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8   Conclusion

The first seven chapters of this book have discussed at some length the tax systems of four industrialized Western countries. We have provided information on tax rates and tax rules applicable to different forms of investment in each country, a theoretical framework for organizing the analysis of these tax rates and rules, information on the allocation of capital in each country, and a summary of all this information in the form of effective rate calculations. Although we set out the goals of this exercise explicitly at the beginning of the book, it is easy for the reader to become lost in the detail of tax law and discussion of special cases. In this final chapter we place our results in perspective and reflect on the lessons of the project.

The objective of the study was descriptive: to characterize the taxation of income from capital in the four countries we studied. Our interest is in the way taxes affect the incentive to save and invest via the corporate sector. If the tax rules provided for an accounting system that measured "income" according to the economist's conception of the net return from investing, and if that income were taxed according to a single schedule, our task would have been easy. We need only have looked up the tax rates in the statute books.

Instead, the taxation of the return to investment is governed in all four countries by extremely complex rules. The primary basis for taxation is "income" in name only. Taxes intervene between the social yield on an investment and the return obtained by the saver, and these taxes are influenced by a variety of provisions that diverge widely from those required to tax real income. Some divergences are explicitly designed to encourage investment. Others reflect particular political interests. Still others arise from the sheer practical difficulty of identifying and measuring income, especially in a time of inflation.

8.1 Methodology

We conceive of the process of saving and investing in terms of double-entry accounts. Each act of investing must be associated with an act of saving (public or private) in equal amount. As assumed in this study, the relevant saving is restricted to private domestic sources. Under a genuine income-based system, the rate of tax applicable to a given "package" of saving and investment would depend at most upon the identity of the saver (because of graduated rates). In practice, however, the tax also depends upon the asset being acquired, the industry in which the asset is used, and the particular form of financing the transaction.

To deal with this complexity, we identified a relatively small number of types to represent the possible variations in each dimension. Thus, for example, assets are considered to be of three possible types that differ in the time path of associated cash flows. Each of the three types was chosen to approximate the actual characteristics of a practically important asset class (specifically machinery, buildings, and inventories).

Similarly, we defined three classes of industries (corresponding to manufacturing, commerce, and "other industry"), three types of finance (corresponding to debt, new share issues, and retained earnings), and three groups of savers (corresponding to households, tax-exempt institutions, and insurance companies). We can imagine a strand of transactions running from each type of saver via each financing mode to acquisition of each type of asset in each industry. We refer to each strand as a project type. The classification scheme thus depicts the corporate economy as a bundle of eighty-one distinct types of projects.

To describe the impact of taxation on each of the eighty-one projects, we employ an effective tax rate. One finds in the literature several different concepts of effective tax rates. In this study we use the term to describe the effect of taxes on a prospective or marginal investment (as distinguished from a measure of taxes paid on historically given capital stocks). The basic elements are a pretax rate of return on the project, denoted p, and the after-tax rate of return, s, received by the saver after all intervening taxes have been withdrawn from the flow. The difference between p and s is the effective tax "wedge," and the ratio of the difference to the pretax return is the notion of effective tax rate most widely used here. Because the measure takes into account all taxes on a marginal investment, a more precise term would be "marginal effective total tax rate."

8.1.1 The Fixed-p and Fixed-r Approaches

Chapter 2 describes in detail the procedures by which we determined the paired values of p and s for each of the eighty-one projects. We shall not attempt to summarize that discussion here; rather, let us remind the

reader of the two basic conceptual approaches. The first, and probably easier to grasp, we called the "fixed-p" method. Here the starting point is an assumed value for p, the social rate of return on each hypothetical project. For this purpose we typically used a 10 percent real return per annum. The value of s for a project is the maximum return that could be provided to the specified saver in view of the tax provisions applicable to an asset of the specified type used in the specified industry and financed in the specified way.

The effective tax rates calculated in this way give a useful measure of the incentive or disincentive effect of taxes on the various investment projects. To have a measure that indicates the ratio of the tax wedge to the pretax return that actually obtains, however, it is necessary to take into account the response of investment and of pretax returns to the taxes themselves. An investment credit on one project type, for example, results in an incentive to pursue that type until its before-tax rate of return is below the level obtaining on other project types. In an actual equilibrium, then, we would not observe the same before-tax rate of return on all eighty-one projects. Because effective tax rates are typically sensitive to the magnitude of the before-tax rate of return, the picture we obtain of a tax system will depend somewhat on the extent to which we take into account such general equilibrium reactions.

