

# ZEW Economic Studies

Christina Elschner · Robert Schwager

Vol. 29

## The Effective Tax Burden on Highly Qualified Employees



### An International Comparison

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# The Effective Tax Burden on Highly Qualified Employees

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With 22 Figures  
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**Authors**

Christina Elschner  
Centre for European Economic Research (ZEW)  
L 7,1  
68161 Mannheim  
Germany  
elschner@zew.de

Professor Dr. Robert Schwager  
Georg-August-University of Göttingen  
Department of Economics  
Platz der Göttinger Sieben 3  
37073 Göttingen  
Germany  
rschwag@gwdg.de

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## Preface

This book is the result of a research project commissioned by the «IBC BAK International Benchmark Club»<sup>®</sup>, an initiative by BAK Basel Economics, and carried out by the Centre for European Economic Research (ZEW). It contributes to the IBC's effort to evaluate and compare economic performance and location factors across European regions. The book provides the background to the headline figures presented at the International Benchmark Forum on June 11<sup>th</sup> and 12<sup>th</sup>, 2003, in Basel, as well as many additional results.

This work has benefited from the help of many institutions and individuals. Above all, we are indebted to the sponsors for financing the project in times of limited fiscal resources. A panel of experts in human resources and taxation has advised us on characterising the compensation structure of typical highly qualified employees. We would like to thank the experts as well as the members of the Steering Committee of the IBC module on taxation for their enduring support. Special thanks go to Kurt Dütchler of the Swiss Federal Tax Administration who was always ready to provide information on detailed aspects of the Swiss tax system. We are grateful to Christoph Koellreuter and Martin Eichler from BAK Basel for organising and promoting research on taxation inside the IBC. Our colleague Lothar Lammersen (ZEW) provided many detailed comments which greatly improved our work. Our thanks go also to Otto H. Jacobs (University of Mannheim) and Christoph Spengel (University of Gießen and ZEW) for encouragement and advice. In addition, we are indebted to Gerd Gutekunst, Rico Hermann, and Thorsten Stetter (all ZEW) for helpful discussions. Finally, we owe thanks to Kristoph Baum and Irina Kremel (ZEW) and Monika Jackmann (University of Göttingen) who provided able help in preparing the final draft of this report. Of course, all remaining errors are our sole responsibility.

Mannheim and Göttingen, October 2004  
Christina Elschner and Robert Schwager

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- Eidgenössische Steuerverwaltung, Bern, Switzerland
- Wirtschaftsministerium Baden-Württemberg, Stuttgart, Germany
- Tax and Finance Departments of the cantons of Basel-Landschaft, Basel-Stadt, Bern, Schwyz, St. Gallen, Ticino, Valais, and Zug, Switzerland

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- René G. Franzoni, UBS AG, Basel, Switzerland
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# Executive Summary

This study presents estimates of the effective level of the tax burden on highly qualified employees in eight European countries and the United States. It is complementary to a companion project analysing the tax burden on capital.<sup>1</sup> Although both studies rely on different models for estimating effective tax burdens, they share the same spirit. The qualitative results of both can be compared, and common conclusions can be drawn. Hence, the results of both approaches provide a comprehensive picture of the level of taxation in the countries studied.

The study was prepared for the «IBC BAK International Benchmark Club»<sup>®</sup>, which evaluates and compares economic performance and location factors across European regions. The headline figures of this Executive Summary represent the *IBC Taxation Index* (see Table 0.1. on p. 5). This index will be updated regularly in the future so as to illustrate trends in the effective tax burdens of companies and on highly qualified employees.

The scope of the study is threefold: First, due to a great number of relevant tax rules, effective tax burdens may differ significantly from statutory tax burdens. Therefore, the analysis quantifies meaningful estimates of effective tax burdens. These estimates take into account the most important rules of all the relevant taxes. The study considers income taxes including surcharges, tax-like social security contributions as well as payroll taxes paid by the company. Second, taxation is deemed to be an important location factor. In order to compare the attractiveness of different locations from a tax perspective, the study compares effective tax burdens inter-regionally and internationally. Third, an effective tax rate is always the result of each particular case. To identify the general context, and to find out the most relevant tax provisions in different economic constellations, the so-called tax drivers, the study examines the effect of important tax provisions on effective tax burdens.

The measurement of the tax burden on highly skilled manpower is a new research field. Due to a lack of established methods a completely new approach has been developed which allows considering several components of the remuneration package, the family situation, and varying levels of compensation. This concept parallels established methodologies for the quantification of company tax burdens by calculating the effective average tax rate (EATR) as an indicator of the tax burden. The basic idea of our approach is that employers compete for highly qualified employees and therefore have to compensate these for taxes on labour income and tax-like social security contributions. As a consequence, the tax burden of differ-

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<sup>1</sup> See Lammersen and Schwager (2005).

ent regions is compared for a given *disposable income* after taxes which the employee can obtain at all locations.

The computer-based model determines the tax burden in an iterative procedure. At first the tax assessment of a typical qualified employee's income before taxes (the *total remuneration*) is conducted. If the resulting income after taxes falls short of (exceeds) the required disposable income, the assessment is repeated for a higher (lower) total remuneration. The model then iterates until the total remuneration necessary to obtain the predetermined disposable income is found. The effective average tax rate is calculated by dividing the difference between total remuneration and disposable income (the *tax wedge*) by the total remuneration. The EATR thus expresses how much the employer has to expend in addition to the predetermined disposable income. For example, if an employee with a disposable income of € 100,000 faces an EATR of 25 per cent this means that the tax wedge (€ 33,333) amounts to a quarter of the total remuneration (€ 133,333).

Taxes in this context are all income taxes including surcharges and state and municipality taxes, as well as payroll taxes paid by the company. Social security contributions are part of the tax burden inasmuch as the employee does not earn a specific, individual benefit by paying them. According to the basic idea of competition, there is little risk of unemployment for the kind of qualified employees considered here. Hence contributions to unemployment insurance, and by a similar reasoning also contributions to accident insurance, are defined as taxes. Health premiums, on the other hand, are not considered to be taxes since they are deemed to provide a genuine insurance.

Contributions to public pension schemes are considered to be partly taxes. The first pillar of old-age insurance is usually organised as a pay as you go system involving redistribution between generations and between high and low earning workers. Inasmuch as contribution payments do not result in actuarially fair pension entitlements, they constitute an implicit tax rather than an insurance premium. To account for this implicit tax, entitlements earned by the highly qualified employee are computed according to the legislation currently in force and offset against contributions.

Our model distinguishes between four kinds of compensation: (1) cash compensation, (2) contributions to old-age provision, (3) stock options and (4) perquisites. These components are taxable in different periods. Cash compensation and perquisites are taxable income in the year of payment whereas stock options are either taxable when the options are granted or when they are exercised. Contributions to old-age provisions may be excluded from taxable income and thus pension benefits are subject to taxation, or contributions may be paid out of taxed income implying that pensions are non-taxable income during retirement. Our model explicitly deals with the timing of tax and pension payments by using an intertemporal approach.

Geographically, the study covers twelve Swiss cantons, Austria, France, Germany, Ireland, Italy, the Netherlands, the United Kingdom, and the United States (Massachusetts). Currencies are converted with average nominal exchange rates of 2002. The effective average tax rates are calculated from the laws applying in 2002 and 2003.

The base case represents the *IBC Taxation Index* for highly skilled manpower. Here, we consider an employee's disposable income of € 100,000 that consists of 75 per cent cash compensation, 20 per cent old-age contributions, and 5 per cent perquisites. The employee is single and has no other income. The results show a threefold picture: The Swiss cantons Schwyz and Zug have the lowest tax burden with EATRs of 25.7 per cent and 25.9 per cent, followed by the other cantons analysed, the United States, and the United Kingdom with EATRs above 28 per cent and below 40 per cent. The highest tax burdens with effective tax rates between 40 per cent and 50 per cent occur in the other European countries considered, namely Ireland, Austria, the Netherlands, Germany, France, and Italy.

To illustrate these differences, it is instructive to translate back the EATRs into the total remuneration required in each location so as to provide the employee with a disposable income of € 100,000. To achieve this, a company has to spend € 134,589 in Schwyz, € 161,812 in Massachusetts, and € 199,203 in Italy. Thus, taxes interfere heavily in the international competition for talent.

*Changing the disposable income* to € 50,000 results in decreasing tax rates in almost all regions. With more than 10 percentage points, the reduction is particularly important in Switzerland and the Netherlands. This result illustrates the overall progressivity of the income tax and social security combined. The system becomes more progressive if tax rates rise steeply over the range of incomes considered, as in Switzerland, or if tax rates applying to low income brackets are very low, as in the Netherlands. On the other hand, ceilings on social security contributions reduce progressivity, as in Germany, Austria, and Italy.

Increasing the disposable income to € 200,000 results in relatively strong increases in the EATRs in Switzerland. This is due to the fact that, except in the case of unemployment insurance, there is no income ceiling in the Swiss social security system. Contributions still have to be paid on high income brackets. While Swiss cantons have the lowest effective tax burden among all countries analysed for low disposable incomes, Switzerland in part loses this top position once one moves to very high disposable incomes. In this respect, the United States, the United Kingdom, Ireland, and Austria compete successfully with Switzerland. In the United States, a highly qualified employee bears a lower effective average tax rate than in the cantons of Bern, Basel-Stadt, Basel-Landschaft, Genève, Ticino, Vaud. Austria ranks ahead of Genève, Ticino, and Vaud.

To analyse the taxation of *families* the effective average tax rates of an employee with a non-working spouse and two children have been calculated. All regions grant tax reliefs for families. On the one hand, families receive child benefits and/or tax credits. On the other hand, tax schedules differ depending on marital status and the number of children. Compared to other countries, families in Germany, Ireland, the USA, France, and Switzerland enjoy a particularly strong reduction of their tax burden relative to singles. In Italy, singles and families are taxed almost equally. A comparison of the effective tax rates for families at disposable incomes of € 50,000 and € 100,000 reveals that the tax advantage of families decreases with increasing income.

The *compensation structure* also influences the effective average tax rate. While increasing the share of old-age provision in the compensation package has



only minor consequences for the EATR, in all countries except Germany and the Netherlands the effective tax burden decreases substantially if the employee is granted stock options.

*Public pensions* are responsible for a substantial part of the tax burden. To assess the quantitative importance of public pensions as a part of the overall tax burden, a simulation has been carried out assuming that contributions to the first pillar of old-age insurance yield a market rate of return. This results in a reduction in EATRs between 1.5 and 6.9 percentage points. The decrease is strongest in Italy, Ireland, and Germany.

The *IBC Taxation Index* presents the headline figures of both studies on the taxation of companies and on highly qualified employees (see Table 0.1.). A synthesis is provided in Fig. 0.1. For the twelve Swiss cantons considered and the median locations of the other countries, this figure displays the EATR at the corporate level together with the EATR of a single employee obtaining a disposable income of € 100,000 in 2003. Due to a number of conceptual differences, we cannot compare the IBC Taxation Index for companies with the IBC Taxation Index for highly qualified employees. Especially, both concepts of effective tax burdens do not permit straightforward conclusions on distributional issues. Nevertheless, we can compare the rankings and the relative differences in effective tax burdens between both studies.

For this purpose, we divide the effective tax burdens by the average of the included Swiss cantons. By definition, this average corresponds to an indexed effective tax burden of 100. We add a trend line which is based on the 20 observations included in order to illustrate the correlation between the tax burden on the production factor capital and on highly skilled employees.

It is striking that effective tax burdens appear to be closely correlated for most locations. This suggests that countries that impose large corporate tax burdens usually also impose large tax burdens on comparatively high personal incomes. A notable exception to these findings is the United States (Massachusetts). There, the tax burden on companies is among the highest of all regions considered, while qualified employees are taxed quite moderately. On the other hand, Ireland displays almost the lowest corporate tax burden of all regions together with a rather high tax burden on qualified employees. Despite these exceptions, however, from the point of view of a company, large corporate tax burdens usually are not compensated by small tax burdens on highly qualified employees, and vice versa. Therefore, those locations that already exhibit a competitive edge with respect to company taxation even improve their advantage when both types of taxes are considered.

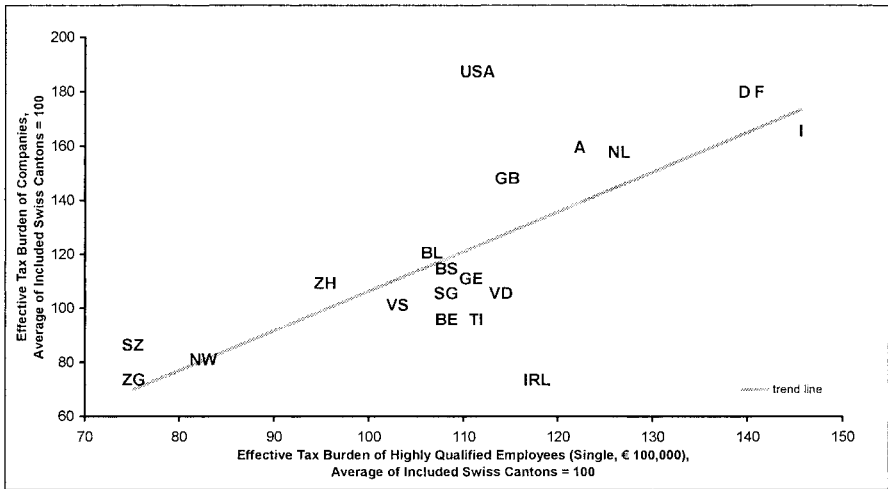
**Table 0.1.** IBC Taxation Index for companies and highly qualified employees, 2003

Region b)	Companies			Highly qualified employees		
	IBC Taxation Index, (EATR, %)	% of Swiss <sup>a)</sup> average	Rank (out of 143)	IBC Taxation Index (EATR, %)	% of Swiss <sup>a)</sup> average	Rank (out of 20)
CH – Zug	13.8	71.8	1	25.9	75.7	2
IR – Dublin	14.0	72.9	2	40.3	117.8	15
CH – Nidwalden	15.4	80.2	3	28.3	82.8	3
CH – Schwyz	16.5	85.9	4	25.7	75.1	1
CH – Ticino	18.5	96.0	5	38.2	111.6	11
CH – Bern	18.6	96.6	6	36.8	107.8	8
CH – Valais	19.7	102.5	7	35.4	103.6	5
CH – St. Gallen	20.3	105.5	8	36.8	107.5	7
CH – Vaud	20.5	106.7	9	39.3	114.9	14
CH – Zürich	21.0	109.6	10	32.6	95.2	4
CH – Genève	21.4	111.4	11	37.9	110.9	10
CH – Basel-Stadt	22.1	115.0	12	36.9	108.0	9
CH – Basel-Land.	22.8	118.9	13	36.6	106.9	6
GB – London	28.1	146.3	14	39.2	114.7	13
NL Min Amsterdam	30.2	–	15	42.9	–	–
NL Med Utrecht	30.2	157.4	16	42.9	125.5	17
NL Max Rotterdam	30.3	–	18	42.9	–	–
A All State Capitals	30.4	158.2	19	41.7	122.0	16
I Min V. d'Aosta	31.6	–	28	49.8	–	–
I Med Cremona	31.8	165.5	44	49.8	145.6	20
I Max Venezia	31.8	–	54	49.8	–	–
F Min Paris	32.1	–	61	48.2	–	–
D Min Weilheim	32.9	–	62	47.6	–	–
F Med Doubs	34.5	179.5	99	48.2	140.9	19
D Med Bayreuth	34.6	180.1	103	47.6	139.3	18
F Max Isère	35.7	–	128	48.2	–	–
US – Boston	36.0	187.3	133	38.2	111.6	12
D Max Frankfurt	37.3	–	143	47.6	–	–

Remarks:

- <sup>a)</sup> Average of the twelve cantons that have been included; the purpose of these columns is to provide the values used in Fig. 0.1.
- <sup>b)</sup> Min/Med/Max: Region that displays the lowest/median/highest EATR for companies out of each country's assessed regions.

Fig. 0.1. Correlation of the tax burdens on companies and highly qualified employees, 2003



# 1 Aim of the Study

Taxes are an important determinant of the location of business activities. Consequently, numerous studies estimate the effective level of company tax burdens and compare these estimates across countries or regions. For example, the European Commission recently has presented a study of company taxation in the European Union,<sup>2</sup> and Gutekunst and Schwager (2002) and Lammersen and Schwager (2005) evaluate company taxation on a detailed regional basis. The aim of the present work is to complement these results with estimates of the tax burden on highly qualified employees, and to assess the relative attractiveness of locations with respect to the taxation of skilled manpower.

For this purpose, a new methodology is developed. The starting point of the analysis is the observation that highly skilled employees are very mobile internationally, which allows them to shift internationally differing tax burdens at least partially onto employers. In order to quantify the resulting burden for companies, we propose a comprehensive measure for the effective tax on highly skilled labour. The measure encompasses all taxes and all tax-like social security contributions which do not provide a specific benefit to the individual, whether they are paid by the employee or the employer. Moreover, we distinguish between cash compensation and other forms of remuneration such as perquisites, the grant of stock options and contributions to pension plans. The reason for this is that on the one hand, such diversified compensation packages are typical for highly qualified employees, and that on the other hand, different forms of compensation may be subject to different tax treatments. Finally, we vary the income level and the family status of the employee.

The method is applied to a number of locations in Europe and the United States and the resulting tax burdens are compared for the years 2002 and 2003. Moreover, the computation of tax burdens for different compensation packages and family conditions allows to identify the effects of specific tax or social security provisions.

Based on the inter-regional and international comparison of tax burdens presented in this study, tax administrations and economic development agencies can assess the competitive position of their own region relative to others. In addition, the detailed picture of the different taxes and contributions as well as their consequences presented here will allow regional decision makers to identify strengths and weaknesses of their own tax and social security systems. Beyond policy mak-

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<sup>2</sup> Devereux, Lammersen, and Spengel (2000), (2001), European Commission (2002). For an early contribution in this line of research, see European Commission (1992).

ers setting tax rules, our study may also serve as a guide for firms comparing locations with respect to the tax part of labour costs. Last but not least, employees who share some of the characteristics of our model employees may find it interesting to learn to what extent tax burdens are different in other countries.

The present study is related to a companion study by Lammersen and Schwager (2005) on the taxation of companies. That report analyses the effective tax burden on investment, covering the same regions as the present work. Thus, a more complete picture of tax policy in the concerned regions emerges than would be possible by considering either the tax on labour or the tax on investment in isolation. In a wider sense, the present study contributes to a detailed and exhaustive assessment of location factors conducted by the «IBC BAK International Benchmark Club»<sup>®</sup> by BAK Basel Economics.<sup>3</sup> Thus, our focus on the taxation of manpower is not meant to imply that we deny the importance of other location factors such as infrastructure or environmental amenities. Rather, we concentrate on taxation so as to clearly isolate the impact of one specific location factor.

The book is structured as follows. In Chapter 2 we present the basic idea, the key assumptions and the structure of the concept used for assessing the tax burden on skilled labour. This is followed in Chapter 3 by a detailed description of the social security systems and tax regulations in the countries studied. The next three chapters contain the results, starting in Chapter 4 with a country by country presentation of effective tax rates. These results are combined in Chapter 5 in an international comparison. Chapter 6 provides some sensitivity analyses where the focus is on the impact of social security. The headline conclusions are summarised in Chapter 7. Some background information on taxes and social security and many detailed results are collected in the Appendix.

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<sup>3</sup> See <http://www.bakbasel.com>.

## 2 The Methodology

In this chapter, we describe the concept used to measure the effective tax burden on highly skilled employees. The first section presents the basic idea motivating the concept. This is followed by a discussion of the main assumptions underlying the calculations. In the last two sections, we give a brief account of the regions and periods covered and compare our approach to existing measures of tax burden.

Since the present book is primarily focussed on the international comparison of the results we do not want to overburden the presentation with mathematical detail. Thus, throughout the chapter, we focus on the economic intuition and concentrate on explaining the basic structure and the principal working of the model. A comprehensive analytical presentation can be found in an accompanying working paper.<sup>4</sup>

### 2.1 Total Remuneration, Disposable Income, and the Effective Average Tax Rate

#### 2.1.1 Mobility and Tax Shifting

We analyse the tax burden on qualified labour from the perspective of the company. We postulate that the tax to be paid on an employee's income is shifted at least partially onto the company and thus constitutes a competitive disadvantage for the employer, and by consequence also for the state or country where this tax is imposed. To see why this should be the case, observe that a qualified workforce is an important determinant for success, inducing companies to compete for these employees like for any scarce factor. This is most pronounced when the concerned employees are mobile across jurisdictional boundaries, as is typically the case for highly qualified specialists or managerial staff. Indeed, many studies<sup>5</sup> reveal an in-

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<sup>4</sup> See Elschner and Schwager (2004a).

<sup>5</sup> According to Winkelmann et al. (2001: 33), 38.9 per cent of all companies in Germany employ university graduates originating from foreign countries. In Great Britain, the corresponding share is even 49.6 per cent. The industries most inclined to employ internationally mobile highly skilled staff are research and development, in-

creasing mobility of highly skilled employees in recent years. Such an individual will evaluate different employment opportunities on the basis of the income after taxes, that is, the amount of money he can spend for his own consumption or saving. This is the *disposable income* of the employee.

Our international comparison of tax burdens now is based on the assumption that the employee obtains a fixed disposable income which he can earn at all locations. Thus, the employee is perfectly mobile across regions and countries and refuses to accept any job which offers less than the disposable income which is generally paid for this kind of qualification. By imposing this assumption, we also implicitly abstract from all other factors which influence a job decision, such as job satisfaction, cost of living, local schools, or environmental amenities. While we do not question the relevance of any of these factors, we think it is fair to say that, nevertheless, a predominant aspect in deciding for or against a job offer is money.<sup>6</sup> Moreover, and more fundamentally, the present study aims at isolating the tax burden as one important factor for the attractiveness of locations. Adjusting disposable incomes according to other local characteristics would result in a combined measure which could not be related to taxes, nor to any other specific location factor.

To remain competitive, a firm seeking to attract or to keep an employee must provide him with the disposable income he obtains everywhere else. For a firm located in a region which taxes labour more heavily than others, this requires to increase the *gross income* before taxes and social security contributions payable by the employee so as to compensate for the high charges. Gross income is usually the quantity being negotiated and written down in the labour contract.<sup>7</sup> For this reason, gross income mostly serves as the base for calculating tax and social security liabilities.

While gross income is an important guide value for both, employer and employee, the firm's considerations will not stop here. In all countries, the employer also has to pay charges on the employee's gross income, e.g., employer's contributions to social insurance or special payroll taxes levied according to aggregated salaries and wages. Thus, total expenses connected with the compensation of a highly qualified employee consist of disposable income, employee's taxes as well as employer's taxes based on the employee's income. We define the total expenses which the company has to incur so as to be able to hire the employee as *total remuneration*. This is the quantity which defines the company's competitive position compared to companies located in other jurisdictions.

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formation technology, and chemicals (Winkelmann et al. 2001: 34). See also Winkelmann (2002).

<sup>6</sup> Especially concerning the competition between locations see Siebert (2000: 23 and 29). For a comprehensive inquiry into the motives and careers of internationally mobile university graduates in Europe, see Jahr et al. (2002).

<sup>7</sup> There are some prominent exceptions to this rule. For example, in professional sports where employees are extremely mobile internationally, contracts often explicitly stipulate a net income, with the employer taking care of all taxes and social security contributions.

### 2.1.2 The Effective Average Tax Rate

The difference between total remuneration and disposable income is called the *tax wedge*. The tax wedge is the amount of money out of the total remuneration which does not benefit the employee. With a fixed disposable income, the expenses necessary to remunerate a highly skilled worker are the higher, the higher the tax wedge.

The tax wedge is a monetary quantity. In order to facilitate comparisons of tax burdens across income levels and family situations, a dimensionless measure is preferable which expresses taxes relative to labour costs. This measure is the *effective average tax rate* (EATR). It is defined as the tax wedge divided by the total remuneration. Denoting total remuneration by  $E^*$  and disposable income by  $E$ , this means

$$EATR = \frac{E^* - E}{E^*} \quad (1)$$

As long as we consider a fixed disposable income, the EATR confers the same information as the tax wedge or the total remuneration. Thus, the higher the EATR, the less attractive is a country or region for companies employing highly qualified employees. Or, to express it from the perspective of the company, the higher the EATR, the more the employer has to spend in order to compensate an internationally mobile employee.

Symmetrically, a high EATR of one country does not mean that the highly skilled employee has a lower disposable income than in other countries with low EATRs. In order to make such a statement, one would have to compare the disposable incomes in the differing countries starting from the same, exogenously fixed total remuneration in each country. This would express the tax burden from an employee's point of view, assuming that he is not able to avoid these taxes by moving. Different levels of EATR resulting in different levels of disposable income would in this case supply information to the employee about the attractiveness of a region or country given a fixed willingness to pay of the employer. While the model would allow to compute such numbers, we prefer the comparison based on a fixed disposable income since it is the most useful way to measure the attractiveness of a location from a company's point of view.

### 2.1.3 Inter-Temporal Structure

Our aim is to quantify the tax burden on the income generated by working during one period, which we call the remuneration period for short. However, the compensation of highly qualified employees typically not only consists of income which is paid out in the remuneration period. The compensation components with this property considered in this study are long-term incentives and contributions to old-age provision. These forms of compensation also trigger tax liabilities in different periods. For this reason, a satisfactory assessment of the effective tax bur-



den on employees earning mixed compensation packages has to account for the inter-temporal structure of income, tax and social security payments. Thus we extend the preceding discussion to account for disposable incomes generated in the remuneration period but accruing in different periods. In such an inter-temporal setting the *EATR* is defined as the difference between total remuneration and the sum of appropriately discounted disposable incomes generated by working in the remuneration period.

Formally, we denote by  $t_0$  the remuneration period, by  $t_l$  the period in which the stock options are exercised after  $L$  years, and by  $t_r$  one out of  $P$  periods during which pensions are received, with retirement starting  $R$  periods after the remuneration period. Moreover, the disposable incomes in the three periods are denoted by  $E_0$ ,  $E_l$ , and  $E_r$ . Evaluating total remuneration and disposable incomes in the period of remuneration, the *EATR* is then defined as

$$EATR = \frac{E^* - \left( E_0 + E_l \cdot \delta^L + E_r \cdot \delta^R \cdot \frac{1 - \delta^P}{1 - \delta} \right)}{E^*} \quad \text{with } \delta = \frac{1}{1 + r} \quad (2)$$

In this expression,  $r$  is the market interest rate at which the individual can lend or borrow, independently of his location. This means that we assume a perfect and internationally integrated capital market. Moreover, we abstract from taxation of interest income. In general, taxation of interest income would reduce the interest rate relevant for the employee and thus give a greater weight to future disposable incomes. More fundamentally, a differential tax treatment of savings on the corporate and on the individual level will give rise to tax-reducing strategies using occupational pension schemes. We ignore these effects in order to keep the model simple, and in order to avoid the need to introduce assumptions concerning the employee's consumption and saving behaviour and concerning other kinds of income beside employment income.<sup>8</sup>

To sum up, the effective average tax rate *EATR* supplies information about current and future tax payments and charges that occur in context with the total remuneration earned in one period.

### 2.1.4 Computation

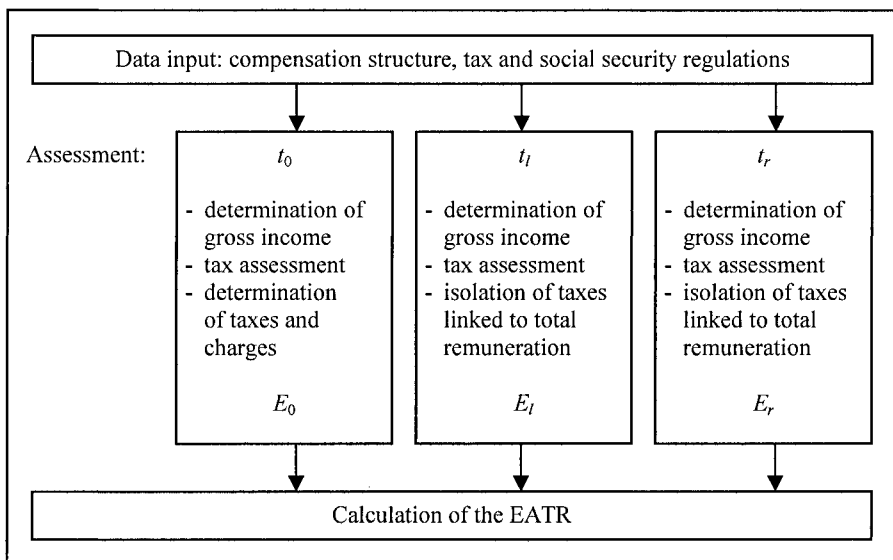
Our model is a computer-based simulation model. It can be structured into three elements (see Fig. 2.1.): data input, tax assessment, and calculation of the *EATR*. In the first element 'data input' the model reads the exogenous data concerning country-specific tax and social security regulations as well as the compensation structure and the level of the employee's compensation. In the second element, taxes and charges are calculated following the country-specific regulations. The

<sup>8</sup> In Elschner and Schwager (2004a) we provide additional results for the case where the rate  $r$  relevant for the employee is given by the interest rate net of taxes while the firm still can accumulate at the gross market interest rate. See also Brassat and Kiewetter (2003).

third element determines the total disposable income and the effective average tax rate according to equation (2).

As explained above, the compensation components are subject to tax and social insurance in different periods. We have identified three kinds of periods relevant in this respect: the period of remuneration, the period when the long-term incentives are exercised, and the pension periods. For the second element of the computation, this implies that the tax and social insurance contributions have to be assessed three times. Consequently, the model consists of three assessment blocks corresponding to the three periods (see Fig. 2.1.) in which tax and tax-like contributions are quantified.

**Fig. 2.1.** Structure of the model



In each period, we first derive the gross income which is the base for social security contributions and taxes. This is done by determining analytically the value of gross income which, for a given total remuneration, is consistent both with the model assumptions, e.g., concerning the compensation structure, and the tax and social security regulations, e.g., about whether or not the employer's contributions themselves are part of gross income. Applying social security and tax schedules to gross income then gives the tax and social security payments. Finally, the disposable incomes  $E_0$ ,  $E_1$ , and  $E_r$  are obtained by deducting these payments from the compensation component which yields income in the period considered.

In the three assessment blocks, the tax rules and social security regulations apply to the total income which is subject to tax and social security in each period. Because of progressive tax schedules, the assessment in the second and third blocks therefore requires some information about the income which is taxed in periods  $t_1$  and  $t_r$  but which is not generated by labour supplied in period  $t_0$ . We assume that in period  $t_1$  the employee earns the same gross income as in period

$t_0$ .<sup>9</sup> For the retirement period  $t_r$ , we postulate that the employee has been paying the same amount of old-age provisions as in  $t_0$  throughout his career, and that he obtains the same retirement income in every year during retirement.<sup>10</sup>

The starting point of one round of tax assessment is total remuneration, the result is disposable income. Our measurement concept, however, treats the employee's disposable income as exogenous and seeks to derive the total remuneration necessary to achieve this disposable income. Therefore, we have to perform an iteration during which the simulation is repeated with changing amounts of total remuneration until the required disposable income is reached.

## 2.2 Model Specifications

In this section, we describe the assumptions and data used to implement the basic model structure outlined in the preceding section. After mentioning the macroeconomic data used, we define the characteristics of the analysed employee concerning his income level, composition of the compensation package, and family situation. We then define which taxes and which social security charges are part of the tax wedge. Finally, we give a brief account of the way the model integrates the tax and social security treatment of the various compensation components.

### 2.2.1 Macroeconomic Data

All present value calculations use an interest rate of 5 per cent. The income levels are all defined in Euro. We use the average nominal exchange rates for the year 2002 to convert the currencies of Switzerland, the United Kingdom, and the United States into Euros. We do not consider differences in purchasing power between or even within countries. This is motivated by our desire to clearly isolate tax effects from other determinants of an employee's choice of location, among which the cost of living is a prominent example.

### 2.2.2 The Employee's Characteristics: Income Level and Family Situation

The model employee whose effective average tax rate is to be determined in our analysis represents a typical highly qualified employee. He is defined by three main characteristics: the income level, the composition of compensation components, and as a personal characteristic the marital status including the number of children. In order to define the typical highly qualified employee we screened publications by personnel consultancies and research institutes.<sup>11</sup> The final selec-

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<sup>9</sup> See Section 2.2.4.3.

<sup>10</sup> For details, see Section 2.2.4.4.

