Volume Title: The Taxation of Income from Capital: A Comparative Study of the United States, the United Kingdom, Sweden, and Germany

Volume Author/Editor: Mervyn A. King and Don Fullerton, eds.

Volume Publisher: University of Chicago Press

Volume ISBN: 0-226-43630-6

Volume URL: http://www.nber.org/books/king84-1

Publication Date: 1984

Chapter Title: West Germany

Chapter Author: Mervyn A. King, Don Fullerton

Chapter URL: http://www.nber.org/chapters/c11498

Chapter pages in book: (p. 149 - 192)

5 West Germany

5.1 Introduction

The basic structure of the present German tax system emerged at the end of World War I. Taxes on income and net wealth, which before this time had been the principal sources of revenue for the states (*Länder*), came under federal control in 1920. Since then, legislation in the field of taxation has been primarily a federal matter, although the states have continued to play an important role in the administration of the tax system.[1]

As can be seen from table 5.1, taxes on personal incomes, including social security contributions, have been the main source of government revenue since the mid-1950s. In 1979 these taxes accounted for 63 percent of total revenue (44 percent in 1955), taxes on corporations accounted for only 6 percent of total revenue (10 percent in 1955), and the value-added tax (before 1968 the turnover tax) accounted for about 16 percent of all taxes (36 percent in 1955). Total revenue increased as a proportion of GDP. About two-thirds of the increase in the ratio of tax revenue to GDP, from about 31 percent in 1955 to about 37 percent in 1979, can be attributed to higher social security contributions.

These figures do not, however, bring out the numerous changes in policy that have occurred since the Second World War. These changes have been due partly to historical circumstances—the allied occupation, the needs of reconstruction, the prolonged recession of the mid-1970s—and partly to changes in the objectives of public policy. It is convenient to divide the postwar years into four distinct periods:

1. For a description of the historical development of the German tax system, see Gumpel and Boettcher (1963).

Table 5.1 **Sources of Tax Revenue, Germany, 1955–79**

Revenue Source	Share of Total Receipt (%)				Total Receipts (DM million)
	1955	1960	1970	1979	1979
Taxes on personal incomes	19.2	22.5	26.6	28.9	151.208
Wages and salaries	7.5	8.5	15.8	18.6	97.067
Assessed income tax	7.5	9.5	7.2	7.2	37.551
Withholding except wages and salaries	0.6	0.9	0.9	0.7	3.809
Enterprise tax	3.6	3.6	2.5	2.4	12.781
Other			0.3		—
Taxes on corporate incomes	9.8	9.3	5.7	6.0	31.497
Corporation tax	5.4	6.9	3.9	4.4	22.912
Enterprise tax	4.4	2.5	1.6	1.6	8.520
Other			0.1	0.0	.064
Social security contributions	24.5	27.5	30.4	34.1	178.110
By employers	14.2	14.9	16.6	18.3	95.520
By employees	9.8	11.8	13.5	15.2	79.230
By self-employed	0.6	0.9	0.3	0.6	3.360
Payroll taxes	0.8	0.7	0.6	0.6	3.324
Property taxes	8.8	6.0	4.2	2.7	14.187
General taxes on goods and services	19.8	17.0	17.1	16.1	84.206
Taxes on specific goods and services	14.7	14.1	12.9	9.3	48.755
Alcohol	1.8	1.9	1.6	1.1	5.769
Tobacco	4.5	3.7	2.9	2.0	10.701
Petroleum	2.0	2.8	5.2	4.0	21.140
Other	6.4	5.7	3.1	2.1	11.145
Miscellaneous taxes	2.4	2.7	2.5	2.2	11.513
Total receipts	100.0	100.0	100.0	100.0	522.800
Gross domestic product (DM million)	182.0	302.8	678.8	1400.2	1,400.200
Share of taxes in GDP (%)	30.8	31.3	32.8	37.3	

Source: Revenue Statistics of OECD Member Countries 1965–1980 (Paris 1981).

1. Immediately after the war, the Allied Control Council introduced high personal income tax rates (up to 90 percent) and corporation tax rates (50 percent, raised to 60 percent in 1951). Favorable depreciation allowances, however, reduced the effective tax burden.

2. During reconstruction there were successive reductions in personal tax rates (1948, 1953, 1954). In 1958 a new rate structure was introduced that, despite subsequent modification, has been largely maintained. This structure comprised a low exemption level, a bracket with a constant marginal tax rate, a second bracket with progressive rates, and a final bracket with a constant marginal tax rate. During this period the major change in the corporation tax was the introduction of a "split-rate system" in 1953 (see below). Tax rates on retained earnings and dividends were changed repeatedly (1953, 1955, 1958). It is interesting that, along with the general reduction in tax rates, depreciation allowances were reduced, apparently in the hope of forcing firms to seek external finance for new investments by restricting cash flows.

3. With the end of the reconstruction period (mid-1960s) governments showed increased concern with demand management and the existing pattern of income distribution. It was often stated (especially by the advisory board of the Ministry of Finance) that tax policy toward investment should be employed to smooth cyclical fluctuations or to assist certain types of activity (regional development, R&D, etc.). Moreover, as in the case of grants, the instruments applied should attempt to be as neutral as possible among firms of different size. Hence surcharges on income and corporate taxes (in 1970–71, 1973–74), an investment tax (1973), and a temporary tax-free investment grant (1974–75) were introduced at different times. Investment grants were provided for regional development, for research, for environmental protection, and for energy saving.

4. Since the mid-1970s there has been a change of climate in favor of establishing a "better general framework" for investment. In 1977 the new corporate tax system was introduced that abolished (for residents) double taxation of distributed earnings by introducing a system with full imputation of corporate tax payments at the recipient level (see section 5.2.2). Wealth tax rates were lowered in 1978, after they had been increased in 1975. Exemption limits were raised for the local business tax, and in 1980 one component of the local business tax—the local payroll tax—was abolished. Furthermore, depreciation allowances were increased in 1977 and 1981, which seemed to indicate a departure from previous attitudes toward the tax treatment of investment.

Since 1975 no fewer than four income tax "reforms" have been carried out (1975, 1978, 1979, 1981). These changes are summarized in table 5.2, which shows the development of marginal tax rates on earnings.

Inflation has been a less serious problem in Germany than in other

Table 5.2 **Development of Individual Income Tax Rates, 1974–81**

Gross Annual Wages and Salaries (DM)	Average 1977[a] Wages and Salaries within Income Interval	Marginal Tax Rates					Change between 1974 and 1981
		1974	1977	1978	1979	1981	
Below 2,400	1,176	0.0	0.0	0.0	0.0	0.0	0
2,400–4,800	3,575	19.0	22.0	22.0	0.0	0.0	−19.0
4,800–7,200	5,950	19.0	22.0	22.0	22.0	22.0	3.0
7,200–9,600	8,401	19.6	22.0	22.0	22.0	22.0	2.3
9,600–12,000	10,773	23.1	22.0	22.0	22.0	22.0	−1.1
12,000–16,000	13,990	27.3	22.0	22.0	22.0	22.0	−5.3
16,000–20,000	18,102	32.0	32.8	32.8	25.6	22.1	−9.9
20,000–25,000	22,591	36.1	36.7	36.7	32.3	27.9	−8.2
25,000–36,000	30,051	40.7	42.0	42.0	40.0	35.7	−4.9
36,000–50,000	42,269	44.6	47.1	47.1	46.5	44.4	−0.1
50,000–75,000	58,471	48.1	50.1	50.1	50.1	50.1	1.9
75,000–100,000	84,212	50.6	53.7	53.7	53.7	53.7	3.1
100,000 and above	140,052	53.0	56.0	56.0	56.0	56.0	3.0
Total[b]	27,281	41.6	43.2	43.2	41.5	39.2	−2.3

Source: Tax laws in Germany.

Note: Entries are marginal tax rates that apply at specified wage and salary levels if the taxpayer has no other income. The wage and salary distribution of 1977 has been used to weight marginal rates among income intervals.

[a]Preliminary figures.

[b]Weighted average.

countries. The average annual inflation rate for consumption and investment goods between 1970 and 1980 was 4.2 percent in Germany, and this is the measure we use for the "actual" expected rate of inflation. The general increase in prices has had, consequently, somewhat less impact on the tax system, although there has still been "fiscal drag." From the point of view of this study, the more interesting effect of inflation relates to the definition of the tax base and the need for "capital income indexation." Although the base has not been adjusted in this way, the raising of depreciation allowances in 1977 and 1981 may be considered as partial compensation for the erosion of allowances that occurs under historic cost depreciation.

5.2 The Tax System

5.2.1 The Personal Income Tax (*Einkommensteuer*)

Individual residents in Germany are liable, in principle, to a single income tax on all sources of income. Assessment is, however, carried out according to a schedular system that specifies seven separate forms of income.[2]

1. From agriculture and forestry
2. From trade and business
3. From independent personal services
4. From employment
5. From capital
6. From rents and royalties
7. Miscellaneous income, including annuities and other recurrent payments of benefits, "speculation gains," and a few other sources of income.

Income for the first three categories is measured, with some adjustment, as the difference in net worth between the beginning and end of the accounting year as measured by book values. For the remaining categories income is measured as the difference between gross receipts and expenses.

Except for preferential tax rates on certain items (e.g., "extraordinary income," described below) tax is computed at graduated rates on the total aggregate amount of the taxpayer's income, net of all the allowable deductions and exemptions. Married couples are entitled to income splitting, whereby the tax charged is twice the amount that would be due on half the joint taxable income. In 1981 there were four clearly defined bands of tax rates:

2. The taxpayer is permitted to offset losses (or the excess of income-related expenses over gross income) from one or several sources against income from other sources.

The first DM 4212 (DM 8424, for married persons jointly assessed) of the tax base is exempt.

For taxable income above DM 4212 (DM 8424) and below DM 18,000 (DM 36,000), the tax is 22 percent.

For taxable income between DM 18,001 (DM 36,002) and 129,999 (259,999), the tax is computed by means of two complicated formulas that raise the marginal tax rate from 22 percent to 56 percent.[3]

Above DM 130,000 (DM 260,000) the tax rate is 56 percent.

A rough idea of the distribution of the tax rates on wages and salaries among the various income classes is presented in table 5.2, and the distribution of wages and salaries is shown in table 5.3.

Tax allowances for children were abolished in 1975. They have been replaced by uniform monthly cash payments made by the labor office. These monthly payments are respectively DM 50 for the first child, DM 100 for the second child, and DM 220 for each child after the first two.

Withholding taxes, the most important of which are the wage taxes (*Lohnsteuer*), are an important part of the German tax system. Most forms of capital income (including dividends and convertible bonds) are also subject to a flat-rate withholding tax of 25 percent, and for some forms—not of direct interest to the present study—a 30 percent rate represents a final payment of tax. Most bonds are, however, exempt from withholding taxes. The withholding tax is considered an advanced payment of income tax for residents. Credit against income tax and refunds, if payments exceed income tax due, are obtainable against amounts withheld. Not all tax-exempt institutions are able to reclaim the refund, and this produces the anomalous result that some institutions bear a rather heavy tax burden on particular forms of investment income.

