The Costs of Taxation

Alex Robson

Perspectives on Tax Reform (8)

THE CENTRE FOR INDEPENDENT STUDIES

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Foreword

According to the Australian Bureau of Statistics, total gross incomes of Australians rose by 33 per cent between 1998-99 and 2003-04. Total income tax revenues accruing to the Commonwealth government rose even faster, however. They went up by 36 per cent, or nearly $40 billion, during the same six-year period. It seems that the harder we work, the more the government has been determined to take off us.

Some prominent commentators think this does not matter. They say that middle and higher income earners could afford to pay even more tax on their earnings, and they deny that a heavy income tax burden undermines the incentive to work. They believe the government could squeeze more tax out of the workforce without doing any damage to output or productivity.

In this, the eighth in a series of papers published by The Centre for Independent Studies on the question of tax reform, Dr Alex Robson shows how wrong they are. Of course much of the money the government spends each year probably does some good, but this misses the key question of whether the good it is achieving outweighs the harm it is causing by the burden of taxation required to finance its spending. The question the government needs to ask is not whether it can do good through more spending, but is whether the relentless increase in the personal tax burden needed to finance all this spending is costing us more in lost enterprise and effort than it is bringing us in added benefits.

Politicians rarely stop to consider this question, but they should, for as Alex Robson demonstrates, every extra dollar they raise in tax has a cost. Taxation does not simply redirect resources from the private sector to the government—it destroys resources too.

Obviously, a dollar going to the Treasury is a dollar lost to the private sector of the economy, but the cost of tax is nearly always much higher than just a one-to-one parity. Echoing Adam Smith, Robson identifies a number of different ways in which tax imposes costs on individuals, irrespective of whether they gain from the way government chooses to spend it. These include enforcement costs, evasion costs, compliance costs (which are particularly high in Australia given the extraordinary complexity of our tax system) and administration costs (borne not only by the ATO but also by thousands of employers acting as unpaid agents of government by processing income tax deductions and GST returns). Following Gordon Tullock, Robson also identifies what he calls the 'rent-seeking costs' of taxation which follow from the efforts of one sector of the population to get government to divert resources from another.

All of these costs can be huge, but in this paper, Robson leaves them on one side to focus on just one, crucial cost of taxation: 'deadweight losses'. Deadweight losses arise when individuals change their behaviour in response to higher taxes, substituting one kind of behaviour for another which would have been preferred had the tax increase not occurred. For example, if income taxes rise, some people might decide to work fewer hours, or they might conclude it is not worthwhile training for an additional qualification, or they might stay on welfare rather than look for a job, or be deterred from the risk of setting up a company of their own. Deadweight losses, in other words, represent the disincentive costs of tax. They are the value of all the work and output that we lose as a result of taxing people's incomes.

It is extremely difficult to calculate these deadweight costs of tax with any accuracy (and governments, of course, rarely even try). However, by applying US research findings to the Australian context, Robson suggests that total deadweight losses here could be as high as $61 billion per year, and drawing on a variety of OECD research, he estimates the Marginal Cost of Funds (MCF)—i.e. the wealth destroyed for each extra dollar we raise in income tax—at between 1.2 and 1.3.

If this is right, it means that each extra dollar of income tax raised by the Commonwealth is costing the economy at least $1.20 and perhaps $1.30, even without counting the costs of administration and enforcement. As Robson points out, in the light of this, it would not be unreasonable to require of government ministers that any new policy should generate at least $1.20 worth of benefits for every extra $1 it would cost in tax revenue, otherwise it should not go ahead.

It seems most unlikely that our politicians in Canberra ever considered such a cost-benefit analysis when they made their profligate election spending promises last October. It is also most unlikely that many new government spending projects nowadays would get anywhere near meeting this rate of return benchmark. Robson quotes the telling statistic that no country anywhere in the world has ever achieved a 4 per cent annual growth rate once its tax-take exceeded 40 per cent of GDP. The probable reason is that, once the basics have been put in place, each new item of government provision that gets added actually costs the economy more in tax than it creates in benefits.

Despite all this, there are still many commentators in Australia urging us to push taxes even higher than they already are in order to bring us closer to the high-tax, high-welfare European Union core nations. The suspicion that such a tax-and-spend strategy would seriously jeopardise our economic growth rates is shown by Robson's cross national comparative data to be well-founded. In recent years, some countries have achieved much more than others in their efforts to reduce the burden of taxation on incomes (Robson mentions Ireland and South Korea as stand-out examples), and by and large, they have been the countries registering the fastest growth rates. Robson finds that OECD countries which secured substantial cuts in income tax between 1980 and 2000 were rewarded with average annual per capita growth over this period in excess of 3 per cent, almost double that achieved by the remainder. Extending the analysis across 98 different countries, Robson finds countries which significantly cut taxes enjoyed average per capita growth rates of nearly three times those that did not.

Earlier papers in this series have demonstrated that our income tax system is grotesquely complex and unjustifiably onerous. Families on low incomes lose so much money when they raise their rate of workforce participation that many find it hardly pays to work at all, and those on higher earnings get viciously penalised by a combination of high marginal rates and low thresholds which is almost unique in the OECD (although the 2005 Budget has gone some way in moderating this). Alex Robson's evidence alerts us to how much this failure to reform our income tax system is costing us. His analysis is quite technical and some of the arguments may appear quite complex to non-specialist readers, but the basic message is really very simple: we are killing the goose that lays the golden eggs.

Peter Saunders
Social Research Director
The Centre for Independent Studies

Executive Summary

Taxation generates various administrative, evasion, compliance and rent-seeking costs. The Australian Taxation Office employs over 21,000 people, and its expenses in 2002-03 amounted to over $2.3 billion. Australia's total 'tax army' of tax lawyers and accountants, as well as ATO staff, is more than three times the size of our 'real army'.

Taxation also leads to 'deadweight losses' (basically, the value of lost output) by prompting people to switch from higher valued to lower valued economic activities. Total deadweight losses from taxation in Australia in 2003-04 are estimated at between $46 billion and $61 billion (approximately equal to the amount of public spending devoted to health each year).

While tax revenues may be spent by government on beneficial uses, these benefits have to be weighed against the deadweight losses incurred as a result of levying the tax in the first place. This is rarely done, and there are no official published estimates of deadweight costs.

Any proposed spending that does not provide a higher percentage return than the marginal cost of raising the extra revenue cannot be justified in economic terms. Australian research estimates the cost of raising $1 in additional tax revenue is between $1.19 and $1.65. To be economically justified, the last dollar of government spending should therefore create a return of at least 19 percent, net of any additional administrative or production costs. It is doubtful if many projects would pass this benchmark test.

By reducing deadweight losses, tax cuts tend to stimulate growth. Countries which significantly cut taxes between 1980 and 2000 enjoyed average per capita economic growth rates of nearly three times those that did not.

Graduated personal income taxes systems tend to generate higher deadweight losses than flatter tax structures. However, a flat tax with a high marginal rate still distorts economic incentives and creates a deadweight loss, and a graduated tax system with low marginal rates may be preferable to a flat tax system with a high marginal rate.

At Australia's current levels of taxation and spending, claims that higher taxes would have little or no effect on economic incentives are misleading.

THE COSTS OF TAXATION

Tax his oil, tax his gas, tax his notes, tax his cash. Tax him good and let him know that after taxes, he has no dough.

