

## Tax Analysis

Economic theorists hold, with reasonable consistency, that the essence of a tax is the absence of a direct *quid pro quo* between the taxpayer and the public authority. It is this that distinguishes a tax from other charges that may be imposed by a public authority. A useful definition is provided by Hugh Dalton: 'a tax is a compulsory contribution imposed by a public authority, irrespective of the exact amount of service rendered to the taxpayer in return, and not imposed as a penalty for any legal offence'.<sup>1</sup> This definition is not a classification of individual taxes and does not rest on the shifting sands of what, for one purpose or another, is from time to time 'always called taxes' or 'never called taxes'. Excluded is public authority revenue from public property and from the pricing policies of state owned enterprises. Revenue derived from public property and state owned enterprises is not different in kind from private income derived from private property and private enterprise. A so-called 'monopoly tax' imposed by a state owned monopoly is not different in kind from a 'monopoly tax' imposed by a privately owned monopoly. On the other hand the definition includes, for example, what today are called 'national insurance contributions' or 'social security contributions'. In particular Dalton's definition is useful since taxation enters into the aggregate supply price for the reason that it is 'a compulsory contribution imposed by a public authority' and is not a payment for 'the exact amount of service rendered to the taxpayer in return'.

The administrative classification of taxes which is used by most writers on public finance is no tool for economic analy-

sis. This method of classification is based on the assumption that tax incidence accords with the intentions of the taxing authorities. A tax is classified as a 'direct tax' because the taxing authority intends it to be paid by the person who receives the income upon which the tax is assessed. Likewise with social security contributions: employee contributions are intended to be paid by employees, while employer contributions are intended to be paid by employers. A tax is classified as an 'indirect tax', or expenditure tax, when the taxing authority intends that tax to be passed on to the final consumer by way of higher prices. For example, excise duty on beer is classified as an indirect tax because the taxing authority intend the tax to be passed on from the brewer to the publican as a price increase and to be passed on yet again by the publican as a price increase to the final purchaser. At this superficial level the administrative classification appears to conform with the facts of experience. Consumers know as a fact of experience that price rises are often justified by, and follow closely upon, increases in indirect taxation and thus the tax inflated price appears to fulfill the intentions of the taxing authorities. Employees are reminded regularly of 'direct taxation' by the difference between gross pay and take-home pay printed on their pay slips. To them this tax wedge appears to reduce directly what otherwise would accrue to them as disposable income. However, in the case of taxation what appears to be is not what is.

To politicians the administrative classification of taxes has an obvious attraction. It carries the implicit assumption that tax incidence accords with their intentions. This allows tax changes to be justified by slogans. Awkward questions relating to tax increases may be avoided by claiming to 'tax the rich to help the poor', 'redistribute incomes', and so on. Again, depending upon whether one is supporting or opposing the government, tax cuts may be presented as 'making the rich richer', 'extending the freedom of choice', 'letting the money fructify in the pockets of the people' and so on.

The media refer to a tax cutting budget as 'a give-away budget' which may sound a pleasing note but is akin to describing a burglary where some valuables have been left behind as a 'give-away burglary'. Nonetheless, these and similar slogans do not prevent the expressed good intentions of politicians being thwarted in practice. The intended payers of a tax can and do retaliate, while those expecting a 'gift' from the Chancellor of the Exchequer usually end up empty handed or worse. In matters of fiscal policy the administrative classification of taxes assists the creation of political myths and provides a fine facade which obscures fiscal injustice.