The "fixed-r" approach represents an attempt to deal with this problem. The symbol r stands for the real rate of interest on debt. The fixed-r approach describes the values of p and s that would obtain if each saver received the same after-tax real return on each project as on a bond having a prespecified real interest rate (typically 5 percent per annum).

It is not clear, however, that this assumption is consistent with a general equilibrium based on individual optimizing behavior. When tax rates differ from one project to another, it may be necessary to impose some constraints to ensure that an equilibrium exists. The tax code contains many such constraints. For any particular set of constraints we may define an equilibrium. If the weights for each project implicit in that equilibrium correspond to the weights based on observed shares used here, then the tax rate in the fixed-r case is the tax rate relevant to an assessment of the welfare costs imposed by the tax system. To illustrate the difficulty of defining an arbitrage equilibrium, consider the following example.

There are differences in the tax treatment at the personal level between the return on an investment financed by retained earnings (which takes the form of capital gains) and the return on an investment financed by debt or new shares (which takes the form of interest or dividend income). These differences mean that if the after-tax returns are equal for one ownership category, they will not be equal for another. To illustrate, suppose a firm is providing a 12 percent return, on both its bonds and its

common stock, to a tax-exempt saver. Suppose also that the common stock return is in the form of accruing capital gain. A different saver, one who is taxed at a higher rate on interest than on capital gains, will earn a higher after-tax return on that firm's stock than on its bonds. We would expect, therefore, that investors would specialize in particular securities according to their marginal tax rate, although we do not observe anything like complete specialization in practice.

The difficulties encountered here are representative of those facing the analyst equipped with an imperfect model of capital market equilibrium. The fixed-r analysis should be read as a measure of the additional taxes that will be paid taking into account the market response to incentives.

Most readers will probably find the fixed-p approach the easier to follow because it measures the tax schedule facing investors, and we have made most of our comparisons in terms of it. We should emphasize, however, that the effective tax rates differ under the two approaches. These differences suggest a degree of care when interpreting the results, and this warning is applicable to effective tax rate comparisons generally.

8.1.2 Behavioral Assumptions and Mean Rate Calculations

Recall that the essential objective is to *describe* tax systems. As long as we confine our attention to the individual project types, the analysis does not make severe demands on assumptions about the working of the economy. The effective tax rates tell us what rate of return could be provided to the saver, after all taxes, on an investment yielding a specified return before all taxes. To be sure, the relevance of such effective tax rates is dependent upon assumptions about the objectives of firms. The reason for studying effective tax rates is to understand the effect of tax laws on incentives and, through incentives, on behavior. It is at the stage of applying the effective tax rates that modeling assumptions become critical.

Applying the descriptive results presented in this study does require judgments or assumptions about the way the various projects—eighty-one of them—are tied together in the economy. To illustrate, one might be tempted to conclude that each class of saver would concentrate all of its savings in the single project type having the lowest effective tax rate. The implication would be a degree of portfolio specialization and invest-ment composition that makes no empirical sense.

Comprehensive analysis of incentives challenges our understanding of capital markets. On the other hand, to confine our description to the eighty-one hypothetical projects would perhaps have been to be too agnostic about overall incentives. We resolved the issue by using weighted averages of the marginal effective tax rates. These averages answer a particular question: By how much would taxes increase if all the corporate assets in the economy were to increase by 1 percent? In posing

the question this way we avoided the issue of whether such behavior would be economically sensible. We shall return briefly to this point below.

Based on this short recapitulation of our methodological approach, the reader who has begun with this chapter should be able to browse usefully through the book (with a little help from the glossary of notation at the front). Chapter 7 in particular contains summary comparisons of the four tax systems, together with brief explanations for the results displayed.

8.2   Principal Conclusions

What, then, are our major conclusions? The reader who is starting with this chapter may expect a summary judgment about the levels of taxation in each country as the most important result. In our view, however, the most significant acomplishment is the expression in reasonably manageable terms of the remarkably complex tax rules bearing on capital income in all four countries.