If he hollers, tax him more. Tax him till he's good and sore. Tax his coffin, tax his grave, tax his sod in which he's laid.

Put these words upon his tomb: 'Taxes drove him to his doom'. After he's gone, we won't relax. We'll still collect the inheritance tax.

'The Tax Collector's Creed', Anonymous

1. INTRODUCTION

If two or more individuals agree to exchange goods or services, then as long as the exchange is voluntary, both will be better off than if such exchange opportunities were not available. In an economy with free markets, the vast majority of exchanges are mutually beneficial—otherwise individuals would not conduct them. Individual pursuit of self interest—combined with institutions that facilitate voluntary exchange between individuals—tends to promote mutually beneficial outcomes, even though no single person consciously promotes this end. These mutually beneficial exchanges of goods and services lie at the heart of the creation of economic wealth and higher living standards.

In essence, taxes tend to discourage mutually beneficial exchanges by driving a wedge between the prices that suppliers wish to receive for their output, and the prices that consumers are willing to pay for these products. For example, income taxes drive a wedge between the wage that workers are willing to accept to supply labour, and the wage that employers are willing to pay them. Because of these wedges, some potential gains from mutually beneficial exchanges—which exist when demand prices exceed supply prices—are left unexploited. Agents instead are induced to conduct alternative exchanges which, while certainly involving mutually beneficial wealth creation, do not create *as much* wealth and are not *as* mutually beneficial. In summary taxes, whilst raising revenue, also tend to divert economic resources from higher valued to lower valued economic uses. For various kinds of taxes, economists generically refer to these unexploited gains from trade as the *deadweight loss* of a tax.

Thus, in a very real sense, taxes destroy economic wealth.[2] Indeed, in 1819 the celebrated American jurist John Marshall noted that 'the power to tax involves the power to destroy'. Unfortunately, Marshall's wisdom regarding the nature of taxation continues to elude some economists, many of whom should know better.[3]

Another famous American jurist, Oliver Wendell Holmes, is reported to have remarked that 'taxation is the price we pay for civilized society'. By some strange coincidence, it seems as though this view is as popular among those in charge of raising tax revenue as it is among those responsible for spending it.[4] But the fact that a disbursement of funds may provide a benefit does *not* mean that the costs of raising those funds– the 'price', as Holmes put it—should be ignored or trivialised. What if the 'price' of a certain tax (in terms of its economic cost) exceeds the benefits that revenue allegedly provides? How are taxpayers supposed to know whether the gains from paying taxes are worth the costs, if the debate over tax rates continually gets diverted, the true costs of taxation obfuscated, and attention directed towards to the alleged benefits of an entirely different branch government activity?

Costs of taxation are costs, not benefits, and that is that. Whether the benefits of government spending exceed the costs is a very different question from the questions of what exactly the costs are and why they exist. Once a full and proper discussion and assessment of the costs of taxation is completed, attention can then be turned towards the purported benefits various spending proposals. It is then possible to examine whether the alleged economic benefit of the last dollar spent on a particular government programme more than offsets the economic cost of raising that last dollar from taxpayers. If costs are conflated with benefits, this is simply not possible.

2. SOME BASIC PRINCIPLES

2.1 A Taxonomy of Costs

In the *Wealth of Nations*, Adam Smith expounded some basic principles of taxation which provide an excellent introduction to some of the issues discussed in this paper. With regard to the costs of taxation and the design of the tax system, Smith's first principle was that:

> Every tax ought to be so contrived as both to take out and keep out of the pockets of the people as little as possible, over and above what it brings into the public treasury of the state. [5]

That is, Smith believed that taxes should be designed so as to minimise economic waste—or to 'take out and keep out of the pockets of the people as little as possible, over and above what the tax raises in revenue'. What kinds of costs did he have in mind?

Like many modern economists, Smith recognised that even if the tax system was simple, easy to comply with, and easy to administer, it could still have economic costs. He wrote:

> It [a tax] may obstruct the industry of the people, and discourage them from applying to certain branches of business which might give maintenance and unemployment to great multitudes. While it obliges the people to pay, it may thus diminish, or perhaps destroy, some of the funds which might enable them more easily to do so.

The modern microeconomic approach to measuring the pure economic or deadweight costs of taxation is based on Smith's observation and is discussed below. It is based on the observation (made in the introduction)—that taxes raise revenue but also tend to divert economic resources from higher valued to lower valued economic uses.

Smith also noted that, in addition to the disincentive effects discussed above, taxation would have additional costs. He classified these costs as follows:

- *Administrative and Enforcement Costs*
  'The levying of [a tax] may require a great number of officers, whose salaries may eat up the greater part of the produce of the tax, and whose perquisites may impose another additional tax upon the people.'
- *Evasion Costs*
  'By the forfeitures and other penalties which those unfortunate individuals incur who attempt unsuccessfully to evade the tax, it may frequently ruin them, and thereby put an end to the benefit which the community might have received from the employment of their capitals. An injudicious tax offers a great temptation to smuggling. But the penalties of smuggling must rise in proportion to the temptation. The law, contrary to all the ordinary principles of justice, first creates the temptation, and then punishes those who yield to it; and it commonly enhances the punishment, too, in proportion to the very circumstance which ought certainly to alleviate it, the temptation to commit the crime.'
- *Compliance Costs*
  'By subjecting the people to the frequent visits and the odious examination of the tax-gatherers, it may expose them to much unnecessary trouble, vexation, and oppression; and though vexation is not, strictly speaking, expense, it is certainly equivalent to the expense at which every man would be willing to redeem himself from it.'

All of these costs are as easily recognisable today as they were in 1776, when Smith wrote the *Wealth of Nations*. Today's taxation systems not only require 'a great number of officers' (the Australian Taxation Office currently employs over 21,000 people, and its expenses from ordinary activities in 2002-03 amounted to over $2.3 billion)[6], but many of the administrative costs have been transferred from the 'great number of officers' to taxpayers themselves or to employers. In many cases the administrative costs and compliance costs of taxation have become indistinguishable from one another, because responsibility for administration has been transferred to the private sector. For example, when employers withhold income taxes from employees, they are performing more of an administrative function than a compliance function. They are, in effect, collecting

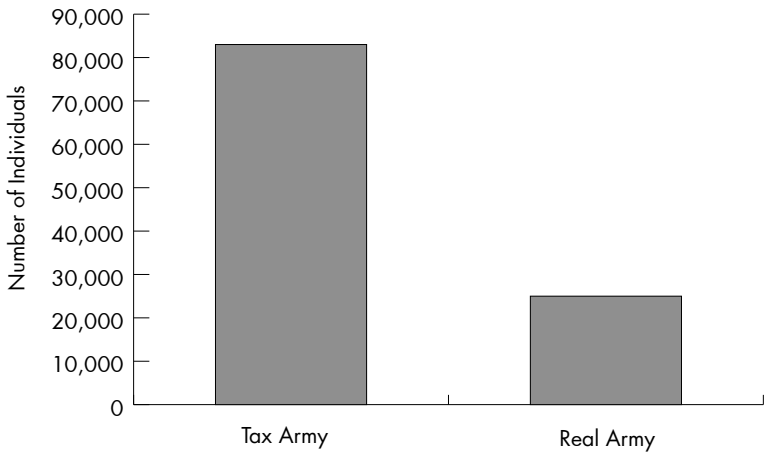
taxes on the government's behalf.