### **An Alternative Classification**

Sir John and Lady Ursula Hicks have provided an alternative framework for tax analysis by distinguishing between the *formal incidence* and the *effective incidence* of a tax. In most cases the formal and effective incidence do not coincide but are linked through both time and space by the process of *tax shifting*.<sup>2</sup> The formal incidence of a tax refers to the initial impact of the tax. For example, an increase in social security contributions of employees reduces their take-home pay immediately and directly by the amount of the increase. The reduction in take-home pay is the measure of the formal incidence of the increase in that particular tax. Elsewhere Lady Ursula points out that the calculation of the formal incidence says nothing of the taxpayer's reaction or of its consequences. In the *Economic Journal* she used Panteleoni's metaphor of a stone being thrown into a pond.<sup>3</sup> The formal incidence of a tax is taken as analogous to the plop of the stone as it breaks the surface of the pond. This stone will set up an ever widening circle of ripples disturbing the surface and eventually causing some damage to the banks. The ripples are analogous to the tax shifting process and the damage to the banks is analogous to the effective incidence. Lady Ursula emphasises that tax analysis needs to be able to trace the whole sequence of events. For example, retaliation

to a tax-imposed cut in take-home pay by demands for higher gross pay will set off a tax shifting process. This tax shifting process upsets the equilibrium of firms and markets as it continues to where the tax burden finally comes to rest, at the place of the *effective* incidence of that tax.

The sequence that follows upon a stone being thrown into a pond is useful in illustrating the operation of a particular tax through the economic system. But the analogy has limitations and these often lead those engaged in tax analysis to attempt the impossible — with misleading conclusions. In the economic pond there is not one stone, one ever widening circle of ripples leading eventually to some damage to the banks of the pond. There are a multitude of stones being thrown into the economic pond continuously; the ripples cross and recross, combine, separate, re-combine, separate yet again and reach the banks only to rebound and cause further disturbance. As it is impossible to trace the disturbance caused by one stone out of a multitude, so also it is impossible to trace any one of many taxes from its formal incidence through the process of tax shifting to its effective incidence, the place where the tax shifting process stops. With the shifting process tax effects merge; as they merge the effects of one tax becomes indistinguishable from the effects of many others, or even from the effects of the tax system as a whole. Thus, while the distinction between the formal and effective incidence provides a framework that enables tax analysis to take into account the whole process of tax shifting, the classification of taxes has of necessity to be based on the formal incidence of a tax. Once the effect of one tax merges with the effects other taxes, classification is not only impossible but meaningless.

In their formal incidence all taxes create a tax liability and tax liability is, in common with other liabilities, a component part of the aggregate supply price (p.23). However, not all taxes in their formal incidence cause a change in the aggregate supply function, that is, cause a change in the value of Z

for all values of  $N$ . The formal incidence of an increase in employees' social security contributions, for example, will increase tax liability and simultaneously reduce take-home pay by a money sum equivalent to the increase in tax. Thus in its formal incidence the imposition of, or change in, employees' social security contributions will not cause a change in the aggregate supply function. Any increase/decrease in employees' tax liability is simultaneously offset by a decrease/increase in take-home pay and, *cet. par.*, the value of  $Z$  remains unchanged for all values of  $N$ . On the other hand, the formal incidence of an increase in employers' social security contributions will increase the tax liability of firms, but will not cause an offsetting decrease in other component parts of the aggregate supply price. Thus by its formal incidence the imposition of, or change in, employers' social security contributions will cause a change in the aggregate supply function. The value of  $Z$  will be changed for all values of  $N$  by precisely the same money sum as the amount of the tax change and with the same sign.

The distinction made by Sir John and Lady Hicks in conjunction with Keynes' general theory of employment provides a useful alternative to the administrative classification of taxes. Particular taxes can be classified on the basis of the effect of their formal incidence on the aggregate supply function. When the formal incidence of a particular tax does not cause a change in the aggregate supply function, it will be classified in this text as an *income-effect* tax. Similarly when the formal incidence of a particular tax is the cause of a change in the aggregate supply function, it will be classified as a *supply-effect* tax. In many cases this macroeconomic method of classifying taxes cuts across administrative classifications. For example, local rates in the United Kingdom were assumed to inflate the current market price for renting dwellings and business premises and, as a result, classified as taxes on expenditure in accordance with the administrative classification of taxes. Using the classification based on the

effect of the formal incidence upon the aggregate supply function, domestic local rates were an income-effect tax. In their formal incidence they could have no impact effect on the aggregate supply function. Local rates on business premises were a supply-effect tax. By their formal incidence they directly affected a firm's costs and as a result caused a change in the aggregate supply function. Similarly the new Council Tax to be levied on domestic householders is an income-effect tax, while the new Uniform Business Rate is a supply-effect tax.

