaluations of the sensitivity of the marginal costs of public funds to variations in the product demand elasticity. The first column displays the base case – for parameter choices see the appendix – and it shows that the marginal cost of public funds are quite sensitive to the demand elasticity. Larger demand elasticities increase the distortions (though at a decreasing rate). An increase in the demand elasticity from 1.4 to 1.6 would thus increase the marginal costs of public funds from 1.10 to 1.14 or increase the distortion from 10% to 14% of the amount of revenue raised via taxation. Moving rightwards in the table the second column shows the marginal costs of public funds if wages are slightly more sensitive (sensitivity increased by 10%) to taxes. This is seen to increase the distortions, but the sensitivity to the demand elasticity is relatively unchanged. The final column shows a deviation from the base case where the underlying labour market distortion is increased (also by 10%) and this is also increasing the marginal costs of public funds, but not quite as much as for a larger tax sensitivity of the wage. This suggests that labour market imperfections and the institutional structure may play a crucial role for how international integration affects tax distortions, that is, the effects may be smaller in high tax countries with centralized wage setting than in low tax countries with more decentralized wage setting.

Table 2: Marginal costs of public funds and product market integration

	Marginal cost of public funds		
Demand elasticity	Base case	Increased tax spillover	Larger labour market distortions
1.2	1.05	1.10	1.05
1.4	1.10	1.15	1.11
1.6	1.14	1.19	1.15
1.8	1.16	1.21	1.17
2.0	1.18	1.23	1.19

Source: Our calculations, see Appendix.

The net result of further product market integration is likely to involve all three effects. Tighter product market integration is going to increase the demand elasticity, this suggests that the

marginal costs of public funds are going to increase, and the sensitivity seems to be large, since moderate increases in the demand elasticity can double the distortions. However, labour market behaviour will not remain unchanged for a number of reasons. More elastic product demands will reduce labour market power, which in turn under general conditions will lower both labour market distortions and the spillover from taxes into wages. This will work to moderate the increase in the marginal costs of public funds, but never to overturn the direct effect (Andersen (2001b)). However, integration may be a separate reason for more decentralization of wage formation (Flanagan (1999)) and this tends to increase the spillover from taxes into wages. Since the available empirical knowledge on the latter mechanisms is very scant it is difficult to make precise estimates of the net effects, but non-trivial effects cannot be ruled seem likely. Hence, even without any consideration of tax base mobility it can be concluded that the costs of financing welfare state activities through general taxation can be significantly increased as a result of product market integration.

4.3 Heterogeneity[10]

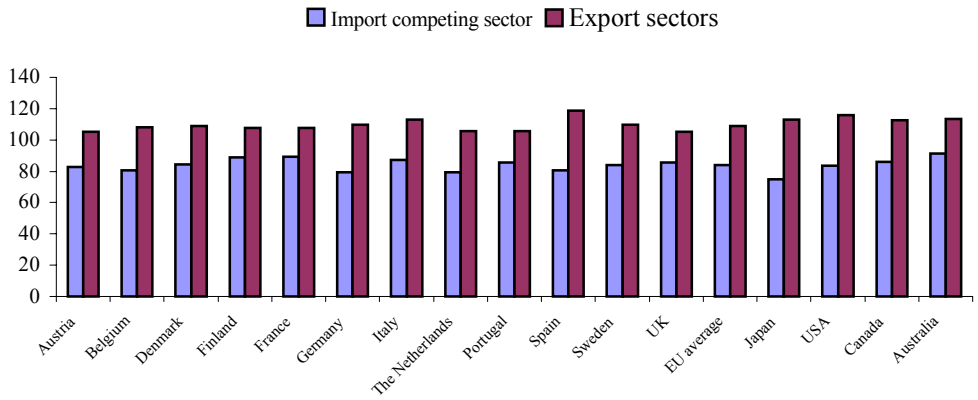
One important question in the debate on international integration is whether it leads to more inequality in labour markets. Product market integration has two immediate effects on labour markets – one is the threat of imports, that is, foreign firms capture the domestic market – the other is the possibility of entering the foreign market via exports, which will give new opportunities and be good news for wages and employment. Hence, there are positive and negative effects from product market integration. Are there any compelling reasons why the gains and losses should be unequally distributed in the labour market such that low wage groups tend to bear the threat of imports, while the high wage groups enjoy the opportunities created by exports? Simple intuition suggests that there might be since low wage groups are more directly affected by the import threat, while the export opportunity tends to accrue to high productive and thus high wage groups. Empirical evidence indicates that there is such a systematic pattern, cf. figure 2.