<sup>11</sup> These included among others Towers Perrin (2002), Kienbaum (2001), Hören (1999), Brümmer (2001).

tion was prepared in co-operation with a panel composed of experts in human resource management as well as experts in the international taxation of employees.<sup>12</sup>

Altogether, we analyse eighteen different types of employees. We distinguish between a single person and the head of a family with a non-working spouse and two children between the ages of six and twelve.<sup>13</sup> These two types of personal characteristics do not cover completely the spread of interesting family types. In particular, we neglect the comparison of a working and a non-working spouse. Nevertheless, with our selection it is possible to show how much a country's tax system supports families.

We consider three different income levels of the highly qualified employee: One type with a *low*<sup>14</sup> income which consists of a disposable income of € 50,000, one with the *standard* disposable income of € 100,000, and one with *high* earnings of € 200,000 disposable income. It should be kept in mind that these income levels are defined on the basis of disposable income, and that the corresponding levels of gross income or even total remuneration will be noticeably higher.

**Table 2.1.** Compensation levels and structure of the compensation in per cent

<b>Disposable income and components</b>	<b>Cash compensation</b>	<b>Perquisites</b>	<b>Long-term incentives</b>	<b>Old-age provision</b>
<b>Low: € 50,000</b>				
Standard	75	-	-	25
Incentive-oriented	70	-	5	25
Pension-oriented	70	-	-	30
<b>Standard: € 100,000</b>				
Standard	75	5	-	20
Incentive-oriented	65	5	10	20
Pension-oriented	65	5	-	30
<b>High: € 200,000</b>				
Standard	75	5	-	20
Incentive-oriented	60	5	15	20
Pension-oriented	60	5	-	35

There are four different kinds of compensation components: cash compensation, perquisites, long-term incentives and old-age provisions. Concerning the structure of remuneration we identified three cases: the standard case with an average structure that implies a moderate proportion of old-age provision and perquisites, the incentive-oriented case with a high proportion of stock options and the pension-oriented case with a high proportion of old-age contributions. The weights of the single compensation components differ among the income levels

<sup>12</sup> We are grateful to the panel members for their invaluable help at this stage of the project. Obviously, all remaining errors are the sole responsibility of the authors.

<sup>13</sup> These ages have been chosen because of differing amounts of child tax allowances in some countries.

<sup>14</sup> Of course, the label "low" is to be understood relative to the other two types analysed in our study. Compared to the wage distribution of the entire workforce, a yearly income of € 50,000 after taxes is high.

because the percentage of total compensation that is invested in compensation components other than cash, i.e. perquisites, long-term incentives, and contributions to the occupational pension scheme, typically increases with increasing total remuneration.

### 2.2.3 Taxes and Social Security Contributions

#### 2.2.3.1 Taxes

When deriving disposable income from gross income, we deduct all direct taxes which are due because of the current employment relationship. Obviously, all personal income taxes including surcharges are part of the tax wedge. The same holds, where applicable, for state and local income taxes or surcharges. Contrary to that, church taxes are not part of the tax burden. Equally, property taxes are not counted as a labour related tax burden since the property does not directly refer to the remuneration of the employee in the current period.

We do not take into account any taxes which are levied on the spending side of the employee's budget. Thus no taxes on specific commodities such as tobacco or gasoline taxes enter the calculation. Most importantly, we do not consider the value added tax. The reason for excluding these taxes is that we want to assess the tax burden on income generation without having to make assumptions about the consumption and saving behaviour of the model employee.<sup>15</sup>

On the side of the company, we take into account payroll taxes which are levied on the aggregate wage costs. This applies to that part of France's *taxe professionnelle* which until 2002 was levied on the total payroll and to the Austrian *Kommunalsteuer* which is also based on aggregate wages and salaries. Until 2002, the Italian tax on productive activities IRAP had a similar effect as personnel expenses were not deductible. In our simulations, the additional amount of payroll tax triggered by paying the remuneration of the highly skilled employee is part of the tax wedge. A high payroll tax therefore increases the total remuneration required in order to achieve a given disposable income. This is a reasonable choice since our approach treats the tax burden on skilled employees as a management issue for the firm. In addition, the consistency with the companion study Lambersen and Schwager (2005) on the tax burden on investment requires to count payroll taxes exactly once. Since these taxes clearly are more closely related to labour input than to capital investment, it is natural to integrate them into the effective tax burden on highly skilled employees.

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<sup>15</sup> In a general equilibrium framework consumption and wage taxation are closely related since consumption taxes are likely to be shifted back onto workers (see e.g., Gaube and Schwager, 2003). The present research, however, aims at analysing the tax burden on the income of highly skilled employees in substantial detail. To keep the analysis manageable it is preferable to use a partial equilibrium approach and therefore to abstract from consumption taxes.

### 2.2.3.2 Social Security Contributions

Should the contributions to the various branches of social security be considered as taxes when computing the effective tax burden on highly skilled employees? The two possible extreme answers to this question are not entirely satisfactory. Ignoring social security contributions altogether would exclude a large, and in some countries the major component of non-wage labour costs from the consideration. On the other hand, counting all social security contributions into the tax wedge implies that differences between social security systems are not taken into consideration. Some countries like Germany have a nearly all-round social insurance including full health insurance, whereas other countries like, e.g., the United States only tender a basic social security implying that many risks have to be insured privately. If one counts contributions to public health insurance as taxes in this example, Germany would be less attractive than the United States because indispensable private insurance premiums in the United States are not part of the comparison, whereas social insurance premiums in Germany would decrease the employee's disposable income.

Assuming that the employee is willing to insure himself against all potential risks he will clearly consider not only charges but also benefits from social insurance and hence take out private insurance or not. Thus, in this example, contributions to social security appear almost as a substitute for a private expense which would have been undertaken anyway. Consequently, they should be part of the disposable income rather than the tax wedge.

This reasoning leads to the following guideline for integrating social security contributions into the tax wedge: We do not consider as tax-like those social security contributions which yield an individualised, specific benefit to the employee. In other words, we consider as taxes all those payments which do not yield an equivalent benefit to the taxpayer. Note that an individualised benefit is to be distinguished from the benefit which every citizen may derive from the spending of general tax revenues, say for schools or for infrastructure investment. Such benefits are not linked to the taxes or contributions paid by the individual, and indeed are also available to individuals who have not paid any tax at all.

Unfortunately, it is not possible to determine in any general way which branch of social security, or which part of the contribution to social security, qualifies as yielding an equivalent benefit, and which branch or part qualifies as a tax-like charge. In the following, we describe the assumptions which allow us to nevertheless quantify the tax-like part of social security contributions.

The most important insurance in this context is the first pillar of old-age insurance as everyone who reaches retirement age may benefit from this insurance. Thus, there clearly is a specific benefit linked to these contributions. However, the first pillar of old-age insurance being organised as a pay-as-you-go (PAYG) system, those contributions do not result in actuarially fair pensions. If the employee were to invest on the capital market instead of paying contributions to the first pillar of old-age insurance, in most countries he would obtain a higher retirement income than the public pension. Thus, in a public pension scheme, it is not the con-

tribution in itself which has to be qualified as a tax but the loss in return compared to an investment on the capital market.

We take the low yield of public pension schemes explicitly into account when calculating the employee's income during the retirement period. In our model, the part of his old-age provisions that goes to the first pillar results in a public pension that is calculated with the actual pension formulae described in Section 3.1.1. Hence, inasmuch as contributions to the first pillar have to be seen as a tax-like charge, this charge appears in the form of a lower pension compared to a pension possible under market conditions. Contrary to that, we assume that the part of old-age provisions that goes into occupational pension schemes yields a pension under market conditions.

We calculate the pension entitlement from the regulations currently in force under the assumption that the employee has been earning the same income over his entire career. Thus, we do not use long-term projections about the likely future returns of the public pension systems in the different countries, nor do we consider possible future reforms. We are aware of the fact that this procedure eliminates a major source of concern about the long-term viability of public finances from our analysis. Moreover, since demographic trends differ between the countries studied, the international comparison would likely be affected if one were to integrate such projections. However, since the present study aims at quantifying the legal regulations both in the tax code and in social security, we consider it beyond the scope of our approach to integrate such long-term macroeconomic projections.

Victims of work incidents are mostly employees who work with dangerous equipment or substances whereas people working in the office typically are not exposed to such risks. This is why banks, for example, pay much lower premiums to accident insurance than companies in the chemical industry. For the same reason work incident insurance premiums paid for highly qualified employees have to be seen as taxes because those employees seldom work under dangerous conditions.

According to the basic idea of competition for a mobile highly skilled workforce, there is little risk of unemployment for the kind of qualified employees considered here. Hence contributions to unemployment insurance are considered as taxes.

In Switzerland, Italy, and France, the employer has to pay contributions for each employee to finance family allowances. These contributions have the character of charges as employees without children do not benefit from these contributions. On the other hand, employees with children receive family allowances which raise the disposable income.

There are some charges that are not levied within the bounds of social security but have to be paid from all employees for special purposes. Examples are in Austria the contributions to the *Arbeiterkammerumlage*, in France the *Contribution sociale généralisée CSG* and the *Contribution au remboursement de la dette sociale CRDS*, and in Switzerland contributions to the *Erwerbsersatzordnung EO* (see Section 3.1.4). All those charges qualify as tax-like contributions and are part of the effective average tax rate.

It is difficult to quantify a tax-like contribution in the health insurance systems of the analysed countries. The health insurance systems are organised and financed in widely varying ways (see Section 3.1.2). It is obvious that a system with contribution rates basing on the gross income cannot be an equivalent insurance: A low-earning worker gets the same health service as a high-earning employee but pays less contributions. Families may benefit from a public health insurance like in Germany as all non-working family members are co-insured in the working family member's health insurance without additional contributions. A high earning single person with a low risk of illness may prefer a private insurance because of lower contributions. To quantify the tax-like contribution one could assume a typical health insurance premium that would be paid to an equivalent private health insurance. The difference between state and private premium would then qualify as a charge or a profit. But risk groups and hence the amount of private health insurance premiums differ, for example according to the employee's age, weight, medical history, and country-specific regulations. For this reason it is not possible to determine a universally valid premium. Given this difficulty, for the purpose of this study, we refrain from quantifying the individual value of the benefit generated by contributions to public health insurance. Choosing between the extreme options of considering all such contributions as a tax or as an equivalent insurance premium, we prefer the latter. That is, we treat health insurance premiums always as a payment yielding an equivalent insurance benefit. Consequently, contributions to public health insurance are not considered in the effective average tax rate.<sup>16</sup> This choice is mainly made for the sake of simplicity. It should be kept in mind though that given the wide variation of public health care systems, this has an influence on the country rankings. In particular, countries where health care is financed out of general tax revenues like the United Kingdom would see their ranking improve once health insurance premiums in other countries were included in the tax burden.

#### 2.2.4 Compensation Components

In this section, we discuss the valuation of compensation components for tax and social security purposes insofar as it is relevant in the context of our model. In addition, we describe the assumptions underlying the allocation of social security charges to the different compensation components. This is necessary in order to have a consistent definition of the compensation structure since the shares of the components according to Table 2.1. relate to total remuneration, which includes social security contributions. We adopt the following convention. Contributions to social security that refer to cash compensation and old-age contributions are distributed between them: Contributions to the first pillar of old-age insurance are part of old-age provisions, contributions to all other kinds of insurance belong to

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<sup>16</sup> It is acknowledged that both choices are equally unsatisfactory. Thus, referring to health care, Heady (2003: 6) states that the "issue of comparability between countries with and without substantial private schemes is an issue that remains unresolved".



the cash compensation. The contributions that refer to the other two compensation components are part of the particular component.

### 2.2.4.1 Cash Compensation

Cash payments to the employee are part of gross income with their nominal value in the remuneration period. To this component belong the ‘normal’ compensation paid out in cash as well as bonus payments. In addition, according to the assumption specified above, social security contributions which are levied on cash income and on old-age provision, except those for the first pillar of old-age insurance, count towards the compensation component “cash”.

### 2.2.4.2 Perquisites

As a concrete example for perquisites, we consider in our calculations a company car. Most countries offer the possibility to assess the company car at a standardised value instead of the true value which would be difficult to determine. Following our assumption on the allocation of social security charges, the share of total remuneration spent on perquisites is composed of the actual value of the company car plus the employer’s contributions to social security weighing on the taxable standardised value of the company car.

In practice, companies usually lease their car pool and receive special prices from their leasing partner. Hence, the actual costs of the company car are equal to the total leasing rates plus prepayments and running costs less the revenue from selling the car at the end of the leasing period. This amount is not necessarily identical to the car price. According to a small internet research<sup>17</sup> screening leasing offers we assume that a standardised value of 1 per cent of the full price of the car per month is roughly equal to half of the actual monthly costs of the company car.

To substantiate our calculation consider the following example.<sup>18</sup> Daimler-Chrysler Bank offers to lease a Mercedes-Benz E 240 with a price of € 32,000 net of VAT for monthly rates of € 600 and a prepayment of 16 per cent of the net price. The leasing period is 36 months and at the end of the period the bank keeps the car. The employer then spends € 742 per month for the company car. In Germany, the standardised taxable value of company cars is fixed at 1 per cent of the gross price including VAT per month. In this example this amounts to € 371 taxable income per month, that is, half of the actual costs of € 742.

The ratio between actual costs and the standardised tax value depends on the type of car, possible company discounts, interest rates etc. The above example therefore can only be seen as an approximation. Generalising nevertheless, we express the tax treatment of perquisites by the ratio  $\theta_p$  between actual costs and standardised value which is calculated by

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<sup>17</sup> We do not claim that this is representative.

<sup>18</sup> Source: Internet research on the website [www.daimlerchrysler-bank.com](http://www.daimlerchrysler-bank.com) in June 2003, rounded values.

$$\theta_p = \frac{\text{full price} \cdot \text{standard percentage per month}}{\text{actual costs per month}} \quad (4)$$

The values for  $\theta_p$  used for the different countries are summarised in Table A.3. on p. 90.

### 2.2.4.3 Long-Term Incentives

In our model, we assume that the employee receives stock options as long-term incentives. The options are granted in the period of remuneration, the vesting date, i.e. the earliest date to exercise the options, is after 5 years in this study. We assume that in the period of remuneration the employer anticipates the expected benefit of exercising the stock option.<sup>19</sup> Moreover, we assume that the vesting date and the date of exercise are identical, and we do not take into account capital gains from the sale of the shares.<sup>20</sup>

The tax treatment of stock options can be distinguished with respect to two aspects, the timing of taxation and the valuation of the benefit. The benefit may be subject to tax and social security at the date when the option is granted, i.e. in the remuneration period  $t_0$ , or at the vesting or exercise dates, i.e. in period  $t_1$ . The taxable value may be equal to, or different from, the actual benefit received by the employee.

Consider first the case of a taxation when the benefit is realised and without tax privileges for stock options. In this case, the true benefit of the option enters gross income at the date  $t_1$ . The costs of granting the stock options for the employer are the anticipated benefit plus, following our assumption about the attribution of social security charges, the employer's contributions to social security that are imposed on that benefit. Since the benefit accrues only in period  $t_1$  and the charges are also due only at that date, the compensation component "long-term incentives" in this case consists of the benefit plus the employer's contributions to social security discounted over the  $t_1 - t_0$  years elapsed between the remuneration period and the period of exercise.

If the option is taxed upon grant, as is the case in Switzerland, the taxable value enters gross income in the remuneration period. As long as the expected benefit of the option is correctly anticipated and fully taxed, however, this has no direct impact in our model.<sup>21</sup> This neutrality result arises because we do not distinguish between gross and net interest rates, so that the tax due in the remuneration period on the present value of the benefit is equal to the present value of the tax due on that same value in the period of exercise.

<sup>19</sup> The benefit of stock options is of course unknown ex ante. However, throughout the analysis, we abstract from risk aversion considerations. Hence we can as well use the expected benefit from exercising the stock options.

<sup>20</sup> See Elschner and Schwager (2004c) for effective average tax rates which take into account capital gains on the sale of shares.

<sup>21</sup> A minor effect may arise from progressive tax schedules.

The actual benefit may, however, differ from the tax value on which the contributions to social security and the personal income tax are based. Several countries grant a special tax treatment to stock option plans which are considered as qualifying or approved option plans.<sup>22</sup> We generally assume that the stock options provided by the employer in our model satisfy all requirements necessary in order to benefit from such preferential treatment. To motivate our modelling of a reduced taxable value of options, consider the example of Switzerland where only a percentage of the expected benefit is taxable income. There, the estimated value of the option is reduced according to the time the options have to be held before they become exercisable. Options with a holding period of five years have a reduced tax value of around 75 per cent of the anticipated benefit. Hence, the anticipated benefit is obtained by dividing the tax value by the factor  $\theta_i = 0.75$ . Also in the other countries, we model a special tax treatment of stock options by the ratio  $\theta_i$  of the taxable value over the true value of the option at the date of taxation. By consequence, when computing the compensation component “long-term incentives” for countries with a tax privilege for stock options, the actual benefit of exercising the option is set equal to the tax value divided by  $\theta_i$ .

As explained in Section 2.1.4, we have to assume a basic income that flows to the employee in the period of exercising the stock options. Thus, beside the benefit from stock options the employee in our model receives the identical gross income as in the period of remuneration. The calculation of taxes and tax-like contributions imposed on the total income of the period of exercise follows the procedure in the period of remuneration. Taxes and tax-like contributions related to the long-term incentives then are isolated. They are equal to the amount by which the total tax liability exceeds the taxes and charges that would have been due if the options had not been exercised. Because the taxable income in the case of not exercising the options is equal to the taxable income of the period of remuneration, the tax liability related to the stock options is equal to the difference of tax and charge payments in the period of exercise less those in the period of remuneration.

#### **2.2.4.4 Old-Age Contributions**

Old-age contributions consist on the one hand of employer’s and employee’s compulsory contributions to the public pension scheme and on the other hand of employer’s and employee’s contributions to occupational pension plans. The percentage of total remuneration spent for old-age contributions is fixed by assumption according to Table 2.1. Also, the country-specific amount of contributions to the first pillar of the old-age insurance is fixed by law. As a consequence, the amount of contributions to the occupational pension scheme is the difference between the total amount of old-age contributions in the compensation package and the contributions to the first pillar. The contributions to occupational pension schemes therefore depend on the compensation structure and on the country-specific public pension scheme. To complete the description of the composition of

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<sup>22</sup> See Section 3.3.3.

the remuneration component “old-age provision”, recall from above that among the social security charges, only old-age contributions count towards this compensation component. Contributions to the other types of social security imposed on contributions to an occupational pension scheme are therefore counted in the compensation component “cash”.

Assessing the tax liability on pensions procured by old-age provisions is one of the major challenges of the model. Contributions by employer and employee to company pension plans are invested in the period of remuneration into pension plans and yield interest. Together with contributions from other periods during working life they result in pension payments during retirement. In other words, at the end of his working life the employee has capital at his disposal which results from all previous old-age contributions. This capital has to be distributed over all following years of retirement to secure the living standard. In our model, the resulting annual pensions are calculated as annuities. The annuities together with the pensions received from the first pillar of social security are then equal to the annual income of the pensioner. However, the taxes imposed on those incomes are not directly linked to the contributions paid in the remuneration period but are the consequence of all invested contributions. Thus, the calculation of the tax burden on the old-age provisions of the remuneration period is split into two parts. First, the annual pension income is assessed. At this step, if special tax rules apply to proceeds from the first pillar of old-age insurance, they are taken into account. Dividing the resulting tax by the annual pension yields an average tax rate. The second part consists of computing an annual pension which would result from distributing only the contributions invested in the remuneration period over the whole retirement period. This annual mini-pension is then multiplied with the average tax rate calculated in the first part. The resulting amount is the tax on the old-age provisions linked to working in the remuneration period.

The average tax rate in the retirement period only consists of taxes paid, as social security contributions are not paid by pensioners. Contributions to health insurance have to be paid also by pensioners but are not characterised as tax-like contributions in our model. Finally, the implicit tax incorporated in the contributions to the first pillar of old-age insurance only are reflected in a lower income in the retirement period, not in directly measurable tax payments.

## 2.3 Geographical Coverage and Time Horizon

The study covers the tax and social security systems of Austria, France, Germany, Ireland, Italy, the Netherlands, Switzerland, the United Kingdom, and the United States. In all countries except Switzerland we provide only one national number per type of employee. This is justified by the fact that in these countries the taxation of labour income is entirely or almost entirely determined at the national level. Concerning personal income taxes, the only exception to this rule is a local

and regional income tax in Italy which however varies very little.<sup>23</sup> In France, Italy, and Austria, there are payroll taxes levied at the local or regional level. In Switzerland personal income taxes vary substantially between cantons and municipalities. The study covers the cantons of Basel-Landschaft, Basel-Stadt, Bern, Genève, Nidwalden, St. Gallen, Schwyz, Ticino, Valais, Vaud, Zug, and Zürich. In each case, we compute local taxes using the tax multiple of the cantonal capital. In the United States as well, income taxes differ among the states. In this study, we consider solely the state of Massachusetts.

The time horizon of the study covers the tax years 2002 and 2003. We consider the situation at the beginning of each year. In the United Kingdom, the tax year starts in April of each calendar year. Thus, we consider in this case the tax years of 2001-2 and 2002-3. In Switzerland and France, the tax authorities change or fix tax schedules or allowances during or even at the end of a tax year. For those two countries, we have to consider the tax burden with a one-period time lag since more recent data are not available during the year. To justify this procedure one could argue that a potential investor will have the same problem and thus has to refer to the same (historic) tax data. In the analysis we will not explicitly mention this time lag and thus compare, for example, the tax burden in France based on tax data of 2002 with the tax burden of Germany based on data from 2003.

## 2.4 Comparison with Existing Approaches

### 2.4.1 Measures of Company Tax Burdens

Our concept of an EATR on the income of highly skilled employees follows acknowledged methods of measuring the tax burden of companies such as the effective marginal tax rate introduced by King and Fullerton, the effective average tax rate proposed by Devereux and Griffith, or the effective average tax rate computed with the *European Tax Analyzer* developed by the Centre for European Economic Research (ZEW) and the University of Mannheim.<sup>24</sup>

In all these concepts, a wedge between a pre-tax value and an after-tax value is divided by the pre-tax value so as to obtain an effective rate of taxation. The concepts by King and Fullerton and Devereux and Griffith only assess the tax burden on an additional unit of investment.<sup>25</sup> Contrary to that, we assess the tax on the to-

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<sup>23</sup> Regions may impose an addition to the income tax rate between 0.9 and 1.4 per cent, and municipalities may add another 0.5 per cent. In the present study, the tax rate applicable to Roma is used.

<sup>24</sup> See King and Fullerton (1984), Devereux and Griffith (1999 and 2003), and Jacobs and Spengel (1996).

<sup>25</sup> These two concepts differ from each other in the assumption about the profitability of the investment considered. In the King/Fullerton approach, only the tax burden on such investments is measured which just yield a sufficient return to be undertaken, while the Devereux/Griffith model also evaluates the tax burden on highly profitable investments.

tal income of the individual rather than the tax on a marginal increase of his working time. In that respect our concept is closer to the *European Tax Analyzer* model which quantifies the tax burden of an entire company. In another respect, i.e. regarding the treatment of the employee's disposable income as exogenous, our approach has its counterpart in the measure of effective marginal tax rates by King and Fullerton. When calculating effective marginal tax burdens on investment, one can either fix the post-tax return to the investor (the so-called fixed-*r*-case) or the cost of capital which the investment earns (the so-called fixed-*p*-case). Since we fix the post-tax income, our approach corresponds to the fixed-*r*-case, whereas a computation of disposable incomes for exogenous total remuneration resembles rather the fixed-*p*-case.

#### 2.4.2 Measures of Labour Tax Burdens

There are several alternative methods for calculating the tax burden on labour. In analogy to backward looking measures on the taxation of capital income, Mendoza et al. (1994) present effective average tax rates on labour income. These measures are computed by dividing aggregate taxes on labour income by a macroeconomic measure of such income. The advantage of these measures is that they are based on observed data, using actual tax payments. However, this also implies that they cannot provide any information about the effect of specific tax rules on the tax burden. Moreover, by their macroeconomic nature, one cannot determine the tax burden for different economic situations such as income levels or marital status. Backward looking measures are therefore not a suitable guide for the impact of taxation on economic decisions. Their main application lies in providing a quick reference figure for the way taxation interferes with the distribution of incomes among the factors of production on a macroeconomic level.

Contrary to the macroeconomic tax ratios presented by Mendoza et al. (1994) the EUROMOD model<sup>26</sup> takes a microeconomic approach. In this and in other tax and transfer simulation models, the tax and social security contributions as well as welfare entitlements are simulated for a representative sample of the population. This simulation is similar to the casuistic tax assessment performed in our model.<sup>27</sup> The results are then aggregated into society wide indicators, for example a Gini coefficient, so as to answer a variety of policy questions. Thus, the focus of microsimulation models is not to provide effective tax rates for specific categories of employees but on a microfoundation of aggregate policy analysis. Here, distributional issues are evidently at the centre of interest.

The approach most similar to ours is taken in the OECD publication series on "taxing wages".<sup>28</sup> Also there, the taxes and social security contributions of several

<sup>26</sup> See the final report of the EUROMOD research consortium, Sutherland (2001).

<sup>27</sup> There are however also backward looking elements in EUROMOD. In particular, pension entitlements are taken from the data and not simulated using the legal regulations. See Sutherland (2001: 5).

<sup>28</sup> OECD (2002), for an introduction, see Heady (2003).

types of workers are assessed in a casuistic simulation. An effective average tax rate is then calculated by dividing the resulting tax wedge by total labour costs. As in our approach, income and payroll taxes are considered. However, there are two major differences between our model and the OECD approach. First, unlike the OECD we do not treat social security contributions as a whole as taxes. Instead, we take care to relate as precisely as possible individual benefits procured by social security contributions to the payment of these contributions. Thus, we quantify the pension resulting from the first pillar of old-age insurance, and unlike the OECD, we do not consider public health insurance premiums as taxes. Second, both approaches consider different types of employees. While the OECD concentrates on the average production worker and workers earning 67 or 167 per cent of this worker, our study is explicitly focussed on highly qualified employees. Beyond a mere change in the income level this has two structural consequences which make our model substantially richer than the OECD approach. Firstly, we take care to analyse the specific tax treatment of various compensation components. Secondly, since long-term incentives and in particular old-age provision are prominent in the compensation package of highly qualified employees this necessitates an inter-temporal approach.

### **2.4.3 Measures of the Tax Implicit in Public Pension Schemes**

Several recent studies quantify the intensity of redistribution induced by public pension systems using a simulation approach that is related to ours. For example, Börsch-Supan and Reil-Held (2001) estimate the share of transfers, as opposed to insurance benefits, included in payments from the German pay-as-you-go pension system. Using data from the Socio-Economic Panel, a sample of German households, they simulate the pension entitlements of each household by applying the legal pension formula to an estimated earnings history. Fenge and Werding (2003) and Fenge et al. (2002) quantify the tax rates which are implicit in the pay-as-you-go pension systems of selected OECD countries. Hirte (2000) takes a similar approach for Germany but is focussed upon differences in the implicit tax rates faced by different age groups and cohorts.

Similarly to the method proposed in the present paper, this line of research is also based on an inter-temporal simulation model describing the earnings and pension entitlements of a representative individual. Since these studies exclusively focus on pensions they are able to include more details, in particular concerning life-expectancy and demographics. On the other hand, our approach is much broader in scope since we incorporate all taxes and social security contributions which are related to employing the highly qualified person. Also, these studies typically refer to an average person with more or less average income whereas the high-earning person who is in the centre of our model usually has to pay higher implicit taxes than an average earner.

To sum up, our model differs from all existing methods by addressing the issue of the tax burden on manpower from the point of view of the company, and by its careful modelling of the tax burden on highly skilled employees.

## **3 Description of Tax and Social Security Systems**

The description of the tax and social security systems starts with a brief overview of the most important aspects concerning social security, the regulations referring to occupational pension plans, and specific charges which are neither social security contributions nor taxes. After that, we give a brief introduction into the tax systems of the countries studied, followed by a more detailed description of specific rules applying to the different compensation components.

### **3.1 Social Security, Occupational Pension Plans, and Various Charges**

Concerning social security systems, we observe a comparable coverage of insured risks in all countries analysed.<sup>29</sup> Retirement, health, unemployment, and work injuries have to be covered by insurance.<sup>30</sup> Usually, compulsory insurance is financed as a pay-as-you-go system which secures at least a standard benefit. Especially in the case of health insurance, a private insurance applies in certain countries. In addition, there are other specific kinds of social insurance and other charges. In all countries, employers have the possibility to finance additional occupational pensions.

#### **3.1.1 Old-Age, Disability, and Survivor Insurance and Occupational Pension Plans**

The old-age insurance systems are organised as three pillar systems in all analysed countries. The first pillar represents the public pension scheme which is financed as a pay-as-you-go system involving redistribution between generations and in some countries also between high and low earning individuals. The second pillar also is associated with the employee's wage and salary. The employer and/or the employee pay into funded occupational pension plans. The form of occupational pension systems varies across and within the countries as there is often more than

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<sup>29</sup> See Table A.1. and Table A.2. on p. 89-90 for all contribution rates and income ceilings considered.

<sup>30</sup> For an overview of social security regulations in Europe see MISSOC (2002 and 2003).



just one possibility of creating pension plans. The contributions to the second pillar are compulsory in some countries, in some countries they are not. Contributions to the third pillar of old-age provision are paid privately and are voluntary.

All in all one can summarise that the three pillar system intends to secure the culturally defined subsistence level with the first pillar whereas the additional second and third pillars guarantee the individual standard of living. The pension systems in the analysed countries differ from that guideline for political, social, and historical reasons.<sup>31</sup>

### 3.1.1.1 Austria

In Austria, the first pillar is dominant in the pension system. Employers and employees have to pay contributions into the first pillar depending on the employee's gross income. The contribution rates that have to be multiplied with the gross income are 10.25 per cent for employees and 12.55 per cent for employers. If the employee's gross income exceeds the income ceiling contributions have to be paid only to income up to the ceiling. In 2003, the income ceiling amounts to € 3,360 per month plus € 6,720 per year for bonus payments (€ 3,270 and € 6,540 in 2002). Examples for bonus payments are the Christmas bonus in December and the holiday bonus in summer. Assuming that those bonus payments amount to a full monthly salary the income ceiling adds up to € 47,040 per year. The employee earns a pension entitlement with all contributions paid. The resulting annual public pension out of all contributions to the first pillar paid during the whole working life is calculated by multiplying the reference income by the number of working years multiplied by 2 per cent. The maximum number of working years is 40 years. The reference income is determined by multiplying the average income of the 15 years with highest earnings by the factor 15/17.5. A reform of the first pillar has been adopted and will take effect in 2004. Cornerstones are the reform of early retirement, an increase in the number of years taken into account when calculating average earnings, and a decrease in the multiplying factor from 2 per cent to 1.78 per cent.

The second pillar is compulsory in one aspect. The so-called *Abfertigung Neu* regulates a minimum occupational pension scheme. For employees with contracts starting in 2003 or employees opting for the new system, the employer has to pay 1.53 per cent of gross income into a pension fund (the so-called *MV-Kasse*). At the end of his working life, the employee can decide whether he prefers a capital payment or a pension annuity. The three most important possibilities of financing the occupational pension scheme are direct guarantees, direct insurance, and pension funds. Direct guarantees are carried out by the companies themselves using pension reserves. The employee does not obtain a legal claim to a future pension payment. The occupational pension must not exceed 80 per cent of the actual income (§ 14 EStG). Direct insurance and pension funds are carried out by insurance companies. Thus, the employee obtains a legal claim to future pension payments.

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<sup>31</sup> For an overview of old-age provision systems in Europe, see Fenge et al. (2003).

### 3.1.1.2 France

The French pension system is composed of several institutions. In the private sector, the system is separated into the pension scheme for workers and non-executive employees and the pension scheme for executives and highly qualified. Both groups have to pay contributions to the general social security system *Caisse nationale d'assurance vieillesse (CNAV)* at a rate of 6.55 per cent for the employee and 8.2 per cent for the employer up to a maximum of € 29,184 in 2003 (€ 28,224 in 2002). On income above this ceiling the contribution rates are 0.1 per cent for the employee and 1.6 per cent for the employer with no further income ceiling. The supplementary occupational schemes are compulsory and are financed as a pay-as-you-go system as well. Executives have to pay into two schemes (*AGIRC* and *ARCO*) with graduated contribution rates. There is a voluntary additional pension scheme which is fully funded and can be used as an occupational scheme or for private saving.

The public pension resulting from contributions to *CNAV* is calculated by multiplying the reference income by an individual pension factor and the number of insurance quarters. The reference income is equal to the average income of the 20 years with highest earnings, the individual pension factor depends on the pensioner's age. It amounts to 50 per cent for a pensioner who entered retirement at the age of 65. The number of insurance quarters must not exceed 160 which is equal to 40 years in which contributions were paid. The pensions of the supplementary schemes are calculated in the same way.