We knew at the outset that it would be difficult to develop a uniform method of comparing tax systems. We learned in the process that the matter is even more complex than we had expected. At the same time, substantial progress was made. The difficulty we anticipated was that of normalizing for nontax differences in the four economies. The tax systems in question are far from uniform in their treatment of particular transactions. Comparisons between tax systems are therefore potentially sensitive to the assumed projects to which the different tax rules are applied.

Our results confirm the importance of this point. In the fixed-p case, to take just one example, the overall average effective tax rates are: United Kingdom 3.7 percent, Sweden 35.6 percent, Germany 48.1 percent, and United States 37.2 percent when the four sets of national rules are applied to their own actual economic data. If, instead, we apply the tax laws of the four countries to the United States economy, we find the four overall tax rates to be: United Kingdom 18.9 percent, Sweden 52.6 percent, Germany 52.6 percent and United States 37.2 percent. Arguably the latter figures provide the better comparison of the tax rules by themselves, while the former give a better impression of the effect of the rules in action. The right figures to use depend upon the question being asked.

While our study indeed confirms the sensitivity of comparisons to assumptions, it also demonstrates the possibility of using the data we have collected to analyze alternative assumptions. The analytical framework makes it relatively simple to vary any assumed before-tax or after-tax return, any of the statutory provisions, or the size of any real or financial stock or flow.

It is natural for the reader to look for some summary statement about

the levels of capital income taxation in the four countries. While we would emphasize that this depends upon the particular formulation of the question, we also bring away from the study the sense that capital income taxes are lowest on average in the United Kingdom at the same time that they are least uniform in the United Kingdom. Capital taxes are highest on average and most uniform in Germany.

More striking than any generalization about levels of taxation is the great variability observed across the eighty-one project types in any of the four countries. The variation can be grasped immediately by a glance at the histograms in figures 7.6 to 7.9. Economists will immediately recognize the potential for efficiency costs due to this lack of uniformity.

The country chapters describe the recent history of tax legislation in each country, finding considerable change over time in the tax rules applicable to various assets. The general trend in all four countries has been a "liberalization" of tax rules as applied to nominally defined income. This has typically taken the form of shortening asset lives on which depreciation allowances are based and enhancing investment grant provisions. Many observers have pointed to the interaction of inflation and an unindexed tax system as a possible rationale for these changes in tax law. This point is illustrative of the general proposition that the tax policy of a country needs to be seen in the context of prevailing conditions.

The 1980 effective tax rate calculations in this book should be viewed as a particular snapshot of the four tax systems. They reflect, of course, the particular tax rules in effect during that year. But their overall effect, as well as the objectives of their framers, can only be understood in relation to the particular expected inflation rate and the particular allocation of capital, both of which are in turn the outcome of historical forces.

Doubtless the effect of inflation on income accounting has much to do with the evolution of the four tax systems. The methods of this study allow us to see the practical importance of the proposition, well understood by economists, that ad hoc corrections are an imperfect substitute for indexing. The combined effect of inflation and tax rule change has generally been an increase in the dispersion of effective tax rates. Many rates have been dramatically lowered, while some have been just as dramatically raised. For all countries we found that an increase in inflation by itself would increase the dispersion of effective tax rates.

Because the various tax rules interact in significant ways, it can be very misleading to deal with a particular component in isolation. The corporate income tax, the personal income tax, and wealth and property taxes all impinge on the return to investment. Similarly, national, state, and local levies interact. Although the various layers tend to have an additive effect, sometimes one tax is ameliorated by its impact on another. For

example, the effect of a wealth tax may be exaggerated if its deductibility under an income tax is neglected.

One particularly often encounters attempts to evaluate corporation income taxes in isolation. Our study shows clearly how misleading this may be. A low effective corporate tax wedge may be completely offset by a high effective personal tax wedge. A particularly interesting finding is that the corporate tax system, including investment tax credits and other incentives, often contributes little to the overall total effective tax wedge. In Britain, Sweden, and the United States after 1982, the corporate tax system actually reduces the overall wedge. At the same time it *does* contribute significantly to variations in effective tax rates among assets. In Britain, where machinery is allowed immediate expensing and interest is deductible, firms can use the resulting effective subsidy to offset any positive tax liability that is due on other investments. The result may be little combined revenue but considerable influence on the allocation of capital.