To consider more closely how product market integration may cause more inequality, consider figure 3, which brings out some very basic mechanisms. For any given level of

[10] This section is based on Andersen (2001c).

productivity in a particular sector or for a given group of workers there is a critical wage above which the wage cannot be set since that would make domestic production unprofitable denote this wage w_h^I, and the goods would be imported. Similarly, there is a wage at which domestic production would also be competitive at the export market denote this w_h^E. Clearly, the critical

Figure 2: Wages and international competition



Source: OECD (1994)

export wage w_h^E is lower than the critical import wage w_h^i. Moreover, the larger the trade frictions in product markets the larger the difference between the two. With low trade frictions and tightly integrated product markets the difference between being in a position threatened by import and one of having an export possibility is very small. Contrary, with large frictions and little integration the margin is wider.

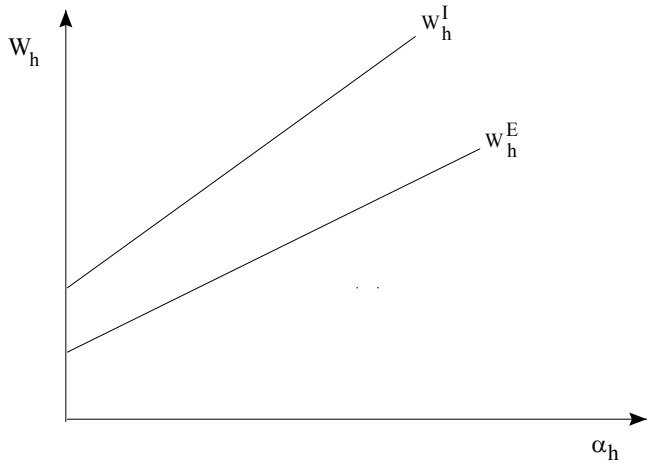
Figure 2 shows how the critical export and import wage depends on productivity – the more productive the workers the higher the wages they can attain. The difference between the two critical wage levels creates a corridor within which the domestic labour market is protected from international competition in the sense that for wages in this interval there would neither be imports nor exports – the sector is a so-called non-tradeables.

Consider now two basic issues related to wage formation. First, social objectives in the form of a lower wage limit set by either an explicit minimum wage or indirectly via unemployment benefits or social security arrangements. Term this wage $w^{\min}$. For some groups

with low productivity (in general low comparative advantage) it would be impossible to find employment at the minimum wage. The reason is that the potential jobs for this group are lost through imports, that is, domestic production is not profitable. Second, trade frictions make it possible for workers to exert market power, or put differently they can appropriate rents created by the trade frictions. Assume for the sake of argument that there is a desired wage, which workers or unions are striving for, call this w^{union}. The corridor implied by trade frictions makes it possible for a group with intermediary productivity to demand a high wage, effectively these sectors become non-tradeables. Not all can demand this wage, some are under severe threat from imports, and therefore forced to accept a lower wage, that is, the critical import wage. For very high productive workers it is possible to demand a higher wage and still maintain their jobs since they can make it on the export markets, see figure 4. An interesting implication is that low productivity workers are those facing low wages because they face the threat of imports, while high productive workers have the possibility of claiming a high wage because they have an export opportunity, in accordance with the facts reported in figure 2.

Turn next to effects of a reduction in trade frictions due to international integration. Consider first the social objectives captured by the minimum wage. Lower trade frictions will make this wage a more binding constraint since the import threat becomes stronger. This implies that unemployment problems for low productivity groups will increase, and that the financial burden of maintaining social objective through wage floors increases. Note that the effects discussed here do not imply that all low wage jobs will disappear since some can be protected by relatively high trade frictions, e.g. for a number of service activities.