### 3.1.1.3 Germany

In Germany, the first pillar does not only provide a minimum income but also secures the living standard to a certain extent. Employee and employer each pay half of the compulsory contributions to the public pension scheme. The combined rate is 19.5 per cent of gross income in 2003 (19.1 per cent in 2002). It is applied up to an annual gross income of € 61,200 (€ 54,000 in 2002).<sup>32</sup> The public pension depends on pension points which are based on the amount of contributions paid and the number of years during which contributions were paid. The monthly pension is calculated by multiplying the pension points by the current pension value. Employees with incomes above the ceiling receive a pension point per year of about 1.8. The pension value in 2003 is € 26.13.

There are several alternatives of occupational old-age provision. Since it is the most common form, especially in big companies, we focus on old-age provision in the form of direct guarantees. In this case, the employer himself pays the pension to his former employee without any intermediary institution.

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<sup>32</sup> These ceilings apply to West Germany. In the East, the ceilings are € 51,000 for 2003 and € 45,000 for 2002.

#### 3.1.1.4 Ireland

Unlike in most of the countries analysed, the Irish social security system is not split into several types of insurance. Overall contributions are paid into the entire system, not into separate insurance branches. It is not possible to determine objectively the proportion of contributions being used for public pensions. However, we know which sectors of social security are tax financed and which are contribution financed. Family allowances are tax financed, whereas the first pillar of old-age insurance, unemployment, and work injury insurance are financed out of the overall contribution. Health insurance is not included in the overall contribution. For the analysis, the approximate contribution to old-age insurance has been estimated. We assume that 20 per cent of the overall contributions correspond to unemployment and accident insurance, and the remaining 80 per cent to the first pillar of old-age insurance. The overall contribution rates are 4 per cent for employees up to incomes of € 40,420 in 2003 (€ 38,740 in 2002). Contributions are not levied on the first € 6,604 of income. Employers pay 8.5 per cent on the total gross income of employees with gross income less than € 356 per week. They pay 10.75 per cent for employees earning more than € 356 per week. Pensioners receive a base pension of currently € 147.30 per week if the employee has paid into the social security for 48 years. Dependent spouses receive an additional pension of € 116.70 per week.

Occupational pension plans are not compulsory and usually are organised as trustee-managed pension plans or pension schemes. The resulting pensions are not subject to any limitation.

#### 3.1.1.5 Italy

The Italian system of old-age provision was reformed in 1992 and 1995. The first pillar was converted from a system with benefits depending on the earnings of the last five years to a system where benefits depend on life-time contributions and the life-expectancy of the pensioner's cohort at the age of retirement. However, the former pension system still influences the expectable pension, and the contributions are relatively high. Employers have to pay 23.81 per cent of gross income and the employees' contribution rate is 8.89 per cent. Contributions have to be paid up to an income ceiling of € 80,391. The annual public pension is calculated by multiplying the contributions by a conversion factor of 6.136 per cent for persons retiring at the age of 65 in 2003.

The second pillar of the Italian pension system is voluntary. There are two kinds of occupational pension schemes: direct guarantees with severance or pension payments as well as pension funds with severance payments. The pension plans with severance payments (*Trattamento de fine rapporto* TFR) were introduced in 1993 and are comparable to regular direct guarantees<sup>33</sup>. The employer has to contribute around 7.4 per cent of the employee's gross income into the TFR which can be transferred to a pension fund.

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<sup>33</sup> See Fenge et al. (2003: 97-99) for more details.

### 3.1.1.6 The Netherlands

In the Netherlands, the first pillar of the pension system only offers a base pension in order to secure a minimum income. All tax payers with employment or rental income have to pay contributions to the public pension scheme at a rate of 17.9 per cent of the taxable income up to a ceiling of € 28,850 in 2003 (€ 27,850 in 2002). In addition, employees have to pay 1.25 per cent and employers have to pay 5.05 per cent of gross income for disability insurance, up to an income ceiling of € 30,260 in 2003. The base pension currently amounts to € 913 per month for singles and € 1,258 per month for married couples.

Because these base pensions are rather low, the second pillar is an important component of the pension system. Occupational pension plans usually are collectively agreed among employers' associations and unions. They often are financed through pension funds or direct insurance. The occupational pension plans are subject to certain limitations (Art. 18a Wet LB). The resulting pension of a defined contribution plan must not exceed 70 per cent of the annual earnings. This ceiling applies to an employee retiring at the age of 60. If he retires later, the ceiling of 70 per cent raises up to 100 per cent. The employee's contributions to a defined benefit plan are limited as well.

### 3.1.1.7 Switzerland

The Swiss pension system is explicitly organised as a three pillar system. Contributions to the first pillar have to be paid by all residents except pensioners. Work-related contributions to the first pillar (*Alters- und Hinterbliebenenversicherung AHV*) amount to 8.4 per cent of an employee's gross income without any ceiling paid half by employee and employer. Non-working spouses are exempt from such contributions if the working spouse contributes more than CHF 870 per month to the first pillar. The resulting base pension only secures a minimum income and depends little on contributions or life-time earnings. In 2003, the public pension for a single is between CHF 12,660 and CHF 25,320. With contributions based on annual earnings of CHF 75,960 the maximum pension is achieved. Contributions above this amount do not raise the resulting pension any more. Married couples receive a maximum pension of 1.5 times the maximum pension for singles, even if both couples paid contributions. The contributions to disability insurance (*Invalidenversicherung IV*) are levied at a rate of 0.7 per cent of gross income for both employee and employer without ceilings.

Employees with annual earnings above the maximum pension obtainable from the AHV are obliged to pay into an occupational pension plan. The pension plans are funded by the employers but have to meet special requirements. For example, the minimum rate of return currently has to be at least 3.25 per cent. The compulsory contribution rate rises with the employee's age.

### 3.1.1.8 United Kingdom

In the United Kingdom, the social security system is financed by overall contributions as well as by taxes. The first pillar of the old-age pension system and the contribution-based jobseeker's allowances are completely financed out of contributions. Health services are contribution-financed to a small extent. Work injuries and family allowances are tax financed. Hence, the overall contributions seem to be linked to the first pillar of old-age provision to a relatively high extent. As in the case of Ireland, we assume that 20 per cent of the contributions correspond to unemployment insurance and other charges. The employee's overall contribution rate amounts to 10 per cent up to a gross income of £ 30,420 in 2003 (£ 29,900 in 2002). The employer has to pay 11.8 per cent without ceiling. There are no contributions levied on the first £ 4,615. These contributions secure both a basic pension and an additional pension whose benefits are more closely linked to the contributions paid. If the employer provides a qualifying occupational pension scheme, the employee has the possibility to contract out of the additional public pension scheme. Thus, he is able to receive a higher pension with the same amount of contributions compared to the additional public pension. In this case, the contribution rate decreases to 8.4 per cent for the employer and to 8.3 per cent for the employee.. Pensioners receive a base pension of currently £ 72.50 per week provided that the employee has paid into social security for 44 years. Dependent spouses obtain an additional pension of £ 43.40 per week.

The second pillar of the pension system is not compulsory, but most big companies offer pension plans or pension schemes that are managed by trustees. The occupational pension plan is either a defined-benefit or a defined-contribution plan. The resulting benefits are limited to a maximum benefit of 1.5 times the final remuneration and an annual pension of two thirds of the final remuneration. In other words, the contributions are limited in so far as they must not result in pensions exceeding the above limits.

### 3.1.1.9 The United States

The old-age, survivor, and disability insurance *OASDI* builds the first pillar of the US pension system. The contribution rates amount to 6.2 per cent of gross income payable by both employee and employer up to a ceiling of \$ 84,900 in 2002 and \$ 87,000 in 2003. The resulting pension is calculated by multiplying the average incomes of the 35 years with highest earnings by a discount factor. The first \$ 592 of average income are weighted by 90 per cent, income from \$ 593 up to \$ 3,567 is weighted by 32 per cent, and exceeding parts of average income are weighted by 15 per cent. Dependent spouses can claim one-half of their working spouse's benefit in addition.

The second pillar is usually financed through pension funds. Pension funds with tax privileges are either defined-benefit or defined-contribution plans. The contributions must not exceed 25 per cent of the employee's earnings or \$ 35,000 per year.

### 3.1.2 Health Insurance

In our model, we do not consider contributions to health insurance as tax-like contributions (see Section 2.2.3.2). Thus, health insurance contributions qualify as disposable income. Nevertheless, we give an overview of the public health insurance systems in the countries analysed.

*Austria* has a compulsory health insurance system. The contribution rates amount to 3.4 per cent for employees and 3.5 per cent for employers. Contributions have to be paid for income not exceeding € 47,040 in 2003 (€ 45,780 in 2002).

Contributions to the health insurance in *France* mostly are paid by the employer. The contribution rate for the employer is 12.8 per cent whereas the employee's contribution rate is 0.75 per cent of gross income without any ceiling.

In *Germany*, in principle each employee has to pay into public health insurance. This system consists of several organisations among which the employee is free to choose. The contribution rates currently vary between 11.9 and 15.7 per cent of gross income half of which is paid by the employee and half by the employer. With this contribution, a non-working spouse and children are insured. Employees and employers have to pay an additional contribution to long-term care insurance of 1.7 per cent. Both types of insurance in West Germany are limited to gross incomes up to € 40,500 in 2002 and € 41,400 in 2003. These limits correspond to 75 per cent of the old-age insurance ceilings. Employees who earned more than € 40,500 in 2002 were able to opt out to a private health insurance with premiums according to individual health risk instead of gross income. Usually, this insurance is favourable for high earning singles. Families may be better off with public health insurance instead of paying insurance premiums for each family member. To finance the expanding costs of the existing health insurance system, the income ceiling for opting out of public health insurance was raised to € 45,900 in 2003.

In *Ireland*, employees pay 2 per cent of gross income into social health insurance.

The *Italian* health insurance system is financed by employers' contributions of 0.66 per cent of a white-collar employee's gross income. Manual workers are subject to other regulations. Since this insurance system only offers a fundamental medical service, most Italians take out an additional private health insurance.

The *Dutch* social health insurance is integrated in the income tax schedule and amounts to 10.25 per cent of taxable income up to earnings of € 28,850. Employees with a gross income of up to € 31,750 are subject to an additional health insurance with compulsory contribution rates of 1.7 per cent for the employee and 6.75 per cent for the employer.

In the *Swiss* health insurance system, mandatory health insurance premiums have to be paid by each resident. The premiums do not differ by age, sex or income. The maximum premiums are regulated by the cantons.

In the *United Kingdom*, social health insurance is part of the national insurance offering a basic medical service.

In the *United States*, the medicare tax is levied at contribution rates of 1.45 per cent for both employer and employee without any ceilings. The medicare system only supports old-aged persons. Personal health risks have to be insured privately.

### 3.1.3 Family Allowances

In all of the countries analysed, families receive family allowances, either in the form of tax privileges or as direct transfer payments (see Table 3.1. on p. 35). Most countries offer benefits as well as tax privileges. In several countries, the family allowances are financed out of contributions of the employers.

In 2002 and 2003, the family allowance in *Austria* amounts to at least € 112.70 per month and child and increases with the child's age and the number of children. The family allowance is tax financed.

*France* only grants a family allowance for families with two or more children. The child allowance amounts to at least € 111.26 per month with surcharges of € 30.77 for children above 11 years and € 54.70 for children above 16 years. Furthermore, there is a family benefit for families with low earnings. The family allowances are not subject to income tax.<sup>34</sup> The contribution rates for employers amount to 5.4 per cent of the aggregate salaries and wages.

Child allowances in *Germany* are tax financed. The child benefit is between € 154 and € 179 per month and child according to the number of children (§ 66 EStG). The family allowances are not subject to tax and social security. Tax payers with high incomes may receive a tax deduction instead of the child benefit if the former is more favourable.

In *Ireland*, child benefits are tax financed. The child allowance amounts to € 117.60 per month and child for the first two children, increasing with the number of children as well as for twins, triplets, and quadruplets. There are special family allowances for families with low incomes. The family benefits are not taxable nor subject to national insurance.

*Italy* grants a family allowance for employees if at least 70 per cent of the earnings derive from work. The child allowance depends on the number of children and the income. A family with two children for example receives € 250 if the income is below € 11,200. The allowance is reduced to zero for incomes above € 43,900. The benefits are not taxable nor subject to social security. The family allowances are financed by employers' contributions of 2.48 per cent of aggregate salaries and wages.

The *Netherlands* grant a child allowance which is graduated according to the child's age. For children born after 1994 the family allowance amounts to € 70.57 per month and child (Art. 12 AKW). The child benefits are not subject to tax and social security.

In *Switzerland*, the family allowances for employees are under cantonal sovereignty. The monthly cantonal family allowances range from CHF 150 to CHF 260

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<sup>34</sup> However, they are subject to the general social contribution CRDS at a rate of 0.5 per cent.

according to canton and number of children (see Table 3.1.). The child allowances are subject to personal income taxes. Employers have to pay contributions of up to 2 per cent of the aggregate salaries and wages to finance the cantonal family funds.

In the *United Kingdom*, family allowances are tax financed. The child allowance amounts to £ 68.25 per month for the oldest child and £ 45.85 for further children. The child benefit is not subject to tax and social insurance.

The *United States* does not grant child allowances. The family allowance is granted as an additional tax deduction.

**Table 3.1.** Family allowances: contribution rates and benefits, 2003

Country / canton	Employer's contribution rate	Child benefits per child and month
Austria	-*	€ 112.70 for children between 3 and 9 years
CH Basel-Landschaft	1.5	CHF 150**
CH Basel-Stadt	1.5	CHF 150**
CH Bern	1.8	CHF 160**
CH Genève	1.9	CHF 200**
CH Schwyz	1.7	CHF 160**
CH St. Gallen	2.0	CHF 170**
CH Ticino	1.5	CHF 183**
CH Valais	-*	CHF 260**
CH Vaud	2.0	CHF 150**
CH Zug	1.6	CHF 230**
CH Zürich	1.5	CHF 170**
France	5.4	€ 111.26 for children between 6 and 11 years
Germany		€ 154 - € 179
		high incomes: tax allowance instead
Ireland	-*	at least € 117.60
Italy	2.48	graduated benefits for low incomes
The Netherlands	-*	€ 70.57 for children born after 1994
United Kingdom	-*	£ 68.25 for the first, £ 45.72 for further children
United States	-	-

\* The child benefits are tax financed.

\*\* The child benefits are taxable.

Source: MISSOC (2003), national ministries of social affairs.

### 3.1.4 Work Injury and Unemployment Insurance and Other Charges

In most of the countries studied, work injuries are covered by a compulsory insurance. The contributions are paid by the employer and differ according to industry. The average contributions are shown in Table 3.2.



**Table 3.2.** Average contribution rates to work injury insurance, 2003

Country	Average contribution rate in per cent	Income ceilings per employee
Austria	1.4	€ 47,040
France	2.26 <sup>a)</sup>	-
Germany	1.42	€ 61,356
Ireland	-	-
Italy	0.5 to 16; manufacturing: 3.0	-
The Netherlands	-	-
Switzerland	0.02 to 28.7	CHF 106,800
United Kingdom	-	-
USA	variable <sup>b)</sup>	-

<sup>a)</sup> According to the International Social Security Association ISSA (2002).

<sup>b)</sup> Current contribution rates are not available. According to ISSA, the average contribution rate was 2.05 per cent in 1995.

Source: MISSOC (2003) and national organisations charged with work injury insurance.

Contributions to unemployment insurance are limited by income ceilings in all analysed countries except Italy (see Table 3.3.). Switzerland has a federal insurance, in the United States, each state can levy premiums in addition to the federal unemployment insurance (FUTA). These premiums are deductible from federal insurance. One observes a great dispersion of contribution rates and ceilings. In particular, the rates in the United States are remarkably low.

**Table 3.3.** Contribution rates to unemployment insurance, 2003

Country	Contribution rate in per cent employee / employer	Income ceiling
Austria	3.0 / 3.7	€ 47,040
France	2.4 / 4.0	€ 116,736
Germany	3.25 / 3.25	€ 62,100
Ireland	included in the overall contribution	-
Italy	0.3 / 4.41 <sup>a)</sup>	-
The Netherlands	5.8 / 1.55	€ 30,260
Switzerland	1.5 / 1.5 up to: 0.5 / 0.5 for exceeding income up to:	CHF 106,800 CHF 267,000
United Kingdom	included in the overall contribution	-
USA	- / 6.2	\$ 7,000
USA - Massachusetts	- / 2.125 (varying)	\$ 10,800

<sup>a)</sup> For manufacturing companies with more than 50 employees.

Source: MISSOC (2003) and national organisations charged with unemployment insurance.

In Switzerland, Austria, and France, there are several charges which do not qualify neither as social insurance nor as income tax and which are levied to finance special purposes.

*Austria* levies two such fiscal charges. The *Arbeiterkammerumlage* – a contribution to a specific form of workers organisation – of 0.5 per cent for employees and a charge to boost the construction of homes with contributions of 0.5 per cent

for both employees and employers. These charges are levied on incomes not exceeding € 40,320 in 2003 (€ 39,240 in 2002).

Tax payers in *France* have to pay a social tax. For employment income this is 8 per cent on 95 per cent of gross income. The contribution consists of a general social contribution (*Contribution sociale généralisée CSG*) and a tax for the purpose of reducing the public debt (*Contribution au remboursement de la dette sociale CRDS*). Each employer has to pay an apprentice charge (*taxe d'apprentissage*) of 0.5 per cent of the employee's gross income. Companies with more than 10 employees are subject to a charge destined to promote the advancement of employees. The contribution rate amounts to 1.5 per cent of gross income. A housing charge which has to be paid by companies with more than 10 employees amounts to 0.45 per cent of the aggregate salaries and wages or 2 per cent for employers not participating in special housing programmes.

In *Switzerland*, a contribution has to be paid to finance the income compensation for military service (*Erwerbsersatzordnung EO*). This fund compensates for earnings lost during the military service of Swiss nationals. All residents with employment income including foreigners and women have to pay 0.15 per cent of gross income into the *EO*. The employer pays another 0.15 per cent. There is no income ceiling.

## 3.2 The Tax Systems in the Analysed Countries

For the tax burden on manpower personal income taxes including surcharges and state and municipality taxes as well as payroll taxes paid by the company are relevant. Contrary to that, the study does not deal with wealth taxes nor inheritance taxes since they are not linked directly to employment income. Church taxes as well are excluded from the study, assuming that all individuals have the possibility to leave church.

In the following, we describe the fiscal constitution, tax deductions, and tax schedules of the countries analysed.<sup>35</sup> For a brief overview of the tax schedules see Table 3.4. For tax allowances see Table A.4. - Table A.7. on p. 91-92.

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<sup>35</sup> The description is based on IBFD (2003a and 2003b) and the national tax laws.

**Table 3.4.** Personal income tax: top rates

Country/Canton	Year	Highest income bracket	Top tax rate
Austria	'02-'03	€ 50,870	50.0 %
CH Basel-Landschaft	'02	CHF 1,119,067	42.6 % <sup>a)</sup>
	'03	CHF 1,122,724	42.6 % <sup>a)</sup>
CH Basel-Stadt	'02-'03	CHF 1,300,800	40.5 % <sup>a)</sup>
CH Bern	'02-'03	CHF 437,400	41.4 % <sup>a)</sup>
CH Genève		CHF 1,000,000	45.0 % <sup>a)</sup>
CH Nidwalden		CHF 300,000	26.7 % <sup>a)</sup>
CH Schwyz	'02	CHF 214,500	24.8 % <sup>a)</sup>
	'03	CHF 214,500	23.9 % <sup>a)</sup>
CH St. Gallen	'02-'03	CHF 248,000	35.9 % <sup>a)</sup>
CH Ticino	'02-'03	CHF 304,400	43.8 % <sup>a)</sup>
CH Valais	'02-'03	CHF 322,200	41.6 % <sup>a)</sup>
CH Vaud	'02-'03	CHF 189,800	45.4 % <sup>a)</sup>
CH Zug	'02-'03	CHF 130,500	23.3 % <sup>a)</sup>
CH Zürich	'02-'03	CHF 224,300	41.0 % <sup>a)</sup>
France	'02	€ 46,343	51.1 %
	'03	€ 47,131	49.6 %
Germany	'02-'03	€ 55,008	51.2 % <sup>b)</sup>
Ireland	'02-'03	€ 28,000	42.0 %
Italy	'02	€ 69,722	46.1 % <sup>*</sup>
	'03	€ 70,000	46.1 % <sup>*</sup>
Netherlands	'02	€ 47,746	52.0 %
	'03	€ 49,464	52.0 %
United Kingdom	'02	£ 29,400	40.0 %
	'03	£ 29,900	40.0 %
United States	'02	\$ 307,050	43.9 % <sup>a)</sup>
	'03	\$ 311,950	43.9 % <sup>a)</sup>

<sup>a)</sup> Combined tax rate with federal, state and municipal tax.

<sup>b)</sup> Including surcharge.

### 3.2.1 Austria

*Fiscal constitution:* The Republic of Austria comprises nine states. The fiscal constitution regulates the authority to levy taxes. The federation has the legislative competency for the income tax. Income tax revenues are shared among the federation, the states, and the municipalities. Employers pay a communal tax (*Kommunalsteuer*) on the aggregate salaries and wages. This tax is under legislative authority of the federation, but revenues accrue to the municipalities. The tax amounts to 3 per cent of the aggregate salaries and wages. The income tax on wages is withheld by the employer.

*Tax base:* The 13th and 14th monthly salaries are taxed at a rate of 6 per cent as long as they do not exceed one sixth of total income. All contributions to social security are tax deductible. For business-related expenses, there is a standard deduction of € 132 (§ 16 EStG) and, in addition, a tax credit of € 54. Further tax al-

lowances are granted in the form of tax credits which are regulated in § 33 EStG. The personal tax credit is reduced as the income increases. It starts at € 887 and is equal to zero at a taxable income of € 35,421. There is an additional child tax credit of € 50.9 per child and month. The maximum pensioners' tax credit is € 400. It is reduced from taxable income of € 16,715 onwards and is equal to zero at an income of € 21,800.

*Tax schedule:* The income tax schedule is progressive. Married couples file separately. Incomes exceeding € 50,870 are subject to a statutory tax rate of 50 per cent.

### 3.2.2 France

*Fiscal constitution:* In the French Republic the most important types of taxes are levied by the central state. The central state is entitled to the entire revenue of the personal income tax. The French tax law is codified in the *Code Général des Impôts* (CGI) and its annexes. At the end of a year, the finance act (*Loi des Finances*) modifies the tax law for the current and the following years. The tax schedules are adjusted at the end of the tax year to account for inflation. The personal income tax is payable on the income of the preceding year. There is no withholding tax.

France levies several taxes or charges based on the employee's salary. The business tax (*taxe professionnelle*) was levied on 18 per cent of the aggregate salaries and wages until 2002. A reform in 1999 abolished this part of the business tax. Since in 2002, tax allowances for business tax based on wages and salaries amounted to € 914,694, many companies did not pay the tax any more. From 2003 on, it is completely abolished. In Paris, the rate of the business tax was 13.37 per cent in 2002 and 17.72 in 2001. The tax rate applies to 84 per cent of the tax base. Employers have to pay an additional payroll tax (*taxe sur les salaires*) if less than 10 per cent of the turnover are subject to value added tax. This applies for example to banks, insurance companies, or freelancers.<sup>36</sup> Companies who grant company cars to the employee's free disposal are subject to a special company tax. Since 1999, the tax due is € 282.03 per quarter for small cars and € 609.80 for larger cars. The company car tax is not deductible from the income tax base.

*Tax base:* In France, 10 per cent of gross income less social security contributions are deductible as business-related expenses. In 2002, the minimum and maximum deductions are € 370 and € 12,437.<sup>37</sup> From the resulting amount again twenty per cent are tax deductible up to a limit of € 22,780. The same deductions apply to pension income. Other tax allowances are integrated in the income tax schedule. The French income tax does not provide any special personal deductions. Old-aged persons with low incomes receive an additional degressive tax allowance. In 2002, the income ceiling for this allowance is € 16,090 for singles and

<sup>36</sup> The *taxe sur les salaires* is not taken into account in the following analysis.

<sup>37</sup> For the amounts of all tax allowances applying in 2002, see *Loi des finances pour 2003 du 30 décembre 2002*.

twice that amount for married couples. From 2001 to 2002, tax allowances increased by little.

*Tax schedule:* The income tax is progressive with a top tax rate of 49.58 per cent which applies to taxable incomes exceeding € 47,131. The top tax rate has been reduced since 2001 when it still amounted to 50.113 per cent. France uses family coefficients. To obtain the tax liability of a family, first the income of the family is divided by the coefficient applicable for the type of family considered, and then the tax due for this income is multiplied by the coefficient. The coefficient for a married couple is 2, for a couple with two children it is 3. However, the tax advantage for a family compared to a married couple must not exceed € 4,102. Otherwise the tax payment of a family with two children is obtained by using a family coefficient of 2 and then subtracting € 4,102 from the ensuing tax liability.

### 3.2.3 Germany

*Fiscal constitution:* The Federal Republic of Germany comprises 16 states. The federation has the authority to enact most tax laws. The revenues from the income tax accrue to the federation, the states, and the municipalities. The federation is entitled to the solidarity surcharge levied since 1995 to finance Germany's unification. The surcharge is 5.5 per cent of the income tax payment. The income tax on wage payments is withheld by the employer.

*Tax base:* In Germany, the employee's contributions to social insurance are deductible in limited amounts for purposes of personal income tax (§ 10c EStG). In principle, a deduction of 20 per cent of gross income is allowed for social security and contributions to other provision schemes for incomes up to € 12,228 for singles respectively € 24,456 for married couples.<sup>38</sup> The standard deduction is progressive and ends for gross incomes above € 19,175/€ 38,350 at an amount of € 2,001/€ 4,002. Furthermore, an additional deduction of € 36 is allowed for other special expenses, e.g., church tax or tax consultant if no exceeding costs are claimed.

Employees can claim a standard deduction of € 1,044 for business-related expenses (§ 9a No. 1 EStG). The deduction also is granted to pensioners who receive pensions related to a prior employment. German tax law grants a personal allowance of € 7,235 for singles respectively € 14,470 for married couples in 2002 and 2003 (§ 32a EStG). The personal allowance is integrated in the formulae of the tax schedule. A special old-age deduction is granted to old-aged persons who are still working (§ 24a EStG).

Tax payers with dependent children receive a child allowance deductible from the tax base or a non-taxable child benefit. The revenue office automatically takes account of the more favourable amount. That is, if the tax allowance reduces the tax liability by more than the non-taxable child benefit the allowance is used, otherwise the benefit. The child allowance (§ 32 EStG) amounts to € 1,824 plus

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<sup>38</sup> See Laux (2002) for detailed formulae to calculate the deduction for provision payments.

€ 1,080 for the costs of the children's education per child, per parent, and year. In 2002 and 2003, the allowance is more favourable than the benefit for taxable incomes above € 56,088 for married couples.

*Tax schedule:* The progressive tax rate of the personal income tax is expressed in formulae with continuously increasing marginal tax rates. From a taxable income of € 55,008 onwards, the top income tax rate of 48.5 per cent applies. Married couples can choose to file individually instead of jointly. If they file jointly the tax is computed by multiplying the joint taxable income by the average tax rate which applies to half the joint taxable income.

### 3.2.4 Ireland

*Fiscal constitution:* The Irish tax system is based on the British tax system. Like in the United Kingdom the tax law is regulated in the annually enacted Finance Act. Employment income is subject to withholding tax.

*Tax base:* Contributions to social security are not tax deductible. Instead of tax deductions tax credits are usual. A tax credit can be claimed by employees or pensioners with state or occupational pensions. It amounts to € 800 in 2003 and € 660 in 2002. Personal tax credits of € 1,520 for singles and € 3,040 for married couples apply. Married couples where one spouse stays at home caring for dependent persons receive an additional home carer's tax credit of € 770. Irish pensioners receive a tax credit of € 205 per person.

*Tax schedule:* Married couples file jointly. The top tax rate of 42.0 per cent is reached with taxable incomes of € 28,000.

### 3.2.5 Italy

*Fiscal constitution:* The Italian Republic is organised as a unitary state structured in 20 regions which are again subdivided into provinces and municipalities. Regions, provinces, and municipalities may only levy taxes that are permitted to them by the central state. The revenue of the personal income tax completely accrues to the central state. Regions levy a surcharge on the income tax. The surcharge ranges from 0.9 to 1.4 per cent of the personal income tax base. The tax rate is fixed by the regions. Municipalities may levy another surcharge up to a maximum of 0.5 per cent.<sup>39</sup> The income tax relating to employment income is withheld by the employer. There is a regional tax on productive activities (IRAP) payable by companies. Until the tax year of 2002 the IRAP effectively was levied on personnel expenses as they were not deductible from the tax base.

*Tax base:* Contributions to social security are fully tax deductible. With the tax reform of 2003, the deductions as well as the schedule have been changed.<sup>40</sup> From 2003 onwards, there is a basic deduction of € 3,000 which is increased to € 7,500

<sup>39</sup> Rome has a municipal rate of 0.2 per cent and a regional rate of 0.9 per cent.

<sup>40</sup> See *Agenzia delle Entrate, Circolare n. 2 del 15 gennaio 2003, Roma.*

for employment income and to € 7,000 for pensions. This deduction is degressive, equalling zero for incomes above € 26,000. Italy does not grant any personal tax credit. However, for non-working spouses a degressive tax credit is granted. In 2002 and 2003, this credit starts at € 546 for incomes up to € 15,494 and ends at € 422 for incomes above € 51,646. Families with low incomes may claim child allowance. Apart from this, individuals receive a tax credit of at least € 285 for each child. The working tax credit decreases because of the new basic deduction from up to € 1,146 in 2002 to at most € 235 in 2003. The tax credit for pensioners in 2003 is € 98 at the maximum for pensioners under 75, and up to € 222 for pensioners who are 75 years or older.

*Tax schedule:* The income tax schedule is progressive, married couples are assessed separately. From 2002 to 2003, tax rates and income brackets were adjusted to rounded amounts of Euro. The top tax rate stayed constant, lower tax rates and income brackets were raised. In 2003, the top tax rate of 45 per cent is reached with an income of € 70,000.

### 3.2.6 The Netherlands

*Fiscal constitution:* In the Netherlands, the state, the provinces, and the municipalities principally have the right to levy taxes. Nevertheless most taxes are levied by the central state. Tax revenues accrue to the state as well as to the provinces and municipalities. The Dutch personal income tax is structured as a box system with different tax schedules. Income from employment belongs to box 1. The tax rates of the two lowest income brackets of the tax schedule are combined with the social tax. The income tax on employment income is withheld by the employer.

*Tax base:* The contributions to workers' social security are partially deductible in the Netherlands. The contributions to the general public social security system are levied together with the personal income tax. These contributions are not tax-deductible. Contributions to social insurance which are paid out of gross income are deductible within limitations. Contributions to the workers' health insurance as well as other medical expenses are deductible in limited amounts. However, the contributions themselves stay below this limit. Contributions to unemployment insurance as well as contributions to occupational and personal pension plans are deductible for income tax purposes.

Tax rebates usually are accorded in the form of tax credits. In 2003, employees receive an employment tax credit of € 1,104 if they are under 57 years old. This credit decreases with increasing income and increases for older employees. Tax payers under 65 years obtain a personal tax credit of € 1,766. Non-working spouses obtain the personal tax credit as a transfer payment. For older persons the tax credit is reduced to € 806. Tax payers over 65 years may claim an old-age tax credit of € 346 if their income does not exceed € 29,592 (Art. 7 and 9 AOW and Art. 8.17-18 Wet LB). Taxpayers who receive a single-person's old-age pension get an additional tax credit of € 242. The child tax credit amounts to € 41 with an income limit of € 56,191. Families are entitled to a supplementary child credit of

€ 354 if their income does not exceed € 29,180 and to an additional credit of € 214 for each working spouse (Art. 8. 12-14 Wet LB).

*Tax schedule:* The income tax schedule of box 1 is combined with the social tax in the first two income brackets. In the lowest income brackets pensioners are therefore subject to other tax rates than employees. Married couples file separately. The top tax rate of 52 per cent is reached with a taxable income of € 49,464.

### 3.2.7 Switzerland

*Fiscal constitution:* In Switzerland, the confederation, the cantons, and the municipalities each levy their own taxes. Confederation and cantons have the sovereignty to levy taxes. Municipalities have a delegated sovereignty and may only levy taxes which they are empowered to by the canton. Regarding income taxes cantons and municipalities apply the same tax law. The confederation has a separate tax law. For reasons of flexibility and competition, cantons and municipalities fix annual multiples (*Steuerfuss*) by which the basic tax rates are multiplied yielding the rates of the canton or municipality tax.