In general, individuals are *not* taxed on capital gains. Sales and certain "dispositions" of property held for short periods are, however, treated as "speculative gains" and included in the individual's taxable income. If the holding period exceeds six months for securities and two years for real property, gains are not taxed. We have therefore assumed, for the purpose of this study, that there is no tax on capital gains ($z = 0$).

The German tax system allows many deductions for work-related expenses (*Werbungskosten*) and other expenses (*Sonderausgaben*) in computing taxable income.[4] For work-related expenses the taxpayer may choose to itemize deductions or take standard deductions for some categories of income.[5] The standard deductions include also a flat-rate

3. The formulas are: (a) DM 18,000–DM 59,999: $\{[(3.05y - 73.76)y + 695]y + 2200\}y + 3034$, where y is 1/10,000 of the amount that exceeds DM 18,000; and (b) DM 60,000–DM 129,999: $\{[(0.09y - 5.45)y + 88.13]y + 5040\}y + 20018$, where y is now 1/10,000 of the amount that exceeds DM 60,000.

4. We omit discussion of certain special allowances granted either for particular groups of taxpayers or exceptional expenses (*Aussergewöhnliche Belastung*).

5. These are as follows: income from employment (DM 564), for capital income (DM 100/joint assessment DM 200), annuities, and pensions (DM 200).

Table 5.3 **Distribution of Gross Annual Wages and Salaries by Income Class, 1950–77**

Gross Annual Wages and Salaries (DM)	Share of Total Wages and Salaries (%)						
	1950	1961	1965	1968	1971	1974	1977
Below 2,400	18.5	3.2	1.9	1.2	0.6	0.3	0.3
2,400–4,800	59.9	12.3	5.1	2.4	1.2	0.8	0.6
4,800–7,200	14.1	26.9	11.3	4.8	1.9	1.0	0.8
7,200–9,600	3.8	26.7	19.8	9.2	3.2	1.5	0.9
9,600–12,000	1.6	12.5	23.1	14.2	5.1	2.0	1.3
12,000–16,000	—	8.8	20.8	24.6	13.9	5.5	3.0
16,000–20,000	1.5	3.9	7.8	17.5	17.9	9.3	4.8
20,000–25,000	0.3	2.2	4.3	13.1	18.8	15.2	10.1
25,000–36,000	—	1.5	3.1	8.5	24.8	29.6	26.5
36,000–50,000	—	0.6	1.0	2.2	8.4	22.1	25.9
50,000–75,000	—	0.4	0.6	0.9	2.7	9.3	18.8
75,000–100,000	—	0.1	0.2	0.3	0.5	1.6	4.0
100,000 and above	—	0.4	0.4	0.4	0.6	1.1	2.4
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Körner (1981).

supplementary allowance for employment income (DM 480), a "Christmas" allowance (DM 600), and a 40 percent allowance for income from pensions (with an upper limit of DM 4,800). In addition, a special "saver's exemption" (DM 300/DM600) is allowed for capital income.

Special expenses (*Sonderausgaben*) are personal or family expenditures not incurred in connection with the generation of income. Among others they include charitable contributions, the church tax, expenses for professional education, and donations to political parties.[6] The most important provisions, however, regard certain types of savings: life insurance policies; insurance policies covering civil liability, accidents, and health; social security contributions (including those paid by the employer); and, within certain limits, contributions to savings and loan associations. A standard allowance is granted for insurance premiums (*Versorgungspauschbetrag*). For wage and salary earners the standard allowance (which depends on income, marital status, and number of children) is incorporated in the wage tax schedule (*Vorsorgepauschale*). This allowance is granted even if the actual insurance premiums are lower. If higher, the actual premiums are deductible only up to certain limits, which depend again upon family composition (*Sonderausgabenhöchstbeträge*). These upper limits are adjusted from time to time.

In practice this system implies that the difference between the maximum allowance and the allowance incorporated in the tax schedule (*Vorsorgepauschale*), is rather small for most people. The *Vorsorgepauschale* becomes equal to the maximum allowance for single taxpayers above an annual income of DM 26,000 and for married taxpayers above DM 52,000 (if both spouses are employed and there are no children). If one spouse is employed the maximum allowance is higher than the allowance that is given automatically, although the difference is small in the middle and higher income brackets. Additional savings in life insurance policies are therefore in most instances not especially favored by the tax system.

There have been a number of other subsidies to saving, but these have recently been reduced. Between 1948 and 1958, all savings made under special "savings contracts" were deductible (*Sonderausgaben*). From 1959 to 1980, cash grants proportional to savings were available up to a certain limit. To encourage a wider distribution of wealth and workers' participation in enterprises, savings of employees and contributions by employers to special schemes are subsidized. Under this scheme a 30 percent cash grant is provided on maximum savings up to DM 624.[7] These

6. The church tax is a regular levy on individuals who declare themselves members of the Roman Catholic church or Protestant churches.

7. The rate of grant is 40 percent for families with three or more children. The maximum amount of savings (DM 624) includes the grant element, so the employee may place only DM 436.80 of his wage and salary income into this scheme. If the employer pays additional wages into the savings promotion scheme, his income (or corporate) tax is lowered by 30 percent of this amount (up to a maximum of DM 6,000).

cash grants are limited to employees with a maximum taxable income of less than DM 24,000 if they are single or DM 48,000 if they are married. There is no restriction on the form of the savings.

The tax treatment of owner-occupied housing distinguishes "one family houses" from "two or more family houses." If classified in the second category (at least one apartment has to be let by the owner), the investment is treated the same as a business investment—that is, interest payments are fully deductible and depreciation is deductible also at rates of 5 percent in the first eight years, 2.5 percent from the ninth to the fourteenth year, and 1.25 percent from the fifteenth to the fiftieth year (see section 5.2.3). On the other hand, both rent received and the imputed rent from owner occupancy are taxed. For a "one family house," interest payments for mortgages generally are not deductible, but there is no taxation of imputed rent. (For houses built between 1983 and 1986, interest payments are deductible up to 10,000 DM per annum during the first three years.) There are, however, favorable depreciation allowances at rates of 5 percent in the first eight years and 2.5 percent for the remaining years, subject to an upper limit of DM 200,000 for the depreciation base. In contrast to many other countries, interest payments on consumer loans are not deductible.

Government interest in savings subsidies seems to have waned in recent years. In 1980 the general savings bonus system was abolished, and grants for savings in residential construction were reduced. The importance of these schemes as a percentage of household saving is summarized in table 5.4.

5.2.2 The Corporate Tax System

In Germany the corporate sector accounts for about 35–40 percent of total turnover of all enterprises. The corporation tax, however, does not constitute a large proportion of tax revenues. In 1977 a new system of company taxation was introduced that virtually eliminated the double taxation of dividends. This was accomplished by combining the basic features of the split-rate system, whereby retained earnings and dividends are taxed at different rates, with an imputation system that provided for a dividend credit. Under this system corporation tax on profits is levied at a rate of 56 percent on retained earnings and 36 percent on distributed profits.[8] The shareholder then receives full credit for this 36 percent when his income tax liability is computed.

8. We shall limit the discussion here to industrial companies. Public credit institutions and savings banks are taxed at rates of 46 percent and 44 percent, respectively. The system separates distributable earnings into three categories: those that have to bear a tax at a rate of 56 percent, those taxed at 36 percent, and those that pay no tax. In most instances the last two categories apply respectively to domestic intercompany dividends and to income from foreign subsidiaries. There is no reduction in tax if dividends are distributed from earnings deemed to come from the 36 percent group, and, indeed, if profits are distributed from the no-tax group, the tax burden is increased to 36 percent.

Table 5.4 **Direct and Indirect Savings Promotion Measures**
(amount of each subsidy as % of total household savings)

Period	Total of All Subsidy Schemes	Residential Housing Promotion					Savings Bonus Scheme	Wealth-Promotion Scheme for Employees
		Total	Savings Promotion		Other			
			Bonus Scheme	Tax Reductions	Special Depreciations	Land Tax Exemptions		
1949–53	9.7	7.6	0.5	2.9	2.5	1.7	2.1	—
1954–59	11.0	8.1	1.9	1.5	2.6	2.0	3.0	—
1960–70	9.9	8.1	2.6	1.8	1.9	1.7	1.4	0.5
1971–74	11.8	7.0	3.4	1.0	1.5	1.1	1.2	3.5
1975–78	13.1	7.0	2.3	0.7	2.8	1.3	2.7	3.3

Source: Ministry of Social Affairs, Statistical Office, and own calculations.

In practice, the credit is computed as follows. Dividends received are grossed up by the 36 percent rate to determine a notional gross dividend; that is, the shareholder includes 36/64 = 9/16 of the cash dividend received as well as the dividend itself in his taxable income. The grossed-up dividends are applied to the appropriate income tax schedule, and a credit equal to 9/16 of the cash dividend is available to offset the tax liability. Refunds are paid to individual shareholders whose credits exceed income tax liabilities.[9] Refunds are, however, not completely available to tax-exempt institutions (see section 5.2.9). The lower tax on dividends is therefore virtually a form of deduction at source for the income tax on dividends.

The basic rate of corporation tax is 56 percent. The effect of this split-rate and dividend credit system is that distributed profits are not taxed by the corporation tax but bear only the shareholder's personal rate of income tax. In other words, the system operates as if it were an imputation system where the rate of imputation is the basic rate of corporation tax. In chapter 2 we showed that with an imputation system the tax discrimination variable θ is equal to $1/(1-c)$ where c is the rate of imputation. Hence in Germany $\theta = 1/(1-0.56) = 2.2727$.

The advantages granted to domestic taxpayers are not given to foreigners. This means that foreigners have to bear the full tax burden on distributions as well as the additional dividend withholding tax. In the case of a 25 percent dividend withholding tax rate, the total tax burden on investment income for foreigners is $0.36 + 0.25\ (1.00 - 0.36) = 52$ percent. In the case of double tax treaties where the dividend withholding tax is reduced to 15 percent, the total burden on foreigners is $0.36 + 0.15\ (1.00 - 0.36) = 45.6$ percent.

Before the introduction of the present system of dividend relief, the German corporation tax was based on a split rate system that provided partial relief for the double taxation of dividends at the corporate level. Under this system, profits distributed to shareholders were subject to a tax rate of 15 percent, whereas retained profits were taxed at 51 percent. During the 1970s, both rates were subject to a 3 percent surcharge, making them 15.45 and 52.45, respectively. If we denote the tax rates on distributed and undistributed profits by c_d and c_u, then the tax discrimination variable θ is equal to $1/(1 + c_d - c_u)$, as described in King (1977, chap. 3). For Germany this gives a value for θ, before the new corporate tax system, of 1.589.