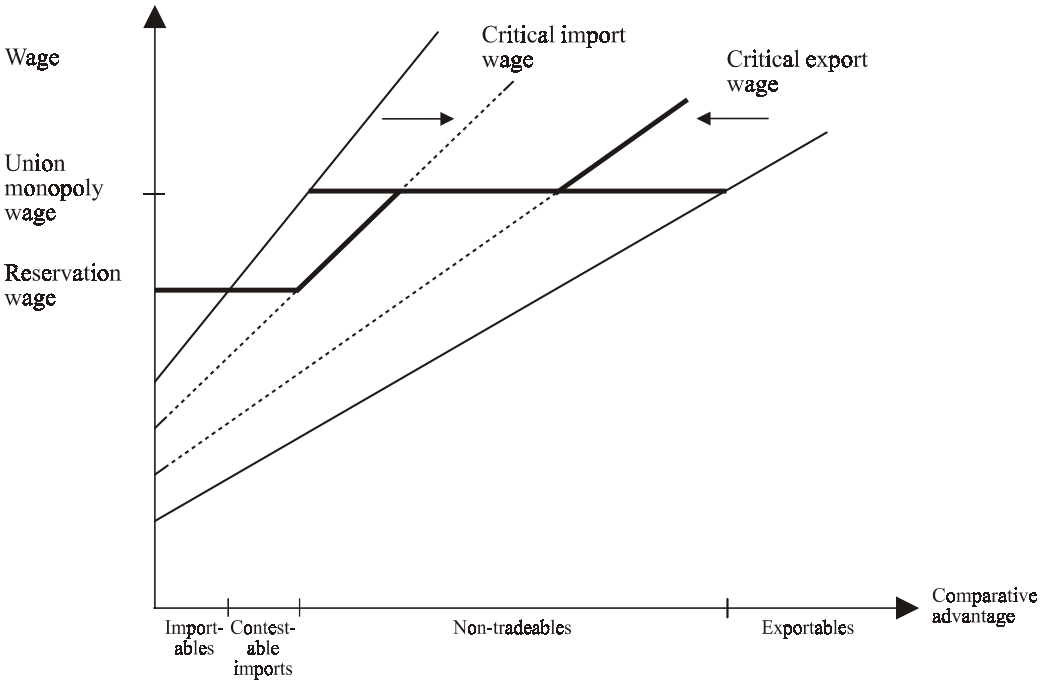
Figure 3: Critical Import and Export Wages



Lower trade frictions have the implications of reducing the possibilities of exerting market power, that is, the non-tradeables sector shrinks. This is like an implicit structural reform since it forces wage to move closer with productivity.

Finally, the distribution of wages for employed workers becomes more unequal. The reason is that those facing the import threat will have to accept lower wage to maintain their jobs, while those having an export possibility face an improvement in their terms of trade. Since there is a systematic tendency between the position in the wage distribution and trade, with the import threat tending to be concentrated in low wage jobs, and the export possibility for high wage jobs, it follows that wage dispersion increases. The intuition is basic, those claiming a high wage must have a high productivity (comparative advantage), otherwise the wage would have to be lower, and vice versa. It is thus a straightforward implication that more integration strengthens the import threat for low wage groups and enforces the export possibility for high productive groups, and this tends to make the wage distribution necessarily becomes more unequal.

Figure 4: Wage Functions – Symmetric Equilibrium



This raises an obvious policy dilemma. The need for a wage floor to achieve social objectives increases, because a larger proportion of the labour force is facing the import threat more fiercely, and the wage dispersion increases. This increases the financing burden, which it can be increasingly difficult (mobility argument) or costly (the distortion argument) to finance via taxation.

Another implication is that itpoints to an important difference between the short run and long run strategy to achieve social objectives in the labour market. The short run is that it will be more costly to maintain social standards as a consequence of international integration, and this has to be financed somehow. The long run perspective is that since it becomes increasingly costly to maintain a qualification structure which does not match social ambitions with respect to the wage structure, it becomes important through labour market and education policy to affect the qualification structure in the direction matching the political objectives with respect to the distribution of pay and employment.

5. Policy implications

International integration is a gradual process, not a regime shift. Hence the development will not display abrupt changes calling for sudden and drastic changes in welfare policies. However, the costs and benefits of welfare state activities will gradually be affected and this will eventually have to affect both the size and structure of the welfare society.

On the cost side an important effect is the increase in the distortionary consequences of labour taxation – the primary source of revenue in most countries. This effect arises via product market integration implying that job location across countries becomes more sensitive to wages, and therefore in turn taxes. These effects will be stronger if labour markets are or become more decentralized due to international integration or for other reasons. The financing problems can be further strengthened by increased labour mobility.

This raises the question whether tax distortions can be reduced while still maintaining basic welfare state arrangements. An immediate solution would be to decentralize the financing of welfare arrangements to reduce tax distortions. This can be done either by linking arrangements more closely to the structure in the labour market (decentralized unemployment insurance etc) or by choosing more individualized solutions. In either case basic welfare state objectives can be maintained by making the arrangements mandatory, but they imply less risk diversification compared to more universal arrangements. This creates a difficult policy dilemma since international integration may increase the need for such risk diversification because the exposure to shocks becomes larger and because further specialization increases the vulnerability to shocks.