In order to simplify the tax systems and to enhance the attractiveness for investors Switzerland has legislated the law on tax harmonisation in 1990.<sup>41</sup> Its objectives are to standardise the assessment periods for both individuals and legal entities and to harmonise the computation of taxable income. The schedules, tax rates, and tax-free allowances remain under the authority of each canton.

One big harmonisation concerning the tax assessment was the change from the *praenumerando* to the *postnumerando* taxation system which was completed in the tax year 2003. In the *praenumerando* taxation system the tax is assessed every two years for the income of the previous two years. In other words, the tax is paid for income that was earned during the two years before the assessment. The *postnumerando* taxation system is an annual assessment that is based on the income of the tax year. Taxes are paid during the whole tax period on an estimated base. At the beginning of the next year, the tax is finally assessed and tax payments may be corrected.

In the cantons Ticino, Vaud, and Valais, the 2-year-*praenumerando* system is still in force in the year 2002. The cantons will change to the annual *postnumerando* system in 2003. This implies that income from the years 2001 and 2002 will never be assessed as the taxes of 2002 and 2001 refer to income of 1999 and 2000 and the tax in 2003 refers to income of 2003. But incomes from 2001 and 2002 have nevertheless to be declared in order to account for extraordinary incomes or expenditures. In the following analysis, only Ticino, Vaud, and Valais are in this special situation.<sup>42</sup>

<sup>41</sup> *Bundesgesetz über die Harmonisierung der direkten Steuern der Kantone und Gemeinden sowie über die direkte Bundessteuer.*

<sup>42</sup> We use the tax regulations from 2000 in the calculations as the special regulations for 2002 income do not reflect the actual tax burden.



Most cantons changed on 01/01/2001 from the *prae-* to the *postnumerando* system. Schwyz still has a two-year tax period, but tax payers have the possibility to opt for the annual tax period. The other cantons analysed switched to a one-year assessment. Zürich already changed on 01/01/1999 and Basel-Stadt has always had the *postnumerando* system.

*Tax base:* The employee is subject to personal income tax with his gross income. In Switzerland, the employee's contributions to social insurance are completely tax-deductible. 3 per cent of the gross income less contributions to social security and occupational pension plans are deductible as business-related expenses. For the federal tax, the minimum deduction is CHF 1,900, the maximum deduction is CHF 3,800.<sup>43</sup> The cantons often follow this standard deduction where the limit varies. Some cantons have fixed standard deductions. For the detailed amounts of tax allowances in the cantons, see Table A.4. to Table A.7. on p. 91 ff.

Concerning the federal tax the personal deductions for the taxpayer or his spouse are integrated in the tax schedule. Income below CHF 15,770 or CHF 29,400, respectively is not taxable. Personal deductions in the cantons range from zero in Ticino up to CHF 6,500 for singles and CHF 13,000 for married couples in Zug. Tax allowances for taxpayers with children vary among the cantons reaching a maximum of CHF 8,000 per child in Zug and Ticino. The federal tax law grants a tax allowance of CHF 5,600 per child. In the cantons Vaud and Genève, the child allowances are part of the tax schedules. Some cantons grant deductions for pensioners of up to CHF 3,000 for singles and CHF 6,000 for married couples. These deductions often depend on the income and the net wealth of the pensioner.

*Tax schedule:* The income tax schedules of the confederation and the cantons are progressive. In contrast to other countries, the tax rate for the highest income is not always the highest statutory tax rate. The statutory tax rates increase up to the highest income bracket. From the highest income ceiling on, the income tax is calculated by multiplying the total taxable income with the tax rate instead of multiplying only the income in the bracket and adding the tax which is imposed on the lower income brackets. This form of progression is found in the confederation as well as in the cantons Zug, Basel-Stadt, Schwyz, and St. Gallen. For the tax rates as well as for the income brackets of the top rates see Table 3.4. on p. 38.

Married couples file jointly. In the cantons Zug and St. Gallen, married couples are taxed with the statutory average tax rate that would apply to half of their actual taxable income. The federal tax as well as the state income taxes of Basel-Landschaft, Basel-Stadt, Bern, Genève, Schwyz, Ticino, Zürich, and Nidwalden do not divide the income of married couples by two but by a smaller coefficient, or they have special tax schedules for married couples.

Vaud uses family coefficients within certain limits. Married taxpayers with or without children or singles with children divide their taxable income by the family coefficient which is 2.8 for a married couple with two children. The statutory tax rate which applies to the divided income is multiplied with the actual taxable in-

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<sup>43</sup> For all deductions regarding the federal income tax, see *Kreisschreiben* No. 7 from 17/12/2001. For the state income taxes, see the canton-specific tax guides.

come. The tax advantage is cut off at high earnings of CHF 206,800 in 2003. For higher incomes the family coefficient is 1.8 for married couples and the tax base is reduced by an allowance of CHF 41,032.

In Genève, all personal tax allowances as well as the cantonal and municipal multiples are combined in the calculation of the tax payment. In a first step the tax is calculated taking deductions into account which results in the basic tax on net income. In addition, the basic tax on specific allowances according to marital status (CHF 15,000 for singles, CHF 27,500 for married couples), children (CHF 6,500 per child) and pensioners (decreasing in income for incomes up to CHF 74,160/CHF 111,240) is calculated as well. The difference between those two tax payments is the basic tax. In a second step the total tax payment is calculated. It consists of the basic tax plus the cantonal multiple of 47.5 per cent of the basic tax less a reduction of 12 per cent of the total plus an additional charge for the city of Genève (*Centime d'aide à domicile* at 1 per cent) and the municipal multiple.

The income tax of the canton Valais only has one schedule for both, singles and married couples, but married couples receive a reduction of 32 per cent of the tax payment. The reduction is at least CHF 600 and must not exceed CHF 3,500. Singles receive a decreasing tax credit for taxable incomes of up to CHF 28,900. From 2001 to 2002, only few changes in income taxes applied.

### 3.2.8 United Kingdom

*Fiscal constitution:* The tax system of the United Kingdom is organised centrally. The House of Commons enacts the Finance Act in which all taxes are regulated. The personal income tax is a non-permanent duty and has to be endorsed each year in the Finance Act. The tax year is from April to March of the following year. The personal income tax is structured as a scheduled system. Each schedule applies to different types of taxable income and stipulates different tax rates. Employment income is regulated in Schedule E.

*Tax base:* The contributions to social security are not tax-deductible. There is no standard deduction for business-related expenses. Tax payers receive a personal tax deduction of £ 4,615. Tax payers between 65 and 75 years instead obtain a tax allowance of £ 6,100, and tax payers beyond that age obtain £ 6,370. The married couple's allowance is £ 5,465 for persons born before 06/04/1935 and £ 5,535 for persons aged 75 or more. Above the income limit of £ 17,900 the old-age related allowances are reduced. Alternatively to the personal allowance for the old-aged the personal allowance may be claimed. The married couple's allowance has a minimum amount of £ 2,110. The United Kingdom reformed the child benefit system in 2002. Until 2002-2003, three types of child benefits applied: the general child benefit, working families tax credit for low-earning families and the child tax credit. In the tax year 2002-2003 the child tax credit is at most £ 529 for

families with children, independent of the number of children.<sup>44</sup> The child tax credit decreases for tax payers whose income is in the higher tax rate band.<sup>45</sup>

*Tax schedule:* Married couples file separately in the United Kingdom. In Schedule E there are three tax rates, the lower, the basic, and the higher tax rate. The higher tax rate of 40 per cent applies to taxable income above £ 29,900.

### 3.2.9 United States

*Fiscal constitution:* In the United States, taxes are levied by the federation, the states, and the local governments. Personal income taxes usually are levied by the federation as well as by several states. Federal and state income taxes are not based on the same regulations. Some local governments also levy taxes on personal income. The state of Massachusetts analysed in our study levies a personal income tax, the city of Boston does not. Tax on employment income is withheld by the employer.

*Tax base:* For federal income tax purposes, the tax payer can choose between a standard deduction which is \$ 4,750 for singles and \$ 7,950 for married couples and itemised deductions (Code Sec. 63 (c), (d)). The itemised deductions include expenses for illness, health insurance premiums as well as taxes, interest payments or donations in limited amounts. The standard deduction is increased for persons over 65 by \$ 1,150 for singles and by \$ 900 per capita for married couples. Employees with low earnings receive an additional earned income tax credit (Sec. 32 IRC), pensioners with low earnings obtain a credit for the elderly (Code Sec. 22). There is an additional personal deduction of \$ 3,050 for each member of the family (Code Sec. 152). Since 1997 there is a decreasing child tax credit of at most \$ 600 (Sec. 24 IRC).

For state income tax purposes, social security contributions are tax deductible up to \$ 2,000. There is a personal deduction of \$ 3,300 (\$ 6,600 for married couples), a child deduction of \$ 1,000 per child as well as a deduction for pensioners of \$ 700 (\$ 1,400 for married couples).

*Tax schedule:* Married tax payers can choose between the possibilities to file jointly or separately. The top tax rate of the federal income tax is reached with an income of \$ 311,950 whether filing separately or jointly. It amounts to 38.6 per cent. The state income tax of Massachusetts is proportional at a rate of 5.3 per cent.

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<sup>44</sup> ICTA 1988, s. 257AA, Sch. 138, FA 1999, s. 30, Sch. 3; FA 2000, s. 34.

<sup>45</sup> From 2003/2004 onwards the credits are replaced by one child tax credit and a working tax credit for low-earning tax payers.

## 3.3 Compensation Components

### 3.3.1 Cash Compensation

For tax and social security purposes, employment income is defined as the compensation for the employee's work in all countries. Compensation can consist in cash or in kind.

In all countries cash compensation is subject to tax with its nominal value. Except for Austria, there are no special privileges concerning cash and bonus payments.<sup>46</sup> In Austria the 13<sup>th</sup> and 14<sup>th</sup> salaries are tax privileged. Up to a limit of one sixth of the regular salary the additional salary is taxed at a reduced tax rate of 6 per cent. Income exceeding this limit is subject to the regular tax schedule (§ 67 (1)-(2) EStG).

### 3.3.2 Perquisites: Company Car

Company cars which are put to the employee's free disposal are usually subject to tax as fringe benefits. The benefit of using the company car for private purposes can be evaluated referring to the intensity of private use or by a standardised value typically based on the price of the car. In Table A.3. on p. 90 we summarise for all countries the taxable fractions of the true monthly costs of a company car as expressed by the values  $\theta_p$ . For the derivation of these values see Section 2.2.4.2.

In *Austria*, the standardised value is 1.5 per cent per month of the full price of the car up to a monthly maximum of € 510 in 2003. If the employee drives less than 500 kilometres per month the taxable value is reduced to 0.75 per cent up to a maximum of € 255 (§ 15 EStG and § 4 *Verordnung über die bundeseinheitliche Bewertung bestimmter Sachbezüge ab 2002*). Neglecting the case of an employee who drives little, we posit a  $\theta_p$  of 0.75 for Austria.

In *France*, Art. 82 CGI stipulates that the valuation of company cars for tax purposes follows the regulations of social security. The valuation of company cars was reformed in 2003. The standard benefit of a leased car is now at 40 per cent of annual costs including the leasing fee, costs for fuel, insurance, and taxes. If the employee pays running costs on his own the standardised value is 30 per cent of the annual leasing fee.<sup>47</sup> Only the second version fits our approach because running expenses are unknown. The ratio  $\theta_p$  between the standardised value and the actual costs is then 0.3. Before 2003 the benefit in kind was calculated based on the company's expenses in connection with the company car.<sup>48</sup> In addition to the

<sup>46</sup> Tax privileges for bonus payments that refer to several years exist in some countries but are not analysed here.

<sup>47</sup> See Direction de la Sécurité Sociale, *Circulaire DSS/SDFSS/5B/N°2003/07* from 07/01/2003, Part 2-2-3.

<sup>48</sup> See Lefebvre, *Fiscal 2002*, Par. 1830.

personal income tax, the grant of the company car is subject to a special company car tax on the level of the firm.<sup>49</sup>

In *Germany* employees can choose between a valuation according to mileage or the standard value of 1 per cent of the full price of the car per month (§ 6 (1) No. 4 EStG and § 8 (2) EStG). Considering only the standardised valuation,  $\theta_p$  results in 0.5.

In *Ireland* the taxable value of the company car is 30 per cent of the original market value per year. If the employee bears all running costs on his own the taxable benefit-in-kind of a car is reduced to 18.5 per cent of the original market value per year (TCA 1997, Part 5, Ch. 4). From 2004 on, this percentage will generally be set equal to 30 per cent. Employees with high mileage connected to their job obtain a reduced valuation. Fringe benefits are not subject to social security until 2003. Restricting attention to the case where the employee bears the running costs, we arrive at a value of  $\theta_p = 0.77$  for Ireland.

The valuation of company cars for tax purposes in *Italy* does not fit the general approach outlined in Section 2.2.4.2. In that country, the fringe benefit provided by a company car is derived from tables on car values issued by the Italian automobile club ACI.<sup>50</sup> The costs of 15,000 kilometres for each type of car are multiplied by 30 per cent to obtain the annual fringe benefit. In order to standardise the calculation of the tax value of perquisites nevertheless, we assume a  $\theta_p$  of 0.5 which corresponds roughly to the values in the ACI tables.

The annual benefit-in-kind of a company car in the *Netherlands* is valued at 25 per cent of the full price of the new car. The percentage is reduced under certain conditions (Art. 3. 145 Wet LB). Ignoring these, the Dutch value of  $\theta_p$  is 1.04.

*Swiss* cantons have different regulations to evaluate the benefit of a company car. For example, Bern has a standardised measure of 1 per cent of the full price of the new car per month implying a  $\theta_p$  of 0.5 which we use for all cantons. In other cantons, the fringe benefit is estimated individually or calculated with an approved regulation for such benefits.<sup>51</sup> With the new compensation certificate (*Lohnausweis*)<sup>52</sup> all cantons will adopt this standard valuation from 2004 onwards.

In the *United Kingdom*, the value of the benefit in kind depends on the CO<sub>2</sub> emissions figure for the company car from tax year 2002/2003 on. The maximum percentage of the price of the company car is 35 per cent per year, the minimum percentage is 15 per cent (Sch. 11 FA 2000). We assume that the lowest valuation applies, yielding a  $\theta_p$  of 0.63. In earlier tax years, the taxable benefit of the car was 35 per cent of the list price. The price was limited to £ 80,000.<sup>53</sup>

In the *United States*, the fringe benefit is regularly measured according to the Lease Value Rule. Under the Lease Value Rule, the company car is valued with the annual lease value of the car which is indicated in the Lease Value Table. For automobiles with a list price above \$ 600,000, the annual lease value is equal to 25

<sup>49</sup> See Section 3.2.2.

<sup>50</sup> See *Supplemento ordinario n. 231 alla Gazzetta Ufficiale del 17 dicembre 2002*.

<sup>51</sup> See Bosshard and Funk (2000: 45).

<sup>52</sup> The new certificate should be valid from 01/01/2004, but is now postponed.

<sup>53</sup> See CCH (2001: par. 402).

per cent of the list price plus extra \$ 500 (§ 1.61-21(d) Reg). This corresponds to a value of  $\theta_p$  equal to 1.04.

### 3.3.3 Long-Term Incentives: Employer-Provided Stock Options

There are three possible dates when employer-provided stock options can become subject to tax: at the date of grant, at the date of the exercise of the option or at the date of vesting when the options can be exercised the first time. While for tradable stock options the date of taxation is often the date of grant, non-tradable options tend to be taxed at the date of exercise. In this study, we only consider non-tradable stock options.

The benefit of the stock options is usually equal to the market value of the underlying share at the time of exercise less the price actually paid. Some countries accord a preferential valuation of this benefit. Table A.3. on p. 90 presents the fractions  $\theta_i$  of the true benefits which are subject to tax in the countries considered under the assumptions of our model.

*Austria* accords a preferential treatment to stock options as part of compensation if they satisfy several conditions (§ 3(1) EStG and § 67(10) EStG). Stock options are tax-privileged up to a fair value of the underlying shares of € 36,400 at the date of grant. A proportion of the benefit is tax-exempt which depends on the number of years elapsed since the date of grant. For each year ten per cent are granted, up to a maximum of 50 per cent. We assume a delay of 5 years, arriving at  $\theta_i = 0.5$ .

In *Germany*, stock options are not subject to a special tax treatment and hence are taxed at the date of exercise.<sup>54</sup> The benefit is equal to the difference between the market value at the date of exercise and the price actually paid. Stock options are subject to social security at the date of exercise as well.

In the *Netherlands*, employer-provided stock options are subject to tax on the vesting date with the full benefit. The employee can choose to be taxed at the date of exercise.<sup>55</sup> Since it is assumed that the options are exercised at the vesting date, this choice is not relevant in our model. Thus, in the Netherlands and in Germany  $\theta_i$  is equal to one.

In *Switzerland*, stock options are taxed at the date of grant if the vesting date is up to five years after the grant of the options (*Reg. No. 5* from 30/04/1997). Otherwise the stock options are subject to tax in the period of exercise. The benefit then is the difference between market value and the price paid by the employee. We only consider the taxation of stock options upon grant. The taxable value of stock options in this case is estimated using the method of Black and Scholes. The value of employer-provided stock options has to be adjusted so as to reflect the restriction concerning the vesting date. The modification is fixed assuming a long-

<sup>54</sup> BFH from 20. 06. 2001 VI R 105/99, BStBl. II 2001; following to BFH from 24. 01. 2001 I R 100/98, BFH/NV 2001 and I R 119/98, BFH/NV 2001.

<sup>55</sup> Supreme Court decision BNB 1985/16, BNB 1992/231, BNB 1992/232 cited in European Commission (2003).

term capital market yield of 6 per cent. For options with a holding period of five years the modification amounts to 25.27 per cent. This results in a reduced value of the stock option of  $\theta_t = 74.73$  per cent. Gains or losses resulting from the exercise of the qualified stock options which have been taxed upon grant do not affect the tax due.

Under certain conditions benefits from stock option plans are tax-exempt in *France, Ireland, Italy, the United Kingdom, and the United States*.<sup>56</sup> In *France*, gains resulting from the disposal of the stock are subject to tax if they exceed € 7,650 in 2002. In *Italy*, the full gain is subject to the capital gains tax of 12.5 per cent. In the tax year 2002/2003, gains are tax-exempt up to £ 7,700 in the *United Kingdom* and up to € 1,270 in *Ireland*. Exceeding gains are subject to capital gains tax in these two countries. In the United States, capital gains are taxed at rates according to the time the stock was held. In all these countries,  $\theta_t$  is zero in our model because we do not consider the sale of the underlying stock.

### 3.3.4 Pension Schemes

In all of the analysed countries, the employer's contributions are deductible as personnel expenses from the company's tax base. Thus, we only refer to tax regulations concerning the employee's personal income tax. Since contributions to the first and the second pillars often are taxed differently, we start in Section 3.3.4.1 by considering the first pillar contributions and pensions. In Section 3.3.4.2 we then turn to the second pillar and where necessary to the third pillar of old-age insurance.

#### 3.3.4.1 First Pillar of Old-Age Insurance

In *France, Italy, and Switzerland*, employees' contributions to the first pillar are fully deductible from the income tax base. As a consequence, public pensions are taxable income with their full amount.

In *Austria*, contributions are tax deductible as well. Furthermore, 25 per cent of public pensions deriving from the employee's contributions are subject to tax, the remaining 75 per cent are tax-exempt (§ 25(1) EStG and § 26 EStG).

In *Germany*, the employee's contributions are tax-deductible only within the standard deduction for personal expenses up to a maximum of € 2,001 for singles and € 4,002 for married couples. During the retirement period, public pensions therefore are subject to tax only with the income element of the pension annuity. For a person retiring at the age of 65, the income element amounts to 27 per cent of the whole public pension (§ 22 No. 1b EStG).

In the *Netherlands*, contributions to the first pillar are levied in combination with the personal income tax. As a consequence, they are not tax deductible (Art.

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<sup>56</sup> Ireland: S519D Taxes Consolidation Act 1997 and Schedule 12C; Italy: Article 9, Paragraph 4 Letter c) of the Italian Tax Code; UK: Section 135 and 185 ICTA 1988, Schedule 14 FA 2000; USA: Section 422 IRC.

11(1) Wet LB). However, public pensions are taxable income with their full amount (Art. 3.82 c, 3.100 in connection with Art. 1.7 (2) Wet LB, Art. 9 AOW).

Tax treatment in the *United Kingdom* and in *Ireland* is similar to the one found in the Netherlands: The employee's overall contributions are not tax deductible. Nevertheless, public pensions are subject to tax.

In the *United States*, employees' contributions are deductible in limited amounts within the standard deductions (\$ 4,750) or within the itemised deductions. The tax treatment of the resulting public pensions depends on the taxable income. If the tax payer has an income below \$ 34,000 for singles or below \$ 44,000 for married couples filing jointly 50 per cent of the pension are tax-exempt. The tax-exempt proportion decreases according to income. With incomes above \$ 43,000 and \$ 56,000, respectively, 85 per cent of the public pension is taxable (Code Sec. 86).

### 3.3.4.2 Second Pillar of Old-Age Insurance

Contributions paid by the employee to the second pillar of old-age insurance usually are part of gross income and therefore are subject to social insurance. In contrast, typically no social insurance charges are levied on contributions to the second pillar paid by the employer.

The basic idea for taxing occupational pensions is either to exclude contributions from taxable income and thus subject pension benefits to taxation, or to require that contributions are paid out of after-tax income implying that pensions are tax-exempt during retirement. For contributions to the second pillar paid by the employer, generally the first alternative is chosen: They are not deemed taxable income of the employee before the period of retirement. Actually, there is a trend to treat the contributions paid by the employee in the same way, that is, to tax pensions from second pillar insurance when the resulting annuities are received and to exempt all contributions from personal income tax. The only country in our sample that does not allow deductibility of employees' contributions to the second pillar even in limited amounts is the United States. However, the tax treatment is diverse in the analysed countries which is shown in the following.

The taxation of contributions to the second pillar in *Austria* depends on the type of pension scheme. Employees can claim a tax credit of 5.5 per cent of the premium plus an additional percentage under certain conditions (§ 108a EStG). The tax credit is applicable up to a contribution of € 1,000. Alternatively, employees can deduct the contributions to pension funds within the limit of € 2,920 (§18(1) EStG). The employee's contributions to a direct insurance or to a direct guarantee are tax-exempt as long as the benefit is below 80 per cent of the employee's annual earnings (§ 14 EStG). Furthermore, contributions to other forms of old-age provision are tax-exempt up to an annual contribution of € 300 (§ 3 Z15a EStG). 25 per cent of occupational pensions resulting from the employee's contributions are not taxable, the remaining occupational pensions are taxable. The contributions to the *MV-Kasse* are not part of the employee's gross income and as a conse-



quence they are not taxable nor subject to social security.<sup>57</sup> Contributions exceeding the compulsory amount of 1.53 per cent of gross income are subject to social insurance and personal income tax. The pension resulting from the *MV-Kasse* is tax-exempt (§ 29 Z 1 EStG).

In *France*, the employee's contributions are tax-deductible up to a limit of 19 per cent of 8 times the social security income ceiling (Art. 83.2 CGI) which is € 44,360 in 2003. The limit refers to all contributions of old-age provision including contributions to the first pillar and contributions by the employer. The sum of all contributions to the public and compulsory occupational pension schemes remains below this limit. Resulting pensions are subject to taxation. Contributions to the non-compulsory pension scheme exceeding the limit for deductibility are part of the taxable income of the employee (Art. 82 CGI). The resulting annuities are taxable with their income element which amounts to 40 per cent for tax payers who retired at an age between 60 and 69 (Art. 158 No. 6 CGI).

In *Germany*, the taxation of occupational pension plans varies. It depends on who pays the contributions (employer or employee), on the kind of pension scheme used (direct guarantee, direct insurance, pension funds), and on the amount paid. If the employee does not obtain a legal claim to a future pension the contributions are not seen as part of the compensation. For example, if the employer invests in a direct guarantee, the employee does not have taxable income before the pension is paid. Contrary to that, contributions to occupational pension plans where the employee receives a legal claim to future pensions are subject to personal income tax in the remuneration period. They may be tax-exempt in limited amounts (e.g. 4 per cent of the income ceiling of the first pillar for pension funds, § 3 No. 63 EstG). Exceeding contributions are subject to a tax rate of 20 per cent up to an amount of € 1,752 (§ 40b EstG). The taxation during the pension period depends on the tax treatment during the time when the contributions were paid. If the contributions were tax-exempt resulting pensions are subject to tax. If the contributions were paid out of taxed income the resulting pension is subject to tax only with its income element. They are thus treated in a way comparable to the public pension.

In *Ireland*, contributions to approved pension plans are deductible up to 15 per cent of the earnings. Since December 2002, there is an earnings cap of € 254,000. The annuities from occupational pension plans are subject to tax.

In *Italy*, the entire contributions paid by employer and employee into the second pillar of old-age provision are tax deductible up to 12 per cent of the total income subject to a maximum of € 5,165 per year. The resulting annuities during retirement are subject to income tax with their income element.<sup>58</sup> Unlike in the other countries, pension funds themselves have to pay a tax of 11 per cent on income.

The employee's contributions to a qualified occupational pension plan are tax deductible in the *Netherlands* as long as they do not exceed 2 per cent of income. Resulting pensions are subject to personal income tax. Contributions to a private

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<sup>57</sup> § 26 Z7 EStG and § 49 (3) Z18 ASVG; see as well Kristen et al. (2002).

<sup>58</sup> See Fenge et al. (2003: 160), Towers Perrin (2001).

old-age provision are tax-deductible up to € 1,069. The resulting pensions are taxable with their income element.

*Switzerland* exempts all contributions to an occupational pension plan during the investment period. The resulting pensions are therefore subject to personal income tax.

In the *United Kingdom*, the employee can contribute to an occupational pension plan up to 15 per cent of the gross income with an annual maximum of £ 97,200 without having to pay tax on this contribution. Exceeding contributions are subject to tax.<sup>59</sup> However, for the contributions to be eligible for this exemption, the expected annual pension payment must not exceed two thirds of the final remuneration. The employee is not allowed to invest more into the occupational pension plan than the amount that results in this maximum pension. Additional investment has to be paid into funded unapproved retirement benefit schemes (*FURBS*) which are not tax privileged. The resulting pensions are taxable and double taxation occurs. A capital payment out of approved pension plans at the date of retirement of 1.5 per cent of the final remuneration is tax-exempt (ICTA 1988, s. 189).

In the *United States*, the employer's contributions to an occupational pension plan are tax-exempt and the resulting pensions are subject to personal income tax (Code Sec. 402-404). Contrary to that, the employee's contributions have to be paid out of taxed income and hence pensions resulting from the employee's contributions only are taxable with their income element during the retirement period. The tax-exempt element in pension payments starting after 1996 is calculated with the so-called simplified method (Code Sec. 72 (b) ff.). The employee's total contributions to the occupational pension plan are divided by the total number of expected monthly annuities. For lifetime annuities this number is estimated following average life expectancies. The estimated number thus depends on the age when the annuity starts. For a single retiring at the age of 65 it is 210, and for a married couple it is 310. The ratio of contributions divided by the number of annuities is the monthly tax-exempt amount of the occupational pension.

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<sup>59</sup> They can also be carried back or forward, ICTA 1988, s. 592 (7).

## 4 The Effective Tax Burden in the Analysed Countries

In the following, we present the effective average tax rates in the assessed countries. We proceed country by country. In each section, we describe the EATRs for each level of disposable income, type of compensation structure, and family situation (see Section 2.2.2). We then identify tax drivers which decrease or increase the tax burden. If there were important changes in taxation or social security systems from 2002 to 2003, we discuss the resulting changes in EATRs.

### 4.1 Austria

Fig. 4.1. illustrates the EATRs resulting for Austria for all types of employees at all income levels in the tax year 2003.<sup>60</sup> With increasing income, one can see a small increase in the EATR, by 4.6 percentage points, for singles and a moderate increase, by 10.6 percentage points, for families. This is due to the fact that the highest income bracket of the tax schedule already is reached with a taxable income of € 50,000.

The advantage in tax burden obtained by families is 8.0 percentage points for the low disposable income. Because married couples do not receive any privileges due to separate filing and because child allowances with roughly € 4,500 are not particularly high, the difference in the EATRs of singles and families is comparatively low and decreases rapidly with increasing income.

The variation of the compensation structure results in small changes of the EATRs of up to 2.2 percentage points for a long-term-incentive-oriented single. This stems from the fact that only 50 per cent of the option's benefit are taxed. Deferring income into the future as in the case of the pension-oriented (Iti-oriented) employee results in a higher tax burden, as the deduction of old-age contributions is limited for employees.<sup>61</sup> Raising only the employer's contributions to the second pillar would result in a decrease of the tax burden, because they are not subject to social security and personal income tax during the period of remunera-

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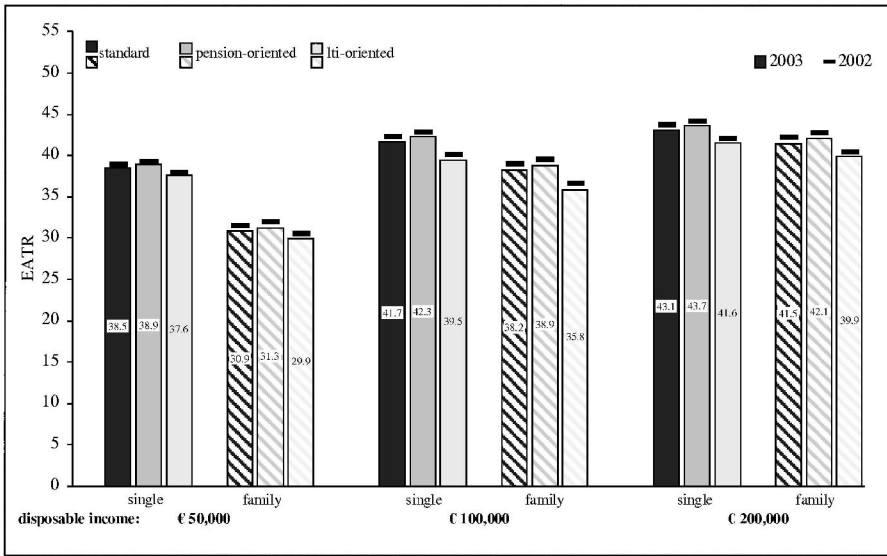
<sup>60</sup> See Table A.8. and Table A.9. on p. 94.

<sup>61</sup> When interpreting the results for the pension-oriented employee, it is important to remember that in our model, future income is discounted with the market interest rate before taxes. See Section 2.1.3 and the discussion in Section 5.2.

tion. However, for the international comparison we stick to the fixed split of the contributions to the second pillar between employee and employer.

The effective tax burden decreases from 2002 to 2003 by up to 0.8 percentage points, as illustrated by the bold lines in Fig. 4.1. There were small increases in tax credits but as well in social security contributions. The main reason for the decrease, however, is the introduction of the new compulsory occupational pension scheme (*MV-Kasse*) which allows the full deduction of contributions while exempting annuities from tax during retirement.

**Fig. 4.1.** Effective average tax rates for Austria in per cent, 2003 and 2002



## 4.2 France

The effective average tax rates in France are illustrated in Fig. 4.2.<sup>62</sup> With increasing income, they vary over a span of 7.8 percentage points for singles and 15.9 percentage points for families. For the single the income starting from which the top tax rate applies is reached with our income levels. Families benefit from the French family quotient which can be seen in the comparably high increase in EATRs. The family quotient of 3 does not apply in our case as the maximum tax advantage compared to a married couple already is exhausted at the analysed income levels. Nevertheless, even the capped tax advantage leads to a substantial decrease in EATR.

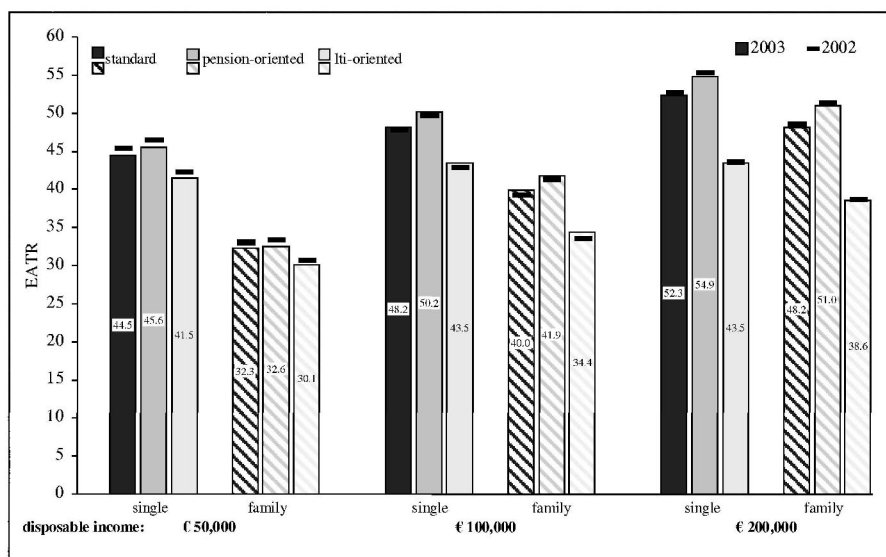
The variation of the compensation structure reduces the EATR remarkably for the lti-oriented employee because the exercise of stock options is tax-exempt.