Apart from the supplementary surcharge of 3 percent (*Ergänzungsabgabe*), levied from January 1968 until the introduction of the new corporate tax system, two other temporary surcharges were introduced as

9. There is also a withholding tax of 25 percent of the cash dividend that is also credited. It is, however, not part of the imputation system and is not discussed here. But see section 5.2.9.

short-term stabilization measures. The "demand pressure surcharge" (*Konjunkturzuschlag*) was a temporary and repayable surcharge between 31 July 1970 and 1 July 1971 and was equal to 10 percent of tax liabilities. It was repaid after 15 June 1972. The "stabilization surcharge" (*Stabilitätsabgabe*) was a temporary surcharge that lasted from 1 July 1973 until 30 June 1974 and was also charged at a rate of 10 percent. Finally, all interest payments are deductible for corporate tax purposes, and in Germany there are taxes on corporate wealth (see section 5.2.6 and 5.2.7).

5.2.3 Tax Allowances for Depreciation and Inventories

The basis for computing depreciation allowances is historical cost. Firms have a choice between two main methods for computing depreciation:[10] (*a*) straight line, allowed on all assets and mandatory for buildings (with an exception to be discussed below), and (*b*) declining balance, at a rate equal to three times the value of the straight-line rate, with a maximum of 30 percent (before 30 June 1981, the rate was 2.5 times the straight-line rate, with a maximum of 25 percent). Changes in these rates are summarized in table 5.5.

There are other methods of depreciation that can be used in special cases: (*a*) The "production" method, based on output and utilization, is allowed for business assets whose use and physical wear and tear are subject to fluctuations. (b) Special depreciation possibilities exist for some sectors (mining, private hospitals, agriculture), some capital goods, environmental protection, and investment goods used for ships or aircraft or in certain areas (Berlin, eastern frontier area).

There are detailed depreciation tables with service lives for individual investment goods. These are compulsory and form the basis of the capital stock values presented in corporate financial balance sheets. Since depreciation rates vary considerably, the values employed in this study are averages based on our own calculations from data from the Statistical Office. These values take account of changes in tax laws and in the composition of the asset category.[11] As can be seen from table 5.6, there has been a shortening of the economic and tax lives of both buildings and equipment.

The present value of depreciation allowances with straight-line depreciation per dollar of investment (A_z) is (see chap. 2)

10. Straight-line and declining-balance depreciation are considered to be ordinary (*planmässige*) methods. The other methods mentioned and the special provisions are said to be "extraordinary" (*ausserplanmässige*).

11. The calculation of the tax lives was based on the same method employed for the actual service lives shown below and on an average adjustment factor provided by the Statistical Office for the present study.

Table 5.5 **Development of Maximum First-Year Allowances for Assets with Different Service Lives**
(%)

Service Life (years)	First-Year Allowance If Straight Line Depreciation	First-Year Allowance If "Accelerated" Depreciation					
		1953-57	1 January 1958 –8 March 1960	9 March 1960– 31 December 1960	1 January 1961– 31 August 1977	1 September 1977 –29 June 1981	Since 30 June 1981
1	100.0	100.00	100.00	100.00	100.00[a]	100.00	100.00
2	50.00		25.00	20.00	20.00	25.00	30.00
3	33.33		25.00	20.00	20.00	25.00	30.00
4	25.00		25.00	20.00	20.00	25.00	30.00
5	20.00	Accelerated	25.00	20.00	20.00	25.00	30.00
6	16.67	depreciation	25.00	20.00	20.00	25.00	30.00
7	14.29	not allowed	25.00	20.00	20.00	25.00	30.00
8	12.50		25.00	20.00	20.00	25.00	30.00
9	11.11		25.00	20.00	20.00	25.00	30.00
10	10.00	28.31	25.00	20.00	20.00	25.00	30.00
11	9.09	26.59	22.73	18.18	18.18	22.73	27.27
12	8.33	25.09	20.83	16.67	16.67	20.83	25.00
13	7.69	23.78	19.23	15.38	15.38	19.23	23.07
14	7.14	22.61	17.86	14.29	14.29	17.86	21.43
15	6.67	21.57	16.67	13.33	13.33	16.67	20.00
16	6.25	20.63	16.00	16.00	12.50	15.63	18.75
17	5.88	19.78	16.00	16.00	11.76	14.71	17.65
18	5.56	19.00	16.00	16.00	11.11	13.89	16.67
19	5.26	18.30	15.79	15.79	10.53	13.16	15.79
20	5.00	17.65	15.00	15.00	10.00	12.50	15.00
25	4.00	15.04	12.00	12.00	8.00	10.00	12.00
30	3.33	13.18	11.67	11.67	6.67	8.33	10.00
40	2.50	10.63	8.75	8.75	5.00	6.25	7.50
50	2.00	8.97	7.00	7.00	4.00	5.00	6.00
100	1.00	5.20	3.50	3.50	2.00	2.50	3.00

Source: Tax laws in Germany.

[a]Accelerated depreciation was not allowed from 6 June 1970 to 31 January 1971, or from 9 May 1973 to 30 November 1973.

Table 5.6 **Development of Average Actual Service Life and Tax Life for Machinery and Buildings, 1960–78**

Year	Period of Service (years)			
	Machinery		Buildings[a]	
	Economic (1)	Tax Allowance (2)	Economic (3)	Tax Allowance (4)
1960	15	14	52	42
1961	15	14	50	40
1962	14	13	50	39
1963	14	13	50	38
1964	14	13	49	36
1965	13	13	48	35
1966	12	11	48	34
1967	13	11	48	34
1968	13	11	48	34
1969	13	11	47	33
1970	13	12	47	33
1971	13	11	46	32
1972	13	12	45	32
1973	13	11	45	31
1974	13	11	45	31
1975	13	11	45	31
1976	13	11	45	31
1977	13	11	44	30
1978	13	11	44	30

Source: Statistical Office and own calculations.
[a]Excluding housing.

$$(5.1) \qquad A_z = \frac{1}{L}\int_0^L e^{-\rho u}du = \frac{1}{\rho L}(1 - e^{-\rho L}),$$

where L is the asset life for tax purposes and ρ is the company's discount rate.

Declining balance depreciation is allowed on equipment at three times the straight-line rate, up to a maximum of 30 percent of the initial cost of the asset. Table 5.7 illustrates the development of these "accelerated" depreciation rates since the 1950s. Accelerated depreciation was reduced in 1960 from 2.5 to 2.0 times the straight-line rate and increased again in 1977 to 2.5 times and in 1981 to 3 times. To reduce short-term demand pressure, accelerated depreciation was, however, not permitted during two short periods in the 1970s (6 May 1970–31 January 1971 and 9 May 1973–30 November 1973). Table 5.6 shows the development of the aver-

Table 5.7 **Development of Average Service Lives Rates of Accelerated Depreciation**
(first-year allowance)

Period of Investment	Average Tax Life of Equipment[a] (years)	Maximum First-Year Allowance Corresponding to Average Tax Life[b] (%)
1960	14	17.86[c]
1961	14	14.28
1962	13	15.38
1963	13	15.38
1964	13	15.38
1965	13	15.38
1966	11	18.18
1967	11	18.18
1968	11	18.18
1969	11	18.18
1970	12	16.66[d]
1971	11	18.18
1972	12	16.16
1973	11	18.18[e]
1974	11	18.18
1875	11	18.18
1976	11	18.18
1977	11	18.11[f]
1978	11	22.73
1979	(11)	22.73
1980	(11)	22.73
1981	(11)	27.27[g]

Source: Tax laws in Germany.
[a]From table 5.6 (rounded figures).
[b]From tax law in individual years.
[c]17.86 until 8 March 1960, followed by 14.28.
[d]16.66 until 5 July 1970, and zero until 31 January 1971.
[e]18.18 until 8 May 1973, zero until 30 November 1973, followed by 18.18.
[f]18.11 until 31 August 1977, followed by 22.73.
[g]22.73 until 29 June 1981, followed by 27.27.

age actual and tax service lives as implied in the official capital stock calculations and also the corresponding maximum depreciation rates.

As for buildings in the United States, it is optimal to switch from declining balance to straight-line depreciation after a certain portion of the asset has been depreciated. The concept of the "switchover point" is discussed in detail in section 6.2.3 for the United States. The present value of depreciation allowances for equipment (A_z) is given by

$$A_z = a' \int_0^{L_s} e^{-(\rho + a')u} du + (e^{-a' \cdot L_s}) \cdot \left(\frac{1}{L - L_s}\right) \cdot \int_{L_s}^{L} e^{-\rho u} du, \tag{5.2}$$

where

B is the declining balance rate (equal to 2.0 for double declining balance and equal to 3.0 since 1981) in Germany

L is the tax life of the asset

L_s is the switchover point

$$a' = \frac{B}{L}.$$

The switchover point occurs at time L_s, where the straight-line depreciation rate $1/(L - L_s)$ exceeds the declining balance rate B/L on the remaining basis, that is, when

$$L_s = \left(\frac{B - 1}{B}\right) L. \tag{5.3}$$

Integrating (5.2), we obtain

$$A_z = \left(\frac{a'}{\rho + a'}\right)(1 - e^{-(\rho + a')L_s}) + \frac{e^{-a'L_s}}{(L - L_s)\rho} \cdot (e^{-\rho L_s} - e^{-\rho L}) \cdot \tag{5.4}$$

As an alternative to straight-line depreciation over an average of thirty years, declining balance depreciation over fifty years is granted on buildings constructed after 31 August 1977. The rates are 5 percent in the first eight years, 2.5 percent from the ninth to the fourteenth year, and 1.25 percent from the fifteenth to the fiftieth year.[12] The present value is

$$A_z = \left(0.05 \int_0^8 e^{-\rho u} du\right) + \left(0.025 \int_8^{14} e^{-\rho u} du\right) + \left(0.0125 \int_{14}^{50} e^{-\rho u} du\right) = \frac{1}{\rho} \cdot \{0.05 - 0.025e^{-8\rho} - 0.0125(e^{-14\rho} + e^{-50\rho})\}. \tag{5.5}$$

12. Before 29 June 1981 the rates were 3.5 percent in the first twelve years, 2 percent from the thirteenth to the thirty-second year, 1 percent from the thirty-third to the fiftieth year.

The present position concerning depreciation allowances is summarized in table 5.6. We have assumed a tax life (L) of eleven years for machinery, and since $B = 3.0$ the switchpoint is $L_s = 7.27$ (from equation 5.3). Since the straight-line tax life for buildings is considerably shorter than that specified by these "accelerated" depreciation provisions, we have assumed that companies employ straight-line depreciation with a tax life of thirty years. For both equipment and buildings, $f_1 = 1$ and $f_2 = 0$ for all sectors.

Turning to the tax treatment of inventories, it is interesting that German tax law disallows, with a few exceptions, the use of either LIFO (last in, first out) or FIFO (first in, first out).[13] The most common practice is to use a weighted average of the prices of the goods acquired during the year (*Durchschnittliche Anschaffungskosten*). To compute the effective proportion of the increase in the value of inventories taxed according to FIFO, we assumed that the real value of the inventory is constant, that there is continuous turnover during the year, and that inventories fully turn over in one year. The value of the taxable portion of inventories under these assumptions will, at the margin, be half that taxed according to the FIFO principle. Therefore $v = 0.5$, $f_1 = 1$, and all other depreciation parameter values are zero.