Related to this is the question of whether the financial burdens of the welfare state can be reduced in other ways. Since large gross amounts are transferred back and forth between individuals relative to the net amounts effectively transferred one important issue is whether more targeting of welfare state activities can be implemented. If so the objective of the welfare state can be achieved with less distortions. This may involve more use of means-testing and (mandatory) private insurance arrangements.

One conclusion from the preceding is that it may be difficult to avoid more heterogeneity and inequality as a consequence of both the direct consequences of international integration and

the indirect effects on welfare arrangements. Passive measures in the form of transfers and minimum wages etc. will have increasing difficulties in meeting basic distributional objectives. A major challenge for future welfare policies is therefore to create incentives and design labour market and social policies so that they result in a qualification level and structure, which is in accordance with the objectives in relation to the level and distribution of material well being.

The universal model also has the problem that it is less robust towards mobility since it is based on a collective arrangement over lifetime – by in and outward mobility this link can be broken. At present this is not a major problem, but the tensions may increase in a not too distant future, not only because labour becomes more mobile, but also because recipients of transfer may take advantage of the mobility (e.g. as is currently happening for pensioners). This may in particular be an important problem for universal elements defined as citizens' rights.

Finally, it is worth pointing out that the challenges faced by welfare state due to international integration do not arise from an outside political pressure, but are caused by changes in the way in which economies work. Or to put it differently, fundamentals are changing and this calls for adjustment in policies.

Appendix

To address how the marginal costs of public funds are affected by product market integration, consider a fairly simple yet general model, which brings out some basic mechanisms on how tax distortions are affected by international integration. To allow for an interesting discussion we need to consider an explicit open economy model with interdependencies, and with possibilities of further integration. To this end consider a non-monetary two-country model with specialized production, i.e. each country produces a commodity, which can be traded internationally. Trade across borders is assumed to be associated with trade frictions implying that one has to buy $1+\tau$ unit of the foreign good to attain one unit for final consumption, i.e. τ measures the friction associated with trade ("iceberg" costs)[11]. The process of international integration is taken to lower these trade frictions. In the following a * indicates foreign variables.

[11] Note that τ is a pure friction and nobody derives any utility from it.

Households

Households own the firms and are entitled to the flow of profits. The utility of a representative household is given as the sum of the utility derived from private consumption ($b - dl$) and public consumption (g), i.e.

$$U(b - dl) + V(g) \qquad (1)$$

where both the U- and the V-function are increasing and concave functions. The private consumption bundle b is defined by an indirect utility function

$$b = \phi(P, (1+\tau)P^*)I$$

where P is the price of the domestic good, P^* the price of the foreign commodity, τ is the iceberg costs, and I the disposable income after taxes (see below). The properties of the indirect utility function (see e.g. Varian (1978)) include that it is homogeneous of degree zero in P, P* and I, the ϕ-function is decreasing in P and $(1+\tau)P^*$. The amount of work is l, and the disutility of work is assumed constant d, which implies that the individual labour supply elasticity is zero for a real compensation exceeding the reservation wage d.

It follows that consumption of the home good can be written

$$c = -\frac{\frac{\partial \phi}{\partial P}}{\phi} I = c(P, (1+\tau)P^*)I = c(1, (1+\tau)p)i$$

and for the foreign good (an upper bar is used as notation for foreign commodities in consumption)

$$\bar{c} = \frac{\frac{\partial \phi}{\partial P^*}(1+\tau)}{\phi} I = \bar{c}(1,\ (1+\tau)p)i$$

where $p \equiv \frac{p^*}{P}$ denotes the terms of trade, and the second equality follows by exploiting the homogeneity properties of the indirect utility function. Note that trade frictions imply that total demand for the foreign good is

$$\bar{d} = (1+\tau)\bar{c}$$

Firms

Assume a setting with perfectly competitive labour markets and imperfectly competitive labour markets. Price taking (representative) firms produce subject to a traditional concave production technology

$$y = f(l) \;\; f_l^{'} > 0, \; f_l^{''} < 0$$

yielding a labour demand function

$$l = l\left(\frac{W}{P}\right) \qquad 1^{'}_{\frac{w}{p}} < 0$$

The elasticity of employment wrt to the real wage is denoted $n_{lw}(<0)$. The supply function reads

$$y = y\left(\frac{W}{P}\right) \qquad y^{'}_{\frac{w}{p}} < 0$$

and the elasticity is denoted η_{yw}.