<sup>62</sup> See Table A.34. and Table A.35. on p. 101.

Note that we ignore the tax liability on the capital gain procured by the sale of the shares. Taking this aspect into account would lead to a higher tax burden. For a pension-oriented employee, independently from his income level or family situation, the EATRs increase when increasing the contributions to old-age provision. This results from a rather unfavourable treatment of voluntary occupational pension plans. Although contributions to such pension plans are not deductible the resulting pensions are taxed with the standardised income element of 40 per cent.

From 2002 to 2003, the EATRs decrease for the low and the high income level. Several changes in the income tax (decreased tax schedule and increased tax allowances) and a decreased rate of the *taxe professionnelle* could not compensate the increase in income ceilings of social insurance totally.

Fig. 4.2. Effective average tax rates for France in per cent, 2003 and 2002



### 4.3 Germany

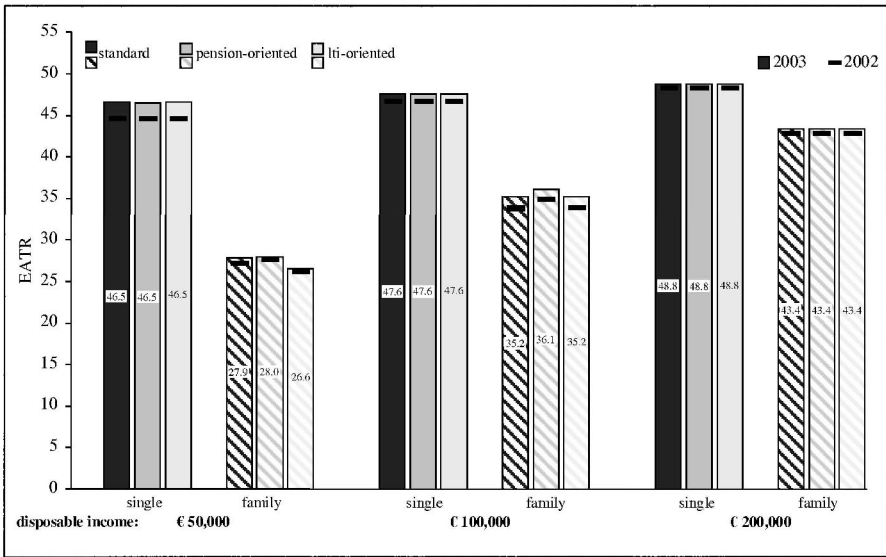
Fig. 4.3. represents the effective average tax rates of Germany for all analysed types and levels of income.<sup>63</sup> The tax schedule as well as the income ceiling of social security have a strong influence on the effective tax burden. A single with a disposable income of € 50,000 already is in the highest income bracket with a statutory tax rate of 48.5 per cent. His tax burden nearly stays constant over all income levels. In contrast to the other analysed countries, the German tax schedule is not based on income brackets with a constant rate applying to each bracket. Instead, marginal tax rates increase continuously starting from a rather high level

<sup>63</sup> See Table A.36. and Table A.37. on p. 96.

(19.9 per cent). Therefore even moderate incomes are subject to a rather high average tax rate. Put differently, the progressivity of the income tax schedule ends at comparatively low levels of taxable income. In addition, ceilings on social security contributions reduce progressivity as well.

The EATR for a family with the low level of disposable income is 18.6 percentage points below the EATR of a single. With increasing disposable income the family's tax advantage decreases to 5.4 percentage points at the income level of € 200,000. For married couples filing jointly, the top tax rate is achieved with a taxable income of around € 110,000. Families are therefore still in a progressive range of the tax schedule with the analysed income levels. As a consequence, with increasing income the EATR of a family increases faster than a single's EATR.

Fig. 4.3. Effective average tax rates for Germany in per cent, 2003 and 2002



The structure of the employee's compensation does not have a noticeable influence on the tax burden. The EATRs of the standard and the incentive-oriented employee are equal for a single since there is no tax privilege for stock options. However, families at the low income level reduce their tax burden by 1.3 percentage points compared to the standard compensation structure if stock options are granted. This is due to the fact that this employee receives a gross income just below the income ceiling of social security at the low income level. In the exercise period gross income exceeds the ceiling due to the option benefit. By consequence there are no social security contributions on the option benefit.

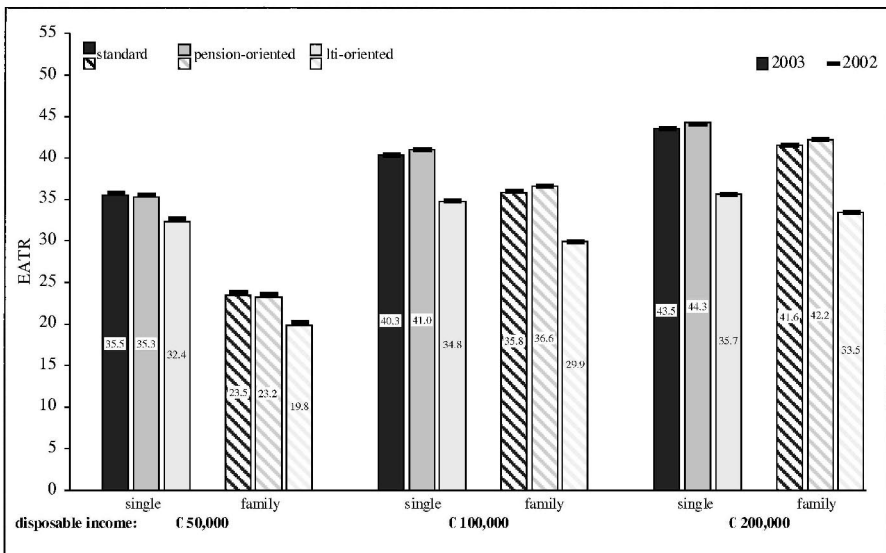
A high proportion of old-age contributions does not affect the effective tax burden for singles. Families are hurt by deferring compensation. For the low and the standard level of disposable incomes, the EATR increases by 0.1 respectively 0.9 percentage points. The reason for this is that the family actually is subject to a higher statutory average tax rate in the retirement period because family allowances are no more available.

The increase in income ceilings and contribution rates of social security from 2002 to 2003 results in increased EATRs, as it is illustrated by the bold lines in Fig. 4.3. The single with low earnings and the family with the standard level of disposable income receive gross incomes that are just above the income ceilings of 2002. Thus, the increase is much higher for these types of employees than for the other income levels, reaching 1.9 percentage points for the single with a disposable income of € 50,000.

## 4.4 Ireland

The effective average tax rates for Ireland are depicted in Fig. 4.4.<sup>64</sup> If the income level is increased the effective tax burden increases by 8.0 percentage points for singles and 18.1 percentage points for families. Couples are filing jointly which results in a relatively high tax advantage for families especially at the low income level.

Fig. 4.4. Effective average tax rates for Ireland in per cent, 2003 and 2002



The EATR can be reduced remarkably with stock options, because they are tax-exempt at exercise. Note, however, that we do not consider the sale of the purchased stock. When capital gains tax occurs upon the sale of stock the effective tax burden rises.

Increasing the old-age contributions has different effects according to the income level. At low incomes, the employee's effective tax burden decreases. For

<sup>64</sup> See Table A.38. and Table A.39. on p. 102.

the higher income levels, contributions to the second pillar exceed the tax-favoured limitation and the EATRs increase for both singles and families.

From 2002 to 2003 there are small changes of the tax schedule and the allowances. As a consequence the EATRs decrease somewhat. The introduction of the earnings cap for contributions to occupational pension plans in 2003 does not seem to have a noticeable influence on the attractiveness of occupational pension plans due to the earnings cap's level of € 254,000. Only for the single pension-oriented employee with high income the tax burden increases from 2002 to 2003 by 0.2 percentage points.

## 4.5 Italy

The effective average tax rates in Italy do not follow a clear trend as one can see in Fig. 4.5.<sup>65</sup> An employee with the standard compensation structure bears a tax burden that decreases by 0.8 percentage points as one passes from the low to the standard income level and increases again by 1.7 percentage points as one moves to the high level. For a pension-oriented employee the situation is reverse. There is a relatively large increase of 4.0 percentage points between the low and the standard level of disposable income and a small increase as one reaches the highest income level. With increasing income, an lti-oriented employee is faced with constantly decreasing EATRs. This diverse pattern is a consequence of our assumption of a compensation structure which varies with the income level even for the same type of employee.

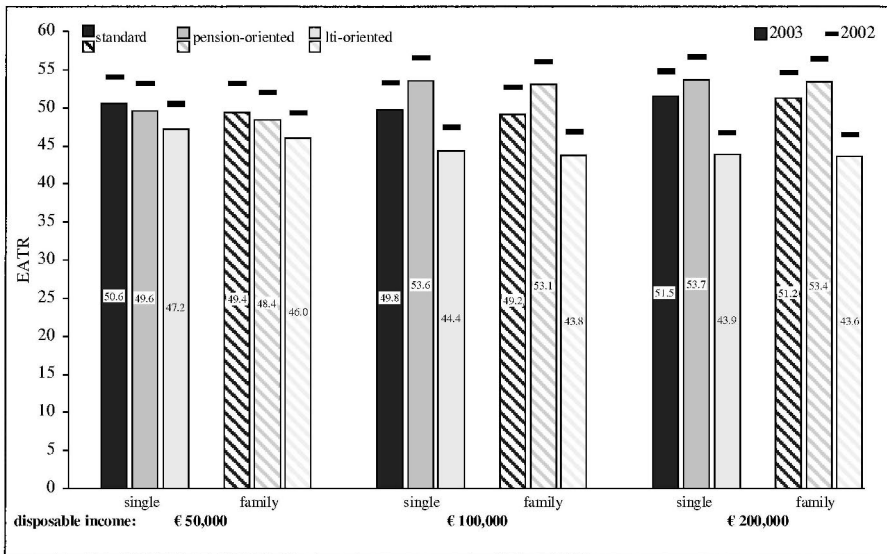
If one calculates the EATRs with a compensation structure which remains fixed across income levels one obtains the results shown in brackets in Table A.41. In that calculation we keep the weights of the compensation components given in Table 2.1. on p. 15 for the low level of disposable income also for the other income levels. In this case we find increasing EATRs with increasing income.

Receiving stock options reduces the tax burden as stock options in Italy are tax-exempt and not subject to social insurance. The comparison of the EATRs using the variable compensation components illustrates that the higher the percentage of stock options the stronger is the decrease in EATR. In contrast to the lti-oriented employee, a pension-oriented employee does not necessarily enjoy a reduced effective tax burden compared to an employee with a standard compensation structure. An employee with a disposable income of € 50,000 experiences a small decrease in EATR whereas for employees with higher incomes the EATR increases. This is due to the limited deductibility of contributions to occupational pension plans. The low-earning employee is still within the limitation and thus benefits from that tax regulation.

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<sup>65</sup> See Table A.40. and Table A.41. on p. 102.



**Fig. 4.5.** Effective average tax rates for Italy in per cent, 2003 and 2002

A striking result of our analysis concerns the taxation of families. In Italy, family allowances strongly depend on the family's income. The levels of disposable income which we analyse exceed the limitations on family allowances by far. Furthermore, married couples are taxed separately. The tax credit for a non-working spouse depends on the income as well. Hence, the differences between the EATRs of a single and of a family are very low. The advantage for a family is 1.2 percentage points at most.

Fig. 4.5. also includes the development of the EATRs from 2002 to 2003. The EATRs decrease by about 3.5 percentage points. The main reason for this is the reform of the regional tax on productive income IRAP that permits the deduction of personnel expenses from 2003 on. The introduction of the no tax area in the personal income tax in 2003 does not have any influence on the tax burden as our incomes are above the requested income ceilings.

## 4.6 The Netherlands

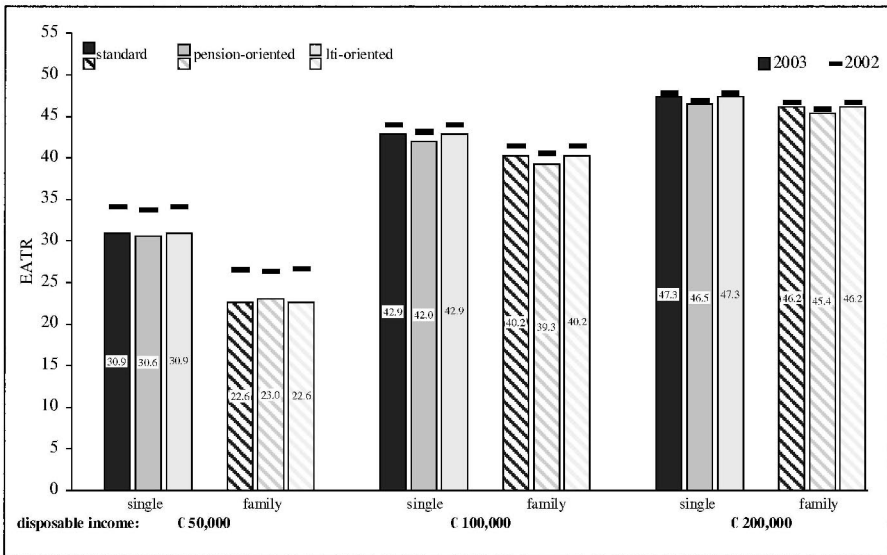
In the Netherlands, the combined tax schedule consisting of personal income tax and social security is reflected in the EATR shown in Fig. 4.6.<sup>66</sup> The highest tax bracket with a top rate of 52 per cent already is reached with the disposable income of € 50,000. But since a high proportion of the income is still in the first two income brackets with tax rates as low as 1.7 and 7.35 per cent the average tax rate

<sup>66</sup> See Table A.42. and Table A.43. on p. 103.

is reduced.<sup>67</sup> This results in a strong increase in EATR as one passes from the low to the standard level of disposable income.

Like in Germany, where stock options are not privileged as well, the EATR stays constant if the proportion of stock options rises. With a higher proportion of old-age contributions, the EATR can be reduced to a small extent for all income levels. Only for families at the low income level the EATR increases because the increase in deductible old-age contributions cannot compensate for the increased tax rate due to the lack of family allowances during the retirement period.

**Fig. 4.6.** Effective average tax rates for the Netherlands in per cent, 2003 and 2002



While families with the low income level bear an EATR which is 8.3 percentage points below the EATR of a single, the family advantage melts away to 2.7 percentage points at the standard and 1.1 percentage points at the high income level. This is due to the decreasing influence of the family allowances of € 1,900.

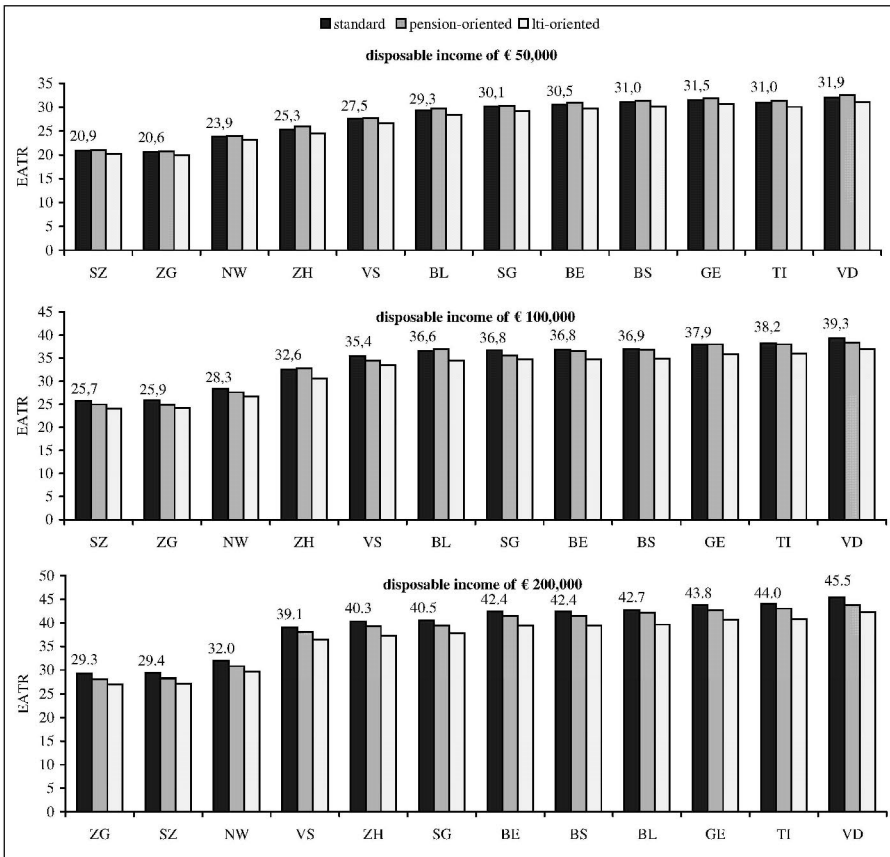
From 2002 to 2003, we observe a relatively strong decrease in the tax burden for the low income (up to 4.0 percentage points for families) and a smaller decrease for the higher levels of disposable income. This is due to changes in social security contributions and personal income tax. The contributions to public health insurance increased by around 2 percentage points. At the same time the personal income tax rates in the two lowest income brackets were decreased. Because we do not consider health insurance contributions as tax-like this has a reducing effect on the tax burden. Furthermore, the income brackets were raised and tax credits were increased.

<sup>67</sup> Note that we define the contributions to the health insurance of 12.55 per cent on the first two income brackets as equivalent insurance contributions. They do not enter the effective tax burden.

## 4.7 Switzerland

Fig. 4.7. illustrates the effective average tax rates for the three income levels and the three variations of compensation structure for a single in the analysed twelve Swiss cantons.<sup>68</sup> In each graph, the cantons are sorted according to the EATR with the standard compensation structure. The displayed values above the bars refer to the respective EATRs of the standard compensation structure. There is a relatively high dispersion of the tax burden derived for different income levels.

**Fig. 4.7.** Effective average tax rates for a single in Switzerland in per cent, 2003



From a disposable income of € 50,000 to € 200,000, the span of EATR in the standard case amounts to 8.1 percentage points for the canton with lowest dispersion (Nidwalden) and to 15.0 percentage points for Zürich which shows the highest dispersion of effective tax rates. For the analysed income levels, the taxable income is still below the highest income bracket of the tax schedule in most

<sup>68</sup> See Table A.10. to Table A.33. on p. 95 ff.

cantons<sup>69</sup>. Therefore, the EATR increases faster than it would do at income levels above the highest income bracket.

Another reason for the relatively steep increase in EATR is the Swiss social security system. Because there are no income ceilings (except for the unemployment insurance) and because the public pension hardly depends on the amount of contributions paid the proportion of tax-like contributions stays constant.

In all cantons, the tax burden decreases with the grant of stock options due to the uniformly favourable valuation of the options at the date of grant. For the high income level the reduction of the EATR is larger because we assume a higher percentage of stock options. However, one has to bear in mind that we do not consider any risk concerning the value of the options. If the actual stock price moves below the expected or even below the exercise price, the employee may tend not to exercise the stock option although he paid taxes on the expected benefit. In this case, the effective tax burden would increase compared to the standard compensation structure. On the other hand, if the stock turns out to be worth more than expected, the tax paid upon grant will seem relatively low ex post.

The effects of a high proportion of old-age contributions are less clear cut. For the high income level, the EATR decreases by up to 1.6 percentage points in Vaud. The same is true for the standard income level, except for the cantons Zürich, Basel-Landschaft, and Genève where the EATR rises with increasing old-age contributions. Regarding the low income level, the EATRs increase in all cantons. The highest increase occurs in the cantons Zürich and Vaud with 0.6 percentage points. However, the increases are fairly low.

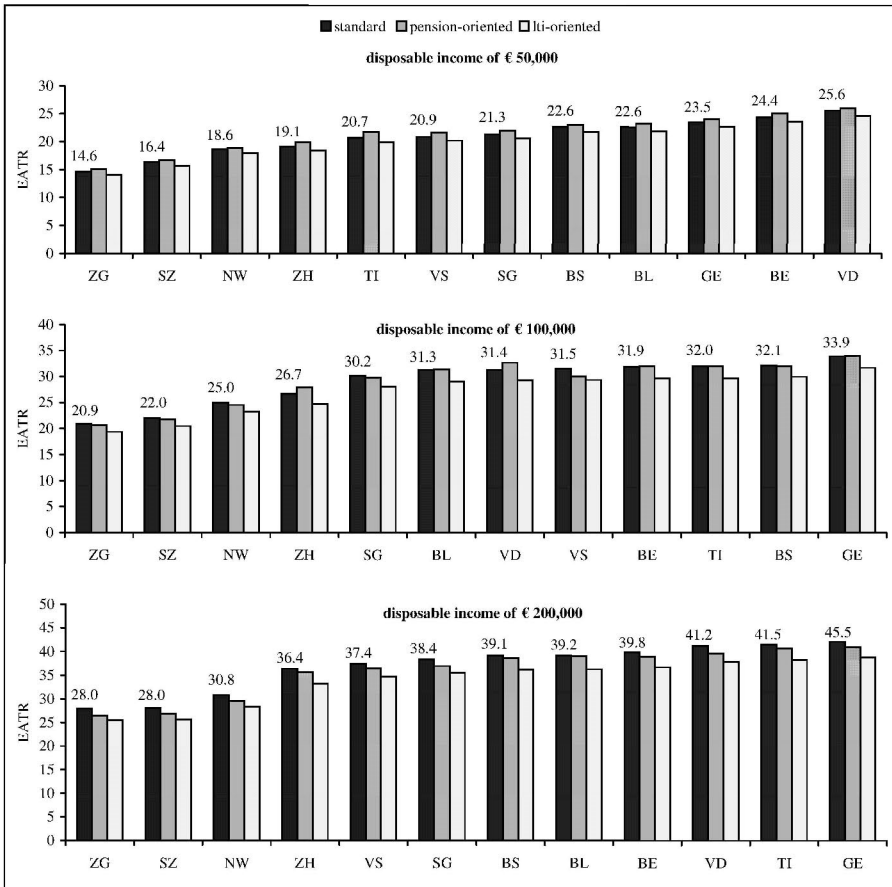
The effective average tax rates for families shown in Fig. 4.8. give a similar picture as for the tax burden of singles. The dispersion of EATRs across income levels is larger than in the case of a single with differences between 11.6 percentage points in Schwyz and 20.8 percentage points in Ticino. Again, the effective tax burden decreases with the grant of stock options at all income levels and increases for pension-oriented employees with a low income level.

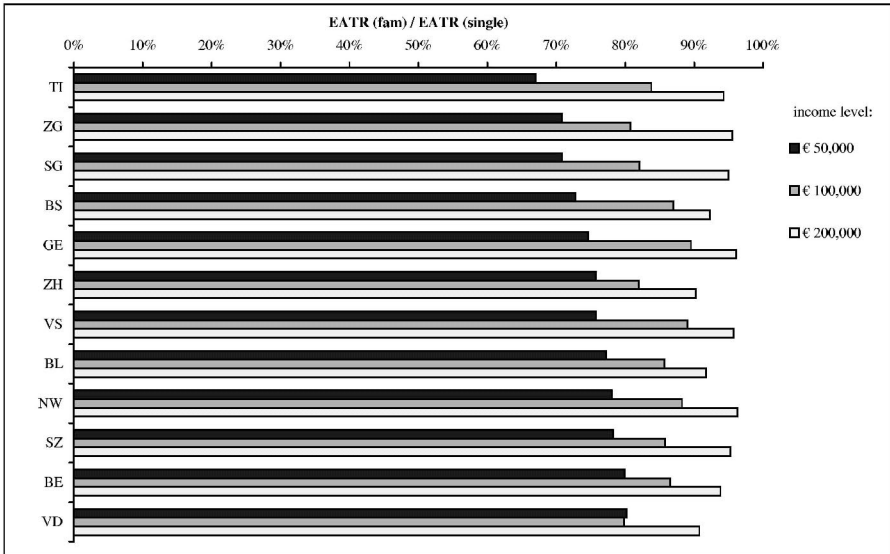
For the standard compensation structure and all income levels, Fig. 4.9. illustrates by how much families are favoured compared to singles. The bars represent the relative advantage for families expressed as the ratio between the EATRs of families and singles. The cantons are sorted according to the ratio derived for the low income level. In all cantons, the EATRs of families are remarkably lower than those of singles. The ratio reaches 67 per cent in Ticino. The family advantage decreases with increasing income level up to a 96 per cent ratio in Zug, Genève, Valais, and Nidwalden. However, for the high income level the ratios of all cantons are within a span of 5 percentage points.

From 2002 to 2003 there are changes scarcely worth mentioning due to minor changes in cantonal and municipal multiples of the state income taxes.

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<sup>69</sup> For the income brackets and highest tax rates, see Table 3.4. on p. 38.

**Fig. 4.8.** Effective average tax rates for a family in Switzerland in per cent, 2003

**Fig. 4.9.** Tax relief for families in Switzerland, 2003

## 4.8 United Kingdom

In the United Kingdom, the EATRs span a range of around 9.1 percentage points from the low to the high level of disposable income for singles and 14.2 percentage points for families. This is illustrated in Fig. 4.10.<sup>70</sup>

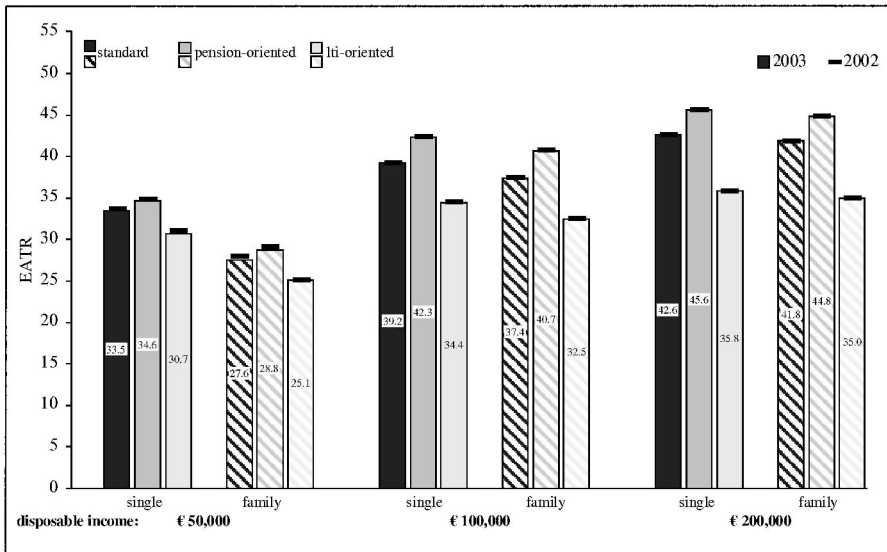
The EATRs decrease if stock options are granted because the benefit conferred by the option is taxed neither at grant nor when the option is exercised.<sup>71</sup> The EATR rises with a higher proportion of old-age contributions over all income levels. This is because on the one hand, old-age contributions are tax deductible only in limited amounts and, on the other hand, the pensions resulting from an approved occupational pension plan are limited. Hence, the pension-oriented employee has to choose an unapproved pension plan which is taxed less favourably.

As married couples file separately and allowances for non-working spouses are only available for the elderly, the EATRs of families are not much lower than the EATRs of singles. At the high income level, the difference between single and family amounts to 0.8 percentage points.

From the 2002 to 2003, only a few changes apply to the tax and national insurance system. The EATRs decrease a little.

<sup>70</sup> See Table A.44. and Table A.45. on p. 103.

<sup>71</sup> Recall that we assume that the purchased stock is not sold, otherwise capital gains tax would occur.

**Fig. 4.10.** Effective average tax rates for the United Kingdom in per cent, 2003 and 2002

## 4.9 United States (Massachusetts)

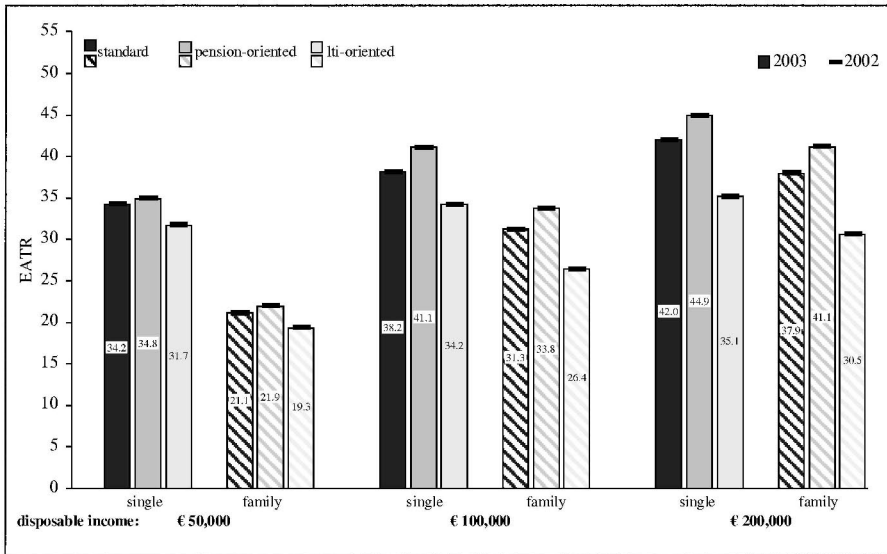
The effective average tax rates of the state of Massachusetts are illustrated in Fig. 4.11.<sup>72</sup> The EATR obtained for a single employee rises by 7.8 percentage points as one increases the disposable income from € 50,000 to € 200,000. For families, the corresponding increase is by 16.8 percentage points. This result mainly stems from the high income necessary to reach the highest tax bracket.

The United States favours families to a relatively high extent. The EATR of families is up to 13.1 percentage points lower than the EATR of singles. Even for the high disposable income the family advantage remains on a relatively high level.

Lti-oriented employees have a lower effective tax burden than the standard employees. A rise in old-age contributions results in a higher EATR for all income levels. This is due to the fact that employees' contributions to an occupational pension plan are taxable at the time of investment. The regulations to determine the tax-exempt part of the resulting annuity cannot compensate for this disadvantage. In the calculations, we assume that 50 per cent of the contributions to the second pillar are paid by the employer. Increasing this proportion would lead to a lower EATR.

<sup>72</sup> See Table A.46. and Table A.47. on p. 104.

**Fig. 4.11.** Effective average tax rates for the United States (Mass.) in per cent, 2003, 2002





## 5 International and Inter-Regional Comparison

The results for the individual countries presented in the previous chapter are now combined so as to allow for an inter-regional and international comparison of the tax burden on highly qualified employees. We start by analysing the ranking of regions according to the tax burden on an employee living single and earning the standard compensation package. This is contrasted in Sections 5.2 and 5.3 to the tax burden resulting from other compensation structures. Section 5.4 presents results on the taxation of families. In the final section our results are related to the conclusions obtained in the companion study on company taxation.

### 5.1 The Standard Case

The basic international ranking is displayed in Fig. 5.1.<sup>73</sup> Here, the EATRs obtained in the standard case for the year 2003 are given for the three levels of disposable income considered. The regions are sorted according to the EATR obtained for the disposable income of € 100,000.

#### 5.1.1 International Rankings

From this figure, it is evident that tax burdens on highly skilled employees vary widely across European countries. For the disposable income of € 100,000, the EATRs range from 25.7 per cent in Schwyz to 49.8 per cent in Italy. For the low disposable income of € 50,000 the span is even larger, from 20.6 per cent in Zug to 50.6 per cent in Italy. To illustrate these differences, it is instructive to translate the EATRs back into total remunerations.<sup>74</sup> In order to provide a highly qualified employee with a disposable income of € 100,000, a company has to spend € 134,574 in Schwyz, € 161,740 in Massachusetts, and € 199,084 in Italy. We conclude that taxes interfere heavily in the international competition for talent.

