1 Introduction

The choice of a tax system is among the most important economic decisions governments make. Tax revenues make up on average roughly one-third of gross domestic product (GDP) across the Organisation for Economic Co-operation and Development (OECD) countries. Taxes influence key economic and social outcomes, including productivity, employment and growth; income and wealth distribution; international and intranational mobility of labour and capital; innovation; and social mobility and stability. Although their details differ, tax systems exhibit similar features across countries and continue to evolve in common ways. These broad similarities can be partly attributed to common circumstances facing different countries. Globalization and competitiveness pressures weigh on all of them. The evolution of inequality of income and wealth has proceeded in comparable ways. The industrial structures of OECD economies have increasingly tilted away from manufacturing toward services, and sectors relying on information technology and intellectual property have blossomed. Labour forces have become more educated and diverse, and large multinational corporations that are relatively footloose now dominate the industrial landscape.

Tax policy is the result of political decision-making, but it is informed and judged by tax policy principles. The applications of these principles unavoidably involve value judgments and social norms that vary from country to country, thus affecting the way they are applied, but the established set of tax principles are widely accepted. These principles are based on the voluminous body of tax analysis built up over the years and continually evolving. Policymakers are exposed to the results of tax analysis partly through their advisors in government and in political parties. The implications of the current state of tax analysis for tax policy circulate widely through the tax reform commissions that have been established in various countries from time to time. Examples of these include the UK Royal Commission on the Taxation of Profits and Income (1955), the Royal Commission on Taxation (1966) in Canada, the United States Treasury (1977), the Meade Report (1978), the President’s Advisory Panel on Federal Tax Reform (2005), the Australian Treasury (2010) and Mirrlees et al. (2011) in the United Kingdom.

Actual tax reforms adopted in OECD countries reflect these evolving principles to varying extents, and practices implemented in some countries often serve as examples that spread to others. One only has to think of the worldwide adaptation of the value-added tax (VAT) as an example. France adopted a broad-based VAT in 1958, followed by West Germany in 1968 and all other European...
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Union countries shortly thereafter. By 2018, 166 countries had adopted a VAT, including all OECD countries except the USA.

The intent of this Element is to recount the tax policy implications that emerge from the tax theory literature. We begin with a summary of how tax design principles have evolved over time before discussing the key results from the optimal income tax analysis inspired by Mirrlees (1971) and extended by Diamond (1980) to the extensive-margin approach. We emphasize the analytical techniques that yield empirically relevant concepts and show the equity–efficiency trade-off at the heart of tax policy. We also summarize the evidence about the behavioural responses to redistributive taxation and the evidence in support of the social welfare functions adopted. We outline the implications for tax policy of more realistic labour market considerations. This includes making wages endogenous and allowing for involuntary unemployment. We consider the consequences of recent findings in behavioural economics for tax-transfer policy. Finally, we summarize the tax policy implications of optimal tax analysis.

This Element complements three others. Gordon and Sarada (2019) focuses on corporation income taxation, while Christiansen and Smith (2021) provide a treatment of commodity taxation. The closest one to ours is Tanninen et al. (2019), who study optimal income taxation. Our Element also treats optimal income taxation but with a different orientation. In addition to outlining the underpinnings of the social welfare–maximizing approach to optimal income taxation, we consider extensions such as the extensive-margin approach to labour supply, involuntary unemployment and behavioural approaches, and we emphasize the policy implications of optimal tax analysis.

2 Evolving Principles of Tax Policy

In the public finance literature, there have been three dominant approaches to choosing the tax structure. The ability-to-pay approach, reflected in Musgrave’s (1959) treatise, dominated the literature until the 1960s. The personal expenditure tax approach introduced by Kaldor (1955) was advocated by the US Treasury Blueprints (1977) and the Meade Report (1978). The optimal tax revolution formalized by Mirrlees (1971) and Diamond and Mirrlees (1971) changed the focus of normative tax theory to a social welfare–optimizing approach, or what we shall loosely refer to as the utilitarian approach. It is utilitarian in the sense that social welfare is based on individual utilities aggregated into a social welfare function. Recently, a fourth approach based on the notion of equality-of-opportunity has been introduced by Roemer (1998) and
Fleurbaey and Maniquet (2011), though its implications for actual tax policy are still in the process of being developed.

In recent years, the tax policy and tax design principles have been dominated by the utilitarian approach, and much of our analysis will be based on it. To put the utilitarian approach into context, it is useful to begin with a brief outline of the different approaches.