Wage Setting

The wage setting mechanism is kept as general as possible to encompass various wage models. Start by observing that the relevant (utility based) consumption real wage measure giving the additional consumption generated by a nominal wage W is

$$W\phi(P, \, (1+\tau)P^{*})(1-\tau) \; = \frac{W}{P}\phi(1, \, (1+\tau)p)(1-\tau)$$

where the equality follows by using the homogeneity properties.

A broad class of wage formation models can be captured by assuming that the real consumer wage is given as a mark-up *(m)* on the disutility of work, i.e.

$$\frac{W}{P}\phi(p, \, (1+\tau)p)(1-t)p) = m(p, \, t, \, \tau)d \quad , \qquad m \geq 1$$

Hence, the real producer wage can in general be written as

$$\frac{W}{P} = \frac{m(p, \, t, \, \tau)d}{\phi(p, \, (1+\tau)p)(1-t)} \equiv \omega\left(p, \, t, \, \tau\right) \qquad \omega_p > 0, \;\; \omega_t > 0, \;\; \omega_\tau \leq 0$$

We can now write output and employment as

$$y = \hat{y}(p,\, t,\, \tau) \qquad where \quad \frac{\partial y}{\partial p}\; y_p^{'} < 0, \quad y_t^{'} < 0, \quad y_l^{'} < 0$$

where the price elasticity is given as $\varepsilon_{yp} = \eta_{yw}\varepsilon_{wp}$ and $\varepsilon_{yt} = \eta_{yw}\varepsilon_{wt}$. Similarly, employment can be written

$$l = \hat{l}\,(p,\, t,\, \tau) \qquad where \quad \frac{\partial l}{\partial p}\, l_p^{'} < 0 \quad l_t^{'} < 0$$

Government

The government produces the public good by use of the home good as an input and finances these expenditures by a linear income tax. Since the model is static the government budget has to balance, i.e.

$$g = \tau\, y$$

The home bias in public consumption captures the observed tendency of the public sector to consume home produced goods (services). The government is assumed to be utilitarian, i.e. the level of public consumption is set so as to maximize the utility function (1).

Equilibrium condition

Product markets are assumed competitive and the price is thus determined by equality between supply $\hat{y}$ and demand given by

$$d\,(p,\ t,\ \tau) = c(1,\ (1+\tau)\,p)(1-t)\,i + (1+\tau)c^{*}(1+\tau,\ p)(1-t^{*})\,pi^{*} + g$$

where the first term is demand by domestic households, the second term demand by foreign households, and finally domestic government demand.

Marginal costs of public funds

To discuss this issue it is useful to consider the marginal costs of public funds and how they are affected by international integration. The marginal cost of public funds (*mcpf*) summarizes the total costs of raising tax revenue, that is, the direct resource use plus the distortions. Hence, the *mcpf* is one in the special case where public sector activities can be financed by lump-sum taxes. If taxes cause distortions the *mcpf* is larger than one.

The optimal choice of public consumption and taxes solves the following Lagrange problem

$$\max_{t,g} \Psi = U(\phi(1,\ (1+\tau)p(1-t)\hat{y}(p,\ t,\ \tau) - d\hat{l}(p,\ t,\ \tau))) + V(g) + \mu(t\hat{y}(p,\ t,\ \tau) - g)$$

The first order conditions are

$$\frac{\partial \Psi}{\partial t} = U_b \phi_2^{'}(1,\ (1+\tau)p)(1-t)\hat{y}(p,\ t,\ \tau)(1+\tau)\frac{\partial p}{\partial t} - U_b \phi \hat{y} + U_b \phi(1-t)\left(\frac{\partial \hat{y}}{\partial p}\frac{\partial p}{\partial t} + \frac{\partial \hat{y}}{\partial t}\right)$$

$$- U_b d\left(\frac{\partial \hat{l}}{\partial p}\frac{\partial p}{\partial t} + \frac{\partial \hat{l}}{\partial t}\right) + \mu\left(\hat{y} + t\frac{\partial \hat{y}}{\partial p}\frac{\partial p}{\partial t} + t\frac{\partial \hat{y}}{\partial t}\right) = 0$$

$$\frac{\partial \Upsilon}{\partial g} = V^{'}(g) - \mu = 0$$

Using that $\frac{\partial \hat{y}}{\partial z} = f_l^{'}\frac{\partial \hat{l}}{\partial z}$ *for* $z = p,\ t,\ \tau$ and