The primary reason for the growth in compliance costs and administrative costs is the increasing legal and economic complexity of the tax system. Legal complexity is best understood as the absence of simplicity. Simplicity tends to decrease with the sheer density of tax rules, their degree of technicality, the extent to which different tax laws apply to the same set of facts, and the degree of indeterminacy or uncertainty which they create.[7]

The growth of compliance costs manifest themselves in a variety of obvious ways, including the growth in the number of accountants, tax specialists and tax lawyers employed in the economy, many of whom do not create any new wealth but are employed to prevent the government acquiring the wealth of their clients. To illustrate this trend for the United States, Vedder[8] compares the size of the 'tax army' (one quarter of all lawyers, one half of all accountants, and all officers employed by the US Internal Revenue Service), with the size of the 'real army' (permanent US Army forces), and finds that the former easily exceeds the latter, with the gap growing over the last two decades.

Figure 1 uses Vedder's methodology to perform the same comparison for Australia in 2001-02, and shows that the 'tax army' (one quarter of all lawyers, one half of all accountants, and all officers employed by the Australian Taxation Office) was more than three times the size of the 'real army' (permanent Australian Army forces) for that year.

Figure 1. The 'Tax Army' and the 'Real Army', 2001-02



Sources: ATO and Department of Defence Annual Reports 2001-02; ABS, *Accounting Practices 2001-02*, Cat No. 8668.0; ABS, *Legal Practices 2001-02*, Cat. No. 8667.0.

At the margin, higher administrative, evasion, enforcement and compliance costs should be associated with lower levels of economic activity, and perhaps even lower *rates* of economic growth, depending on how the costs change with changes in the level of economic activity. The existence of complexity is itself an obstacle to tax reform and lower levels of taxation. If nobody truly understands what the law means as it stands or to which situation it applies, how can intelligent reform proceed? The existence of complexity in the tax code is often the result of some interest group or another successfully lobbying for special deductions or treatment by the ATO. These special interest groups oppose reform because complexity in certain parts of the tax code benefits them. This leads us to another category of the costs of taxation—*revenue-seeking* or *rent-seeking costs*—which were not discussed by Smith but which were first identified by Tullock.[9]

• *Rent Seeking Costs*

The revenues that governments raise from taxes represent lost consumption and profit opportunities for those who are taxed. However, taxes signify greater potential consumption and profit opportunities for those who gain access to this revenue by way of subsidies, direct transfers, or other redistributive government programmes. Thus, before taxes are raised and the proceeds

redistributed, potential producers and consumers may lobby the government not to levy taxes, but other groups may lobby in favour of higher taxes in order to finance the greater spending that might be directed their way. Because these activities are directed at redistributing wealth rather than creating it, they represent an additional social cost of taxes and subsidies above and beyond the usual deadweight losses, because rent seeking activity is not directed at creating extra production, but instead aims at reducing output below its competitive level in some markets and increasing it in other markets.

In general then, the full social costs of taxation and subsidies could also include some fraction of the potential revenues that are raised from taxes, and so the full social costs of taxation and subsidies may be much larger than the usual deadweight losses and other costs that each create separately. More generally, in any analysis of public policy in the rent-seeking society, the resources aimed at influencing the distribution of wealth—and which do not (either directly or indirectly) create wealth—should be added to standard deadweight costs to arrive at an overall measure of the welfare cost of redistributive programmes.[10]

Furthermore, there may be additional incentives for rent seeking when there are existing distortions in other markets. When distortions in markets already exist, producers in these distorted markets may have an incentive to suppress or encourage the establishment of new distortions in hitherto undistorted markets. The incentive for this inter-industry lobbying is often at its strongest when the welfare effects of an existing distortion can, in theory, be partially offset by the introduction of a new distortion in another related market. For example, if an existing tax on the consumption of butter induces consumers to switch to margarine, then introducing a new tax on margarine may partially offset the initial negative welfare effects of the butter tax.

In other words, individuals who already enjoy the fruits of redistributive taxation may have a strong incentive to appeal to the language of second-best to further their own private interests. In these situations, the total amount of resources spent on trying to encourage government intervention in an undistorted market can easily exceed Tullock's partial equilibrium deadweight loss 'rectangle' measure, because the creation of a new distortion can enlarge the 'rectangles' that already exist in other distorted markets.[11]

Although this paper focuses on the pure economic or deadweight costs of taxation, these other kinds of costs may be as important (or, in some cases, more important). For example, if a tax rate is very low, its deadweight costs may be very low in both a marginal and total sense, but the economic costs of enforcing, administering, avoiding and complying with the tax may be very high, depending on the institutional arrangements that are in place and which sort of economic activities the tax applies to. Thus, while we discuss the deadweight costs of taxation in some detail, we do not mean to imply that this narrow category of wealth destruction is the most important one. Indeed, focusing only on deadweight costs can sometimes lead to serious economic policy errors when it comes to tax reform.

3. THE PURE ECONOMIC COSTS OF TAXATION

The modern microeconomic approach to measuring the pure economic or deadweight costs of taxation is based on Smith's observations. The approach proceeds by noting that when a government taxes a particular economic activity, it raises revenue but also alters individual economic incentives at the margin and 'obstructs the industry of the people'. The correct measurement of deadweight loss takes both of these effects into account. It does *not* account for administrative costs, evasion costs, compliance costs, enforcement costs, or rent-seeking costs.

3.1 The Deadweight Loss of a Tax: The Example of Personal Income Taxation

Higher income taxes reduce workers' after-tax wages. Lower after-tax wages make workers worse off, even if workers do not alter their behaviour. At the margin, reductions in after-tax wages make other kinds of economic activities more attractive. To partially mitigate the adverse effects of lower after-tax wages, workers substitute away from the taxed activity (work) into other activities.

At the margin, workers may increase time devoted to leisure or recreation, lower their work intensity (devote more time to 'on-the-job' leisure), pursue 'do-it-yourself' work, engage in home production for barter, or substitute into activities or occupations with significant non-pecuniary

(non-wage) benefits.