2.1 Ability-to-Pay Approach

The ability-to-pay doctrine is based on the idea that the taxes individuals pay should be governed by the economic resources they have at their disposal. Two key features of ability-to-pay distinguish it from other approaches. First, ability-to-pay depends on one’s command over resources and not how one chooses to use them. This resource-based emphasis distinguishes it from the utilitarian approach, where tax liabilities are based on utility as determined by individual behaviour. Second, tax liabilities are not related to the uses to which the taxes are put, especially to the benefits one receives from public goods and services. This distinguishes the ability-to-pay principle from benefit taxation associated with Wicksell (1896), according to which taxes are assigned based on benefits received. The benefit principle is challenging to implement and eschews any redistributive role for taxation.

Two operational issues confront the ability-to-pay principle: how should ability-to-pay be measured, and how should taxes vary with ability-to-pay? The standard measure of ability-to-pay is *comprehensive income* developed by Schanz (1896), Haig (1921) and Simons (1938). Comprehensive income parallels Hicks’ (1946) notion of income, which is defined as the maximum individuals could consume annually without changing their wealth, or \( Y = C + \Delta A \), where \( Y \) is income, \( C \) is consumption and \( \Delta A \) is the change in assets or saving. This definition is based on the sum of the uses of income, and through the individual’s budget constraint, it is equivalent to the sum of the sources of income, since \( Y = E + rA + I \), where \( E \) is earnings, \( rA \) is capital income assuming a rate of return of \( r \) and \( I \) is net inheritances.

Some conceptual issues in the definition of \( Y \) are worth highlighting. First, consumption and income include items that involve market transactions: they do not include household production, leisure or items obtained by barter. Consumption also includes consumption services obtained from consumer durables that have been purchased. Thus, consumer durables are not included in asset wealth \( W \), and the return on consumer durables is treated as consumption rather than asset income. Similarly, human capital is not included in asset wealth, and the returns to human capital are included in earnings. The rate of
return \( r \) includes not just normal market returns but also returns to risk-taking and windfall gains. Another conceptual issue concerns bequests, inheritances and other voluntary transfers. While the receipt of such transfers constitutes a change in wealth, giving them may or may not be considered as an act of consumption. Whichever it is, it has implications for tax liabilities under comprehensive income taxation as well as under the other approaches discussed in Sections 2.2 and 2.3.

The second issue is how tax liabilities should vary with ability-to-pay. Some principles have been dominant. One is horizontal equity, or the equal treatment of equals. Horizontal equity holds that individuals who are equally well off before taxes and transfers should be equally well off in their presence (Musgrave, 1959). Though this seems innocuous, it becomes murkier when the use of tax revenues is taken into account. Horizontal equity of government decisions entails that equally well-off individuals should remain equally well off after both taxation and government expenditures, which is a demanding standard. Extending the principle of horizontal equity to a federal context is even more demanding. Requiring equal treatment of equals who reside in different regions of a federation is difficult, given that sub-national levels of government choose different policies. In the fiscal federalism literature, horizontal equity is typically invoked in potential terms to inform the design of intergovernmental equalization transfers. The argument is that transfers should be designed so that different sub-national governments have the capacity to provide comparable public services at comparable tax rates, even if they choose not to do so (Boadway and Shah, 2009).

Another general idea is vertical equity, which suggests that individuals who have greater ability-to-pay should face appropriately higher tax burdens. The question is how to establish what burdens are appropriate. The principle commonly turned to is equal sacrifice, which suggests that the loss of income due to taxes should be comparable for individuals with different initial incomes. Musgrave (1959) distinguished three notions of equal sacrifice. First, equal absolute sacrifice of incomes would lead to a regressive tax system in the sense that average tax rates would fall with income.

A second notion is equal proportionate sacrifice, which, when applied to incomes, amounts to proportional income taxation. The Royal Commission on Taxation (1966) added to this the idea that there is a level of non-discretionary expenditures that all persons require for the necessities of living. Incomes necessary to finance non-discretionary expenditures should be exempt from taxation, and equal sacrifice should apply only to incomes above that. Assuming equal proportional income sacrifice on non-discretionary income leads to a linear progressive income tax, where tax liabilities \( T \) are given by \( T = t(Y - N) \), where \( Y \) is income, \( t \) is the tax rate, and \( N \) is nondiscretionary income.

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\[ T = \frac{tY}{C_0N}, \]

where \( Y \) is income, \( t \) is the tax rate, and \( N \) is nondiscretionary income.
A third notion is equal marginal sacrifice, whereby taxes are allocated among individuals such that their marginal loss from the last increment of taxation is the same. If equal marginal sacrifice is defined in terms of utility, and if utility is strictly concave in income, taxation would be progressive even in the absence of an exemption for non-discretionary income. This interpretation of equal marginal sacrifice takes us into the realm of utilitarianism, which we discuss in Section 2.3.