It is also possible for special reserves to be set aside when the replacement cost of purchased raw materials and work in progress has increased by more than 10 percent in the course of a year.[14] The reserves must be added back to taxable income no later than the sixth year following the end of the taxable year in which the allocation to reserves is made.

The value of the deferral of tax may be considerable at high rates of inflation. If we let π define the nominal increase in the price of inventories, the present value of the deferred taxes on the increase in price in excess of 10 percent is equal to $\tau(\pi - 0.1)e^{-6\rho}$, where τ is the rate of corporation tax and ρ is the discount rate. Hence total taxes on the increase in inventory values are given by the tax on the first 10 percent increase in price (0.1τ) plus the deferred taxes:

$$\tau\{0.1 + (\pi - 0.1)e^{-6\rho}\}. \tag{5.6}$$

The value of this deferral possibility will depend on the comparison with the usual method of inventory accounting. We have not incorporated deferral into our estimates because the average level of price increases was lower than 10 percent. This provision may nonetheless be important for some firms in order to smooth out large changes in relative prices.

13. LIFO is allowed if a taxpayer can *prove* it is his established practice to sell first the goods most recently produced or acquired.

14. There are also tax-free reserves for commodities that fluctuate on world markets.

5.2.4 Estimates of Economic Depreciation

The calculation of the rate of true economic depreciation is always problematic. The formulas in chapter 2 employ a declining balance rate that is not readily available from German statistics. It was therefore necessary to resort to some simplifying assumptions.

First we calculated the average economic useful lives used by the Statistical Office in capital stock computations. Second, we estimated depreciation rates as follows. With straight-line economic depreciation, the average rate of economic depreciation can be found by dividing the annual flow of depreciation by the gross capital stock. We tested the accuracy of the computed average depreciation rates (which were calculated by using gross capital stock figures) by building up the capital stock time series for past years. The values thus obtained were very close to the official capital stock figures. The estimated depreciation lives are shown in table 5.6 for both equipment and buildings.

The straight-line rate of economic depreciation was translated into an equivalent declining balance rate by assuming that (as derived in chap. 2)

$$\frac{L}{2} = \frac{1}{\delta}, \tag{5.7}$$

where L is now the economic life of the asset. Based on information from the Statistical Office, we have assumed that $L = 12.77$ for equipment, which gives δ as 0.1566. For buildings $L = 43.9$, which implies that δ is 0.0456.

The assumption that the economic life is on average longer than the tax service life is confirmed by a recent survey in which, out of 1,900 firms in manufacturing, 43 percent claimed economic life was longer, 46 percent stated that they were roughly equal, and only 11 percent reported that economic life was shorter than the tax service life (see Uhlmann 1981).

5.2.5 Investment Grants and Incentives

A special law (*Investitionszulagengesetz*) encourages three types of investment by offering nontaxable cash grants. Eligible investment includes:

1. investment in the eastern border areas (with a grant of 10 percent) and other less developed regions (8.75 percent). The subsidy is confined to the acquisition of new investment goods if they are part of a new establishment, an enlargement, or a rationalization of a factory. Furthermore, investment goods must stay in the factory for at least three years.[15]

15. For investment in the eastern border area, additional special depreciation allowances are granted for the first five years (50 percent for equipment investment and 40 percent for buildings). In exceptional cases it is also possible to set aside tax-free reserves (*Zonenrandförderungsgesetz*).

2. Research and development investment (20 percent, up to an investment of DM 500,000; 7.5 percent in the case of higher investment).
3. Certain types of investment in the energy sector (7.5 percent).

In addition to the nontaxable cash grants in less developed areas, there are taxable cash grants that range between 2.5 and 17.5 percent of initial cost. Substantial tax incentives are provided for investment in Berlin. The program includes favorable depreciation allowances (up to 75 percent in the first five years); tax-free cash grants (*Investitionszulage*) ranging from 10 to 30 percent; a 30 percent (22.5 percent) reduction of the income tax rate (corporate tax rate) on income from activities in Berlin; a reduction of the value-added tax (VAT) liability of Berlin suppliers (in general 4.5 percent of the amount received from its VAT liability for deliveries to a West German business) and of West German customers (4.2 percent of the amount payable from the tax liability, provided the goods were manufactured in West Berlin and shipped to West Germany).[16]

Table 5.8 shows the development of investment grants since 1960. In order to compare tax-free and taxable grants, all rates have been expressed as an equivalent rate of tax-free grant. These grants are particularly significant for the mining and energy sector and the sector "other industry." In this latter case, however, the figures are dominated by payments to public corporations, which are excluded from our study. For this reason we do not use this column of data. The last column of table 5.8 includes construction (part of our "other industrial" sector) and services (part of our commercial sector). We use this column for investment grants in both sectors. Table 5.9 shows investment grants by type given to the manufacturing sector. For our calculations only regional policy measures were included (25 percent of the total), because other grants are discretionary and to a large extent are also intramarginal. Our procedure here is the same as that followed in the United Kingdom chapter. For our estimate of g, therefore, we used not the 8.5 percent figure shown in table 5.8 but a rate of (0.25×0.085), which equals 2.1 percent. A lower figure of 0.7 percent was used for the other two industry groups (final column of table 5.8). The same rates of grant apply to equipment and buildings, but no grants are available for investment in inventories.

5.2.6 Local Taxes

There are two local taxes on companies in Germany, a local business tax (*Gewerbesteuer*) and a local land tax (*Grundsteuer*). These taxes are regulated by federal legislation but are levied by local authorities who are free to determine the rate of tax. Both local taxes are deductible against corporation tax, since they are considered a business expense.

16. In addition, the promotion of Berlin includes tax-free cash grants to employees amounting to 8 percent of their salaries, which may be increased by DM 49.50 for each child.

Table 5.8 **Investment Grants as a Percentage of Investment** (subsidy values)

Year	Agri-culture	Mining, Energy	Manu-facturing	Other Industry[a]	Other Sectors[b]
1960	6.5	7.5	1.1	3.3	4.5
1961	5.9	7.5	1.3	5.4	2.4
1962	6.1	6.8	1.3	3.7	0.6
1963	7.2	9.7	1.6	7.1	0.6
1964	6.2	5.9	1.5	8.6	0.6
1965	11.2	6.0	1.6	9.0	0.6
1966	11.8	5.8	1.7	12.1	0.6
1967	14.9	5.7	2.8	5.9	2.4
1968	17.7	10.4	2.8	5.7	0.7
1969	16.5	13.2	3.0	9.4	2.6
1970	21.0	16.3	2.4	16.7	1.5
1971	17.6	12.7	4.0	11.5	1.4
1972	13.7	13.6	5.4	11.3	1.0
1973	12.7	12.1	7.4	11.7	1.0
1974	13.3	12.7	10.5	13.9	1.7
1975	12.5	14.3	15.9	22.4	5.4
1976	9.2	9.7	7.9	15.3	1.5
1977	8.0	11.9	7.8	17.9	0.8
1978	8.1	12.9	8.1	20.6	0.7
1979	8.4	13.3	8.5	25.4	0.7

Source: Teschner (1981).

[a]Includes public transport and excludes construction.

[b]Includes construction (part of our "other industrial" sector) and services (part of our commercial sector).

Gewerbesteuer

The local business tax has two bases—profits and capital stock.[17] The base for the local profits tax (*Gewerbeertragsteuer*) is equal to taxable income as defined for the corporation tax except that interest payments on long-term debt are not deductible. It is further adjusted by excluding a pro rata share (0.12) of the value of land.[18] The tax rate for the Gewerbeertragsteuer is calculated as the product of a basic rate (*Messzahl*), M, of 0.05 and a multiplicative coefficient (*Hebesatz*), H. The *Hebesatz*, which at present varies between 3 and 5, is set each year by the local municipality. The tax is computed on a tax-exclusive basis, which means that the effective tax-inclusive rate (τ_L) on earnings above the exemption level limits is given by

17. Until 1979 some states used payroll as a third tax base.
18. The latter is excluded in order to avoid double taxation of land from the land tax.

Table 5.9 **Investment Grants to Manufacturing**
(share of total grants from each type of grant, %)

Year	Sectoral Aids	Environmental Protection	Regional Policy (Including Promotion of Berlin)	Anticyclical Measures[a] and Special Labor Market Measures	Total
1960	15	39	41	5	100
1961	19	32	34	15	100
1962	18	34	34	14	100
1963	30	31	30	9	100
1964	27	32	30	11	100
1965	25	37	27	11	100
1966	16	46	25	13	100
1967	30	40	20	10	100
1968	31	40	20	9	100
1969	36	31	28	5	100
1970	20	33	43	6	100
1971	27	26	45	2	100
1972	26	21	49	4	100
1973	39	17	40	4	100
1974	36	14	32	18	100
1975	21	7	18	54	100
1976	30	15	35	20	100
1977	33	17	34	16	100
1978	33	16	35	16	100
1979	23	22	25	30	100

Source: Teschner (1981).
Note: Investment grants equal subsidy values.
[a]1974–75.

$$\tau_L = \frac{M \cdot H}{1 + M \cdot H}. \tag{5.8}$$

For our calculations we have taken the average value of 3.25 for H from the 1979 statistics of the *Hebesatz*. From (5.8) this gives an average local tax on adjusted profits of $\tau_L = 0.14$.

It is now possible to compute the parameter value for τ, the tax rate on corporate profits, given the deductibility of local taxes. Its value is given by

$$\tau = c_u(1 - \tau_L) + \tau_L, \tag{5.9}$$

where c_u is the rate of federal corporation tax on undistributed profits. For $c_u = 0.56$ and $\tau_L = 0.14$, the value of τ is equal to 0.62.

The basis of assessment for the local capital tax (*Gewerbekapitalsteuer*) is the capital stock as estimated for wealth tax purposes (see below) but inclusive of the value of long-term debt.[19] The value of buildings is deducted from the tax base so the local capital tax applies only to equipment and to inventories. As with the local profits tax, there is a basic rate of tax (0.002) that is multiplied by a local multiplier (3.25). This yielded in 1979 a local tax rate of 0.0065. Since the tax is deductible from both the local profits tax and the corporation tax, the effective overall local wealth tax on equipment and inventories is equal to 0.0026, or 0.26 percent. Addition of the federal wealth tax is described below.

Grundsteuer

The local land tax is paid on agricultural wealth (land tax *A*), on the value of land and buildings in general use (land tax *B*), and on land and buildings used for business purposes (either land tax *A* or land tax *B*). The base for the land tax is the "standard value" (*Einheitswert*), which is assessed at irregular periods and adjusted to take account of price changes (see section 5.2.7). It is widely held that at present the valuation is considerably below actual replacement cost. Estimates made by the Ministry of Finance suggest that the *Einheitswert* is approximately a quarter of the true replacement cost of assets. The computation of the tax rate is similar to that for other local taxes. A local multiplier (the average for 1979 being 2.75 for land tax *B*) is applied to a base rate of 0.0035 for industrial buildings and land.[20] The tax rate is therefore equal to 0.0096, which in turn is deductible from the local profits tax and the corporation tax. Allowing for the deductibility of the tax and the low valuation, the effective local tax on buildings is equal to 0.09 percent.[21] Although this is a tax on wealth, this figure is clearly very small. The federal wealth tax is added to this figure below.