Some previous studies of different countries have compared the average tax rate—that is, the ratio of observed tax paid to observed capital income. Such a rate may be useful for measuring cash flow from capital owners to government, but it may not indicate much about the incentives for making new investment. Unanticipated inflation, for example, can increase the real cash flow of taxes on previous investments without necessarily affecting the expected tax on a new investment. Inflation acts as a lump-sum tax by reducing the real value of the depreciation allowances on existing capital. Furthermore, the cash flow of taxes paid in a given year reflects taxes on assets put in place in different years. If tax allowances have recently become more generous, for example, then the marginal tax rate can be expected to be less than the average tax rate. The United States chapter (section 6.4.4) summarizes some other reasons the marginal tax rate might differ from the observed average tax rate.

In making overall comparisons we looked at a marginal increase in the existing capital stock: a 1 percent increase in the existing allocation of assets, located among industries in the existing proportions of assets, financed in existing proportions for each source of finance and ultimately provided by ownership groups in proportion to existing holdings. It is for this reason that the four country chapters were careful to derive weights based on capital stocks, not on investment flows. Similarly, we looked at the market value of debt and the market value of equity to characterize the financial structure of our hypothetical increase in saving.

The margin we chose to analyze may not represent a realistic description of likely new investment in the four countries. The associated mean tax rates may not be the actual future taxes to be expected in a country which is changing the pattern of its capital stock. The data presented,

however, especially the tables of effective tax rates for the eighty-one project types (in Appendix A), allow other analysts to substitute alternative investment weights and thereby answer other questions.

The tax rates calculated here, if used properly, can provide information about the misallocation of capital among assets within the corporate sector. In combination with other information on taxes in the noncorporate sector, our tax rates can be used to measure overall effects of taxes on the allocation of capital among all competing uses (corporate, other business, or residential). They can be used to shed light on the misallocation of savings among different vehicles (such as pensions, insurance, and direct ownership), and they can be used to help measure efficiency costs associated with the way taxes affect debt/equity choices, dividend payment decisions, and corporate financial policy in general. Because we have no explicit treatment of risk, however, these results cannot be used to measure other efficiency costs such as those associated with the allocation of risk bearing. They shed some light on intertemporal distortions, but because noncorporate investments are excluded our calculations do not by themselves provide information on the total or average wedge in the economy between the social marginal product of capital and the saver's ultimate return net of tax. The average social marginal product of capital in the economy would depend on the combination of corporate, noncorporate, public, and residential investments, while the saver's net of tax return, or rate of time preference, would have to be averaged over all those investments as well.

We might point out some particular complications that arise in using our effective tax rates or wedges (between the pretax return and the posttax return for each combination in a given country) to estimate the welfare costs of the misallocation of capital even within the corporate sector. Tax rates on different combinations are affected by different personal tax rates among different owners, and these differences do not necessarily imply anything about capital misallocations. To make the same point another way, the histograms in figures 7.6 through 7.9, if taken at a glance, probably overstate the differential effects of capital income taxation. Some of the variation just reflects the normal variation of rates among individuals.

If the corporate tax system did not discriminate among assets, industries, or sources of finance, and if there were ten ownership categories with equal holdings and ten different personal tax rates varying from zero to 90 percent, then the histograms would just show the uniform distribution of ownership among the ten ownership categories. Analysis of corporate capital misallocation (across asset types or industries) would, in such an instance, require controlling for differences in personal tax rates.

8.3 The Quest for Improved Equilibrium Models

The differences in personal tax rates found in this study are of a slightly different character from the ones in the example just described. While the ownership category "household" does have a different marginal rate from the ownership categories "tax-exempt institutions" and "life insurance companies," households are the indirect claimants on the other two. In the final analysis one would like to have an equilibrium theory rationalizing the picture of the economy revealed in the figures on asset composition, industry structure, financing methods, and ownership breakdown.

The development of such a theory is a matter requiring further study. The research reported here is intended as a contribution both to an increased awareness of how our tax systems actually work in practice and to the empirical modeling of taxes and the capital market. We hope that the results of our study will stimulate further theoretical analysis of equilibrium models with diverse tax rates, and that in turn this will lead to improved quantitative estimates of the impact of taxes. The interplay between theoretical and empirical investigation is crucial if research in this area is to shed light on the ways tax policy might be improved.