Before turning to that, there is a distinction between equal marginal sacrifice and the other two notions of equal sacrifice that has been emphasized by Weinzierl (2014). Under both equal absolute and equal proportional sacrifices, taxation depends on the initial position of taxpayers. Higher pre-tax incomes mitigate liability for higher taxation, especially in the case of equal absolute sacrifice. In effect, the tax system gives property rights to individuals for their pre-tax incomes and bases taxation on costs of deviating from the initial position (a stance defended by Feldstein, 1976, 2012). This is unlike equal marginal sacrifice where marginal utility of income at the pre-tax allocation does not count.

2.2 Personal Expenditures Approach

The ability-to-pay approach emphasizes an individual’s command over resources or comprehensive income. Kaldor (1955) interpreted comprehensive income as a measure of one’s contribution to the economy. He argued that instead individuals should be taxed according to what they took out for personal use, which he argued was their consumption expenditures. He proposed using aggregate consumption expenditures over the tax year as the base for direct personal taxation. This idea was taken up by the US Treasury (1977) and the Meade Report (1978), and more recently by the Mirrlees Review (Mirrlees et al., 2011). It has become an important benchmark alternative to income taxation.

Taxing personal consumption expenditures directly would be very challenging since it would require individuals to report their total consumption annually. Fortunately, there are feasible tax bases that are equivalent to consumption. One follows immediately from the individual’s annual budget constraint: 

\[ C = Y - S, \]

where \( S = \Delta A \) is saving, which can be positive or negative. This is called the tax-deferred approach to expenditure taxation. Each year individuals deduct savings from the incomes they report. Sheltered savings are held in an account and accumulate tax-free. When the account is drawn down, funds removed are reported as income. In many countries, private pension funds are taxed on a tax-deferred basis.
A second approach is the *tax-prepaid approach*, whose equivalence to consumption is a consequence of the individual’s intertemporal budget constraint. Over the life cycle, the present value of earnings plus windfall gains (including net inheritances) equals the present value of consumption. Thus, if the individual reported earnings plus windfall gains, an expenditure tax base would apply in present value terms. In this case, the tax base under the tax-prepaid approach would be equivalent to that under the tax-deferred approach. However, tax liabilities would occur later in the life cycle with tax deferment, and the present value of tax liabilities would differ if tax rates differed over time. In practice, tax systems that use the tax-prepaid approach include only earnings and not windfall gains or returns to risk.

An indirect consumption tax system, such as a general VAT, is equivalent to a proportional tax on consumption. Its base is analogous to the tax-deferred base. Expenditure tax systems could be a mixture of tax-deferred direct taxation, tax-prepaid direct taxation and indirect consumption taxation. Moreover, taxpayers could have the discretion to choose the proportions of their assets to hold in tax-deferred and tax-prepaid form. As such, they could smooth their tax liabilities over the life cycle and thereby reduce their tax liabilities in the face of a progressive tax rate structure. Although pure consumption expenditure tax systems are exceedingly rare, many countries have hybrid systems combining an income tax system with a VAT and with the ability to shelter some savings in either tax-deferred or tax-prepaid assets.

Like the ability-to-pay approach, the expenditure tax approach advocated by Kaldor (1955) was not grounded in individual preferences or utility. Subsequent advocates of expenditure taxation, such as the US Treasury (1977), did evoke an efficiency-based welfare cost argument in its support. The argument was that by taxing returns to saving, future consumption is taxed at a higher rate than present consumption. This so-called double taxation of future consumption and the deadweight loss it entails can be avoided by consumption expenditure taxation. However, this alleged superiority of consumption over income taxation on efficiency grounds does not withstand scrutiny when one takes into account leisure as a commodity of choice along with goods. The utilitarian approach does that.

### 2.3 Utilitarian Approach

Rather than basing tax liabilities on ability-to-pay or total consumption, the utilitarian approach bases taxes on an index of an individual’s well-being or utility. More precisely, the ideal tax system maximizes a social welfare function of the form:
SWF ≡ W_n1 u_1 x_1 /C0/C1 ; ...; n_h u_h x_h /C0/C1 ; ...; n_H u_H x_H /C0/C1 /C16/C17 ; (1)

where \( x^h = (x^h_0, \ldots, x^h_i, \ldots, x^h_m) \) is a vector of commodities consumed by each individual of type \( h \), \( h = 1, \ldots, H \), and \( n^h \) is the number of type \(-h\) individuals. The \( m + 1 \) commodities include both goods and leisure, and by convention, we treat good \( x^h_0 \) as leisure. The function \( u^h (x^h) \) is the utility function of each individual of type \( h \). In the standard utilitarian approach, the social welfare function in (1) satisfies several properties.