5.2.7 Wealth Taxes

In contrast to the Anglo-Saxon countries, federal taxes on wealth have long been a feature of the German tax system. In 1981 the wealth tax rate was 0.5 percent of taxable wealth for individuals and 0.7 percent for corporations. As can be seen from table 5.10, these rates have changed frequently during the past decade.

All assets are valued according to a set of rules incorporated in the Fiscal Code. Buildings and land are assessed separately from other assets on special dates and with reference to definite periods of time. These

19. The exemption level (*Freibetrag*) has been successively raised from DM 6,000 (1977) to DM 60.000 (1978) and to DM 120,000 (1981).

20. The base rate varies according to type of asset. Other representative rates are 0.006 for agricultural land, 0.0026 to 0.0035 for one-family houses, and 0.0031 for two-family houses.

21. Note that $0.0009 = (2.75 \times 0.0035)(1 - .62) \times 0.25$.

Table 5.10 Development of Nominal Wealth Tax Rates
(%)

	Until 1973	1974	1975	1976	1977	Since 1978
Personal wealth tax	1.0	0.7	0.7	0.7	0.7	0.5
Corporate wealth tax	1.0	0.7	1.0	1.0	1.0	0.7
d_1 (= 1 if wealth tax deductible from corporate income tax, = 0 otherwise)	1	1	0	0	0	0

Source: Tax laws in Germany.

"standard" or "ratable" values (*Einheitswert*) have not been regularly computed in recent years, and, as was mentioned above, buildings and land are widely believed to be considerably undervalued. In 1981 the valuation was based on assessments made in 1964, which were increased by 40 percent in 1974. Official estimates suggest that the *Einheitswert* was only 25 percent of actual values. The valuation of equipment is based on the so-called *Teilwert*, which the tax law defines as the value a potential buyer of the enterprise would place on the individual piece of equipment. This rule is obviously difficult to apply in practice. The tax administration has therefore set an upper limit equal to replacement cost and a lower limit equal to scrap value. In general it uses acquisition cost less accumulated depreciation up to a minimum value (*Anhaltewert*) as the tax base.[22] The base for the valuation of inventories is normally taken to be replacement cost.

For individuals, certain amounts of wealth are tax free (DM 70,000 for the taxpayer and DM 70,000 for the spouse and each child). In 1979 total wealth tax revenues amounted to DM 4.5 billion, or 1.4 percent of total tax revenues. Although the tax rates are low, the wealth tax burden may be substantial for individual enterprises, particularly since the wealth tax cannot (since 1975) be deducted from the income, corporate, or local business tax bases.

The wealth tax burden for a given investment depends on the source of finance. Since the tax is based on net worth, a corporate investment financed by debt does *not* increase the corporate wealth tax base.[23] The federal wealth tax rate of 0.7 percent (in addition to the local capital tax) applies to equity-financed investment in machinery and inventories. Making allowance for the favorable valuations used, a rate of 0.2 percent

22. These minimum values were, in general, 15 percent of acquisition cost for equipment acquired before 31 December 1969 and 30 percent for assets acquired after that date.

23. In fact, because of a favorable valuation formula, gross taxable wealth may be increased by less than the additional debt employed to acquire the land, since borrowings are fully deductible.

was assumed for investment in buildings (in addition to the local land tax).

We may summarize our assumptions as follows. Including both local and federal wealth taxes, for debt-financed investment $w_c = 0.09$ for buildings and 0.26 for machinery and inventories. For equity-financed investment, we add the 0.26 percent local tax and 0.7 percent federal tax to obtain $w_c = 0.96$ percent for all machinery and inventories. We add the 0.09 percent local tax and 0.2 percent federal tax to obtain $w_c = 0.29$ percent for buildings. Because these calculations already account for the deductibility of the local tax at the federal level, $d_1 = 0$ in both cases. The wealth tax rate on households is $w_p = 0.5$ percent for all types of financial security.

5.2.8 Household Tax Rates

Estimates of the marginal tax rate on capital income accruing to households have been based on the distribution of capital income as given in the income tax statistics. Unfortunately, the most recent statistics available to us refer to 1974. Table 5.11 shows the distribution of capital income from 1961 to 1974 and the corresponding marginal income tax rates in the various income brackets from 1961 to 1979. Because of inflation and increases in real income, in 1979 the income distribution was weighted more heavily toward the higher brackets than it was in 1974. On the other hand, the marginal tax rates shown in table 5.11 are those applying before taking account of income splitting (see section 5.2.1). They imply, therefore, an overstatement of the average marginal income tax rates on recipients of capital income as a whole.

To estimate the average marginal capital income tax rate in 1979, we used the 1974 income weights. Our assumption is that the change in the income distribution since 1974 is offset by the opportunities created by income splitting. The average marginal tax rate on interest and dividend income in 1979 (a separation of the two was not possible) was 48 percent. It is, however, widely believed that the taxation of interest income is often evaded. To allow for this possibility, in one of the simulations reported below, the marginal tax on interest income was taken to be equal to 20 percent.

Finally, we account for the corporate interest that accrues to individuals in the form of tax-free banking services. Banks use sight deposits to buy corporate debt but use the interest receipts to provide banking services to depositors rather than to pay interest. We calculate a weighted average household tax rate on interest income, where a 48 percent marginal rate applies to direct ownership and bank holdings through time deposits, and a zero marginal tax rate applies to bank holdings through sight deposits. Using data from section 5.3.5 on the ownership of corporate debt, we find a weighted-average 39.8 percent tax rate is used for

Table 5.11 **Distribution of Gross Capital Income and Marginal Personal Income Tax Rates**

(%)

Income Groups (DM)[a]	1961		1965		1968		1971		1974		Marginal Tax Rate after 1974	
	Distribution of Capital Income	Marginal Tax Rate	Distribution of Capital Income	Marginal Tax Rate	Distribution of Capital Income	Marginal Tax Rate	Distribution of Capital Income	Marginal Tax Rate	Distribution of Capital Income	Marginal Tax Rate	1975–78	1979
Below 1,500	0.1	0	0.1	0	0.1	0	0.1	0	0.1	0	0	0
1,500–2,900	0.6	20	0.5	19	0.5	19	0.4	19	0.3	19	0	0
3,000–4,999	1.8	20	1.6	19	1.6	19	1.2	19	0.9	19	22	22
5,000–7,999	3.4	20	3.2	19	3.5	19	2.8	19	2.2	19	22	22
8,000–11,999	4.5	28	4.3	22	4.7	22	3.9	22	3.3	22	22	22
12,000–15,999	4.2	31	4.9	27	4.5	27	3.7	27	3.2	27	22	22
16,000–24,999	8.3	35	8.2	34	8.9	34	7.8	34	6.7	34	35	29
25,000–49,999	14.8	42	15.2	43	16.8	43	17.0	43	16.2	43	46	45
50,000–74,999	8.6	47	9.1	48	9.4	48	10.0	48	10.6	48	51	51
75,000–99,999	5.8	52	6.2	51	6.4	51	6.6	51	6.9	51	54	54
100,000–249,999	16.5	53	17.5	53	17.4	53	18.3	53	18.7	53	56	56
250,000–499,999	9.4	53	10.0	53	9.2	53	9.4	53	10.4	53	56	56
500,000–999,999	7.4	53	7.5	53	17.0	53	7.0	53	7.0	53	56	56
1,000,000 and above	14.6	53	11.7	53		53	11.8	53	13.5	53	56	56
Weighted marginal tax rate	(100.0)	45	(100.0)	46	(100.0)	45	(100.0)	46	(100.0)	46	49	48

Source: Income Tax Statistics, tax laws, and own calculations.

[a]Annual taxable income.

households' direct and indirect holdings of corporate debt. This rate is used for household interest income, and 48 percent is used for dividend income.

5.2.9 Tax-Exempt Institutions

The ownership category "tax-exempt institutions" includes pension funds, many of which are public pension funds, and the so-called *Gemeinnützige Institutionen*—religious organizations, foundations, and trade unions. The description of all these organizations as tax-exempt relates only to their investment activities under the new corporate tax system. These tax-exempt institutions are *not* allowed to impute the corporate tax that has been paid on distributions, so these shareholders bear a corporate tax at a rate of 36 percent on distributions and a dividend withholding tax of 25 percent. This implies a total tax burden of 52 percent (0.36 + 0.25 (1 − 0.36)). The dividend withholding tax is, however, refunded either totally (to charitable or religious institutions) or by one-half (to other institutions such as trade unions). In these cases dividends pay tax at either 36 percent or 44 percent. Capital income other than dividends is, with a few exceptions, tax free. We have assumed that the marginal tax rate on interest income is zero and on dividend income is 40 percent.[24]

5.2.10 Insurance Companies

In 1981 there were approximately 430 major insurance companies in Germany. Of this group, 46 percent were corporations, 20 percent were mutual insurance companies, 11 percent were "enterprises under public law" (regulated companies known as *Unternehsmen des Öffentlichen Rechts*), and 23 percent were foreign companies. The market shares were distributed among these enterprises as follows: corporations 60 percent; mutual insurance companies 26 percent; enterprises under public law 10 percent; and foreign companies 4 percent. Corporations concentrate on life insurance, mutual insurance companies on health insurance, and enterprises under public law on insurance against damage to tangible (fixed) assets. With premiums of about DM 26 billion and about DM 13 billion, respectively, life insurance and automobile insurance companies are the largest individual insurance branches. Apart from insurance, these companies are heavily engaged in financial investment activities (leasing, building and loan associations, etc.).

Besides the private insurance companies, there exists an extensive system of public social security including the old-age pension system, unemployment insurance, health insurance, and accident insurance. In 1978 total expenditure of the whole public social security system amounted to DM 403 billion or 31 percent of GNP, which is rather high by international standards.

24. This rate may be on the high side since, in practice, some of these institutions have created companies that act as intermediate institutions so that the imputation credit can be received.

In general, savings made through contributions to insurance companies must be made from net of tax income, and the proceeds are tax free to the beneficiaries.[25] Insurance companies are subject to the corporate tax, the corporate wealth tax, and the local business tax. But there are some special concessions. The accumulation of tax-free reserves is possible up to certain limits (*Deckungsrückstellung*). In 1978, life insurance companies placed 95.6 percent of their cash flow (before taxes) into reserves. Since these reserves were tax free, interest income would have borne an effective tax of 2.7 percent (0.62 times 0.044). Dividend income bears no additional tax at the insurance company level when allocations to reserve are taken into account. Because of the imputation system, the 95.6 percent allocation to reserves implies a rebate of 19 percent.[26]

National accounts statistics also give evidence of a relatively low tax burden on the capital income of insurance companies. In 1979 private insurance companies paid DM 630 million in direct taxes and earned DM 18,250 million of income from property and entrepreneurship, implying an average direct tax rate of 3.5 percent. Since wealth tax payments are included in these direct taxes, the effective corporate tax rate has been somewhat lower. For our calculations, we have assumed that the effective income tax rate of insurance companies was 2.7 percent, as derived above.