### **The Formal Incidence**

The analysis of the formal incidence of a change in taxation implies a run short enough to preclude the possibility of retaliation by taxpayers. This is to say there is no possibility of a tax shifting process being motivated. Such an analysis casts doubts on the conventional wisdom of demand management techniques in so far as their immediate effects on an economy are concerned. Demand management techniques are based on the assumption that any increase in the amount of taxation is always contractionary, deflationary, or both, and any cut in the amount of taxation is always expansionary, or inflationary, or both. For example, in the practice of demand management an increase in those taxes included within what was formerly called 'the regulator' is held to be counter-inflationary. The policy intention is to 'take the heat out of the economy' by a tax-induced rise in prices leading to a cut-back in aggregate real demand; this is to say that an increase in tax intended to raise prices is both contradictory and, paradoxically, counter-inflationary. However, analysis based on the formal incidence of changes in the amount of taxation leads to the conclusion that in the short-run at least the assumptions inherent in demand management techniques do not always hold in the real world. There are many circumstances in which the impact of a change in the amount of taxation will produce immediate results precisely opposite

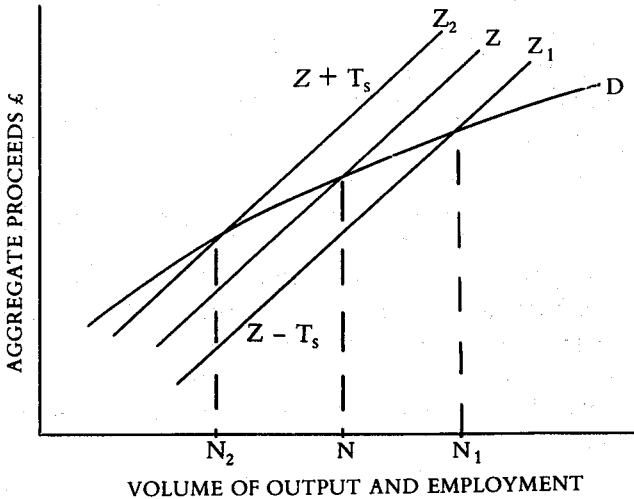


Figure 4

to those predicted and intended by the advocates of demand management. In any period of time short enough to preclude tax shifting the result produced by the formal incidence of any change in the amount of taxation will depend on a number of factors, such as government's propensity to spend out of tax revenue, the relationship of this propensity to the rest of the economy's propensity to spend out of their disposable income, whether the tax change applies to income-effect or supply-effect taxes, the elasticities of the relevant sections of the aggregate demand price and aggregate supply price schedules and the elasticity of the money supply.

The formal incidence of a change in the amount of supply-effect taxation causes an immediate change in the aggregate supply function since, by definition, there is a change in the value of  $Z$  for all values of  $N$ . The change in the aggregate supply function will cause in turn (assuming an unchanged aggregate demand function) a shift in the point of intersection. As illustrated in Figure 4 a cut in supply-effect taxation by an amount  $-T_s$  shifts the aggregate supply price curve downwards from  $Z$  to  $Z_1$  and the point of intersection to the

right, corresponding to a higher level of activity  $N_1$ . Such an expansionary policy is, on these assumptions, counter-inflationary and most likely to be associated with a tendency for the general price level to fall. Conversely an increase in supply-effect taxation by an amount  $+T_s$  (Figure 4) shifts the aggregate supply price curve upwards from  $Z$  to  $Z_2$ , causing the point of intersection to move to the left corresponding to a lower level of activity  $N_2$ . In most cases the contraction of activity will be associated with a rising general price level, but in some cases, especially when the money supply is highly inelastic, the supply-effect tax increase may precipitate a slump of sufficient intensity to lead to a fall in the general price level.