### 2.3.1 Individualism

The utility functions are individualistic in the sense that they represent the preferences of the individual over the commodities consumed. This rules out paternalistic preferences of the government or other institutions overriding those of the individual. Moreover, it does not allow for interdependent utilities, where one individual’s utility depends on commodities consumed by another. As discussed in Section 4.2, interdependent utilities raise some difficult conceptual issues that have relevance for tax policy. Note also that social welfare depends on the utility level that individuals reach ex post as a result of policy interventions. It does not depend on where they start out in the absence of the policy.

### 2.3.2 Pareto Principle

The social welfare function \( \mathcal{W} (\cdot) \) is generally increasing in each of its arguments, with the exception of the leximin and maximin cases discussed in Section 2.2.3. This is a non-controversial assumption, although it does mean that social welfare increases if, say, the best-off person becomes better off and nobody is made worse off so the allocation of resources is more unequally distributed.

### 2.3.3 Concavity and Symmetry

The social welfare function \( \mathcal{W} (\cdot) \) is assumed to be concave and symmetric in individual utilities. Symmetry means that all individuals are given equal weight in the social welfare function, and concavity means that the social welfare function displays a non-decreasing aversion to inequality. To understand this, assume that the social welfare function in (1) takes the symmetric constant-elasticity-of-substitution (CES) form:

\[
\mathcal{W}(\cdot) = \sum_{k=1}^{\mu} n^h \frac{u^h(\cdot)^{1-\gamma}}{1-\gamma},
\]

where the parameter \( \gamma \) is the aversion to inequality of the government. To achieve concavity of \( \mathcal{W}(\cdot) \), we assume \( 0 \leq \gamma < \infty \) with \( \gamma \neq 1 \). Differentiating (2), we see...
that \( \gamma \) is the elasticity of the marginal utility of social welfare with respect to any individual’s utility:

\[
\gamma = \frac{-1}{u^h} \left( \frac{\partial u_h}{\partial u} \right)
\]

where we follow the convention of using subscripts to refer to a partial derivative of a function. The assumption that \( \gamma \geq 0 \) is equivalent to \( \frac{\partial u_h}{\partial u} \leq 0 \), as required for concavity.

It is useful to distinguish three cases corresponding to different values of \( \gamma \). If \( \gamma = 0 \) so there is no aversion to inequality, (2) takes the linear form:

\[
\frac{W}{C} = \sum h \frac{n^h u_h}{C}
\]

This is the classical utilitarian case where only the sum of utilities counts and not their distribution. (It is equivalent to the previously mentioned equal marginal sacrifice principle.) In the two-type case \( (h = 1, 2) \), social indifference curves in utilities \( u^1 \) and \( u^2 \) are linear and parallel with slopes equal to \( n^2 / n^1 \). This does not mean that the distribution of income does not count. If the individual utility function is strictly concave in income, social welfare will be higher if a given amount of aggregate income is distributed more evenly.

At the other extreme, suppose \( \gamma \to \infty \). In this case, social welfare approaches the leximin case where social welfare depends on the utility of the individual with the lowest utility level. Choices between two allocations under leximin are determined as follows. For each allocation, individuals are ranked by their utility levels. The allocation in which the lowest-ranked person has the highest utility level is preferred. If the lowest-ranked persons have identical utility levels, the allocation in which the second-lowest-ranked person has the higher utility level is preferred. If the second-lowest-ranked persons have the same utility, the procedure is repeated for the third lowest and so on until the tie is broken. In the case of two types, social indifference curves under leximin are right-angled along the 45° line. Finally, when \( 0 < \gamma < \infty \), aversion to inequality is positive and finite and increases with \( \gamma \).

1 Leximin can be contrasted with maximin in which only the least well-off persons are compared. If the least well-off persons have the same utility level in two allocations, the two allocations are socially equivalent under maximin despite the fact that the next least well-off persons might have different levels of utility.