5.3 The Structure of the Capital Stock and Its Ownership

5.3.1 Data Limitations

The major sources of data for the present study were the Statistics of the Bundesbank and the national accounts statistics of the Statistical Office. Many adjustments were made to the data in order to obtain the various matrixes of parameters used in our calculations. Although precise numbers are presented in the following tables, it should be borne in mind that various figures had to be estimated. This is especially true for those data refering to the structure of the ownership of debt. As far as equity ownership is concerned, we carried out our own investigation into the pattern of ownership of German corporations.

25. There are exceptions: If proceeds of life insurance policies are paid in the form of pensions, part of this income (the so-called *Ertragswert*, which amounts to 30 percent of the pension) is liable to income tax. Furthermore, for private pension funds it can generally be assumed that premiums are lower than the maximum allowances (*Sonderausgabenhöchstbetrag*), so that at the margin they are deductible from taxable income. In turn, pensions paid by these institutions are taxable.

26. The computation is given by the following formula:

$$0.62\left(1+\frac{36}{64}-0.956\right)-\frac{36}{64}=-0.186.$$

Because of legal restrictions concerning the capital structure of these companies, dividend income is only a small share (5–10 percent) of total capital income.

5.3.2 Capital Stock Weights

Data on the size of capital stock are published by the Statistical Office both for the total business sector and for major industrial sectors.[27] These figures were adjusted to obtain the breakdown among the three sectors: manufacturing, other industry, and commerce, as defined in chapter 2. From the manufacturing (*Verarbeitendes Gewerbe*) sector, the automobile repair and services sector was reallocated to the commercial sector. The commercial sector, in addition to wholesale and retail trade (*Handel*), contains the private part of social and personal services. Since no capital stock data were available for this latter subgroup, estimates were obtained by using the share of total sales of this group as a proxy for the share of the capital stock.

The sector "other industry" includes electricity, gas, and water, construction, transport, and communication. Since the electricity, gas, and water sector is either directly or indirectly owned by the public sector, or is at least regulated by public administration, it has been excluded. Public railroads and postal services that are included in official data of the transport and communication sector were also excluded. These estimates were based on capital stock statistics provided by the DIW-Institute for Economic Research (Görzig and Kirner 1976). The official data on inventories are less detailed than those for machinery and buildings. The levels of inventories for the sector other industry and for the service part of the commercial sector were estimated separately.

Since official data by the Statistical Office refer to the business sector as a whole—that is, to the corporate and noncorporate sectors—we made our own estimates to provide data for the corporate sector alone. Bundesbank statistics provide data for the breakdown of fixed assets (book values) by corporate and noncorporate enterprises in manufacturing, construction, and trade.[28] Our estimates are based on these relationships. Table 5.12 presents the resulting matrix of the proportions of the total net capital stock by asset and industry in the total business sector and in the corporate sector. We use these 1978 proportions for the capital stock weights in 1980.

5.3.3 Sources of Financial Capital

Data concerning the structure of business financing are published by the Statistical Office and the Bundesbank. The major drawback of both these sources is that they are based on book values. It was therefore necessary to adjust the raw figures to obtain the proportions needed for our calculations. Both sources were used at different stages.

The Bundesbank provided statistics on the aggregate balance sheets

27. Volkswirtschaftliche Gesamtrechnungen, tables on "Sachvermögen."
28. Jahresabschlüsse der Unternehmen.

Table 5.12 **Proportion of Capital Stock by Asset and Industry, 1978**
(at replacement costs)

Asset	Sector			Total
	Manufacturing	Other Industry	Commercial	
	A. Corporate and Noncorporate Enterprises			
Machinery	0.2454	0.0559	0.0537	0.3550
Buildings	0.1794	0.0637	0.1315	0.3746
Inventories	0.1687	0.0166	0.0851	0.2704
Total	0.5935	0.1362	0.2703	1.0000
	B. Corporate Enterprises Only			
Machinery	0.3648	0.0243	0.0281	0.4172
Buildings	0.2069	0.0266	0.0641	0.2975
Inventories	0.2378	0.0060	0.0414	0.2853
Total	0.8096	0.0569	0.1335	1.0000

Source: Own estimates based on Statistisches Bundesamt, 1980, Bundesbank, 1976, and updatings provided by the Bundesbank.

for different types of legal entities operating in manufacturing, trade, and construction. Although the original sources do not cover all enterprises, the Bundesbank adjusted the figures to be representative of the whole economy.[29]

The values of the gearing ratio (debt to total market value) were computed for each sector in several steps (see tables 5.13 to 5.15).

1. Book values of the capital stock were adjusted by the ratio of the capital stock at replacement cost to the capital stock at historical cost implied by the aggregate capital data published by of the Statistical Office, and also by a factor that reflects the depression of recorded book values owing to the use of accelerated tax depreciation. In this way the capital stock at replacement cost was calculated for the corporate manufacturing, construction (other industry), and trade (commerce) sectors (see table 5.13). These capital stock figures are repeated in the first row of table 5.14.

2. Financial assets and liabilities were taken directly from Bundesbank statistics, as shown in rows 2–6 of table 5.14. Net financial liabilities are shown in row 7.

3. The next step was to compute the tax-adjusted value of the capital stock as the difference between the capital stock and the deferred tax liability. The latter was computed by a "backward-looking" measure as τ times the difference between the replacement cost value of the capital

29. Bundesbank statistics are based on balance sheets of about 9,800 corporations (*Kapitalgesellschaften*), 24,500 unincorporated firms (*Personengesellschaften*), and 14,100 other firms (*Einzelkaufleute*).

Table 5.13 Capital Stock Figures at Replacement Costs (RC) and Book Values (BV) (billion DM)

	Manufacturing	Other Industry	Commerce
Machinery			
RC	99.17	2.79	7.13
BV	66.11	1.86	4.75
RC/BV	1.50	1.50	1.50
Buildings			
RC	79.29	2.56	16.09
BV	44.05	1.42	8.94
RC/BV	1.80	1.80	1.80
Inventories			
RC = BV	99.36	0.96	21.32
Total			
RC	277.82	6.31	44.54
BV	209.52	4.24	35.01
RC/BV	1.33	1.49	1.27

Source: Own calculations as described in the text.

Table 5.14 Computation of Market Value of Equity (billion DM)

	Manufacturing	Other Industry	Commerce
1. Capital stock (at replacement cost)[a]	277.82	6.31	44.54
2. Financial assets	165.10	20.95	39.17
3. Short-term financial liabilities	140.23	18.50	45.89
4. Long-term financial liabilities	55.03	1.25	7.22
5. Reserves (pensions, etc.)	85.88	3.03	7.42
6. Total gross financial liabilities (3 + 4 + 5)	281.14	22.77	60.53
7. Net financial liabilities (6 − 2)	116.04	1.83	21.36
8. Deferred tax liability .62 × [replacement cost of capital stock − book value]	42.35	1.28	5.91
9. Tax-adjusted capital stock (1 − 8)	235.47	5.03	38.61
10. Market value of equity [$q \times (9 - 7)$]	150.48	4.03	21.74
11. Debt as a proportion of (debt + market value of equity)	0.4354	0.3123	0.4956

Source: Statistical Office, Bundesbank, and own calculations.

[a]From table 5.13.

stock and the tax written down value of the stock.[30] The deferred tax liability is shown in row 8 of table 5.14, and the tax-adjusted capital stock is shown in row 9.

4. Since no reliable figures were available for the aggregate market value of outstanding shares, it was necessary to compute the market value of equity indirectly by employing an equilibrium value of Tobin's "q" derived analytically. Personal taxation affects the value of equity, and hence "q," by capitalizing the tax penalty (or advantage) of any eventual distribution (see Auerbach 1979; Bradford 1981; King 1977). The value of q was estimated using the same procedure as that described in section 4.3.3 for Sweden. For our estimates, we used a weighted average marginal tax rate on dividends, computed by employing the table for "proportion of ownership by source of finance" (see section 5.3.4) and the values of m for the different owners. This weighted marginal tax rate on dividends equals 0.436. The market value of equity was then computed as q times the tax-adjusted capital stock net of financial liabilities. This market value of equity is shown in row 10 of the table. The market value debt/equity ratio is shown in row 11.

5. Finally, the weights for new share issues and retentions were computed by making use of flow of funds data as shown in table 5.15. That is, the equity share (unity minus the debt share from table 5.14) was multiplied by the ratio of new share issues to total equity (in table 5.15) to obtain the ratio of new shares to total finance. The final proportions for the different sources of finance are given in table 5.16.

5.3.4 The Ownership of Equity

There has been no recent comprehensive study of the ownership of equity in German industry. To determine the distribution of equity among the three sectors (private households, tax-exempt institutions, and the insurance sector), we carried out our own analysis based on statistics of the Commerzbank (1979). These statistics provide information on firms with a minimum share capital of DM 500,000. For each firm, this information includes the trade or industry code, the total outstanding shares, and the shareholdings of major shareholders. Where other companies were shareholders, we traced ownership back to the original owner. With this information about direct and indirect ownership, it was possible to attribute 65 percent of total share capital to four groups of owners: households, tax-exempt institutions, insurance companies, and foreigners. About 31 percent of share capital either was held by companies not included in these statistics or was widely distributed stock. For the residual 4 percent of share capital, no information was given about either direct or indirect ownership.

30. This correction is similar to that proposed by Flemming et al. (1976).

Table 5.15 Ratio of New Share Issues in Total Equity Finance of Corporate Industry

1973	1974	1975	1976	1977	1978	1979	Average 1973–79
.091	.074	.128	.086	.082	.093	.058	.087

Source: Statistical Office and own calculations.
Note: Includes only *Aktiengesellschaften*.

Table 5.16 Weights for Sources of Finance by Industry

	Manufacturing	Other Industry	Commerce
Debt	0.4354	0.3123	0.4956
New share issues	0.0491	0.0599	0.0439
Retained earnings	0.5155	0.6278	0.4605
Total	1.0000	1.0000	1.0000

Source: Own estimates as described in text.

For the distribution of widely distributed share capital or holdings by companies that are not included in the statistics (the above-mentioned 31 percent of total share capital), we used as a second source Bundesbank statistics on the ownership of shares held in bank custody.[31] The residual share capital (the above-mentioned 4 percent) was distributed among the ownership groups in the same proportions as the allocated 96 percent.

Table 5.17 shows the resulting ownership pattern for the three business sectors under consideration. Private households own about 44 percent, tax-exempt institutions about 13 percent, insurance companies about 4 percent, and foreigners about 39 percent of total share capital of the business sector as defined in this study. Households own more than 40 percent of share capital in all three sectors, but their share reaches almost 50 percent in the other industrial sector. Foreign ownership is especially concentrated in the manufacturing and commercial sectors, with shares of about 44 percent and 41 percent of total share capital, respectively. In the other industrial sector, foreigners own only about 20 percent of total share capital. Tax-exempt institutions and insurance companies own about 10 and 3 percent of share capital in the manufacturing sector, but about 24 and 7 percent of share capital in the other industrial sector.