The Swiss cantons are ranked on top of the list in most comparisons. In particular, the three cantons of central Switzerland in our sample, Schwyz, Zug, and Nidwalden, share the three lowest EATRs for all income levels, only changing ranks among each other. On the other end of the scale, in the standard case, the

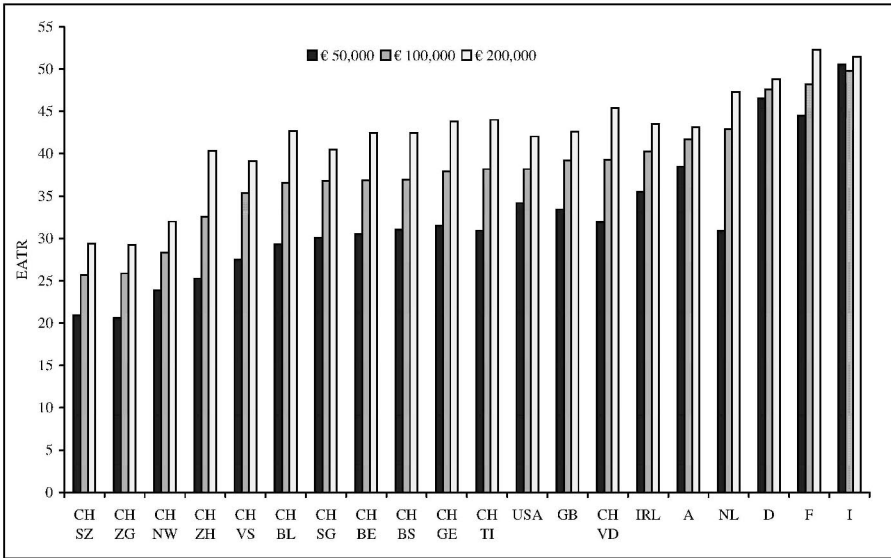
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<sup>73</sup> This figure is based on Table A.54. to Table A.56. on p. 108 f.

<sup>74</sup> The total remuneration  $E^*$  is obtained by the formula  $E^* = E / (1 - EATR)$ , with the disposable income  $E = 100,000$ .

three countries with the highest EATRs always are Germany, France, and Italy. For a disposable income of € 100,000, the United States has a lower tax burden than all European Union countries, and for € 200,000 the United States places itself on 7<sup>th</sup> rank, leaving several Swiss cantons behind. On the other hand, the Netherlands move up to the 9<sup>th</sup> rank when one considers the income of € 50,000.

**Fig. 5.1.** International variation of EATRs for a single in the standard case in per cent, 2003



A main determinant of a country's position in the rankings is the income tax schedule. Obviously, large differences in the top rates<sup>75</sup> translate into differences in EATRs. This is exemplified by Zug and Schwyz with top rates below 25 per cent as opposed to Austria, France, and Germany with top rates close to or exceeding 50 per cent. However, since we compute an average tax rate, the rates applying to lower income brackets and the size of these brackets also have a major influence. For example, due to very low rates in the lower brackets and despite a very high statutory top income tax rate of 52 per cent, the Netherlands display an EATR similar to many Swiss cantons for the low disposable income.

The second main cause of a country's rank is the social security system, notably the first pillar of old-age insurance. As a rule, contributions to this part of social security yield a poor return and hence have to be considered as tax-like to a substantial degree. The higher the contribution rates of both employer and employee, the more this fact adds to the EATR. Italy sticks out with contribution rates of 23.81 per cent for the employer and 8.89 per cent for the employee, but also Austria, with 12.55 per cent for the employer and 10.25 per cent for the employee, and Germany, with 9.75 per cent for both employer and employee, have

<sup>75</sup> See Table 3.4. on p. 38.

high rates.<sup>76</sup> To a substantial degree, the high EATRs of these countries stem from these social security contribution rates. Similarly, the United States owes its attractive position partly to the low contribution rates to old-age insurance which are 6.2 per cent for both employer and employee.

As we consider individuals with high earnings, ceilings on social security contributions are important. If there is a low ceiling, only a small fraction of the income is subject to social security, and the implicit tax burden is reduced. For example, the ceiling of € 28,850 substantially mitigates the effect of the high contribution rate of 17.9 per cent in the Netherlands. Conversely, since there is no ceiling on the contributions to the first pillar of the Swiss old-age insurance system, Switzerland loses some of the advantage procured by contribution rates which are about as low as in the United States.

In the United Kingdom, the Netherlands, and Ireland, the pension entitlements derived from contributions to the first pillar of old-age insurance are limited irrespective of the contributions paid. This implies that a high-earning employee pays much more into the system than he gets back in terms of pensions. Since we take the individual pension benefit into account, such base pensions or ceilings on entitlements raise the EATR.

Finally, other social security charges and payroll taxes add a noticeable amount to the tax wedge. This is particularly relevant for France with its variety of social charges and the *taxe professionnelle*.

### 5.1.2 The Progressivity of the Tax and Social Security System

As a second main feature Fig. 5.1. shows how the tax burden changes when the disposable income increases. As one expects, the EATR almost always rises as one passes from low to middle and high disposable income. However, the extent to which this happens differs substantially. In the Netherlands, the EATR on the high income exceeds the one on the low income by 16.4 percentage points. Also in most Swiss cantons the difference between the EATRs for the high and the low disposable incomes is large. For example, it is 15.0 percentage points in Zürich. On the other hand, in Austria, Germany, and Italy this difference is below 5 percentage points. Indeed, according to our definition of the standard employee, Italy even shows a decrease in the EATR as the income rises from € 50,000 to € 100,000.<sup>77</sup>

These comparisons give an impression of the overall progressivity of the tax and social security system. In France, Germany, and Austria the top income tax brackets start at taxable incomes of around € 50,000. Consequently, the average tax rate cannot increase by much anymore once a disposable income of € 50,000 or even € 100,000 is reached. Thus, in these countries the system does not appear to be progressive any more at the relatively high incomes considered in this study.

<sup>76</sup> See Table A.2. on p. 90.

<sup>77</sup> This effect however disappears if one adopts the same compensation structure across income levels (see Section 4.5).

Contrary to that, in the United States the highest tax rate starts at \$ 311,950, and in both cantons of Basel as well as in Genève, one needs to earn CHF 1,000,000 or more in order to pay the top rate. As a consequence, the progressivity of the tax schedules is still visible at the incomes we analyse.

Ceilings on contributions to social security have a regressive effect since with increasing income, an increasing fraction of earnings exceeds the ceiling and is therefore exempt from charges. Together with high contribution rates, such ceilings counteract the progressivity of the income tax in France, Germany, Austria, and Italy.

Ceilings on pension entitlements or base pensions have the opposite effect. As the income rises the benefit conferred by a base pension becomes increasingly irrelevant relative to contributions. Thus, the tax implicit in social security increases as a share of income. This is a cause of the high differences in EATRs between high and low disposable incomes in the Netherlands, the United Kingdom, and most Swiss cantons. In Switzerland, this effect is reinforced by the lack of a ceiling on contributions.

### 5.1.3 The Changes from 2002 to 2003

To complete the analysis of the standard case, Fig. 5.2. shows the EATRs for the single employee with a disposable income of € 100,000 in the years 2002 and 2003.<sup>78</sup> In most regions, we observe a slight decrease in the EATR between these years. In the Swiss cantons, there have only been minor adjustments of the annual multiples. In Italy, the abolition of the payroll tax IRAP reduced the EATR by 3.6 percentage points. In the Netherlands, the decrease by 1.1 percentage points is mainly due to a shift of burden from the income tax to the public health insurance.<sup>79</sup>

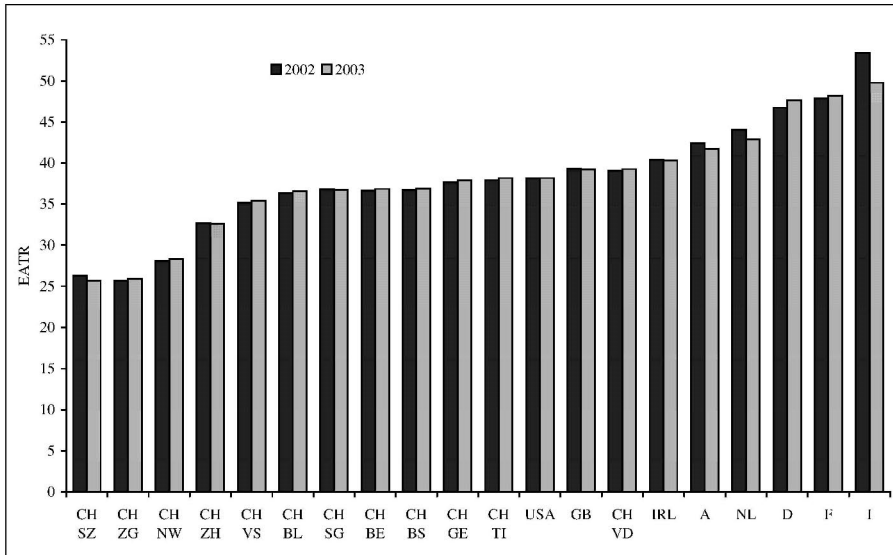
Germany is the only country where the EATR rises for all income levels from 2002 to 2003. There, both the contribution rates to social security as well as the ceilings up to which contributions are levied have been increased in 2003. However, a reduction in income tax rates has already been legislated in Germany which will take effect in 2004 and 2005. This reform not only cuts the top rate from the current 48.5 per cent to 45 per cent in 2004 and to 42 per cent in 2005 but reduces tax rates across the board. Hence, a substantial decrease in German EATRs is the consequence.<sup>80</sup>

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<sup>78</sup> See Table A.48. to Table A.50. on p. 105 f.

<sup>79</sup> Income tax rates have been reduced together with an increase in the contribution rates to public health insurance. As we do not count health insurance premiums as taxes, this reduces the EATR, see Section 4.6.

<sup>80</sup> See Elschner and Schwager (2004b).

**Fig. 5.2.** Variation of EATRs in per cent in the standard case from 2002 to 2003

## 5.2 Pension-Oriented Employees

We now turn to the EATRs for pension-oriented employees.<sup>81</sup> For a disposable income of € 100,000, the resulting EATRs are compared with the EATRs of the standard compensation package in Fig. 5.3.<sup>82</sup> In the majority of cases, there is only a very small effect in the order of less than 1 percentage point. The only noticeable change in the ranking concerns the United Kingdom which falls back from 13<sup>th</sup> to 17<sup>th</sup> place.

In general, one would expect employees to benefit from deferred compensation payments by two effects. The first effect occurs because an increase in old-age provision shifts a fraction of income into periods with lower tax rates, as taxable income during retirement is usually lower than in active years. However, for the highly skilled employees considered here, this mechanism only has a very weak impact since the incomes are still very high even after retiring. The second effect arises from the possibility, conferred by occupational pension plans, to save with tax free interest earnings. This mechanism does not appear in our model since we calculate present values with the gross market interest rate before taxes,<sup>83</sup> implying that a hypothetical alternative form of saving is available the interest of which is tax free. Compared to this investment, contributions to the second pillar of old-age

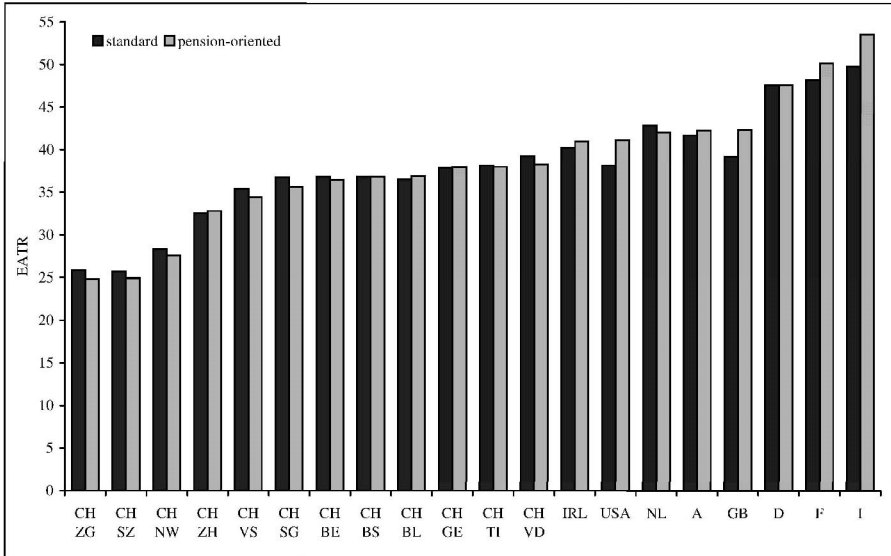
<sup>81</sup> For the shares of the compensation components, see Table 2.1. on p. 15.

<sup>82</sup> See Table A.57. to Table A.59. on p. 108 f.

<sup>83</sup> See Section 2.1.3.

provision are even disadvantageous unless either contributions are fully deductible or pensions are completely tax-exempt.<sup>84</sup>

**Fig. 5.3.** EATRs for a pension-oriented single with a disposable income of € 100,000, 2003



There are three countries where, for this reason, the EATR in our simulation is remarkably higher for a pension-oriented employee than with the standard compensation structure. In the United States, the United Kingdom, and Italy, the differences are 2.9, 3.1, and 3.8 percentage points respectively. In the United States, the employee's contributions to the second pillar of old-age insurance are fully taxed in the remuneration period. The pensions resulting from these contributions are then only partially tax-exempt according to the "simplified method". By consequence, these contributions are taxed more heavily than in other countries. For the United Kingdom, we assume that the employee invests in a defined-contribution scheme. Inasmuch as contributions to such schemes and the resulting pensions exceed certain limits, the contributions are taxable in the remuneration period while the resulting pensions in addition are taxable in the retirement period. In our analysis, these limits are surpassed by the employee earning a disposable income of € 100,000. Finally, in Italy a similar effect occurs since our pension-oriented employee has to invest some of his old-age provision into the third pillar of old-age insurance. Although these contributions are not deductible from the income tax base, 87.5 per cent of the resulting pensions are again subject to tax.

<sup>84</sup> If interest income is taxed the discount rate relevant for the employee is the market rate of interest net of tax. In this case, occupational pension plans indeed provide a tax-efficient way of saving since contributions are deductible from the company's profit tax base. As shown in Elschner and Schwager (2004a: 15 ff.), the tax advantage conferred by occupational pension plans in such a scenario can be very large.

Thus, in these countries the income received in the form of old-age provision is taxed rather heavily. Compared to the standard employee, the pension-oriented employee invests a larger fraction of his income into this compensation component. By consequence, the average tax burden is larger for the pension-oriented employee.

These effects show the benefit of an explicitly inter-temporal model, as they are not captured by measures of the tax burden which are based on a one period consideration such as the OECD “taxing wages” approach or the EUROMOD simulations.<sup>85</sup> However, one has to bear in mind that our results also depend on the model’s structure and the assumptions taken. In addition to the discount rate used, a crucial assumption concerns the allocation of the contributions to the second pillar of old-age insurance between employer and employee. We only consider a fixed ratio where both, employer and employee, pay the same amount into the second pillar. In reality, where the amount of employees’ contributions eligible to preferential tax treatment is limited, the employer usually will pay a higher proportion into the second pillar and simultaneously will reduce the employee’s gross income. In a model allowing for such tax reducing strategies, the EATRs of pension-oriented employees would be lower.

### 5.3 Long-Term-Incentive-Oriented Employees

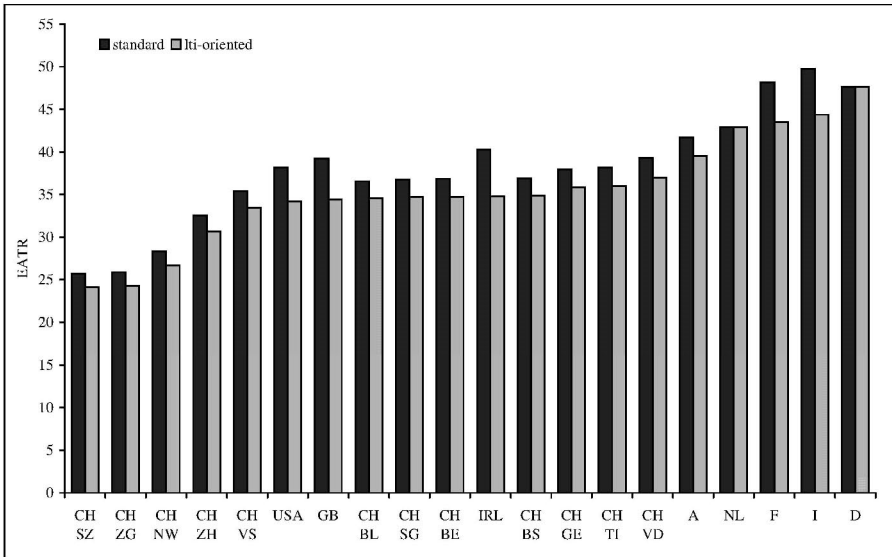
As a second variation in the compensation structure, we consider an employee who obtains a fraction of his compensation in the form of stock options provided by the employer.<sup>86</sup> The EATRs which result from this compensation structure are depicted for the disposable income of € 100,000 in Fig. 5.4. and for the disposable income of € 200,000 in Fig. 5.5. In all countries with the exception of Germany and the Netherlands, the EATR is lower for a long-term-incentive-oriented employee than for an employee with the standard compensation structure. The decrease is substantial for the middle income employee, with the largest reductions in Ireland (5.5 percentage points), Italy (5.4 percentage points), France (4.7 percentage points), the United Kingdom (4.8 percentage points), and the United States (4.0 percentage points). For the high disposable income, we find that granting stock options reduces the EATRs by even more. Here, the differences compared to the EATRs for the standard compensation package are 8.8 percentage points in France, 7.8 percentage points in Ireland, 7.6 percentage points in Italy, 6.9 percentage points in the United States, and 6.8 percentage points in the United Kingdom.

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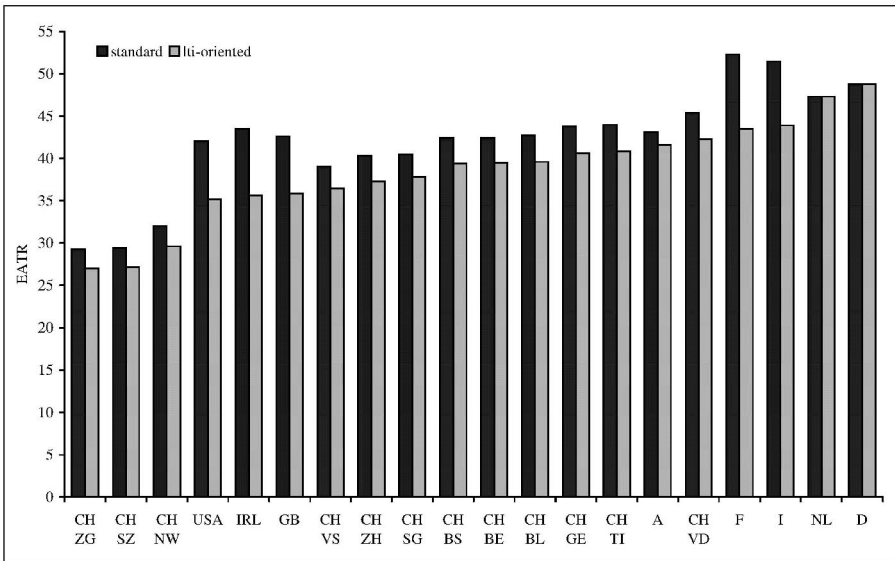
<sup>85</sup> See OECD (2002), Heady (2003), and Sutherland (2001).

<sup>86</sup> For the shares of the compensation components, see Table 2.1. on p. 15.

**Fig. 5.4.** EATRs for an lti-oriented single with a disposable income of € 100,000, 2003



**Fig. 5.5.** EATRs for an lti-oriented single with a disposable income of € 200,000, 2003



Given these huge reductions in their tax burdens, these countries gain many positions in the international rankings for the incentive-oriented employees compared to the standard case. Already for the disposable income of € 100,000, the United States, the United Kingdom, and Ireland have lower EATRs than many Swiss cantons. For the high income, the United States, Ireland, and the United



Kingdom move in front of all regions except the three low-tax cantons of central Switzerland. On the other hand, Germany is relegated to the last rank, and the Netherlands have the second-to-highest EATR for the high earning incentive-oriented employee.

These drastic changes in EATRs and international rankings reflect the strong discrepancies which exist between the taxation of stock option plans in the countries studied here. The Netherlands and Germany find themselves at the end of the list because they are the only two countries in our sample who tax stock options as regular income without granting any rebates or exemptions. In Switzerland and Austria, the taxable value of stock options falls short of the fair value. In the other countries, stock options are either completely or within limitations exempt from income tax if the stock option plan satisfies certain conditions.<sup>87</sup> Thus, firms in these countries can substantially reduce the tax burden on highly qualified employees by substituting stock option plans for cash compensation.

This strong conclusion has to be modified by two remarks. Firstly, it is important to recall that we exclude the effects of capital gains taxes from the model by assuming that the employee does not sell the shares. Since Italy, the United Kingdom, and the United States impose capital gains tax on the proceeds from selling shares obtained by exercising an option, our figures exaggerate the tax advantage procured by the preferential treatment.<sup>88</sup>

As a second caveat, it has to be noted that our model assumes a correct valuation of the stock options by the market and even by the tax authorities (unless there is an explicit rebate as in Switzerland). Moreover, we abstract from risk aversion considerations and assume that the employee and the firm just consider the expected value of the stock option plan and of the tax liability. These two simplifications imply that the date of taxation is irrelevant for the resulting tax burden. That is, if the options are taxed at the date of grant as in Switzerland, the tax paid is the same as the expected discounted tax which would have been paid if the options were taxable at the date of exercise, as is the case for example in Germany. However, a Swiss employee finding his options worthless at the end of the vesting period will have paid a tax on an income which was expected *ex ante* but which did not materialise *ex post*. Conversely, a German employee whose options turn out to be worth more than expected will have to pay the full tax on this gain.

## 5.4 Family Taxation

So far, the international comparison of effective tax rates has exclusively dealt with single persons. In this section, we extend the focus and consider the tax burden on highly qualified employees who are married and have two children. In

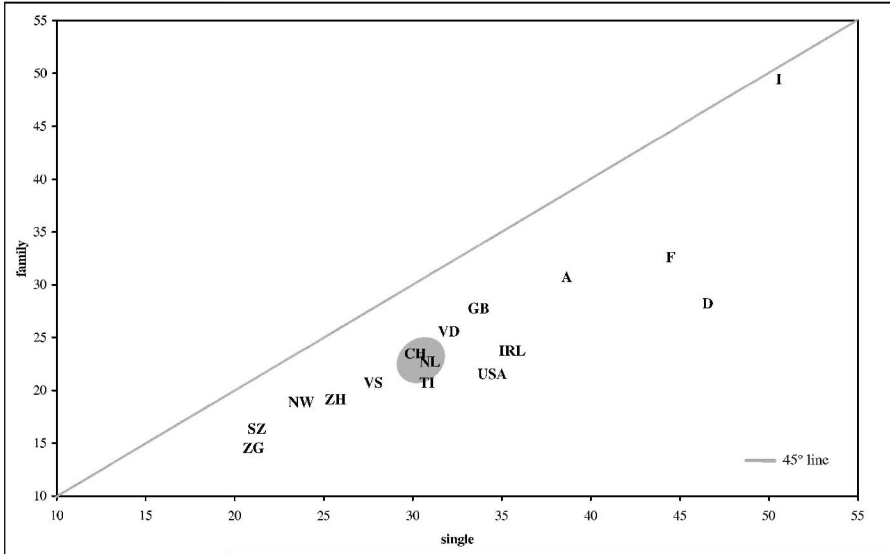
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<sup>87</sup> In the calculations, we generally assume that these conditions are met. See Section 3.3.3.

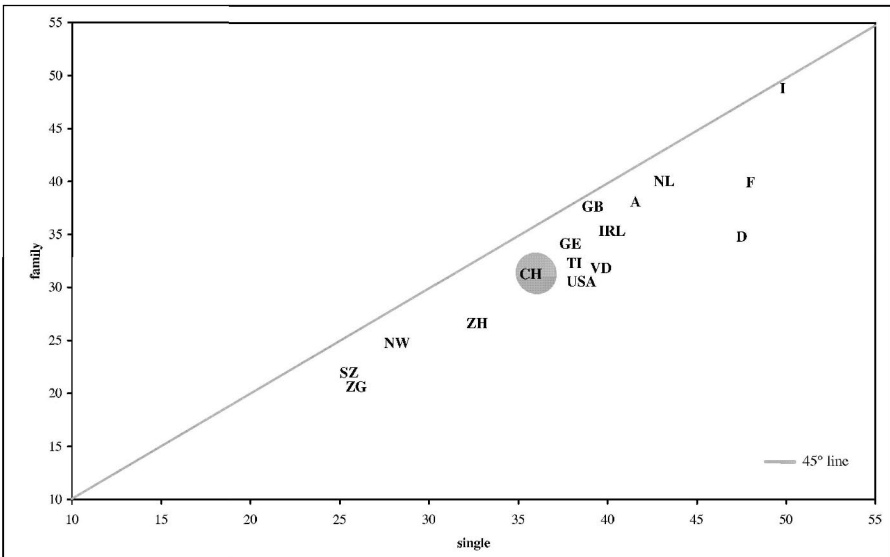
<sup>88</sup> See Elschner and Schwager (2004c) for additional results taking capital gains into account.

these calculations, it is assumed that the spouse of the employee in question does not earn any taxable income from work or other sources.

**Fig. 5.6.** Comparison of EATRs for singles and families with an income of € 50,000, 2003



**Fig. 5.7.** Comparison of EATRs for singles and families with an income of € 100,000, 2003



As can be seen by comparing Table A.57. to Table A.59. on p. 109 f. with Table A.54. to Table A.56. on p. 108 f., for a given disposable income, a family always pays less taxes than a single person. For the low and the middle disposable

incomes, the effect of this tax relief for families is depicted in Fig. 5.6. and Fig. 5.7. In these figures, the EATR for a single person is measured on the horizontal axis and the EATR for a family on the vertical axis. Each point in the picture represents a region.<sup>89</sup> The 45-degree line in this diagram corresponds to situations where a family pays exactly the same amount of taxes as a single person. As mentioned, all countries exhibit some preferential treatment for families, so all points are placed below the diagonal in both pictures.

The extent of the family relief in a specific country is illustrated by the distance of the point representing this country from the 45-degree line. We notice a substantial family relief in many countries, but we also observe large differences between the locations in our sample. Considering first the standard disposable income of € 100,000, Germany sticks out with an EATR for families which is 12.4 percentage points below the EATR for singles. At some distance, France and Vaud follow with a corresponding reduction in EATRs for families compared to singles by 8.2 and 7.9 percentage points respectively. Also the United States, Sankt Gallen, and Ticino display a substantial family relief according to this measure. The countries which grant the lowest family relief are the Netherlands where the EATR for families is only 2.7 percentage points below the EATR for singles, the United Kingdom with a difference of 1.8 percentage points, and Italy with a reduction in EATR by only 0.6 percentage points. Ranking countries according to the EATR for families we find Germany on 14<sup>th</sup> place, ahead of Ireland, the United Kingdom, and the Netherlands.

For the low disposable income, the differences are even more striking. The German family relief expressed as the difference between the EATR for a family and for a single person in this case amounts to 18.6 percentage points. The United States (13.1 percentage points), Ireland (12.0 percentage points), and Ticino (10.2 percentage points) also display EATRs for families which are by more than 10 percentage points below the EATRs for singles. Contrary to that, in Italy the EATR for the family is only 1.1 percentage points below the EATR for the single person. This implies that for the family earning a disposable income of € 50,000, the EATR in Italy (49.4 per cent) exceeds the second highest EATR in the sample (France, 32.3 per cent) by nearly half.

For the high disposable income, the family relief does not vary so strongly among the countries. However, the greatest relief still occurs in Germany (5.3 percentage points) and the smallest is found in Italy (0.2 percentage points).

Three elements determine the extent to which the tax burden on families is reduced compared to singles. First, there are family or child allowances paid directly as transfers. Second, families may be allowed to deduct certain amounts from their income tax base. Third, the tax schedule applying to couples or families with children is important. As can be seen from Section 3.1.3, direct transfers to families are not negligible, but they do not differ as much among the countries studied as the resulting EATRs suggest. Deductions from the tax base are more important, and vary more among the countries. For example, Germany grants a deduction of

<sup>89</sup> The cantons not labelled individually in Fig. 5.6. and Fig. 5.7. are placed in the shaded area marked "CH".

€ 5,808 for each child. However, by far the most important determinant of the difference between the effective tax burden on families and single persons is the tax schedule.

The large relief for families observed in some countries is brought about by a tax schedule which treats a family with a single earner essentially as if the income had been earned by two or more taxpayers. With a progressive tax schedule, this can reduce the average tax rate by a large amount. In Germany, couples file jointly and then pay a tax at an average rate which would apply to a single earner with half the taxable income. In France and Vaud, a similar result is achieved by applying a family divisor to the taxable income. On the other hand, in countries where married couples are assessed separately as in the Netherlands, the United Kingdom, and Italy there is only a very small family relief.

The importance of the tax schedule suggests that in the countries with a very favourable taxation of families, it is not so much the children who are favoured by the tax system but the non-working spouse. In Germany, the EATR of a family will move much closer to the EATR of a single person once one assumes that both spouses earn similar incomes. On the other hand, we do not count contributions to public health insurance as taxes. While this is generally justified because of the specific benefit provided by health insurance, it probably has an impact on the tax burden of families. We expect that integrating public health insurance into the tax wedge will reduce the tax burden in countries where non-working spouses and children are insured with the employee without having to pay additional premiums.

## **5.5 Comparison with the Effective Tax Burden of Companies**

As mentioned in the introduction, the present study should be seen in connection with the companion study Lammersen and Schwager (2005) on the taxation of companies. That report covers the same countries as the present work, albeit in a much more regionally differentiated way. There, the effective tax burden on investment is measured using the approach by Devereux and Griffith (1999, 2003). In that model the tax burden on an indivisible, profitable investment is assessed. The model allows to evaluate the attractiveness of regions for the location of investment projects or companies. The tax burden is expressed as an effective average tax rate defined to be the difference between the pre-tax and the post-tax returns of an investment divided by the pre-tax return.

While Lammersen and Schwager (2004) produce effective average tax rates for a large variety of combinations of assets and sources of finance, for the comparison of Fig. 0.1. on p. 6, we only focus on the headline figures provided by that study. These figures represent the effective tax burden on an investment by a firm in the manufacturing sector. The investment earns a pre-tax real rate of return of 20 per cent. It is composed of intangibles, industrial buildings, machinery, financial assets, and inventories with equal weights, and it is financed by a mix of retained earnings, new equity and debt according to empirically observed weights.

The resulting effective average tax rates on the investment are compared to the EATR on a single employee with a standard compensation structure earning a disposable income of € 100,000. To make sure that we can compare<sup>90</sup> the results, we index effective tax burdens based on the average of the included Swiss cantons. By definition, this average corresponds to an indexed effective tax burden of 100. We add a trend line which is based on the 20 observations included in Fig. 0.1. in order to illustrate the correlation between the tax burden on the production factor capital and on highly skilled employees.

It is striking that effective tax burdens appear to be closely correlated for most locations. This suggests that – with the notable exceptions of Ireland and the United States – countries which impose large (small) tax burdens on highly skilled employees also impose large (small) corporate tax burdens. Thus, from the point of view of a company, in most cases small (large) corporate income tax burdens do not compensate for large (small) individual tax burdens. Therefore, those locations that already exhibit a competitive edge with respect to the taxation of qualified employees even improve their advantages when we consider both types of taxes.

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<sup>90</sup> Although both studies provide effective average tax rates, we cannot compare the numerical results of both studies due to a number of conceptual differences. Especially, note that both concepts of effective tax burdens do not permit straightforward conclusions on distributional issues.

## 6 The Importance of Social Security

The social security system influences the effective average tax rate in three ways. First, contributions to social insurance reduce the tax base and thus result in a lower tax payment. Second, the contributions themselves partly qualify as a kind of tax if there is no direct benefit procured by them. Third, the benefits from the public pension scheme increase the tax base in the retirement period and therefore the tax payment. Because of the complicated interaction of tax and social security regulations it is difficult to identify clearly the proportion of social security charges in the effective average tax rates.

Nevertheless, in this chapter we present some simulations which isolate the impact of social security on the effective average tax rate. It is structured into two parts. In the first part, we analyse the influence of the first pillar of old-age insurance by assuming that the contributions to the first pillar yield a market rate of return. In the second part, we analyse the influence of the entire social security system by assuming that this system provides an equivalent insurance and hence contributions are not to be considered as tax-like.

### 6.1 The First Pillar of Old-Age Insurance

The first pillar of old-age insurance is organised as a pay-as-you-go system in all of the analysed countries. The PAYG system usually redistributes not only between generations but also between high and low earning employees. The higher the contributions payable by an employee the higher is the tax implicit in the contribution. Countries which offer a basic pension that only depends on the number of years in which contributions were paid but not on the amount of contributions (e.g. the Netherlands, United Kingdom, or Ireland) or countries with a limited state pension but no ceiling on contributions (e.g. Switzerland) are expected to have higher implicit taxes within the public pension scheme than countries with income ceilings and with state pensions depending on the amount of contributions.