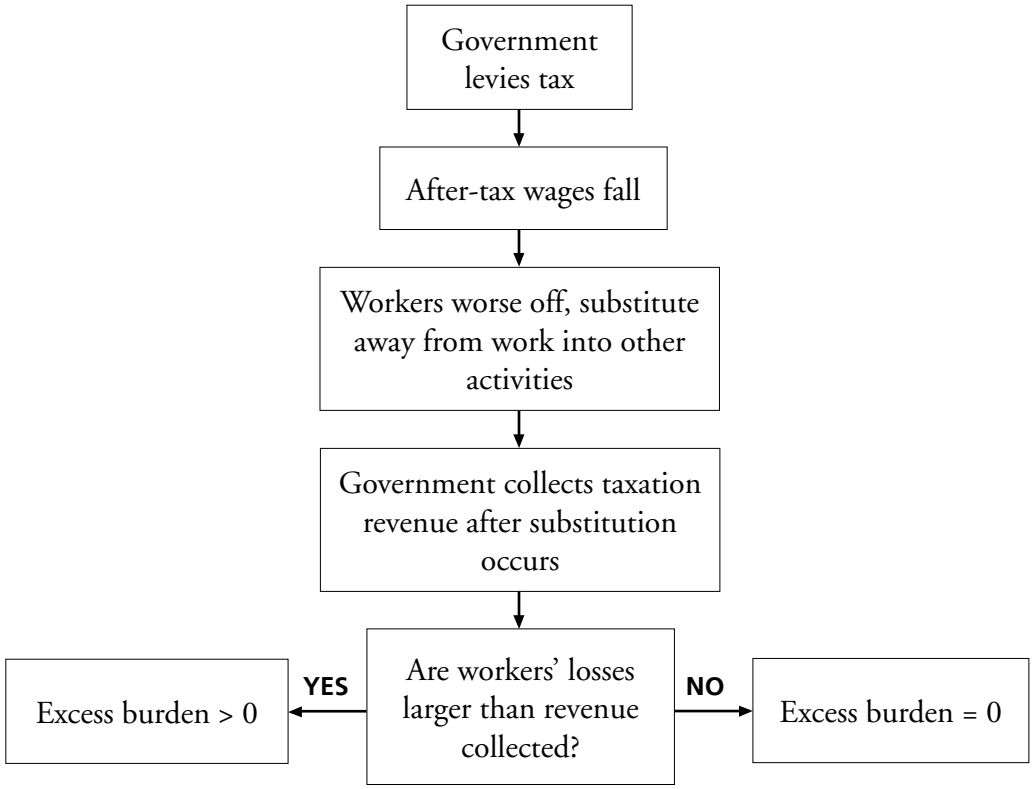
This is what meant by the observation that taxes drive economic resources from higher valued to lower valued uses. Higher personal income taxes encourage workers to substitute into economic activities which they otherwise would not have undertaken. These substitution effects never work in the same direction as the tax change. That is, higher personal income taxes never induce substitution towards more work.

Some commentators correctly point out that higher income taxes create disincentives and induce workers to substitute out of work, but then go on to claim that because leisure is valuable, income taxes should not be reduced or that they should even be increased.[12] This argument misses the point regarding the nature of the disincentive effects of higher taxation. Leisure is indeed valuable—no economist has ever claimed that leisure has zero value or is a bad. The question is whether, at the margin, workers prefer to undertake more or less work. Higher income taxes alter the gains and losses involved in these marginal assessments and by themselves can never make workers better off than they otherwise would have been. Otherwise, workers would tax themselves. To claim that higher income taxes by themselves make workers better off is to take paternalism to new an entirely new level.

Governments also collect revenue from income taxes. The tax is said to create an *excess burden* or *deadweight loss*[13] if the revenue raised by the tax is less than the overall loss in worker wellbeing created by the fall in after-tax wages.[14] Correctly measured, the size of the deadweight loss is driven by the size of the tax and the size of substitution effects.[15] The steps involved in measuring the excess burden of personal income taxation are illustrated in Figure 2 below.

The same steps can be used to estimate the deadweight cost of a tax on any kind of economic activity. Other issues such as income effects, existing taxes on other activities, and so on are discussed at length by Chris Jones (see endnote 41). However, these considerations do not change the basic approach, which can be applied to taxes on all forms of economic activity including consumption, saving, investment and so on.

Figure 2: Computing the Excess Burden or Deadweight Loss of Personal Income Taxes



4. PERSONAL INCOME TAXATION AND INDIVIDUAL INCENTIVES

Those who ignore or seek to trivialise the economic costs of high marginal tax rates point to the older literature on the effects of taxes on certain observable features of labour supply, and incorrectly infer from this literature that high marginal income tax rates create little or no deadweight costs. Some commentators go further and argue (for example) that 'cutting the top rate of tax might do nothing at all'.[16]

Such views indicate an extremely poor understanding of basic economics. First, observed changes in labour market behaviour in response to changes in tax rates are a poor indicator of the true sign and magnitude of the substitution effect. As the author of one of the best graduate public finance texts states:

> One 'theorem' commonly derived from the supply and demand framework is that government should tax products (factors) whose demand (supply) is perfectly inelastic to avoid deadweight loss. If either demand or supply curve were constant, output would remain constant, and there would be no deadweight resulting from the tax. Unfortunately, this proposition is not accurate. Taxes can generate welfare loss, properly measured, even if demand or supply is perfectly inelastic. [17]

Second, as discussed above, even if individuals do not respond to higher tax rates and do not alter their behaviour, increasing personal income tax rates by itself unambiguously makes workers worse off.

Third, increasing personal income tax rates alters the amount of revenue that government collects. Thus, changing a particular tax may or may not alter individual behaviour, but it is wrong to conclude from this that income taxes create no welfare losses, and illogical to claim that the effects will amount to 'nothing at all'.

Much of the literature suggests that, for adult males, changes in net wages may have little effect on average labour force participation rates or average hours worked.[18] However, these findings do *not* mean that taxing such activities creates no economically meaningful disincentives. Average participation rates and average hours worked provide extremely poor estimates of the true size of the substitution effect for individuals. For example, a finding of zero average effect on hours could mean that the majority of productive workers only slightly reduce their hours, whilst a minority of relatively unproductive workers increase their hours significantly. The efficiency consequences could be quite large, even though average hours worked remain constant. The same point about heterogeneity in the labour force applies to participation rates.

Moreover, as discussed above, individuals can vary their effective labour supply in many ways, none of which may involve reducing their actual hours worked or their decision to participate in the labour force. Indeed, in some workplaces individuals have very little freedom to vary their hours of work, particularly in jurisdictions with highly centralised and rigid industrial relations systems. In these circumstances workers can and do adjust to changes in after-tax wages along other margins.

4.1 Taxable Income

Thus, for the purposes of meaningful policy analysis, the narrow focus on average measures of hours worked and participation rates is misplaced. For personal income taxes, a more accurate measure of the disincentive effects is the responsiveness of *taxable income* to changes in wages. Measuring taxable income is quite different from measuring hours worked or labour force participation rates, and is a more suitable way of picking up changes in work intensity or effort, shifts to home production or barter, or changes to occupations with significant non-pecuniary components.

Recent empirical evidence from the United States suggests that taxable income is quite sensitive to changes in after tax wages. The key parameter is the *elasticity of taxable income* with respect to changes in tax rates, which measures the percentage change in taxable income when marginal tax rates change by one percent. Table 1 summarises some recent US studies of the absolute size of this parameter, with a higher number indicating a greater degree of responsiveness.

The most recent and most comprehensive study by Gruber and Saez estimates the elasticity of taxable income to be 0.4. They also find that the elasticity for taxpayers with annual incomes

above $100,000 is 0.57, while for those on lower incomes it is much smaller.[19] As a general rule, the responsiveness of taxable income tends to be higher for higher income earners, indicating a very large economic cost per dollar of revenue raised for the most productive individuals. The notion that there are little or no economic costs associated with higher taxes on 'high income earners' seems to be as popular as it is wrong.[20]

Table 1: US Estimates of the Elasticity of Taxable Income with Respect to Tax Rates

Study	*Estimate*
Lindsey[21] (1987)	1.05-2.75
Auten and Carroll[22] (1987)	0.75
Feldstein[23] (1995)	1.1-3.05
Navratil[24] (1995)	0.8
Carroll[25] (1998)	0.5
Saez[26] (1999)	0.4
Gruber and Saez [27](2002)	0.4

5. MEASURING THE COSTS OF TAXATION

5.1 Total and Average Deadweight Losses

The pure economic costs of taxation can be measured in total and at the margin. The costs are typically normalised to allow for the fact that government collects revenue from taxation. The *average deadweight cost* of taxation or *average cost of funds* (ACF) computes the total deadweight loss created by a tax, and then divides it by the total amount of revenue collected by that tax.