Whether the formal incidence of a change in supply-effect taxation affects the aggregate demand function will depend largely on the government's marginal propensity to spend, out of tax revenue. The change in taxation will not, in its formal incidence, cause a change in non-government disposable incomes, but it will cause a change in the non-government sector's expected tax liability. What from the point of view of firms is a change in expected tax liability is from governments' viewpoint a change in expected tax revenue. If the government's marginal propensity to spend out of tax revenue is equal to zero, then the aggregate demand function is likely to remain unchanged and the formal incidence of a cut in supply-effect taxation will provide an expansionary impulse, while an increase will provide a contractionary impulse. When government's marginal propensity to spend is greater than zero, then it is to be expected that government spending will change to some extent in line with the change in tax liability. A cut in supply-effect taxation will be associated with a cut in government spending, while an increase will be associated with an increase in government spending. In these circumstances the formal incidence of the tax change will cause the aggregate demand function to change in a way that will reduce the tax effect on



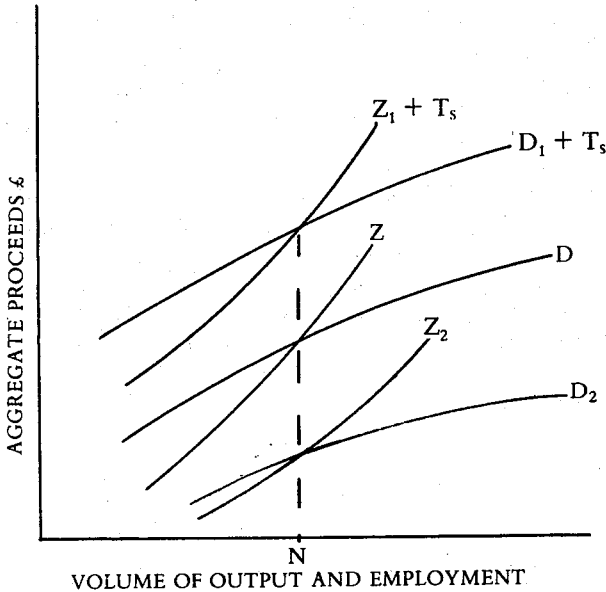


Figure 5

the level of activity and increase the tax effect on the general price level. When government's marginal propensity to spend out of tax revenue is equal to unity then, given a sufficiently elastic money supply, the formal incidence of a change in the amount of supply-effect taxation will affect the general level of prices and leave the level of activity in the economy as a whole largely unchanged. A cut in supply-effect taxes will tend to reduce prices and an increase will tend to raise prices. Within this overall result there will be some disturbance as a consequence of the expected change in government demand, or government induced demand, relative to non-government demand.

In Figure 5 the government's marginal propensity to spend out of tax revenue is assumed to be equal to unity. Thus, the formal incidence of an increase in supply-effect tax by an amount  $+T_s$  results in both the aggregate supply price curve,  $Z$ , and the aggregate demand price curve,  $D$ , shifting up-

wards to  $Z_1$  and  $D_1$  respectively. The upward shift of both curves by the same amount causes the point of intersection to rise vertically implying a tendency for the general price level to rise with the level of activity unchanged. The formal incidence of a cut in supply-effect tax by an amount  $-T_s$  results in both the aggregate supply price curve,  $Z$ , and the aggregate demand price curve,  $D$ , shifting downwards to  $Z_2$  and  $D_2$  respectively. The downward shift of both these curves by the same amount causes the point of intersection to fall vertically implying a tendency for the general price level to fall with the level of activity unchanged. In both cases the elasticity of the money supply will determine any trade-off between a change in the general level of prices and a change in the level of activity.