In our study of effective tax rates, we consider only domestic ownership. If foreign holdings are excluded, the share of private households increases to about 73 percent, the share of tax-exempt institutions to about 21 percent, and the share of insurance companies to about 6

31. In 1978, according to statistics on shares held in banks, 66.8 percent of these shares were held by private households, 9.3 percent by tax-exempt institutions, 8.9 percent by insurance companies, and 20.9 percent by foreigners.

Table 5.17 Ownership of Equity in Each Industry
(%)

	Manufacturing	Other Industry	Commerce	Total
	A. Including Foreign Ownership			
Private households	42.6	49.1	44.6	44.1
Tax-exempt institutions	10.4	23.7	11.3	13.3
Insurance companies	3.1	6.8	3.6	3.9
Foreign ownership	43.9	20.4	40.6	38.6
Total	100.0	100.0	100.0	100.0
	B. Excluding Foreign Ownership			
Private households	75.8	61.7	75.1	73.1
Tax-exempt institutions	18.6	29.8	18.9	20.7
Insurance companies	5.6	8.5	6.0	6.2
Total	100.0	100.0	100.0	100.0

Source: Own estimation on the basis of statistics of the National Bank and Commerzbank.

Table 5.18 Liabilities of Aggregate German Enterprises in 1978

	Billion DM	%
1. Short-term		
Bank credit	176.9	21.4
Money market paper	2.3	0.3
2. Long-term		
Bank credit	319.3	39.1
Loans from building and loan associations	0.7	0.1
Loans from insurance companies	37.5	4.6
Bonds	30.4	3.7
3. Other liabilities		
Domestic creditors[a]	107.4	13.1
Foreign creditors	142.7	17.5
Foreign trade credits	(52.5)	(6.4)
Total	817.2	100.0
Total without trade credits	(764.7)	(93.6)

Source: Bundesbank statistics.
[a]Excluding intrasectoral liabilities.

percent. Table 5.17 also shows the corresponding ownership pattern for the three industry groups.

5.3.5 The Ownership of Debt

Data from the Bundesbank were used to calculate the distribution of corporate liabilities among the four groups of creditors: private households, tax-exempt institutions, insurance companies, and foreign owners. The starting point for these calculations is table 5.18, which shows the aggregate liabilities of German enterprises. Tables 5.19 and 5.20 show

Table 5.19 **Liabilities of German Enterprise in 1978, by Type and by Creditor Group**

Liabilities[a] (percentage figures in each row sum to 100.0)	Total (Billion DM)	Groups of Creditors: Private Households		Tax-Exempt Institutions		Insurance Companies		Foreign Owners	
		%	Billion DM	%	Billion DM	%	Billion DM	%	Billion DM
1. Short-term									
a. Bank credit	176.9	66.3	117.3	16.2	28.6	6.5	11.5	11.0	19.5
b. Money market paper	2.3	66.3	1.5	16.2	0.4	6.5	0.1	11.0	0.3
2. Long-term									
a. Bank credit	319.3	59.3	189.3	18.7	59.7	5.8	18.5	16.2	51.7
b. Loans from building and loan associations	0.7	100.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0
c. Loans from insurance companies	37.5	0.0	0.0	0.0	0.0	100.0	37.5	0.0	0.0
d. Bonds	30.4	52.2	15.9	16.5	5.0	16.2	4.9	15.1	4.6
3. Other liabilities									
a. Domestic creditors	107.4	0.0	0.0	100.0	107.4	0.0	0.0	0.0	0.0
b. Foreign creditors (without trade credit)	90.2	0.0	0.0	0.0	0.0	0.0	0.0	100.0	90.2
Total	764.7	42.5	324.7	26.3	201.7	9.5	72.5	21.7	166.3

Of which (percentage figures in each column sum to 100.0)								
Direct loans (2c, 3b above)	0.0	0.0	0.0	0.0	51.7	37.5	54.2	90.2
Through commercial bank loans (1a, 1b, 2a, 2b above)	95.1	308.8	44.1	88.7	41.5	30.1	43.0	71.5
Through direct and indirect bond holdings (2d above)	4.9	15.9	2.5	5.0	6.8	4.9	2.8	4.6
Direct		5.3		1.7		3.7		1.3
Indirect		10.6		3.3		1.2		3.3
Other sources[b] (3a above)		0.0		107.4		0.0		0.0

Source: Own calculations based on data from Duetche Bundesbank.

Note: Excludes housing.

[a]Without trade credits.

[b]Especially workers' pension funds and "special government lending."

Table 5.20 **Liabilities of German Enterprises in 1978, by Creditor Group**

	Total		Domestic	
	Billion DM	%	Billion DM	%
Private households	324.7	42.5	324.7	54.3
Tax-exempt institutions	201.1	26.3	201.1	33.6
Insurance companies	72.5	9.5	72.5	12.1
Foreign owners	166.3	21.7	—	—
Total	764.7	100.0	598.3	100.0

Source: Own estimation, as described in the text.
Note: Excludes housing; liabilities are without trade credits.

the distribution of these liabilities among the four groups—private households, tax-exempt institutions, insurance companies, and foreigners—and also the corresponding structure for domestic creditors only. These estimates have been based on Bundesbank data.

The distribution of direct industrial bondholdings has been estimated on the basis of statistics on total bondholdings. Indirect debt holdings (via the banking sector and investment funds) have been estimated on the basis of bank deposits and special statistics on investment funds. Direct (both long- and short-term) bank credits and money market paper have also been distributed on the basis of the bank deposit structure. Loans from building and loan associations have been fully attributed to the private household sector.

"Other" domestic liabilities in table 5.19 include pension reserves and direct public loans but do not include domestic trade credits. These liabilities have been totally attributed to tax-exempt institutions. Foreign liabilities as in table 5.19 also exclude trade credits.

The share of debt finance directly and indirectly provided by private households amounts to about 43 percent according to these estimates. About 26 percent is provided by tax-exempt institutions, about 10 percent by insurance companies, and about 22 percent by foreigners. Of the domestic ownership of debt finance, 54 percent is provided by private households, while 34 percent and 12 percent are provided by tax-exempt institutions and by insurance companies, respectively.

5.4 Estimates of Effective Marginal Tax Rates

In this section the tax parameters described in section 5.2 and the weights described in section 5.3 are employed together to compute the effective tax rate on capital income originating from the corporate sector in West Germany. In section 5.4.1 we describe the results of the "stan-

dard case," which represents our best estimates of the tax parameters and of the weights in 1980. It also describes the sensitivity of the results to an alternative assumption about the marginal capital income tax rate of households. In section 5.4.2 the effect of the 1981 increase in accelerated depreciation is analyzed. Section 5.4.3 compares the effective tax rates in 1980 with the corresponding rates in 1960 and 1970. Section 5.4.4 compares our estimates of marginal tax rates with the average tax rate on companies implied by tax payments.

5.4.1 Principal Results

We consider the fixed-p and fixed-r cases in turn. Using as weights the structure of the capital stock by asset and by industry, and the structure of ownership and business financing, and with the average German inflation rate of the past ten years (4.2 percent), then for a real return before tax of 10 percent (fixed-p case) the average marginal tax wedge in 1980 was 4.8 percent and the average marginal tax rate ($p - s/s$) was 48.1 percent. By coincidence 48 percent is also the average marginal tax rate for capital income of private households, so the result suggests that overall the German tax system is close to a comprehensive income tax. But the breakdown of this effective tax rate in table 5.21 by asset, by industry, by source of finance, and by owner reveals striking differences.

Table 5.21 **Effective Marginal Tax Rates, West Germany, 1980, Fixed-p Case**
(%)

	Inflation Rate		
	Zero	10%	Actual (4.2%)
Asset			
Machinery	38.1	46.6	44.5
Buildings	42.7	31.2	42.9
Inventories	57.7	60.8	59.0
Industry			
Manufacturing	44.7	46.8	48.1
Other industry	50.8	57.9	57.0
Commerce	44.6	36.6	44.4
Source of finance			
Debt	12.1	−33.3	−3.1
New share issues	56.1	65.7	62.6
Retained earnings	72.0	111.5	90.2
Owner			
Households	59.7	82.0	71.2
Tax-exempt institutions	17.6	−17.9	6.3
Insurance companies	14.6	−38.9	−3.8
Overall	45.1	46.1	48.1

The breakdown by assets shows that investment in inventories bears the highest tax burden (59 percent), while for machinery and buildings the effective tax rates are similar (44 and 43 percent, respectively). This difference reflects the inventory valuation scheme, which is relatively unfavorable compared with depreciation allowances for fixed investment. As regards the various industries, the other industrial sector has the highest and the commercial sector the lowest effective tax rate. The main reason is the difference in debt/equity ratios. The debt/equity ratio is relatively low in the other industry sector and relatively high in the commercial sector. Concerning the various sources of finance, there are also striking differences. For debt financing the marginal effective tax rate is slightly negative, whereas it amounts to 63 percent for investment financed by new share issues and to 90 percent for financing by retained earnings. With debt finance, corporations may deduct nominal interest payments against the corporate tax rate, which is considerably higher than the average rate at which recipients of interest pay tax. In addition, debt finance is not liable to the federal corporate wealth tax. The higher effective tax rate for retained earnings compared with new share issues results from the imputation system: the average marginal income tax rate of owners is lower than the corporate tax rate, which implies that the opportunity cost of keeping the money in the firm (retentions) is higher than the opportunity cost of raising new capital (new share issues).

The savings of private households bear an effective tax rate of 71 percent at the margin, while for investment financed by tax-exempt institutions and insurance companies the effective tax rates are much lower (6 percent and -4 percent, respectively).

Table 5.21 shows that (at least in the fixed-p case) there is no significant relation between the rate of inflation and the overall effective marginal tax rate. There are obviously some factors that lead the tax rate to increase with inflation, but there are others that tend to reduce the effective tax rate as inflation rises. This can be seen from the disaggregated result. The effect of inflation differs significantly for the various types of assets, industries, sources of finance, and groups of owners. The effective tax rate increases with inflation in the case of machinery and also for inventories, but it declines for buildings. This seems to reflect the fact that the adverse effect of historic cost valuation is more than offset by the significantly shorter service life compared with life for buildings.

Inflation increases the effective tax rate for retained earnings and for new share issues but reduces it for debt finance. With higher inflation the deductibility of nominal interest payments against the corporate tax rate of 62 percent outweighs the taxation of nominal interest receipts at lower income tax rates. The effect of inflation on the effective tax rate in the case of debt financing explains the differences in the impact of inflation among the industry groups. In the commercial sector, which has a rel-

atively high debt/equity ratio, the effective tax rate declines with inflation.