Recent US studies (see Table 2) indicate that the ACF for all forms of taxation lies somewhere between 18 per cent and 24 per cent of total government revenue. This means that *on average* each dollar that the US government collects in revenue from all forms of taxation costs the private sector between $1.18 and $1.24.

Table 2: US Estimates of the Average Deadweight Costs of All Taxes

Study	*Estimate*
Ballard et al (1985)[28]	23.8%
Jorgenson and Yun (1990)[29]	21.2%
Jorgenson and Yun (1991)[30]	18%

Taxation revenue for all levels of government in Australia (combined local, state, and federal) in 2003-04 was $257 billion.[31] Applying US estimates of the ACF to Australia suggests that the total excess burden of taxation in Australia in 2003-04 amounted to at least $46 billion and could be as large as $61 billion. To put this in perspective, in 2003-04 governments at all levels spent $51.5 billion on health.[32] Thus, the total deadweight loss from taxation in Australia, not including costs associated with administration, enforcement, compliance and evasion is approximately equal to the amount of public spending devoted to health.

The ACF can also be calculated for particular kinds of taxes. For example, there are several US estimates of the average cost of personal income taxation per dollar of revenue. These are reported in Table 3 below.

Table 3: US Estimates of the Average Deadweight Costs of Personal Income Taxes

Study	*Estimate*
Hausman[33] (1981)	18.4%-22.1%
Ballard et al[34] (1985)	37.4%
Jorgenson and Yun[35] (1990)	33.3%
Jorgenson and Yun[36] (1991)	18%
Feldstein[37] (1999)	32.2%

These studies estimate that the ACF for personal income taxation is between 18 per cent and 37 per cent for the United States. In Australia, revenue from personal income taxation in 2003-04 amounted to $99 billion,[38] so applying the US estimates of the ACF to Australia yields a total annual deadweight loss from personal income taxation of between $18 billion and $37 billion. To place this in context, the combined amount of spending on defence, public order and safety across all levels of government in 2003-04 was $26 billion.[39]

5.2 Marginal Deadweight Losses and the Marginal Cost of Funds

Most changes in economic policy are incremental. Taxes are usually increased or reduced incrementally, and each proposal for additional government spending or cutbacks are small, compared to the overall size of the budget and economic activity. Thus, the pure economic costs of raising a tax *incrementally* (or the benefits of reducing taxes or government spending incrementally) should be of great interest to practitioners and policymakers. Comparisons of these costs for different taxes should also be widely publicised so that taxpayers can observe exactly how much private surplus is destroyed when the last dollar of tax revenue is raised by the government, and how much better off they would be if governments at all levels reduced their voracious appetites for spending more.

Incrementally raising a tax may have a large additional deadweight cost, but may also raise a relatively large amount of additional revenue. Some sort of normalisation is required so that sensible comparisons of costs can be made between various taxes. The *marginal deadweight loss* (MDWL) of a tax does exactly this: it calculates the incremental cost of raising a particular tax, and then normalises this by dividing by the incremental change in revenue. The *social marginal cost of public funds* [or simply the *marginal cost of funds* (MCF)] is computed as one plus the MDWL.

5.3 Why is the MCF so Useful?

The MCF for a particular tax is a convenient summary measure of the pure economic cost of raising the last dollar in revenue from the private sector using that particular tax. Raising a dollar by changing a particular tax reduces private sector wellbeing by at least one dollar, plus the additional pure economic costs (discussed above) of the tax increase.

The claim that spending revenue might create a benefit somewhere in the economy is immaterial for computing the cost of raising that revenue. Moreover, the costs of taxation don't depend in any way on how revenue is spent, so there is no need to calculate a different MCF for every dollar of public spending. In any case, this is an impossible task for welfare states in the modern era, where there are literally thousands of various spending projects.

Holmes' infamous remark is irrelevant if the actual economic costs of taxation are ignored. Nevertheless, as pointed out above, Holmes' argument is made time and again in most public discussions of taxation without any explicit reference to the 'price' that is being borne by taxpayers. Public debate has become so skewed against taxpayers that Australian politicians rarely (if ever) argue that the costs of raising an additional dollar of revenue are too high, relative to the alleged benefits of an additional dollar of public spending. It seems that making such a claim is as unfashionable as it is true.[40]

Although the concept is ignored by most commentators and public sector economists, the MCF is a central issue in the evaluation of public policy because it gives a precise answer to the following question: At current levels of taxation, how much additional private wealth was destroyed when the government raised its last dollar of revenue? In addition, the MCF provides a benchmark with which to measure public projects or policy interventions against. Specifically, any project or policy that does not provide a higher percentage return than the MCF should not go ahead. The MCF can therefore be seen as a lower bound on the hurdle rate of return for public sector projects.[41]

The correct measurement and widespread publication of the MCF of taxation should be a fundamental part of the design of any public policy involving either taxation or spending. Even if the alleged public benefits of additional government spending exceed the *direct* production costs (say, of building a road or hospital), the extra spending may not be justified because private wealth was destroyed when those funds were raised via taxation.

In other words, *to properly justify an additional dollar of government spending, the benefit of that extra dollar must be far more than a dollar, because the economic cost of raising that dollar is far more than a dollar to begin with.* Interestingly, Australian governments and their agencies do not currently provide any official published estimates of the MCF or the total deadweight costs of taxation. For reasons that are probably not unrelated, they also fail to provide official published estimates of the alleged marginal or total benefits of public spending.

5.4 Estimates of the MCF for Personal Income Taxation

The MCF can vary widely, depending on the nature of the tax in question. Economists have employed sophisticated economic and statistical techniques to estimate the MCF. Since personal income taxation is the major single source (47.3 per cent in 2003-04) of Federal government tax revenue in Australia, most analysts have focused on these particular taxes. For personal income taxes, older estimates for OECD countries are in the 1.2—1.3 range.[42] In other words, studies suggest that the last dollar of revenue raised through personal income taxation cost the private sector between $1.20 and $1.30.

For Australia, Campbell and Bond[43] estimate the MCF at between 1.19 and 1.24, while Findlay and Jones derive an estimate of between 1.23 and 1.65.[44] These estimates mean that to be economically justified, the last dollar of government spending should create an economic return of at least 19 percent (and perhaps as high as 65 per cent), net of any direct administrative or production costs involved in that spending.

More recent evidence suggests that the MCF for personal income taxes may be much higher that these estimates. As discussed earlier, if income tax rates rise, then individuals and firms may respond by legally shifting part of the employee's compensation into non-pecuniary forms of earnings, in order to reduce their tax liability. Thus, when income tax rates rise, observed hours may not change by much, but taxable income may fall substantially. But this implies that the additional revenue raised from a tax increase may also be very small. Indeed, there may actually be a *reduction* in tax revenue as workers accept more non-wage forms of compensation.[45]

All of this suggests that the traditional estimates of the MCF discussed earlier may be far too small. Feldstein[46] studies these issues in the light of the US 1986 Tax Reform Act, and finds substantially larger values of the MCF for income taxes than those obtained using traditional estimates. He estimates that the MCF may be larger than two for personal income taxes. In other words, Feldstein's estimates imply that the last dollar of revenue raised from personal income taxation in the US cost the private sector more than two dollars, and that the economic return from the last dollar of government spending should exceed 200 per cent.