2 The social welfare function (2) is undefined when \( \gamma = 1 \). Instead, taking the limit as \( \gamma \to 1 \), the expression to (2) reduces to \( \frac{W}{C} = \sum h \frac{n^h u_h}{C} \), which is the Cobb–Douglas social welfare function.
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2.3.4 Measurability, Concavity and Comparability of Utility

Applying the social welfare function in (1) to tax policy analysis requires that individual utility functions be specified and that they be comparable among individuals. There is a literature on the issue of measurability and comparability of utilities, and we can only summarize some key features of it.¹

Measurability of utility can take various forms. The least demanding is ordinality. Ordinal utility functions are unique up to any positive monotonic transformation, so only preference rankings are possible. If utility levels are comparable across individuals, leximin-type social orderings are possible.² Formally, suppose persons a and b obtain utilities $u(x_a)$ and $u(x_b)$ from commodities $x_a$ and $x_b$. If these are ordinal utility functions, they can be replaced by $\emptyset (u(x_a))$ and $\emptyset (u(x_b))$, where $\emptyset (\cdot)$ is an increasing function and is the same for both persons to satisfy measurability. If $u(x_a) > u(x_b)$, then $\emptyset (u(x_a)) > \emptyset (u(x_b))$, and vice versa, so the ordering of levels of utility are preserved. A social welfare function that relies only on rankings of individual utilities, like maximin or leximin, is permissible since social welfare rankings are not affected by a common monotonic transformation applied to all individuals’ utility functions.

Cardinality is a higher degree of measurability. Cardinal utility functions are unique up to a positive affine transformation, which implies that $u(x)$ can be replaced by $v(x) = c + ku(x)$ with $k > 0$. If in addition utility functions are comparable across individuals such that any common affine transformation applies to all of them, a utilitarian social welfare function is possible. To see this, consider the utility functions for a and b above and subject them to a common positive affine transformation, so $v(x_a) = c + ku(x_a)$ and $v(x_b) = c + ku(x_b)$. It follows that

$$v(x_a) \geq v(x_b) \text{ as } u(x_a) \geq u(x_b), \quad (3)$$

$$v(x'_a) - v(x_a) \geq v(x'_b) - v(x_b) \text{ as } u(x'_a) - u(x_a) \geq u(x'_b) - u(x_b), \quad (4)$$

where $x'_a$ and $x'_b$ are alternative bundles of commodities for a and b, respectively. The ranking of levels and first differences in utility are unaffected by common positive affine transformations, so both leximin and utilitarian social welfare functions are permissible.

Cardinal individual utility functions are also assumed to be strictly concave, so, for example, they exhibit diminishing marginal utility of income, and this

¹ See the survey in Boadway and Bruce (1984), chapter 5.
² Leximin social orderings also require an equity axiom to ensure that the least well-off persons are favoured.
concavity is maintained under a positive affine transformation. That is, $v''(x) = ku''(x)$, so if $u(x)$ is strictly concave, so will $v(x)$ be. The concavity of individual utility functions ensures that even if the social welfare function is utilitarian and exhibits zero aversion to utility inequality, the government will pursue policies that redistribute from higher- to lower-income persons.

Greater precision of measurability can lead to more general social welfare functions. For example, suppose utility is strictly concave and unique up to a ratio-scale transformation. Thus, if $u(x)$ is a representation of consumer utility, so is $v(x) = ku(x)$. If utility is also comparable across individuals, social welfare is unique up to a common ratio-scale transformation applied to all individual utility functions. In this case, we obtain

$$\frac{v(x'_a) - v(x_a)}{v(x'_a)} \geq \frac{v(x'_b) - v(x_b)}{v(x'_b)} \text{ as } \frac{u(x'_a) - u(x_a)}{u(x'_a)} \geq \frac{u(x'_b) - u(x_b)}{u(x'_b)}.$$

and (3) and (4) continue to apply. Social welfare functions like the CES form in (2) are now permissible.

In the most general case, utility is fully measurable such that utility function transformations cannot be applied. Any general social welfare function (1) becomes admissible.

A judgment must be made about how utility diminishes as consumption rises. There is no objective answer to this, although some maintain that in principle, utility can be measured objectively (e.g., Kaplow, 2008). Usually, some assumption is made that incorporates one’s notion of vertical equity. The matter becomes more complicated if individuals differ in their ability to enjoy consumption, for example, because of some disability. Some judgment must be made about how much more weight to give to consumption needs of those who require more consumption to generate given levels of utility. As Sen (1973) observed, this can have real policy consequences. Under a leximin social welfare function, consumption would be redistributed to those less able to enjoy it so that utilities are equalized, while under classical utilitarianism, redistribution would go to those better able to generate utility from consumption so that more total utility is produced.

In what follows, we take as given a general social welfare function of form (1). Unlike in the ability-to-pay and personal expenditure approaches discussed previously, the progressivity of the tax system is determined by the form of the social welfare function and the individual utility functions. We study the optimal income tax problem in more detail below. Before doing so, we discuss some concerns with the social welfare–maximizing approach to tax policy.