$$f_l^{'} = \frac{W}{P} = \frac{m \cdot d}{\phi(1-t)}$$

we have

$$\frac{\partial \hat{l}}{\partial z} = \left(\frac{W}{P}\right)^{-1}\frac{\partial \hat{y}}{\partial z}$$

we get

$$\frac{\partial \hat{l}}{\partial z} = \frac{\phi(1-t)}{md}\frac{\partial \hat{y}}{\partial z}$$

and hence

$$\phi(1-t)\frac{\partial \hat{y}}{\partial z} - d\frac{\partial \hat{l}}{\partial z} = \phi(1-t)\left[1 - \frac{1}{m(p,t,\tau)}\right]\frac{\partial \hat{y}}{\partial z} = \phi(1-t)n(p,t,\tau)\frac{\partial \hat{y}}{\partial z} \quad for \quad z = p,t,\tau$$

where

$$n(p,t,\tau) \equiv 1 - \frac{1}{m(p,t,\tau)}$$

We can now write

$$\mu = -\frac{\phi_2'(1-t)\hat{y}(1+\tau)\frac{\partial p}{\partial t} - \phi\hat{y} + \phi(1-t)n(p,t,\tau)\left(\frac{\partial \hat{y}}{\partial p}\frac{\partial p}{\partial t} + \frac{\partial \hat{y}}{\partial t}\right)}{\hat{y} + t\frac{\partial \hat{y}}{\partial p}\frac{\partial p}{\partial t} + t\frac{\partial \hat{y}}{\partial t}} U_b$$

Expressing the Lagrange multiplier in monetary equivalents we get

$$\frac{\mu}{U_b\phi} \equiv mcpf = \frac{t - s\varepsilon_{p,t} - (1-t)n(p,t,\tau)\left(\varepsilon_{\hat{y}p}\varepsilon_{pt} + \varepsilon_{\hat{y}t}\right)}{t + \varepsilon_{\hat{y}p}\varepsilon_{pt} + \varepsilon_{\hat{y}t}}$$

where $$s = p\frac{\phi_2'(1-t)\hat{y}(1+\tau)}{\phi\hat{y}} = \frac{p\bar{d}}{\hat{y}}$$

denotes the import share (in total income). The elasticity of the price wrt to the tax rate is

$$\varepsilon_{pt} = \frac{\varepsilon_{\hat{y}t} - \varepsilon_{dt}}{\varepsilon_{dp} - \varepsilon_{\hat{y}p}} \begin{matrix} \geq \\ \leq \end{matrix} 0$$

and $\varepsilon_{dp}(<0)$ denotes the price elasticity of demand for the domestic product. It follows that

$$\varepsilon_{\hat{y}p}\varepsilon_{pt} + \varepsilon_{\hat{y}t} = \frac{\varepsilon_{dp}\varepsilon_{\hat{y}t} - \varepsilon_{dt}\varepsilon_{\hat{y}p}}{\varepsilon_{dp} - \varepsilon_{\hat{y}p}} < 0$$

capturing the contractionary effects of a tax increase.

One important issue is how the *mcpf* is affected by the product demand elasticity ε_{dp}. It can be shown that under plausible conditions the demand elasticity is increasing when the trade friction falls (Andersen, Haldrup and Sørensen 2001). Note that the effect of variations in ε_{pt} on *mcpf* is

$$\frac{\partial mcpf}{\partial \varepsilon_{dp}} > 0$$

that is, more elastic demand increases the marginal costs of public funds.

For the numerical illustrations assure that under a Cob[b]-Douglas technology $(y = 1^a)$ in which case $\varepsilon_{\hat{y}p} = \frac{a}{a-1}\varepsilon_{wp}$, $\varepsilon_{\hat{y}t} = \frac{a}{a-1}\varepsilon_{wt}$. The parameter *s* is related to the import share as follows: import share = $\frac{m}{gdp} = \frac{c}{y+g} = \frac{\bar{c}}{(1+t)y}$, hence $s = (1+t)\frac{m}{gdp}$.

The elasticity of demand with respect to the tax rate is given as $\varepsilon_{dt} = -\frac{t}{1-t}$. The parameter choices are motivated as follows: i) *a* is the labour share, = 0.66, ii) $\varepsilon_{wp} = 0.7$, (Andersen and Risager), iii) $\varepsilon_{wt} = 0.25$ (Alesina and Perotti, 1999), and iv) import share = 0.3

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