As discussed above, the MCF provides a *minimal* benchmark with which to measure public projects or policy interventions against. From an efficiency point of view, any project or policy that fails to offset the cost of taxation (even if it would raise welfare in isolation) should not be undertaken. These costs should be taken into account when governments wish to levy taxes to redistribute wealth (that is, impose a system of direct cash transfers or government purchases of private goods) or to provide public goods. Expenditure on transfers, subsidies and public goods of course may produce their own (negative or positive) welfare effects, but these additional welfare effects of spending should not be confused with the economic costs of extracting the revenue in the first place.

5.5 An Alternative Way to View the MCF

The MCF is still a very useful concept even when governments refuse to reduce taxes. For example, suppose the government reduced spending on a particularly wasteful policy, and used the money to instead fund a more productive project, without extracting any additional revenue from the private sector. Then, the marginal cost of funds is effectively equal to the (very small) marginal benefit of the wasteful policy. The more wasteful the policy, the lower the opportunity cost of eliminating it. In other words, in economies characterised by wasteful government spending, the cheapest method of funding productive government projects is to eliminate that wasteful spending, rather than by raising taxes.

6. INCOME TAXATION AND ECONOMIC GROWTH

The costs of high personal income taxation also show up in broader measures of economic activity. No economy in history has ever achieved per-capita GDP growth of 4 per cent or more on a sustained basis once general government spending exceeds 40 per cent of national product. Even though government spending may be productive, after it reaches a certain level it is not sufficiently productive to offset the distortionary effects of the high levels of taxation which are required to finance it. That is, once government reaches a certain size, any positive correlation that might exist gets swamped by the negative incentive effect of higher taxation.

From a microeconomic perspective, this is exactly what estimates of the marginal cost of funds tend to suggest—additional public projects should have a social return of at least or 20 and 30 per cent (and perhaps higher) to have any chance of having a net overall positive economic effect. As government size increases and the average and marginal costs of taxation rise, there are fewer and fewer public projects or policies that possess such characteristics.

As discussed above, estimates of the MCF are driven by the fact that higher personal income taxes create significant work disincentives, and cause workers to substitute out of work into other activities. But the estimates are only a start—they assume that tax codes are easy to understand and easy to comply with.[47] Thus, they are far from being completely accurate summaries of the full costs of taxation, in the sense that they ignore some potentially important costs.

A key factor in determining long run growth rates is the *effective* supply of labour, which depends on productivity, skills, effort and so on. A worker who is more skilled will produce more output than a worker with fewer skills, even though each employee may work the same number of hours. By definition, personal income taxation induces individuals to substitute away from *any* activity which will earn them higher personal income, including investment in human capital. Human capital forms a significant part of Australia's wealth, and higher income taxes retard the accumulation of this wealth.[48] Again, the narrow focus on the effect of personal income taxation on hours worked or participation rates misses an important part of this story.

6.1 Personal Income Tax Cuts and Per Capita Economic Growth

The older literature using the neoclassical growth model allowed no role for taxation and public spending to influence long run growth rates. The more recent endogenous growth literature emphasises the notion that in the long run, increases in productivity can only occur via accumulation of physical capital, human capital, and knowledge. In modern economies this accumulation overwhelmingly occurs in the private sector, as a result of decisions made by firms and individuals regarding the benefits and costs of savings, investment, education, and so on. To the extent that taxation on capital and labour taxation reduces investment in these accumulated factors, its marginal effect (net of any spending effects) will tend to reduce economic growth.

6.1.1 Within Country Studies

Over the long run, the effects of international differences in institutions, legal regimes, and so on may swamp any effects that changes in taxes may have on economic growth. Thus, the effects of taxation on economic growth are most easily identifiable when the possibility of other growth-altering factors (such as changes in institutional arrangements) are small or non-existent. Therefore, one possibility is to look for evidence of the effect of local and state taxes on economic growth *within* a particular country. There are several studies which do this, and most find negative correlations. Kleine,[49] Grierson[50] and Grierson et al[51] report negative correlations between US state tax levels and state growth. Helms[52] uses a pooled time series and cross sectional data set from 48 US states, and finds that increases in property taxes, income taxes and user fees all tend to retard economic growth at the state level. Mofidi and Stone[53] find similar results.

6.1.2 International Evidence

The disincentive effects of taxation tend to show up in international data over the long run. Consider, for example, the data collected by the Fraser Institute in their *Economic Freedom in the World* publication. Our own preliminary analysis of this data for the period 1980-2000 tends to suggest that higher rates of income taxation retard economic growth.[54]

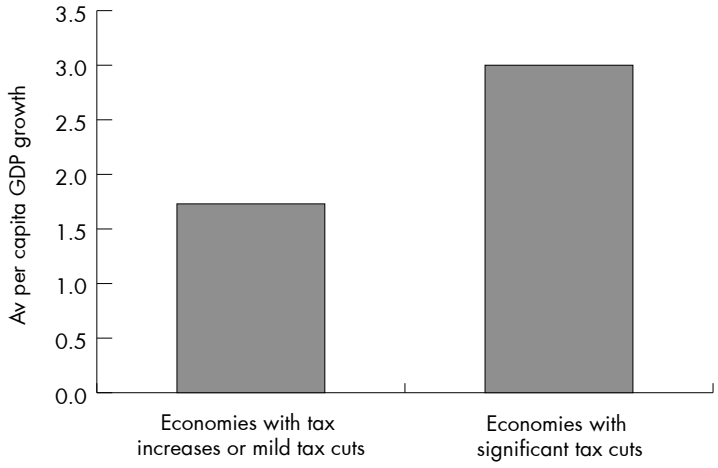
The Fraser Institute reports on the structure of personal income tax systems for rich and poor countries since 1970, and derives a measure of the taxation burden which takes into account the importance of high marginal tax rates and the level of income at which the highest marginal rate actually applies. Table 4 below summarises their 0-10 rating scheme, where a higher number indicates a less burdensome personal income tax system. Tax systems receive a higher rating if they have low marginal rates, but also receive a high rating if the highest marginal rate does not apply to low income levels. Note also that the Fraser Institute measure controls for changes in nominal incomes across time and across countries by using 1982-84 US dollars.

Table 4: Measuring the Income Tax Burden
Fraser Institute Rating System, Economic Freedom of the World, 1980-2000

	Income Threshold Level of Top Marginal Tax Rate (1982-84 $US)			
Top Marginal Tax Rate	<25	25-50	50-150	>150
>20%	10	10	10	10
21%-25%	9	9	10	10
26%-30%	8	8	9	9
31%-35%	7	7	8	9
36%-40%	5	6	7	8
41%-45%	4	5	6	7
46%-50%	3	4	6	7
51%-55%	2	3	4	4
56%-60%	1	2	3	3
61%-65%	0	1	2	2
66%-70%	0	0	2	1
>70%	0	0	0	0

Many countries in the Fraser Institute's sample have changed their personal tax systems in the last two decades, so it is straightforward to make long run comparisons of the effects of changing tax systems across countries. The change in income tax structures in OECD countries in the last two decades can be measured by the difference between their Fraser Institute ratings in 1980 and 2000. For example, Australia's measure only increased from a rating of 2 to a rating of 3, indicating that the Fraser Institute estimates no significant improvements in the personal income tax system occurred in Australia between 1980 and 2000.