The formal incidence of a change in the amount of income-effect taxation cannot cause, by definition, a change in the aggregate supply function, although in certain circumstances it may motivate a change in the aggregate demand function. The aggregate demand function will be unaffected by the formal incidence of a change in the amount of income-effect tax only when government's marginal propensity to spend out of tax revenue is equal to the non-government sector's propensity to spend out of disposable income. Given this circumstance any increase/decrease in government's expected spending will be fully offset by a decrease/increase in non-government expected spending. When government's marginal propensity to spend out of tax revenue is greater than the rest of the economy's marginal propensity to spend out of their disposable income, then the formal incidence of an increase in the amount of income-effect tax will tend to increase aggregate demand price. Although government expected tax revenue will increase by the same amount as the rest of the economy's expected disposable income is reduced, the government's expected spending will rise by more than the non-government sector's expected spending falls. Thus the aggregate demand price curve will shift upwards as the

value of  $D$  is increased for all values of  $N$  and the point of intersection will move to the right consistent with an expansion of the economy. Likewise in the same circumstances the formal incidence of a cut in the amount of income-effect tax will tend to contract activity. The increase in the non-government sector's expected spending out of their additional disposable income will not fully offset the fall in government's expected spending out of a smaller tax revenue. As the value of  $D$  falls for all values of  $N$  the aggregate demand price curve will shift downwards and the point of intersection move to the left consistent with a contraction of activity.

When government's propensity to spend out of tax revenue is less than the rest of the economy's propensity to spend out of their disposable income then the tendencies described in the preceding paragraph are reversed. The formal incidence of an increase in income-effect tax will tend to contract activity. The rise in government's expected spending out of an increased tax revenue will be less than sufficient to offset the fall in the non-government sector's expected spending out of their reduced disposable income. As the value of  $D$  falls for all values of  $N$  the aggregate demand price curve will shift downwards causing the point of intersection to move to the left, consistent with a contraction of activity. Given the same relationship between propensities to spend between the government and non-government sectors, the formal incidence of a cut in the amount of income-effect tax will tend to expand an economy. The rise in non-government expected spending out of an increased disposable income will more than offset the fall in government's expected spending out of a smaller tax revenue. As the value of  $D$  increases for all values of  $N$ , the aggregate demand price curve will shift upwards, causing the point of intersection to move to the right, consistent with an expansion of activity.

The formal incidence of supply-effect taxation directly

inflates the aggregate supply price and this automatically motivates a process of tax shifting which tends to raise prices, or to contract output and employment, or to some combination of these two. With income-effect taxation the process of tax shifting is motivated only when the taxpayer retaliates against the imposition of the tax. When the amount, or change in the amount, of income-effect tax is insufficient to cause the taxpayer to retaliate, or when the taxpayer cannot retaliate, then the formal incidence is also the effective incidence of the tax. Adam Smith, for example, argued that the receivers of ground rents cannot shift a tax imposed on their rental income. In contemporary economic theory it is accepted in general that a tax imposed on monopoly or rental incomes cannot be shifted. However, in most cases the formal incidence of an income-effect tax does cause a taxpayer to retaliate and this sets in motion a process of tax shifting. Once this process is motivated, whether directly by the imposition of the tax or by the retaliation of taxpayers, it will continue until either the effect of the tax is shifted upon incomes whose recipients cannot retaliate, or the amount of the tax becomes so diffused throughout the economy as to become insufficient at any one point to cause further retaliation. The process of tax shifting results in a significant difference between the formal and effective incidence of a tax. Indeed, where tax incidence finally comes to rest is a matter of chance and is unlikely, except by accident, to accord with any policy intention. Of even greater importance for individuals, firms and the well-being of an economy as a whole, is the fact that the tax shifting process is the cause of much disturbance and distortion throughout the economy and in particular is a significant primal cause of rising prices and unemployment.

1. Hugh Dalton, *Principles of Public Finance*.
2. *The Incidence of Local Rates in Great Britain*, National Institute of Economic and Social Research.
3. *Economic Journal*, Vol.LVI no.221, March 1946.