In this sensitivity analysis, we hypothetically assume that the contributions to the first pillar of old-age insurance payable by employer and employee are invested under market conditions and are paid out as an annuity during retirement. For tax purposes, contributions and resulting pensions are treated in the same way as in the standard case. This means that contributions are deductible to the same extent and that the “public” pensions benefit from the same privileges and tax regulations. The pension formulae are replaced by an investment yielding the

market interest rate. We then compare the effective average tax rates in the standard case with those obtained in this simulation.

It would be wrong to interpret the difference between the two EATRs as the implicit tax stemming from the public pension scheme. The reason is that the impact of social security on the EATR is highly non-linear. To give just two examples, observe first that a higher pension resulting from the investment under market conditions also induces a higher tax payment during retirement. Second, a lower EATR also implies a lower gross income which in turn results in lower contributions to social security. Nevertheless, this difference provides a qualitative indicator for the impact of the first pillar of old-age insurance on the effective tax burden.

**Fig. 6.1.** Influence of the first pillar of old-age insurance on the EATR of a single, 2003

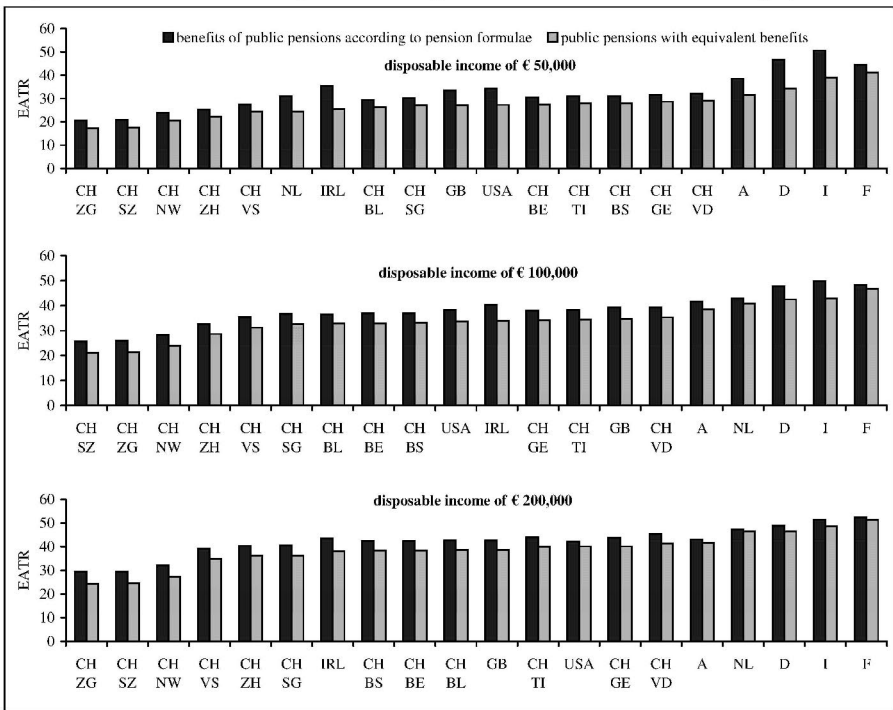


Fig. 6.1. illustrates the simulation for a single with the standard compensation structure at all income levels.<sup>91</sup> The EATRs decrease by varying amounts. In Switzerland, the charge implicit in the first pillar is larger for higher incomes because the state pension is limited while the contribution payments are not. Thus, the EATR without implicit taxes on the first pillar is lower than in the standard case by around 3 percentage points for the low and 4.2 percentage points for the high income level. In the other countries the difference between the two EATRs decreases with increasing income. This is due to income ceilings on the contribu-

<sup>91</sup> See Table A.60. on p. 111.

tions to the public pension scheme which imply that the relative importance of the first pillar decreases with income. For example, in the Netherlands, the first pillar is very important for the low income level yielding a difference between the EATRs in the standard case and the simulation of 6.4 percentage points. After the ceiling on contributions is reached, at higher income levels the importance of the PAYG pension scheme decreases rapidly, leaving a difference between both EATRs of only 0.9 percentage points at a disposable income of € 200,000. The reduction in the EATRs for families (see Table A.61. on p. 112) is comparable to the one observed for singles.

## 6.2 All Social Insurances

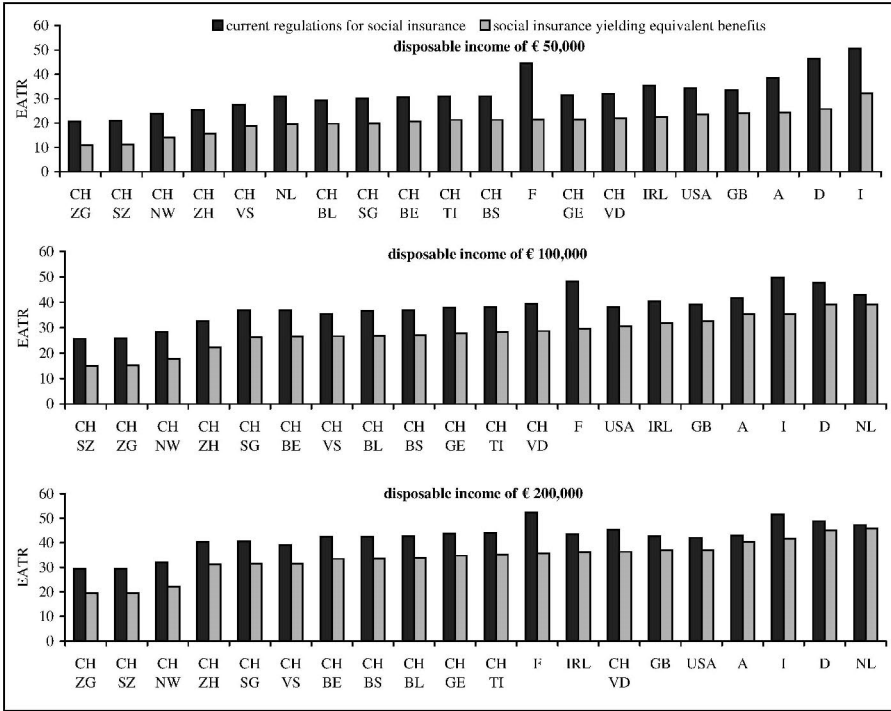
For the analysis of the influence of the entire social security system, we assume that all contributions have the character of actuarially fair insurance premiums. The tax-like contributions then are equal to zero and, as already analysed above, contributions to the old-age insurance result in fair annuities. We then compare the EATR with the corresponding EATR in the standard case (see Fig. 6.2. and Table A.62. on p. 113).

At the low income level, the social insurance system has a very important influence on the EATR in France, Germany, and Italy with reductions in the tax burden by 18 percentage points or more. In Switzerland, the reduction is about 10 percentage points. This reduction remains constant over all income levels. For the low disposable income, the Netherlands still improve their position relative to Switzerland. For the two higher levels, on the contrary, the Netherlands have the highest tax rate. This is again due to comparably low income ceilings and a high top tax rate of 52 per cent.

As mentioned above, it is not possible to define the difference between the EATRs in the standard case and in the simulation carried out in the present section as the burden resulting from social security. This is evident especially for families (see Table A.63. on p. 114). In Germany, the EATR is below 5 per cent if one assumes that none of the contributions to social insurance qualifies as tax-like. To understand why the EATR is so low in this simulation in spite of Germany's high statutory income tax rate, note that we still assume that the employer's contributions to social security are not part of gross income. As they are not considered to be tax-like, these contributions are now part of the disposable income. Both assumptions together imply that employers' contributions now raise the disposable income one for one, that is, they are tax free income. Since these contributions amount to 20 per cent of gross income, the measured effective average tax rate must decrease substantially if they are considered to be tax free income. In addition, this effect also reduces the tax base which implies a lower statutory tax rate, driving down the EATR still further. Altogether, these considerations show that this simulation to some extent overstates the impact of social security.



Fig. 6.2. Influence of the social security on the EATR of a single, 2003



## 7 Summary and Conclusions

1. In this study, we calculate and compare the effective average tax rates on highly qualified employees in eight European countries and the United States for the years 2002 and 2003. Since there is no generally recognised approach for this research task we develop a new method. In our model the effective tax burden on highly qualified employees is quantified from a company's point of view.
2. The basic idea of our approach is that employers compete for highly qualified employees and therefore have to compensate these for taxes on labour income and tax-like social security contributions. As a consequence the tax burden of different regions is compared for a given disposable income after taxes which the employee can obtain at all locations. The tax burden is expressed by the effective average tax rate (EATR) which is defined as the ratio of taxes divided by total remuneration.
3. We derive EATRs for several income levels, structures of compensation and family situations which are typical for highly qualified employees. We consider income taxes including surcharges, tax-like social security contributions as well as payroll taxes paid by the company. The typical employee's income is assessed for tax and social security purposes in several periods during the life cycle.
4. The results show that there are considerable differences in tax burden across the countries studied. Swiss cantons generally have low or moderate EATRs. Throughout the analysis, Zug and Schwyz display the lowest tax burden. Germany, France, and Italy have the highest effective tax burdens in most cases. The United States, the United Kingdom, and Ireland mostly have moderate tax burdens.
5. Comparing our results with the effective tax burden on companies one finds that the rankings of countries with respect to both measures of tax burden are correlated. In general, countries which display a high tax burden on employees also tax companies quite heavily.
6. The EATR increases with increasing income in virtually all cases. However, the progressivity of the tax and social security system differs between countries.
7. Except for Germany and the Netherlands, the EATRs decrease substantially if employer-provided stock options are introduced into the compensation package since all the other countries grant tax privileges for such compensation.
8. In all countries, the EATRs for families are lower than the EATRs for singles with the same disposable income. The extent to which families are favoured

differs largely between the countries analysed. Germany by far accords the largest tax relief for families. Contrary to that, families in Italy almost bear the same effective tax burden as singles.

9. A sensitivity analysis shows that the first pillar of old-age insurance as well as the social security system as a whole contribute substantially to the overall effective tax burden.

# A Appendix

## A.1 Social Security Contributions and Charges

**Table A.1.** Contribution rates to social security and other charges, 2002

	old-age	health	unemployment	work injury	other charges	total	charge	income ceiling 1	income ceiling 2	income ceiling 3
A	10.25 <sup>2</sup> 12.55 <sup>2</sup>	3.40 <sup>2</sup> 3.50 <sup>2</sup>	3.00 <sup>2</sup> 3.70 <sup>2</sup>		1.00 <sup>1</sup> 0.50 <sup>1</sup>	17.65 22.10	4.00 5.60	39,240	45,780	
CH	4.20 <sup>0</sup> 4.20 <sup>0</sup>		1.50 <sup>1</sup> 1.50 <sup>1</sup>		0.15 <sup>0</sup> 0.15 - 2.15 <sup>0</sup>	6.55 7.55	1.65 2.65	106,800	267,000	
	0.70 <sup>0</sup> 0.70 <sup>0</sup>		0.50 <sup>2</sup> 0.50 <sup>2</sup>							
D	9.55 <sup>2</sup> 9.55 <sup>2</sup>	7.00 <sup>1</sup> 7.00 <sup>1</sup>	3.25 <sup>2</sup> 3.25 <sup>2</sup>			19.80 21.22	3.25 4.67	40,500	54,000	61,356
F	6.55 <sup>1</sup> 8.20 <sup>1</sup> 0.10 <sup>0</sup> 1.60 <sup>0</sup>	0.75 <sup>0</sup> 12.8 <sup>0</sup>	3.60 <sup>2</sup> 2.00 <sup>2</sup>		7.60 <sup>0</sup> 7.85 <sup>0</sup>	18.60 34.71	11.20 12.11	28,224	112,896	
I	8.89 <sup>1</sup> 23.81 <sup>1</sup>		0.30 <sup>0</sup> 4.41 <sup>0</sup>		0.50 - 16.00 <sup>0</sup>	9.19 31.86	0.30 7.39	80,391		
IRL	4.00 <sup>1</sup> 10.75 <sup>0</sup>	2.00 <sup>0</sup>	**	**		6.00 10.75	0.80 2.15	38,740		
NL	17.90 <sup>1</sup>	10.25 <sup>1</sup>	4.95 <sup>2</sup> 3.60 <sup>2</sup>			36.05 16.20	4.95 3.60	27,850	27,000	30,700
	1.25 <sup>2</sup> 5.85 <sup>2</sup>	1.70 <sup>3</sup> 6.25 <sup>3</sup>								
UK	8.40 <sup>1</sup> 8.30 <sup>0</sup>	**	**	**		8.40 8.30	1.68 1.66	29,900		
USA	6.20 <sup>2</sup> 6.20 <sup>2</sup>	1.45 <sup>0</sup> 1.45 <sup>0</sup>	6.20 <sup>1</sup>	2.05		7.65 13.85		7,000	84,900	

Note: Rates marked with a superscript <sup>0</sup> apply without ceiling. Rates marked with a superscript <sup>1</sup> (<sup>2</sup>, <sup>3</sup>) apply to income in national currency up to ceiling 1 (2, 3) as given in the final three columns. The first row represents the employee's contribution rate, the second row the employer's contribution rate. Income ceilings are in national currency. \*\*Overall contributions in column old-age.

**Table A.2.** Contribution rates to social security and other charges, 2003

	old-age	health	unemployment	work injury	other charges	total	charge	income ceiling 1	income ceiling 2	income ceiling 3
A	10.25 <sup>2</sup> 12.55 <sup>2</sup>	3.40 <sup>2</sup> 3.50 <sup>2</sup>	3.00 <sup>2</sup> 3.70 <sup>2</sup>	1.40 <sup>2</sup>	1.00 <sup>1</sup> 0.50 <sup>1</sup>	17.65 22.10	4.00 5.60	40,320	47,040	
CH	4.20 <sup>0</sup> 4.20 <sup>0</sup>		1.50 <sup>1</sup> 1.50 <sup>1</sup>	1.00 <sup>1</sup>	0.15 <sup>0</sup> 0.15 - 2.15 <sup>0</sup>	6.55 7.55	1.65 2.65	106,800	267,000	
D	0.70 <sup>0</sup> 0.70 <sup>0</sup> 9.75 <sup>2</sup> 9.75 <sup>2</sup>		0.50 <sup>2</sup> 0.50 <sup>2</sup> 3.25 <sup>2</sup> 3.25 <sup>2</sup>			20.00 21.42	3.25 4.67	41,400	61,200	61,356
F	6.55 <sup>1</sup> 8.20 <sup>1</sup> 0.10 <sup>0</sup> 1.60 <sup>0</sup>	0.75 <sup>0</sup> 12.80 <sup>0</sup>	2.40 <sup>2</sup> 4.00 <sup>2</sup>	2.26	7.60 <sup>0</sup> 7.85 <sup>0</sup>	17.40 36.71	10.00 14.11	29,184	116,736	
I	8.89 <sup>1</sup> 23.81 <sup>1</sup>	0.66 <sup>0</sup>	0.30 <sup>0</sup> 4.41 <sup>0</sup>	0.50 - 16.00 <sup>0</sup>	2.48 <sup>0</sup>	9.19 31.86	0.30 7.39	80,391		
IRL	4.00 <sup>1</sup> 10.75 <sup>0</sup>	2.00 <sup>0</sup>	**	**		6.00 10.75	0.80 2.15	40,420		
NL	17.90 <sup>1</sup> 1.25 <sup>1</sup> 5.05 <sup>2</sup>	10.25 <sup>1</sup> 1.70 <sup>3</sup> 6.75 <sup>3</sup>	5.80 <sup>2</sup> 1.55 <sup>2</sup>			36.90 13.35	5.80 1.55	28,850	30,260	31,750
UK	8.40 <sup>1</sup> 8.30 <sup>0</sup>	**	**	**		8.40 8.30	1.68 1.66	30,420		
USA	6.20 <sup>2</sup> 6.20 <sup>2</sup>	1.45 <sup>0</sup> 1.45 <sup>0</sup>	6.20 <sup>1</sup>	2.05		7.65 13.85	6.20	7,000	87,000	

For remarks see Table A.1.

**Table A.3.** Valuation of compensation components used in the simulation

Country	Value for company cars $\theta_p$	Value for stock options $\theta_l$
Austria	0.75	0.50
France	0.30	0.00
Germany	0.50	1.00
Ireland	0.77	0.00
Italy	0.50	0.00
Switzerland	0.50	0.75
The Netherlands	1.04	1.00
The United Kingdom	0.63	0.00
The United States (Mass.)	1.04	0.00

## A.2 Tax Deductions and Tax Credits

**Table A.4.** Personal deductions and tax credits (in national currency)

Country	Year	Personal deductions / tax credits		Deductions per child
		married couple	single	
Austria	'02-'03	3,640*	3,640*	
(tax credits)		887-0**	887-0**	613
CH Basel-Landschaft	'02-'03	14,372*	14,372*	5,000
CH Basel-Stadt	'02-'03	6,200	-	5,200
		14,600*	10,400*	
CH Bern	'02-'03	9,800	7,100	4,400
CH Confederation	'02	24,900	12,800	5,600
	'03	24,900*	15,770*	5,600
CH Genève <sup>a)</sup>	'02	8,000*	8,000*	-
	'03	12,100*	12,100*	-
CH Nidwalden	'02-'03	18,000*	10,000*	3,750
CH Schwyz	'02-'03	6,000	3,000	5,000
CH St. Gallen	'02-'03	4,400*	2,200*	6,000
CH Ticino	'02-'03	-	-	8,000
CH Valais	'02-'03	8,000* <sup>b)</sup>	8,000*	5,000
CH Vaud <sup>a)</sup>	'02-'03	-	-	-
CH Zug	'02-'03	13,000	6,500	8,000
CH Zürich	'02-'03	11,000*	5,500*	5,400
France	'02	4,121*	4,121*	<sup>-d)</sup>
	'03	4,191*	4,191*	<sup>-d)</sup>
Germany	'02-'03	14,470*	7,235*	5,808
Ireland (tax credits)	'02-'03	3,040	1,520	-
Italy (tax credits)	'02-'03	546-422**	-	285
The Netherlands	'02	3,294	1,647	40
(tax credits)	'03	3,532	1,766	41
United Kingdom	'02	4,535	4,535	520-0**
(tax credits)	'03	4,615	4,615	529-0**
United States	'02	7,850 <sup>c)</sup>	4,700	
	'03	7,950 <sup>c)</sup>	4,750 <sup>c)</sup>	
	'02-'03	6,000	3,000	3,000
(tax credit)	'02-'03			600-0**
United States, Mass.	'02-'03	6,600	3,300	1,000

\* Within the tax schedule. \*\* Degressive tax credit, which starts at a high level for low incomes and ends at zero for high incomes.

<sup>a)</sup> The personal allowances are combined with the tax schedule.

<sup>b)</sup> A tax credit of 32 per cent of the income tax for married couples, at the minimum 610 and at the maximum 3,560.

<sup>c)</sup> Standard deduction; alternatively itemised deductions may be claimed.

<sup>d)</sup> Within the family quotient.

**Table A.5.** Deductibility of employee's contributions to social security, 2002 and 2003

Country	Year	Deduction up to	Full deduction
Austria	'02-'03		x
France	'02-'03		x
Germany	'02-'03	€ 2,001 / € 4,002	
Ireland	'02-'03	-	
Italy	'02-'03		x
The Netherlands	'02-'03	within certain limits	
Switzerland	'02-'03		x
USA Federal income tax	'02-'03	-	
USA Massachusetts state income tax	'02-'03	\$ 2,000	
United Kingdom	'02-'03	-	

**Table A.6.** Old-age deductions (in national currency)

Country	Year	Married couples	Singles
Austria (tax credits)	'02-'03	400-0*	400-0*
CH Basel-Stadt	'02-'03	500	500
		-	3,100 <sup>a, b)</sup>
CH Nidwalden	'02-'03	-	3,500-0 <sup>a, b)</sup>
CH Schwyz	'02-'03	6,000	3,000
CH St. Gallen	'02-'03	3,000-0*	2,000-0*
CH Ticino	'02-'03	8,000-0*	8,000-0*
CH Zug <sup>a)</sup>	'02-'03	3,000-0*	3,000-0*
Italy	'02-'03	7,000-0*	7,000-0*
(tax credits) <sup>c)</sup>		98-222*	98-222*
The Netherlands	'02	1,474	737
	'03	1,612	806
United Kingdom (tax credits)	'02-'03	6,100-4,615*	6,100-4,615*
		5,535-2,110 <sup>a, c)</sup>	
United States, Mass.	'02-'03	1,400	700

\* Degressive tax credit/allowance, which starts at a high level for low incomes and ends at zero for high incomes.

<sup>a)</sup> The deduction depends not only on the income but on the property as well.

<sup>b)</sup> Only for single pensioners.

<sup>c)</sup> The allowance depends on the pensioner's age.

**Table A.7.** Standard deductions for business-related expenses (in national currency)

Country	Year	Deduction
Austria	'02-'03	132
(tax credit)		54
CH Basel-Landschaft	'02-'03	500
CH Basel-Stadt	'02-'03	700
CH Bern	'02-'03	3 % of income, between 1,900 and 3,800
CH confederation	'02-'03	3 %, between 1,900 and 3,800
CH Genève	'02-'03	3 %, between 500 and 1,500
CH Nidwalden	'02-'03	5 %, at the maximum 7,000
CH Schwyz	'02-'03	20 %, at the maximum 6,600
CH St. Gallen	'02-'03	10 %, between 700 and 2,400
CH Ticino	'02-'03	2,100
CH Valais	'02-'03	3 %, between 1,800 and 3,600
CH Vaud	'02-'03	3 %, between 1,800 and 3,600
CH Zug	'02-'03	3 %, between 1,900 and 3,800
CH Zürich	'02-'03	3 %, between 1,900 and 3,800
France	'02	10 %, between 364 and 12,229 *
	'03	10 %, between 370 and 12,437 *
Germany	'02-'03	1,044 *
Ireland (tax credit)	'02-'03	660 *
Italy	'02-'03	7,500-0
The Netherlands (tax credit)	'02	949
	'03	1,104
United Kingdom	'02-'03	-
United States	'02-'03	within the standard deduction
United States, Mass.	'02-'03	-

\* For occupational pensions as well.



### A.3 Detailed Results

**Table A.8.** EATR of singles and families in Austria 2002, in per cent

Disposable income (€)	50,000	100,000	200,000
Single			
Standard	38.9	42.4	43.8
Pension-oriented	39.3	42.9	44.3
Lti-oriented	38.0	40.1	42.2
Family			
Standard	31.7	39.1	42.2
Pension-oriented	32.1	39.7	42.8
Lti-oriented	30.6	36.6	40.5

**Table A.9.** EATR of singles and families in Austria 2003, in per cent

Disposable income (€)	50,000	100,000	200,000
Single			
Standard	38.5	41.7	43.1
Pension-oriented	38.9	42.3	43.7
Lti-oriented	37.6	39.5	41.6
Family			
Standard	30.9	38.2	41.5
Pension-oriented	31.3	38.9	42.1
Lti-oriented	29.9	35.8	39.9

**Table A.10.** EATR of singles and families in Basel-Landschaft 2002, in per cent

Disposable income (€)	50,000	100,000	200,000
Single			
Standard	34.4	38.2	42.1
Pension-oriented	35.0	41.1	45.0
Lti-oriented	31.9	34.2	35.2
Family			
Standard	21.2	31.3	38.0
Pension-oriented	22.0	33.8	41.2
Lti-oriented	19.4	26.4	30.7

**Table A.11.** EATR of singles and families in Basel-Landschaft 2003, in per cent

Disposable income (€)	50,000	100,000	200,000
Single			
Standard	29.3	36.6	42.7
Pension-oriented	29.7	36.9	42.1
Lti-oriented	28.4	34.5	39.6
Family			
Standard	22.6	31.3	39.2
Pension-oriented	23.3	31.4	39.1
Lti-oriented	21.9	29.1	36.3

**Table A.12.** EATR of singles and families in Basel-Stadt 2002, in per cent

Disposable income (€)	50,000	100,000	200,000
Single			
Standard	31.2	36.7	42.3
Pension-oriented	31.5	36.7	41.3
Lti-oriented	30.3	34.7	39.3
Family			
Standard	22.6	31.9	39.0
Pension-oriented	23.1	31.9	38.4
Lti-oriented	21.8	29.8	36.0

**Table A.13.** EATR of singles and families in Basel-Stadt 2003, in per cent

Disposable income (€)	50,000	100,000	200,000
Single			
Standard	31.0	36.9	42.4
Pension-oriented	31.3	36.8	41.4
Lti-oriented	30.1	34.8	39.4
Family			
Standard	22.6	32.1	39.1
Pension-oriented	23.0	32.1	38.6
Lti-oriented	21.8	30.0	36.2

**Table A.14.** EATR of singles and families in Bern 2002, in per cent

Disposable income (€)	50,000	100,000	200,000
Single			
Standard	30.6	36.6	42.4
Pension-oriented	31.0	36.4	41.4
Lti-oriented	29.7	34.6	39.4
Family			
Standard	24.8	31.9	39.8
Pension-oriented	25.6	32.1	39.0
Lti-oriented	24.1	29.8	36.7

**Table A.15.** EATR of singles and families in Bern 2003, in per cent

Disposable income (€)	50,000	100,000	200,000
Single			
Standard	30.5	36.8	42.4
Pension-oriented	30.9	36.5	41.4
Lti-oriented	29.7	34.7	39.5
Family			
Standard	24.4	31.9	39.8
Pension-oriented	25.1	32.1	38.9
Lti-oriented	23.7	29.7	36.8

**Table A.16.** EATR of singles and families in Genève 2002, in per cent

Disposable income (€)	50,000	100,000	200,000
Single			
Standard	31.5	37.7	43.7
Pension-oriented	31.9	37.8	42.5
Lti-oriented	30.7	35.6	40.5
Family			
Standard	24.0	33.9	42.0
Pension-oriented	24.6	34.0	40.8
Lti-oriented	23.2	31.7	38.8

**Table A.17.** EATR of singles and families in Genève 2003, in per cent

Disposable income (€)	50,000	100,000	200,000
Single			
Standard	31.5	37.9	43.8
Pension-oriented	31.9	38.0	42.7
Lti-oriented	30.7	35.8	40.6
Family			
Standard	23.5	33.9	42.1
Pension-oriented	24.1	34.0	40.9
Lti-oriented	22.7	31.7	38.8

**Table A.18.** EATR of singles and families in Nidwalden 2002, in per cent

Disposable income (€)	50,000	100,000	200,000
Single			
Standard	23.9	28.1	31.8
Pension-oriented	24.0	27.5	30.6
Lti-oriented	23.2	26.5	29.4
Family			
Standard	18.6	24.8	30.6
Pension-oriented	18.9	24.4	29.3
Lti-oriented	17.9	23.1	28.1

**Table A.19.** EATR of singles and families in Nidwalden 2003, in per cent

Disposable income (€)	50,000	100,000	200,000
Single			
Standard	23.9	28.3	32.0
Pension-oriented	24.0	27.6	30.8
Lti-oriented	23.2	26.7	29.6
Family			
Standard	18.6	25.0	30.8
Pension-oriented	18.9	24.5	29.6
Lti-oriented	17.9	23.3	28.4

**Table A.20.** EATR of singles and families in Schwyz 2002, in per cent

Disposable income (€)	50,000	100,000	200,000
Single			
Standard	21.6	26.3	30.0
Pension-oriented	21.8	25.6	28.9
Lti-oriented	20.9	24.7	27.7
Family			
Standard	17.1	22.6	28.6
Pension-oriented	17.4	22.4	27.4
Lti-oriented	16.4	21.0	26.2

**Table A.21.** EATR of singles and families in Schwyz 2003, in per cent

Disposable income (€)	50,000	100,000	200,000
Single			
Standard	20.9	25.7	29.4
Pension-oriented	21.0	24.9	28.3
Lti-oriented	20.2	24.1	27.2
Family			
Standard	16.4	22.0	28.0
Pension-oriented	16.7	21.8	26.8
Lti-oriented	15.7	20.5	25.7

**Table A.22.** EATR of singles and families in St. Gallen 2002, in per cent

Disposable income (€)	50,000	100,000	200,000
Single			
Standard	30.3	36.8	40.6
Pension-oriented	30.5	35.7	39.5
Lti-oriented	29.4	34.7	37.9
Family			
Standard	21.5	30.1	38.5
Pension-oriented	22.1	29.9	37.0
Lti-oriented	20.7	28.1	35.6

**Table A.23.** EATR of singles and families in St. Gallen 2003, in per cent

Disposable income (€)	50,000	100,000	200,000
Single			
Standard	30.1	36.8	40.5
Pension-oriented	30.2	35.6	39.4
Lti-oriented	29.2	34.7	37.8
Family			
Standard	21.3	30.2	38.4
Pension-oriented	22.0	29.8	37.0
Lti-oriented	20.6	28.1	35.5

**Table A.24.** EATR of singles and families in Ticino 2002, in per cent

Disposable income (€)	50,000	100,000	200,000
Single			
Standard	31.0	37.9	43.9
Pension-oriented	31.3	37.9	42.9
Lti-oriented	30.1	35.8	40.7
Family			
Standard	20.7	31.7	41.3
Pension-oriented	21.7	31.9	40.5
Lti-oriented	19.9	29.5	38.2

**Table A.25.** EATR of singles and families in Ticino 2003, in per cent

Disposable income (€)	50,000	100,000	200,000
Single			
Standard	31.0	38.2	44.0
Pension-oriented	31.3	38.0	43.0
Lti-oriented	30.1	36.0	40.9
Family			
Standard	20.7	32.0	41.5
Pension-oriented	21.7	32.0	40.7
Lti-oriented	19.9	29.7	38.3

**Table A.26.** EATR of singles and families in Valais 2002, in per cent

Disposable income (€)	50,000	100,000	200,000
Single			
Standard	27.5	35.2	38.9
Pension-oriented	27.7	34.2	37.9
Lti-oriented	26.6	33.2	36.3
Family			
Standard	20.9	31.3	37.2
Pension-oriented	21.7	30.0	36.2
Lti-oriented	20.2	29.2	34.5

**Table A.27.** EATR of singles and families in Valais 2003, in per cent

Disposable income (€)	50,000	100,000	200,000
Single			
Standard	27.5	35.4	39.1
Pension-oriented	27.7	34.4	38.1
Lti-oriented	26.6	33.4	36.4
Family			
Standard	20.9	31.5	37.4
Pension-oriented	21.7	30.1	36.4
Lti-oriented	20.2	29.4	34.7

**Table A.28.** EATR of singles and families in Vaud 2002, in per cent

Disposable income (€)	50,000	100,000	200,000
Single			
Standard	34.4	38.2	42.1
Pension-oriented	35.0	41.1	45.0
Lti-oriented	31.9	34.2	35.2
Family			
Standard	21.2	31.3	38.0
Pension-oriented	22.0	33.8	41.2
Lti-oriented	19.4	26.4	30.7

**Table A.29.** EATR of singles and families in Vaud 2003, in per cent

Disposable income (€)	50,000	100,000	200,000
Single			
Standard	31.9	39.3	45.4
Pension-oriented	32.5	38.3	43.8
Lti-oriented	31.1	37.0	42.3
Family			
Standard	25.6	31.4	41.2
Pension-oriented	26.1	32.7	39.6
Lti-oriented	24.7	29.4	37.8

**Table A.30.** EATR of singles and families in Zug 2002, in per cent

Disposable income (€)	50,000	100,000	200,000
Single			
Standard	20.6	25.7	29.0
Pension-oriented	20.7	24.7	27.9
Lti-oriented	19.9	24.0	26.7
Family			
Standard	14.6	20.7	27.7
Pension-oriented	15.1	20.6	26.2
Lti-oriented	14.0	19.2	25.3

**Table A.31.** EATR of singles and families in Zug 2003, in per cent

Disposable income (€)	50,000	100,000	200,000
Single			
Standard	20.6	25.9	29.3
Pension-oriented	20.7	24.8	28.1
Lti-oriented	19.9	24.2	27.0
Family			
Standard	14.6	20.9	28.0
Pension-oriented	15.1	20.7	26.4
Lti-oriented	14.0	19.3	25.5

**Table A.32.** EATR of singles and families in Zürich 2002, in per cent

Disposable income (€)	50,000	100,000	200,000
Single			
Standard	25.5	32.7	40.6
Pension-oriented	26.2	33.0	39.6
Lti-oriented	24.7	30.7	37.5
Family			
Standard	19.3	26.7	36.6
Pension-oriented	20.1	28.0	35.9
Lti-oriented	18.6	24.8	33.5

**Table A.33.** EATR of singles and families in Zürich 2003, in per cent

Disposable income (€)	50,000	100,000	200,000
Single			
Standard	25.3	32.6	40.3
Pension-oriented	25.9	32.8	39.3
Lti-oriented	24.4	30.6	37.3
Family			
Standard	19.1	26.7	36.4
Pension-oriented	19.9	27.9	35.7
Lti-oriented	18.4	24.8	33.3

**Table A.34.** EATR of singles and families in France 2002, in per cent

Disposable income (€)	50,000	100,000	200,000
Single			
Standard	45.5	47.9	52.8
Pension-oriented	46.6	49.8	55.4
Lti-oriented	42.4	43.0	43.6
Family			
Standard	33.1	39.4	48.7
Pension-oriented	33.4	41.4	51.5
Lti-oriented	30.8	33.6	38.8

**Table A.35.** EATR of singles and families in France 2003, in per cent

Disposable income (€)	50,000	100,000	200,000
Single			
Standard	44.5	48.2	52.3
Pension-oriented	45.6	50.2	54.9
Lti-oriented	41.5	43.5	43.5
Family			
Standard	32.3	40.0	48.2
Pension-oriented	32.6	41.9	51.0
Lti-oriented	30.1	34.4	38.6

**Table A.36.** EATR of singles and families in Germany 2002, in per cent

Disposable income (€)	50,000	100,000	200,000
Single			
Standard	44.6	46.7	48.4
Pension-oriented	44.6	46.7	48.4
Lti-oriented	44.6	46.7	48.4
Family			
Standard	27.2	33.9	42.9
Pension-oriented	27.7	34.9	42.9
Lti-oriented	26.3	33.9	42.9

**Table A.37.** EATR of singles and families in Germany 2003, in per cent

Disposable income (€)	50,000	100,000	200,000
Single			
Standard	46.5	47.6	48.8
Pension-oriented	46.5	47.6	48.8
Lti-oriented	46.5	47.6	48.8
Family			
Standard	27.9	35.2	43.4
Pension-oriented	28.0	36.1	43.4
Lti-oriented	26.6	35.2	43.4



**Table A.38.** EATR of singles and families in Ireland 2002, in per cent

Disposable income (€)	50,000	100,000	200,000
Single			
Standard	35.8	40.4	43.6
Pension-oriented	35.6	41.1	44.1
Lti-oriented	32.7	34.9	35.7
Family			
Standard	23.9	35.9	41.6
Pension-oriented	23.6	36.7	42.2
Lti-oriented	20.2	30.0	33.5

**Table A.39.** EATR of singles and families in Ireland 2003, in per cent

Disposable income (€)	50,000	100,000	200,000
Single			
Standard	35.5	40.3	43.5
Pension-oriented	35.3	41.0	44.3
Lti-oriented	32.4	34.8	35.7
Family			
Standard	23.5	35.8	41.6
Pension-oriented	23.2	36.6	42.2
Lti-oriented	19.8	29.9	33.5

**Table A.40.** EATR of singles and families in Italy 2002, in per cent

Disposable income (€)	50,000	100,000	200,000
Single			
Standard	54.1	53.4	54.9
Pension-oriented	53.2	56.6	56.8
Lti-oriented	50.6	47.5	46.8
Family			
Standard	53.2	52.8	54.7
Pension-oriented	52.1	56.2	56.6
Lti-oriented	49.4	47.0	46.5

**Table A.41.** EATR of singles and families in Italy 2003, in per cent

Disposable income (€)	50,000	100,000	200,000
Single			
Standard	50.6	49.8 (52.3 <sup>*</sup> )	51.5 (53.4 <sup>*</sup> )
Pension-oriented	49.6	53.6 (53.6 <sup>*</sup> )	53.7 (54.1 <sup>*</sup> )
Lti-oriented	47.2	44.4 (49.7 <sup>*</sup> )	43.9 (50.9 <sup>*</sup> )
Family			
Standard	49.4	49.2 (51.8 <sup>*</sup> )	51.2 (53.2 <sup>*</sup> )
Pension-oriented	48.4	53.1 (53.1 <sup>*</sup> )	53.4 (53.9 <sup>*</sup> )
Lti-oriented	46.0	43.8 (49.1 <sup>*</sup> )	43.6 (50.7 <sup>*</sup> )

<sup>\*</sup> EATRs with identical weights of compensation components as for € 50,000.