Figure 3. Income Tax Cuts and Per Capita Economic Growth
Average Performance of OECD Countries, 1980-2000



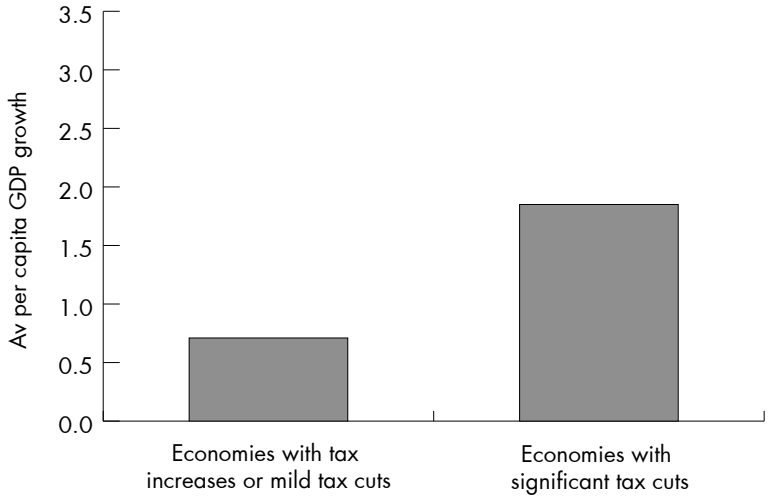
Sources: Fraser Institute, Economic Freedom of the World, various issues; Penn World Tables 6.1, Real GDP Per Capita 1980-2000, see http://dc2.chass.utoronto.ca/pwt/

Average real per capita rates of economic growth over the same period are also available.[55] Figure 3 above shows that OECD countries which significantly cut their taxes (increased their Fraser Institute measure by 4 or more points) had an average per capita growth rate of over 3 per cent, while those that increased taxes or reduced taxes mildly managed an average per capita economic growth rate of only 1.7 per cent, almost *half* the rate enjoyed by significant tax-cutting nations.

This is highly suggestive of the proposition that lower marginal income tax rates (i.e. higher measures of tax cuts) are associated with higher per capita economic growth. However, the figure by no means provides conclusive evidence of the effects of lower income taxes on growth—a complete analysis would control for other factors that are important for growth. Nevertheless, the figure supports findings of microeconomic studies of the costs of income taxation.

For the full sample of all countries for which both sets of data are available (98 countries in total) countries which increased their Fraser Institute measure by 4 or more points had an average per capita growth rate of 1.84 per cent, while those that did not only managed an average per capita economic growth rate of a meagre 0.66 per cent. This is illustrated in Figure 4 below. *On average, countries which significantly cut taxes between 1980 and 2000 enjoyed average per capita economic growth rates of nearly* ***three times*** *those that did not.*[56]

Figure 4. Income Tax Cuts and Per Capita Economic Growth
Average Performance of 98 Countries, 1980-2000



Sources: Fraser Institute, Economic Freedom of the World, various issues; Penn World Tables 6.1, Real GDP Per Capita 1980-2000, see http://dc2.chass.utoronto.ca/pwt/

7. ARE FLATTER PERSONAL INCOME TAX STRUCTURES THE ANSWER?

Microeconomic analysis suggests that graduated personal income tax systems tend to be more distortionary than flatter tax structures.[57] This suggests that from a pure efficiency point of view flatter tax structures are preferable. There are other reasons why flat tax systems are desirable. Once a single marginal tax rate is chosen, further policy deliberations regarding changes in the tax system essentially involve only three choices—should the rate stay the same, be increased, or reduced? A tax increase for one group of taxpayers is a tax increase for all. The same principle applies to tax cuts.

These observations immediately suggest why a system of graduated income taxes (and even, to a lesser extent, a flat tax with a tax-free threshold) tend to discourage reductions in tax rates, particularly at higher income levels. It is not at all obvious why one particular graduated tax schedule is 'fairer' than any other. Any proposal to change a graduated tax schedule cannot be based on first principles, since nobody can agree on what makes one tax system more 'progressive' than another. Hence, proposals for change usually involve setting different taxpayers against one another as political competitors. When a change in a graduated schedule is proposed, a tax increase for one group of income earners could mean a reduction for others, and vice versa.

The same reasoning applies to income tax deductions for special interest groups or classes of individuals or income earners. Once these are entertained for one group, they could potentially be entertained for all groups, setting off a costly process of lobbying and political competition. As discussed above, not only does this involve a direct waste of resources on lobbying and so on; it creates greater administrative and compliance costs as the tax code becomes progressively more complex and voluminous, as discussed earlier. This is wonderful for accountants and tax lawyers, but is a net loss for the economy as a whole.

A flat tax which does not allow for any deductions or a tax-free threshold is administratively very simple, and easy to comply with. Whatever disincentive effects it creates are not altered by inflation. In most existing tax systems, changes in nominal wages (but not real wages) move some individuals into higher tax brackets ('bracket creep') when their real incomes have in fact not changed. With a flat tax, there are no 'brackets' to creep into when one's nominal wage changes with inflation. Individuals pay a higher real tax bill if and only if their real wage increases. Moreover, they pay the same proportion of their income in taxes, which does not occur even when brackets are indexed for inflation as they are in the US.

However, an important caveat is in order: *a flat tax which has a high marginal rate still distorts economic incentives and creates a deadweight loss*. Indeed, a graduated tax system with low marginal rates may be preferable to a flat tax system with a high marginal rate. This suggests that it is almost pointless discussing flat taxes if the level of government spending is not controlled.

In fact, some economists have gone further and argue that implementing 'efficient' taxes such as flat consumption taxes and flat income taxes may actually cause governments to spend more, since the economic costs of raising a particular amount of revenue under such systems are relatively lower.[58] Because the 'price' of increasing spending is lower, demand for spending rises. Flat taxes, it is argued, are so efficient that they create an incentive for governments to spend more money, which, as we have already mentioned, tends to distorts economic behaviour in other ways.

8. CONCLUSIONS

High personal income taxes not only reduce the ability of individuals to enjoy the fruits of their own labour and make workers worse off; they also create significant disincentives. Because all forms of taxation alter economic choices and drive economic activity from high to low valued uses, a dollar increase in government revenue ends up costing the economy far more in real terms than the dollar that is actually paid in taxes. These harmful effects of taxation are present for all kinds of taxation and exist irrespective of whether tax revenue is spent productively or wasted.

Conflation of costs with benefits is a sure recipe for expanding the size of government over and above that which can be justified rigorously on economic grounds, and can lead to ruinous public policy decisions.[59] The MCF provides a dollar measure of the pure economic effects of a tax on the incentives to produce, work, save, invest or consume. It is important to note that it does *not* include the administrative costs of taxation, or the costs to business of filling out forms, or even the costs of avoiding taxes or evading taxes (this is not to say that these costs are not important or economically significant).

There is little evidence to suggest that higher taxation increases GDP growth rates, and much evidence to suggest that the opposite is true. Whatever view one takes of the merits or otherwise of higher taxes, it is simply erroneous to assert that, at current levels of taxation and spending, confiscating an additional dollar from individuals and transferring it to one's favourite bureaucrat or politician would have little or no effect on economic incentives.

Endnotes

1 Sid Marris, 'Income tax up 36 pc in six years', *The Weekend Australian,* 16-17 April 2005, 3.

2 It is worth noting that subsidies have a similar wealth-destroying effect to the costs that are described here. Subsidies drive down the prices that consumers are willing to pay below the prices that producers wish to receive. Thus, subsidies induce *too many* exchanges of subsidised goods, and drive resources away from higher valued uses. Thus, in this sense, the wealth-destroying effects of subsidies are no different from those of taxes, and must be added on to the costs of taxation to get a full estimate of the cost of both forms of government intervention.