For the fixed-*r* calculations (described in chap. 2) with our standard tax parameters and the actual average inflation rate, the overall effective tax rate is 64.8 percent, as shown in table 5.22. This can be interpreted as follows: if the real rate of return before personal tax were 5 percent, if the inflation rate were 4.2 percent, and if the savings of all owners were increased by 1 percent, then the present value of the expected tax would be 64.8 percent of the additional real return. It is shown in table 5.22 that, in the fixed-*r* case, the effective tax rate increases slightly with inflation. With zero inflation the German tax system would provide an overall effective tax rate of 57.4 percent, and with 10 percent inflation a rate of 68.2 percent. The same pattern of the tax rates for asset, industry, source of finance, and owner can be seen in the fixed-*r* case as in the fixed-*p* case.

As mentioned in section 5.2.8, it is widely believed that taxes on interest income are often evaded by households. To analyze the sensitivity of the results to the assumed marginal tax rate of households, we have replaced the standard parameter of 39.8 percent by a lower rate of only 20 percent. The overall marginal effective rate would then (in the fixed-*p* case and with actual inflation) be 41.1 percent; that is, seven percentage

Table 5.22 **Effective Marginal Tax Rates, West Germany, 1980, Fixed-*r* Case**
(%)

	Inflation Rate		
	Zero	10%	Actual (4.2%)
Asset			
Machinery	53.0	68.9	63.4
Buildings	51.5	56.1	59.9
Inventories	66.3	74.6	70.4
Industry			
Manufacturing	57.4	68.8	65.0
Other industry	60.5	73.8	69.5
Commerce	56.1	60.7	61.3
Source of finance			
Debt	16.3	−211.3	−17.9
New share issues	63.1	83.8	73.2
Retained earnings	73.4	94.0	85.4
Owner			
Households	68.6	94.0	82.4
Tax-exempt institutions	32.9	7.5	26.5
Insurance companies	30.5	−32.6	9.1
Overall	57.4	68.2	64.8

points lower than with the standard assumption. The reduction of the effective tax rates of the three assets and three industries would be of a similar order of magnitude. The subsidy for debt financing would increase considerably from 3.1 percent to 23.6 percent, and the effective tax rate on households would decline from 71.2 percent to 59.6 percent.

5.4.2 Recent Changes in Tax Legislation

As part of our standard set of parameters, we have included the new rate of accelerated depreciation for machinery of three times the straight-line rate. Although this was increased from 2.5 times the straight-line rate in 1981, the change was felt to be important enough to be included in the standard case. To examine the effects of the change, we show in table 5.23 the marginal tax rates under the old regime in the fixed-*r* case. The table shows that this measure reduced the effective marginal tax rate for machinery by 4.8 percentage points from 49.3 percent to the 44.5 percent figure mentioned above. Other assets were unchanged. The effect on machinery was sufficient to reduce the overall rate by 2.1 percentage points, from 50.2 to 48.1 percent.

Table 5.23 **Effective Marginal Tax Rates, West Germany, with 250 Percent of Declining Balance for Machinery, Fixed-*p* Case**
(%)

	Inflation Rate		
	Zero	10%	Actual (4.2%)
Asset			
Machinery	41.7	52.7	49.3
Buildings	42.7	31.2	42.9
Inventories	57.7	60.8	59.0
Industry			
Manufacturing	46.4	49.5	50.3
Other industry	52.1	60.2	58.9
Commerce	45.3	37.9	45.4
Source of finance			
Debt	14.3	−29.6	−0.1
New share issues	57.5	68.1	64.5
Retained earnings	72.9	113.1	91.5
Owner			
Households	60.9	84.0	72.8
Tax-exempt institutions	19.6	−14.5	9.1
Insurance companies	16.9	−35.0	−0.6
Overall	46.6	48.6	50.2

5.4.3 Comparison with 1960 and 1970

As mentioned in section 5.1, various attempts have been made since the mid-1970s to establish a "better general framework" for investment activity. In terms of the tax parameters used for this study, the following measures were especially important:

1. The introduction of the new corporate tax system (1977), which abolished the double taxation of distributed earnings.
2. Depreciation allowances were increased in various steps. In 1960 and also in 1970 only double declining balance (DDB) was possible for machinery, but the accelerated rate of depreciation was increased in 1977 to 2.5 and in 1981 to 3.0 times the straight-line rate (see table 5.5). Furthermore, there was on average a moderate reduction in actual service lives and a larger reduction in tax lives during the 1960s and 1970s (see table 5.6).
3. During the 1970s there were some changes in wealth taxes. Rates were first increased (1975) and then lowered again (1978), and the income deductibility of this tax was abolished (1975; see table 5.10).
4. Investment grants were increased during the 1960s and also during the 1970s (see tables 5.8 and 5.9).
5. Owing to the interaction between a progressive income tax and inflation, the marginal rate on households increased over the period (see table 5.11).
6. The estimated effective marginal tax rates for 1960 and 1970 are shown in tables 5.24 and 5.25, respectively. Between 1960 and 1970, the overall marginal tax rate fell by 2.6 percentage points from 52.5 to 49.1 percent.

The various policy measures between 1970 and 1980 did not bring about a fundamental change in the effective taxation of capital income, but the overall rate fell by one more percentage point. In comparison with the other countries in this study, the German experience has been one of stability with relatively high marginal tax rates on capital income.

The various measures combine into an overall effect as follows:

1. The improvement in depreciation allowances reduced the effective tax rate for machinery between 1970 and 1980 by 5.2 percentage points. A similar reduction (by 5.3 percentage points) also occurred between 1960 and 1970.
2. Owing to the introduction of the imputation system with full imputation of corporate tax payments at the recipient level, the effective tax rate on new share issues declined by 16.8 percentage points between 1970 and 1980.

As mentioned above, these reductions did not bring about a substantial reduction in the overall effective tax rate between 1970 and 1980/81. One reason for this is the low weight of new share issues as a source of finance.

Furthermore, there were offsetting effects. With the new corporate tax system, tax-exempt institutions are not allowed to benefit from the imputation of corporate tax paid on distributions. This tax rule implied a substantial increase in the marginal dividend income tax rate for this group of owners as compared with the "old" system. This is in sharp contrast to the United Kingdom, where tax-exempt institutions are allowed to benefit from imputation relief and, in consequence, receive substantial refunds from the tax authorities.

5.4.4 Comparison with Average Tax Rates

The calculations in the present study refer to the marginal effective tax burden on capital income, and it is interesting to compare these results with the average tax burden on companies, particularly since this usually plays an important role in public discussions.

The numerator of such an average tax rate should include the actual tax revenues from corporate tax, the local business tax, the wealth tax, and taxes on dividend receipts and interest receipts from the corporate sector. The denominator should reflect actual operating profits defined to include distributed and retained profits and interest payments of the corporate sector. We based our estimate on the national accounts statistics,

Table 5.24 **Effective Marginal Tax Rates, West Germany, 1960, Fixed-*p* Case**
(%)

	Inflation Rate		
	Zero	10%	Actual (4.2%)
Asset			
Machinery	47.5	57.3	55.0
Buildings	48.1	33.7	46.4
Inventories	53.4	57.6	55.2
Industry			
Manufacturing	49.7	51.9	53.2
Other industry	52.1	55.4	56.8
Commerce	46.5	38.7	46.1
Source of finance			
Debt	19.7	−19.9	6.9
New share issues	68.7	94.1	81.4
Retained earnings	72.7	105.8	88.4
Owner			
Households	65.9	89.4	77.8
Tax-exempt institutions	15.5	−26.5	1.8
Insurance companies	24.0	−20.0	9.5
Overall	49.4	50.4	52.5

which provide profits data (distributions and retentions) for the nonfinancial corporate sector. The other elements in our calculation had to be estimated by using information provided by Bundesbank statistics on balance sheets of corporations and by tax statistics.

In table 5.26 real operating profits are defined to consist of net interest and net dividend payments, corporate taxes (including corporate local taxes and corporate wealth taxes), and retained earnings. During 1978–80 the average corporate tax rate on real corporate profits amounted to 57.8 percent. Tax, interest, and dividend payments were larger than operating profits, which implied negative retained earnings. The negative sign for retained earnings in table 5.26 cannot be fully explained by a relatively depressed profit level; it seems also to reflect statistical errors. There are indications that during the envisaged national accounts revisions, estimates of operating profits of nonfinancial corporations will be revised upward. Since tax payments will not be revised, the average tax rate in table 5.26 will decline somewhat. In table 5.27 we show taxes on interest and dividend payments paid by the owners of the securities, and also the corresponding personal wealth taxes. For the taxation of interest payments, an average of owners' tax rates was used. These rates were 30 percent for households, zero for tax-exempt institutions, 3 percent for

Table 5.25 **Effective Marginal Tax Rates, West Germany, 1970, Fixed-*p* Case**
(%)

	Inflation Rate		
	Zero	10%	Actual (4.2%)
Asset			
Machinery	43.2	50.7	49.7
Buildings	44.2	28.3	42.2
Inventories	54.5	56.6	55.4
Industry			
Manufacturing	46.9	47.2	49.8
Other industry	49.9	52.2	54.3
Commerce	44.2	34.0	43.0
Source of finance			
Debt	13.7	−32.2	−1.5
New share issues	67.1	91.4	79.4
Retained earnings	72.8	107.5	89.2
Owner			
Households	64.5	87.6	76.3
Tax-exempt institutions	10.5	−36.4	−5.2
Insurance companies	18.8	−30.4	2.3
Overall	46.7	45.7	49.1

Table 5.26 **Corporate Profits and Their Appropriation, Germany, 1978–80**
(billion DM in current prices)

	1978–80 Average
Real operating profits	55.7
Corporate taxes	32.2
Interest payments	10.8
Dividend payments	16.2
Real retained earnings	−3.5

Source: National Accounts Statistics, Deutsche Bundesbank, and own estimates.

Table 5.27 **Average Tax Rate on Real Corporate Profits**
(billion DM in current prices)

	1978–80 Average	Percentage of Profits
Total taxes	37.5	67.32
Corporate taxes	32.2	57.81
Taxes on		
Interest payments	2.5	4.49
Dividend payments	2.0	3.59
Real retained earnings	—	—
Personal wealth	0.8	1.44
Real operating profits	55.7	
Average tax rate (%)	67.3	
Average profit rate (%)		
Gross of tax	16.9	
Net of tax	5.5	

Source: Own calculations as described in text.

insurance companies, and 15 percent for dividends to foreigners, which are also included here. The ownership of debt in section 5.3.5 was used to weight the tax rates. For additional taxes on dividends at the recipient level, corresponding estimates have been made using our own estimates on the ownership of equity and marginal tax rates of the different ownership groups.

With these assumptions, the estimated average tax rate on real operating profits amounts to 67.3 percent for the period 1978–80. Taxes therefore reduced the average profit rate from 16.9 percent before tax to 5.5 percent after tax (see table 5.27). With the above-mentioned forthcoming statistical revisions to the profits data, the average tax rate as calculated in table 5.27 will be reduced. It may therefore come somewhat closer to the marginal effective tax rate as described above.

Nevertheless, the average tax rates do not depart significantly from the estimated marginal rates, especially in the fixed-r case, which is the estimate more closely related to the comparison with actual tax payments.