**Table A.42.** EATR of singles and families in the Netherlands 2002, in per cent

Disposable income (€)	50,000	100,000	200,000
Single			
Standard	34.1	44.0	47.8
Pension-oriented	33.8	43.2	47.0
Lti-oriented	34.1	44.0	47.8
Family			
Standard	26.6	41.5	46.7
Pension-oriented	26.4	40.6	45.9
Lti-oriented	26.6	41.5	46.7

**Table A.43.** EATR of singles and families in the Netherlands 2003, in per cent

Disposable income (€)	50,000	100,000	200,000
Single			
Standard	30.9	42.9	47.3
Pension-oriented	30.6	42.0	46.5
Lti-oriented	30.9	42.9	47.3
Family			
Standard	22.6	40.2	46.2
Pension-oriented	23.0	39.3	45.4
Lti-oriented	22.6	40.2	46.2

**Table A.44.** EATR of singles and families in the United Kingdom 2002, in per cent

Disposable income (€)	50,000	100,000	200,000
Single			
Standard	33.7	39.3	42.7
Pension-oriented	34.9	42.5	45.6
Lti-oriented	31.0	34.5	35.9
Family			
Standard	28.0	37.6	41.9
Pension-oriented	29.2	40.8	44.9
Lti-oriented	25.2	32.6	35.0

**Table A.45.** EATR of singles and families in the United Kingdom 2003, in per cent

Disposable income (€)	50,000	100,000	200,000
Single			
Standard	33.5	39.2	42.6
Pension-oriented	34.6	41.1	45.6
Lti-oriented	30.7	34.4	35.8
Family			
Standard	27.6	37.4	41.8
Pension-oriented	28.8	40.7	44.8
Lti-oriented	25.1	32.5	35.0

**Table A.46.** EATR of singles and families in the United States (Mass.) 2002, in per cent

Disposable income (€)	50,000	100,000	200,000
Single			
Standard	34.4	38.2	42.1
Pension-oriented	35.0	41.1	45.0
Lti-oriented	31.9	34.2	35.2
Family			
Standard	21.2	31.3	38.0
Pension-oriented	22.0	33.8	41.2
Lti-oriented	19.4	26.4	30.7

**Table A.47.** EATR of singles and families in the United States (Mass.) 2003, in per cent

Disposable income (€)	50,000	100,000	200,000
Single			
Standard	34.2	38.2	42.0
Pension-oriented	34.8	41.1	44.9
Lti-oriented	31.7	34.2	35.1
Family			
Standard	21.1	31.3	37.9
Pension-oriented	21.9	33.8	41.1
Lti-oriented	19.3	26.4	30.5

**Table A.48.** EATR for a single with a disposable income of € 50,000 in 2002, in per cent

	Standard		Pension-oriented		Lti-oriented	
	EATR	Rk	EATR	Rk	EATR	Rk
Austria	38.9	17	39.3	17	38.0	17
CH Basel-Landschaft	29.4	6	29.8	6	28.5	6
CH Basel-Stadt	31.2	10	31.5	10	30.3	10
CH Bern	30.6	8	31.0	8	29.7	8
CH Genève	31.5	11	31.9	11	30.7	11
CH Nidwalden	23.9	3	24.0	3	23.2	3
CH Schwyz	21.6	2	21.8	2	20.9	2
CH St. Gallen	30.3	7	30.5	7	29.4	7
CH Ticino	31.0	9	31.3	9	30.1	9
CH Valais	27.5	5	27.7	5	26.6	5
CH Vaud	31.9	12	32.5	12	31.1	13
CH Zug	20.6	1	20.7	1	19.9	1
CH Zürich	25.5	4	26.2	4	24.7	4
France	45.5	19	46.6	19	42.4	18
Germany	44.6	18	44.6	18	44.6	19
Ireland	35.8	16	35.6	16	32.7	15
Italy	54.1	20	53.2	20	50.6	20
The Netherlands	34.1	14	33.8	13	34.1	16
United Kingdom	33.7	13	34.9	14	31.0	12
United States	34.4	15	35.0	15	31.9	14

**Table A.49.** EATR for a single with a disposable income of € 100,000 in 2002, in per cent

	Standard		Pension-oriented		Lti-oriented	
	EATR	Rk	EATR	Rk	EATR	Rk
Austria	42.4	16	42.9	16	40.1	16
CH Basel-Landschaft	36.4	6	36.8	9	34.4	7
CH Basel-Stadt	36.7	8	36.7	8	34.7	10
CH Bern	36.6	7	36.4	7	34.6	9
CH Genève	37.7	10	37.8	10	35.6	13
CH Nidwalden	28.1	3	27.5	3	26.5	3
CH Schwyz	26.3	2	25.6	2	24.7	2
CH St. Gallen	36.8	9	35.7	6	34.7	11
CH Ticino	37.9	11	37.9	11	35.8	14
CH Valais	35.2	5	34.2	5	33.2	5
CH Vaud	39.0	13	38.2	12	36.8	15
CH Zug	25.7	1	24.7	1	24.0	1
CH Zürich	32.7	4	33.0	4	30.7	4
France	47.9	19	49.8	19	43.0	17
Germany	46.7	18	46.7	18	46.7	19
Ireland	40.4	15	41.1	13	34.9	12
Italy	53.4	20	56.6	20	47.5	20
The Netherlands	44.0	17	43.2	17	44.0	18
United Kingdom	39.3	14	42.5	15	34.5	8
United States	38.2	12	41.1	14	34.2	6

**Table A.50.** EATR for a single with a disposable income of € 200,000 in 2002, in per cent

	Standard		Pension-oriented		Lti-oriented	
	EATR	Rk	EATR	Rk	EATR	Rk
Austria	43.8	14	44.3	14	42.2	15
CH Basel-Landschaft	42.6	10	42.0	9	39.5	12
CH Basel-Stadt	42.3	8	41.3	7	39.3	10
CH Bern	42.4	9	41.4	8	39.4	11
CH Genève	43.7	13	42.5	10	40.5	13
CH Nidwalden	31.8	3	30.6	3	29.4	3
CH Schwyz	30.0	2	28.9	2	27.7	2
CH St. Gallen	40.6	5	39.5	5	37.9	9
CH Ticino	43.9	15	42.9	11	40.7	14
CH Valais	38.9	4	37.9	4	36.3	7
CH Vaud	45.3	16	43.7	12	42.2	16
CH Zug	29.0	1	27.9	1	26.7	1
CH Zürich	40.6	6	39.6	6	37.5	8
France	52.8	19	55.4	19	43.6	17
Germany	48.4	18	48.4	18	48.4	20
Ireland	43.6	12	44.1	13	35.7	5
Italy	54.9	20	56.8	20	46.8	18
The Netherlands	47.8	17	47.0	17	47.8	19
United Kingdom	42.7	11	45.6	16	35.9	6
United States	42.1	7	45.0	15	35.2	4

**Table A.51.** EATR for a family with a disposable income of € 50,000 in 2002, in per cent

	Standard		Pension-oriented		Lti-oriented	
	EATR	Rk	EATR	Rk	EATR	Rk
Austria	31.7	18	32.1	18	30.6	18
CH Basel-Landschaft	22.7	10	23.3	10	21.9	11
CH Basel-Stadt	22.6	9	23.1	9	21.8	10
CH Bern	24.8	13	25.6	13	24.1	13
CH Genève	24.0	12	24.6	12	23.2	12
CH Nidwalden	18.6	3	18.9	3	17.9	3
CH Schwyz	17.1	2	17.4	2	16.4	2
CH St. Gallen	21.5	8	22.1	8	20.7	9
CH Ticino	20.7	5	21.7	6	19.9	6
CH Valais	20.9	6	21.7	5	20.2	7
CH Vaud	25.6	14	26.1	14	24.7	14
CH Zug	14.6	1	15.1	1	14.0	1
CH Zürich	19.3	4	20.1	4	18.6	4
France	33.1	19	33.4	19	30.8	19
Germany	27.2	16	27.7	16	26.3	16
Ireland	23.9	11	23.6	11	20.2	8
Italy	53.2	20	52.1	20	49.4	20
The Netherlands	26.6	15	26.4	15	26.6	17
United Kingdom	28.0	17	29.2	17	25.2	15
United States	21.2	7	22.0	7	19.4	5

**Table A.52.** EATR for a family with a disposable income of € 100,000 in 2002, in per cent

	Standard		Pension-oriented		Lti-oriented	
	EATR	Rk	EATR	Rk	EATR	Rk
Austria	39.1	17	39.7	16	36.6	18
CH Basel-Landschaft	31.1	7	31.3	7	28.9	7
CH Basel-Stadt	31.9	12	31.9	9	29.8	12
CH Bern	31.9	11	32.1	10	29.8	11
CH Genève	33.9	14	34.0	13	31.7	14
CH Nidwalden	24.8	3	24.4	3	23.1	3
CH Schwyz	22.6	2	22.4	2	21.0	2
CH St. Gallen	30.1	5	29.9	5	28.1	6
CH Ticino	31.7	10	31.9	8	29.5	10
CH Valais	31.3	8	30.0	6	29.2	9
CH Vaud	31.1	6	32.5	11	29.2	8
CH Zug	20.7	1	20.6	1	19.2	1
CH Zürich	26.7	4	28.0	4	24.8	4
France	39.4	18	41.4	19	33.6	16
Germany	33.9	13	34.9	14	33.9	17
Ireland	35.9	15	36.7	15	30.0	13
Italy	52.8	20	56.2	20	47.0	20
The Netherlands	41.5	19	40.6	17	41.5	19
United Kingdom	37.6	16	40.8	18	32.6	15
United States	31.3	9	33.8	12	26.4	5

**Table A.53.** EATR for a family with a disposable income of € 200,000 in 2002, in per cent

	Standard		Pension-oriented		Lti-oriented	
	EATR	Rk	EATR	Rk	EATR	Rk
Austria	42.2	16	42.8	15	40.5	17
CH Basel-Landschaft	39.1	9	39.0	9	36.2	11
CH Basel-Stadt	39.0	8	38.4	7	36.0	10
CH Bern	39.8	10	39.0	8	36.7	12
CH Genève	42.0	15	40.8	12	38.8	16
CH Nidwalden	30.6	3	29.3	3	28.1	3
CH Schwyz	28.6	2	27.4	2	26.2	2
CH St. Gallen	38.5	7	37.0	6	35.6	9
CH Ticino	41.3	12	40.5	11	38.2	14
CH Valais	37.2	5	36.2	5	34.5	7
CH Vaud	41.1	11	39.5	10	37.7	13
CH Zug	27.7	1	26.2	1	25.3	1
CH Zürich	36.6	4	35.9	4	33.5	5
France	48.7	19	51.5	19	38.8	15
Germany	42.9	17	42.9	16	42.9	18
Ireland	41.6	13	42.2	14	33.5	6
Italy	54.7	20	56.6	20	46.5	19
The Netherlands	46.7	18	45.9	18	46.7	20
United Kingdom	41.9	14	44.9	17	35.0	8
United States	38.0	6	41.2	13	30.7	4

**Table A.54.** EATR for a single with a disposable income of € 50,000 in 2003, in per cent

	Standard		Pension-oriented		Lti-oriented	
	EATR	Rk	EATR	Rk	EATR	Rk
Austria	38.5	17	38.9	17	37.6	17
CH Basel-Landschaft	29.3	6	29.7	6	28.4	6
CH Basel-Stadt	31.0	11	31.3	11	30.1	10
CH Bern	30.5	8	30.9	9	29.7	8
CH Genève	31.5	12	31.9	12	30.7	11
CH Nidwalden	23.9	3	24.0	3	23.2	3
CH Schwyz	20.9	2	21.0	2	20.2	2
CH St. Gallen	30.1	7	30.2	7	29.2	7
CH Ticino	31.0	10	31.3	10	30.1	9
CH Valais	27.5	5	27.7	5	26.6	5
CH Vaud	31.9	13	32.5	13	31.1	14
CH Zug	20.6	1	20.7	1	19.9	1
CH Zürich	25.3	4	25.9	4	24.4	4
France	44.5	18	45.6	18	41.5	18
Germany	46.5	19	46.5	19	46.5	19
Ireland	35.5	16	35.3	16	32.4	16
Italy	50.6	20	49.6	20	47.2	20
The Netherlands	30.9	9	30.6	8	30.9	13
United Kingdom	33.5	14	34.6	14	30.7	12
United States	34.2	15	34.8	15	31.7	15

**Table A.55.** EATR for a single with a disposable income of € 100,000 in 2003, in per cent

	Standard		Pension-oriented		Lti-oriented	
	EATR	Rk	EATR	Rk	EATR	Rk
Austria	41.7	16	42.3	16	39.5	16
CH Basel-Landschaft	36.6	6	36.9	9	34.5	8
CH Basel-Stadt	36.9	9	36.8	8	34.8	12
CH Bern	36.8	8	36.5	7	34.7	10
CH Genève	37.9	10	38.0	10	35.8	13
CH Nidwalden	28.3	3	27.6	3	26.7	3
CH Schwyz	25.7	1	24.9	2	24.1	1
CH St. Gallen	36.8	7	35.6	6	34.7	9
CH Ticino	38.2	11	38.0	11	36.0	14
CH Valais	35.4	5	34.4	5	33.4	5
CH Vaud	39.3	14	38.3	12	37.0	15
CH Zug	25.9	2	24.8	1	24.2	2
CH Zürich	32.6	4	32.8	4	30.6	4
France	48.2	19	50.2	19	43.5	18
Germany	47.6	18	47.6	18	47.6	20
Ireland	40.3	15	41.0	13	34.8	11
Italy	49.8	20	53.6	20	44.4	19
The Netherlands	42.9	17	42.0	15	42.9	17
United Kingdom	39.2	13	42.3	17	34.4	7
United States	38.2	12	41.1	14	34.2	6

**Table A.56.** EATR for a single with a disposable income of € 200,000 in 2003, in per cent

	Standard		Pension-oriented		Lti-oriented	
	EATR	Rk	EATR	Rk	EATR	Rk
Austria	43.1	12	43.7	12	41.6	15
CH Basel-Landschaft	42.7	11	42.1	9	39.6	12
CH Basel-Stadt	42.4	9	41.4	7	39.4	10
CH Bern	42.4	8	41.4	8	39.5	11
CH Genève	43.8	14	42.7	10	40.6	13
CH Nidwalden	32.0	3	30.8	3	29.6	3
CH Schwyz	29.4	2	28.3	2	27.2	2
CH St. Gallen	40.5	6	39.4	6	37.8	9
CH Ticino	44.0	15	43.0	11	40.9	14
CH Valais	39.1	4	38.1	4	36.4	7
CH Vaud	45.4	16	43.8	13	42.3	16
CH Zug	29.3	1	28.1	1	27.0	1
CH Zürich	40.3	5	39.3	5	37.3	8
France	52.3	20	54.9	20	43.5	17
Germany	48.8	18	48.8	18	48.8	20
Ireland	43.5	13	44.3	14	35.7	5
Italy	51.5	19	53.7	19	43.9	18
The Netherlands	47.3	17	46.5	17	47.3	19
United Kingdom	42.6	10	45.6	16	35.8	6
United States	42.0	7	44.9	15	35.1	4

**Table A.57.** EATR for a family with a disposable income of € 50,000 in 2003, in per cent

	Standard		Pension-oriented		Lti-oriented	
	EATR	Rk	EATR	Rk	EATR	Rk
Austria	30.9	18	31.3	18	29.9	18
CH Basel-Landschaft	22.6	11	23.3	12	21.9	11
CH Basel-Stadt	22.6	10	23.0	10	21.8	10
CH Bern	24.4	14	25.1	14	23.7	14
CH Genève	23.5	13	24.1	13	22.7	13
CH Nidwalden	18.6	3	18.9	3	17.9	3
CH Schwyz	16.4	2	16.7	2	15.7	2
CH St. Gallen	21.3	8	22.0	8	20.6	9
CH Ticino	20.7	5	21.7	6	19.9	7
CH Valais	20.9	6	21.7	5	20.2	8
CH Vaud	25.6	15	26.1	15	24.7	15
CH Zug	14.6	1	15.1	1	14.0	1
CH Zürich	19.1	4	19.9	4	18.4	4
France	32.3	19	32.6	19	30.1	19
Germany	27.9	17	28.0	16	26.6	17
Ireland	23.5	12	23.2	11	19.8	6
Italy	49.4	20	48.4	20	46.0	20
The Netherlands	22.6	9	23.0	9	22.6	12
United Kingdom	27.6	16	28.8	17	25.1	16
United States	21.1	7	21.9	7	19.3	5



**Table A.58.** EATR for a family with a disposable income of € 100,000 in 2003, in per cent

	Standard		Pension-oriented		Lti-oriented	
	EATR	Rk	EATR	Rk	EATR	Rk
Austria	38.2	17	38.9	16	35.8	18
CH Basel-Landschaft	31.3	7	31.4	7	29.1	7
CH Basel-Stadt	32.1	12	32.1	9	30.0	13
CH Bern	31.9	10	32.1	10	29.7	11
CH Genève	33.9	13	34.0	13	31.7	14
CH Nidwalden	25.0	3	24.5	3	23.3	3
CH Schwyz	22.0	2	21.8	2	20.5	2
CH St. Gallen	30.2	5	29.8	5	28.1	6
CH Ticino	32.0	11	32.0	8	29.7	10
CH Valais	31.5	9	30.1	6	29.4	9
CH Vaud	31.4	8	32.7	11	29.4	8
CH Zug	20.9	1	20.7	1	19.3	1
CH Zürich	26.7	4	27.9	4	24.8	4
France	40.0	18	41.9	19	34.4	16
Germany	35.2	14	36.1	14	35.2	17
Ireland	35.8	15	36.6	15	29.9	12
Italy	49.2	20	53.1	20	43.8	20
The Netherlands	40.2	19	39.3	17	40.2	19
United Kingdom	37.4	16	40.7	18	32.5	15
United States	31.3	6	33.8	12	26.4	5

**Table A.59.** EATR for a family with a disposable income of € 200,000 in 2003, in per cent

	Standard		Pension-oriented		Lti-oriented	
	EATR	Rk	EATR	Rk	EATR	Rk
Austria	41.5	12	42.1	14	39.9	17
CH Basel-Landschaft	39.2	9	39.1	9	36.3	11
CH Basel-Stadt	39.1	8	38.6	7	36.2	10
CH Bern	39.8	10	38.9	8	36.8	12
CH Genève	42.1	16	40.9	12	38.8	16
CH Nidwalden	30.8	3	29.6	3	28.4	3
CH Schwyz	28.0	2	26.8	2	25.7	2
CH St. Gallen	38.4	7	37.0	6	35.5	9
CH Ticino	41.5	13	40.7	11	38.3	14
CH Valais	37.4	5	36.4	5	34.7	7
CH Vaud	41.2	11	39.6	10	37.8	13
CH Zug	28.0	1	26.4	1	25.5	1
CH Zürich	36.4	4	35.7	4	33.3	5
France	48.2	19	51.0	19	38.6	15
Germany	43.4	17	43.4	16	43.4	18
Ireland	41.6	14	42.2	15	33.5	6
Italy	51.2	20	53.4	20	43.6	19
The Netherlands	46.2	18	45.4	18	46.2	20
United Kingdom	41.8	15	44.8	17	35.0	8
United States	37.9	6	41.1	13	30.5	4

**Table A.60.** Comparison of the EATR in the standard case and with a public pension scheme under market conditions, single in 2003, in per cent

Disposable income	€ 50,000		€ 100,000		€ 200,000	
	standard case	simulation	standard case	simulation	standard case	simulation
Austria	38.5	31.6	41.7	38.6	43.1	41.6
CH Basel-Landschaft	29.3	26.3	36.6	32.8	42.7	38.7
CH Basel-Stadt	31.0	28.0	36.9	33.0	42.4	38.3
CH Bern	30.5	27.5	36.8	32.9	42.4	38.4
CH Genève	31.5	28.6	37.9	34.1	43.8	40.1
CH Nidwalden	23.9	20.6	28.3	23.9	32.0	27.2
CH Schwyz	20.9	17.6	25.7	21.1	29.4	24.5
CH St. Gallen	30.1	27.0	36.8	32.6	40.5	36.3
CH Ticino	31.0	28.0	38.2	34.4	44.0	40.0
CH Valais	27.5	24.3	35.4	31.2	39.1	34.8
CH Vaud	31.9	29.1	39.3	35.4	45.4	41.4
CH Zug	20.6	17.2	25.9	21.3	29.3	24.3
CH Zürich	25.3	22.2	32.6	28.7	40.3	36.1
France	44.5	41.2	48.2	46.6	52.3	51.3
Germany	46.5	34.4	47.6	42.5	48.8	46.5
Ireland	35.5	25.4	40.3	34.0	43.5	38.2
Italy	50.6	39.0	49.8	42.9	51.5	48.7
The Netherlands	30.9	24.5	42.9	40.8	47.3	46.4
United Kingdom	33.5	27.1	39.2	34.6	42.6	38.7
United States	34.2	27.3	38.2	33.7	42.0	40.1

**Table A.61.** Comparison of the EATR in the standard case and a public pension scheme under market conditions, family in 2003, in per cent

Disposable income	€ 50,000		€ 100,000		€ 200,000	
	standard case	simulation	standard case	simulation	standard case	simulation
Austria	30.9	22.5	38.2	34.5	41.5	39.9
CH Basel-Landschaft	22.6	20.5	31.3	27.5	39.2	35.4
CH Basel-Stadt	22.6	20.4	32.1	28.4	39.1	35.2
CH Bern	24.4	22.3	31.9	28.2	39.8	35.8
CH Genève	23.5	21.3	33.9	30.3	42.1	38.0
CH Nidwalden	18.6	16.4	25.0	20.9	30.8	26.2
CH Schwyz	16.4	14.2	22.0	18.0	28.0	23.3
CH St. Gallen	21.3	19.2	30.2	26.4	38.4	34.2
CH Ticino	20.7	18.7	32.0	28.3	41.5	37.6
CH Valais	20.9	18.7	31.5	27.6	37.4	33.2
CH Vaud	25.6	23.4	31.4	28.0	41.2	37.1
CH Zug	14.6	12.5	20.9	16.8	28.0	23.2
CH Zürich	19.1	17.1	26.7	23.1	36.4	32.2
France	32.3	28.4	40.0	37.9	48.2	51.3
Germany	27.9	12.4	35.2	27.7	43.4	40.6
Ireland	23.5	9.1	35.8	28.6	41.6	35.9
Italy	49.4	37.6	49.2	42.1	51.2	48.4
The Netherlands	22.6	16.0	40.2	38.0	46.2	45.3
United Kingdom	27.6	21.2	37.4	32.8	41.8	37.9
United States	21.1	15.6	31.3	25.6	37.9	36.0

**Table A.62.** Comparison of the EATR in the standard case and with social security contributions yielding equivalent individual benefits, single in 2003, in per cent

Disposable income	€ 50,000		€ 100,000		€ 200,000	
	standard case	simulation	standard case	simulation	standard case	simulation
Austria	38.5	24.4	41.7	35.3	43.1	40.2
CH Basel-Landschaft	29.3	19.7	36.6	26.8	42.7	33.9
CH Basel-Stadt	31.0	21.3	36.9	27.1	42.4	33.6
CH Bern	30.5	20.7	36.8	26.6	42.4	33.4
CH Genève	31.5	21.5	37.9	27.7	43.8	34.8
CH Nidwalden	23.9	14.1	28.3	17.8	32.0	22.2
CH Schwyz	20.9	11.2	25.7	15.1	29.4	19.5
CH St. Gallen	30.1	19.9	36.8	26.2	40.5	31.3
CH Ticino	31.0	21.2	38.2	28.3	44.0	35.3
CH Valais	27.5	18.9	35.4	26.6	39.1	31.5
CH Vaud	31.9	22.0	39.3	28.7	45.4	36.3
CH Zug	20.6	10.9	25.9	15.2	29.3	19.5
CH Zürich	25.3	15.8	32.6	22.4	40.3	31.2
France	44.5	21.5	48.2	29.6	52.3	35.7
Germany	46.5	25.8	47.6	39.2	48.8	45.0
Ireland	35.5	22.4	40.3	31.8	43.5	36.2
Italy	50.6	32.1	49.8	35.3	51.5	41.5
The Netherlands	30.9	19.7	42.9	39.2	47.3	45.8
United Kingdom	33.5	24.1	39.2	32.6	42.6	37.0
United States	34.2	23.6	38.2	30.5	42.0	37.0

**Table A.63.** Comparison of the EATR in the standard case and with social security contributions yielding equivalent individual benefits, family in 2003, in per cent

Disposable income	€ 50,000		€ 100,000		€ 200,000	
	standard case	simulation	standard case	simulation	standard case	simulation
Austria	30.9	13.1	38.2	30.8	41.5	38.5
CH Basel-Landschaft	22.6	13.9	31.3	20.9	39.2	30.5
CH Basel-Stadt	22.6	13.6	32.1	21.9	39.1	30.3
CH Bern	24.4	15.5	31.9	21.5	39.8	30.5
CH Genève	23.5	13.8	33.9	23.4	42.1	33.0
CH Nidwalden	18.6	9.7	25.0	14.6	30.8	21.0
CH Schwyz	16.4	7.7	22.0	11.8	28.0	18.1
CH St. Gallen	21.3	12.1	30.2	19.4	38.4	28.9
CH Ticino	20.7	11.9	32.0	21.6	41.5	32.7
CH Valais	20.9	13.6	31.5	22.6	37.4	29.8
CH Vaud	25.6	15.8	31.4	21.2	41.2	31.5
CH Zug	14.6	6.1	20.9	10.7	28.0	18.0
CH Zürich	19.1	10.5	26.7	16.7	36.4	27.1
France	32.3	9.1	40.0	19.0	48.2	29.9
Germany	27.9	4.1	35.2	22.8	43.4	38.9
Ireland	23.5	5.4	35.8	26.2	41.6	33.9
Italy	49.4	30.3	49.2	34.6	51.2	41.2
The Netherlands	22.6	10.0	40.2	36.2	46.2	44.6
United Kingdom	27.6	18.6	37.4	30.7	41.8	36.2
United States	21.1	11.8	31.3	22.0	37.9	32.7

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# List of Abbreviations and Symbols

## Abbreviations

A	Austria
ACI	Automobile Club d'Italia
AGIRC	Régime de retraite des cadres
AHV	Alters- und Hinterbliebenenversicherung
AKW	Algemene kinderbijslagwet
AOW	Algemene ouderdomswet
ARCO	Régime de retraite des non-cadres
ASVG	Allgemeines Sozialversicherungsgesetz
BE	Bern
BFH	Bundesfinanzhof
BL	Basel-Landschaft
BNB	Beslissingen in belastingzaken Nederlandse belastingrechtspraak (unofficial tax reporter)
BS	Basel-Stadt
BStBl	Bundessteuerblatt
CCH	Commerce Clearing House
CGI	Code général des impôts
CH	Switzerland
CNAV	Caisse nationale d'assurance vieillesse
CRDS	Contribution au remboursement de la dette sociale
CSG	Contribution sociale généralisée
D	Germany
EO	Erwerbsersatzordnung
ESRI	Economic and Social Research Institute (Tokyo)
EStG	Einkommensteuergesetz (Austria or Germany)
F	France
FA	Finance Act
FURBS	Funded unapproved retirement benefit scheme
FUTA	Federal unemployment tax act
GB	United Kingdom
GE	Genève
I	Italy
IBFD	International Bureau of Fiscal Documentation
ICTA	Income and Corporation Tax Act
IRAP	Imposta regionale sulle attività produttive
IRC	Irish Revenue Code
IRL	Ireland

ISSA	International Social Security Association
lti	long-term incentives
MISSOC	Mutual Information System on Social Protection in the EU Member States
MV	Mitarbeiter-Vorsorge
NL	Netherlands
NW	Nidwalden
OASDI	Old-age survivor and disability insurance
OECD	Organisation for Economic Co-Operation and Development
PAYG	pay-as-you-go
Rk	rank
SG	St. Gallen
SZ	Schwyz
TCA	Taxes Consolidation Act
TFR	Trattamento de fine rapporto
TI	Ticino
USA	United States
VD	Vaud
VS	Valais
Wet LB	Wet op de loonbelasting
ZG	Zug
ZH	Zürich

### Symbols

$\delta$	discount factor
$E$	disposable income
$E_0$	disposable income in the remuneration period
$E_l$	disposable income in the period when stock options are exercised
$E_r$	disposable income in a pension period
$E^*$	total remuneration
$EATR$	effective average tax rate
$L$	time between remuneration period and date of exercise, $L = t_1 - t_0$
$P$	number of retirement periods
$r$	market interest rate
$R$	time between the beginning of retirement and the pension period
$t_0$	period of remuneration
$t_1$	period of exercising the stock options
$t_r$	any period during retirement
$\theta_l$	share of the true value of the option which is subject to tax
$\theta_p$	share of the lease value of the company car which is subject to tax

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