[3] For example, in a recent paper by Michael Keating, 'The Case for Increased Taxation' Michael Keating ('The Case for Increased Taxation', Academy of the Social Sciences, Occasional Paper No. 1 (2004), (see http://www.assa.edu.au/publications/op/op12004.pdf) argues that 'the Australian economy could tolerate a significant increase in the ratio of taxation to GDP without great difficulty.' While framed in terms of GDP, the major thrust and implication of Keating's paper is that increasing taxes by a significant amount would not create any substantial economic costs.

[4] For example, the quote is chiselled in stone at the US Treasury Building in Washington DC. This somewhat schizophrenic view of taxation was also adopted in 1999 by the Commissioner of Taxation (without crediting Holmes). The Commissioner attempted to make the 'ethical' case in favour of paying higher taxes by conflating its costs with the alleged benefits of government spending. See 'Ethics and Taxation', Speech Delivered to the Edmund Rice Business Ethics Forum, Sydney, 28 October 1999. http://www.ato.gov.au/corporate/content.asp?doc=/content/sp9907.htm.

[5] All quotes below are from A. Smith, *An Inquiry into the Nature and Causes of the Wealth of Nations* (1776) Liberty Fund Edition (Indianapolis: Liberty Fund, 1981) Book V, Chapter 2, 826-827.

[6] Australian Taxation Office *Annual Reports* 2002-2003 and 2003-2004, http://www.ato.gov.au/default.asp?menu=98.

[7] See P. Schuck, 'Legal Complexity: Some Causes, Consequences and Cures', *Duke Law Journal*, 42 (1992),1-52, and R. Epstein, *Simple Rules for a Complex World* (Cambridge, MA: Harvard University Press, 1995). For a formal economic analysis of the effects of complexity and variability of regulations, see R. Quandt, 'The Welfare Effects of Complexity and Variability in Regulations', *Economics Letters*, 13:2-3 (1983), 259-261.

[8] R. Vedder, 'Replace the Income Tax with Consumption Tax', Paper presented at the World Taxpayers Conference, Gold Coast (November 2004).

[9] G. Tullock, 'The Welfare Costs of Tariffs, Monopolies and Theft', *Western Economic Review* 5 (1967), 224-232.

[10] The costs of rent-seeking activities are certainly large enough to concern welfare economists. Recent estimates (by D. Laband and G. McClintock, *The Transfer Society* (Washington D.C.: Cato Institute, 2001)) are available for United States in the year 1997, and amount to US$546 billion (at 1997 prices).

[11] See A. Robson, 'Rent Seeking and the Presence of Existing Distortions', Working Paper in Economics and Econometrics No. 448 (Canberra: Australian National University, 2005).

[12] See, for example, R. Gittins, 'The Real Secret to Happiness: Higher Taxes', *The Melbourne Age,* 14 April 2005.

[13] We will use these terms interchangeably throughout the paper.

[14] More precisely, the deadweight loss is the excess of the funds that must be given to a consumer to restore him to his pretax indifference curve, over and above the additional tax revenue collected from him. See P. Diamond, and D. McFadden, 'Some Uses of the Expenditure Function in Public Finance', *Journal of Public Economics* 3 (1974), 3-21.

[15] Diamond & McFadden, 'Some Uses of the Expenditure Function in Public Finance'; A. Auerbach, 'The Theory of Excess Burden and Optimal Taxation', in Auerbach, A. and Feldstein, M. (eds) *Handbook of Public Economics*, Volume 1, (Amsterdam: Elsevier Science, 1985); A. Auerbach and J. Hines, 'Taxation and Economic Efficiency', Working Paper No. 8181, National Bureau of Economic Research (2001); and B. Salanie, The Economics of Taxation (Cambridge, MA: MIT Press, 2003). Some economists and commentators implicitly include income effects in calculations of the deadweight loss of taxation. This approach is problematic for a variety of reasons, most of which are explained in the sources noted above as well as R. Tresch, *Public Finance* (New York: Academic Press, 2002).

[16] See P. Martin, 'Tax Cuts Don't Make us Work Harder', *The Sydney Morning Herald*, 30 March 2005.

[17] R. Tresch, *Public Finance* (New York: Academic Press, 2002), 404.

[18] On the other hand, a common finding is that adult *female* labour force participation and hours worked are much more sensitive to changes in net wages.

[19] Interestingly, Gruber and Saez use their findings to argue that efficient tax systems should feature tightly targeted transfers to lower income taxpayers and a flat or even declining marginal rate structure for middle and high income taxpayers. J. Gruber, and E. Saez, 'The Elasticity of Taxable Income: Evidence and Implications', *Journal of Public Economics* 84 (2002), 1-32.

[20] Other recent evidence also suggests that labour supply may indeed be highly responsive to tax rates. For example, E. Prescott Prescott, 'Why Do Americans Work So Much More Than Europeans?', *Federal Reserve Bank of Minneapolis Quarterly Review* 28:1 (2004), 2-13, estimates that Americans on average devote 50 percent more work to the market sector than, for example, French workers. He argues that this is primarily due to differences in the tax structures in these economies.

[21] L. Lindsey, 'Individual Taxpayer Response to Tax Cuts: 1982–1984, with Implications for the Revenue Maximizing Tax Rate', *Journal of Public Economics* 33 (1987), 173–206.

[22] G. Auten, and R. Carroll, 'The Effect of Income Taxes on Household Behavior', *Review of Economics and Statistics* 81:4 (1999), 681-693.

[23] M. Feldstein, 'Behavioural Responses to Tax Rates: Evidence from the Tax Reform Act of 1986', *American Economic Review* 85:2 (1995), 170-174; M. Feldstein, 'The Effect of Marginal Tax Rates on Taxable Income: A Panel Study of the 1986 Tax Reform Act', *Journal of Political Economy* 103:3 (1995), 551-572.

[24] J. Navratil, *The Economic Recovery Tax Act of 1981: Evidence on Individual Taxpayer Behavior from Panel Tax Return Data* (Unpublished Harvard Thesis, 1995).

[25] R. Carroll, 'Tax Rates, Taxpayer Behavior, and the 1993 Tax Act. Office of Tax Analysis' (US Department of the Treasury, mimeograph, 1998).

[26] E. Saez, 'The Effect of Marginal Tax Rates on Income: A Panel Study of 'Bracket Creep', Working Paper No. 7367 (National Bureau of Economic Research, 1999)

[27] J. Gruber, and E. Saez, 'The Elasticity of Taxable Income: Evidence and Implications', *Journal of Public Economics* 84 (2002), 1-32.

[28] C. Ballard, J. Shoven, and J. Whalley, 'General Equilibrium Computations of the Marginal Welfare Costs of Taxes in the United States', *American Economic Review* 75 (1985), 128-138

[29] D. Jorgenson, and K. Yun, 'Tax Reform and US Economic Growth', *Journal of Political Economy* 98:5 (1990), S151-193

[30] D. Jorgenson and K. Yun, 'The Excess Burden of Taxation in the United States', *Journal of Accounting and Finance* 6:4 (1991), 487-509.

[31] All forms of government revenue (including non-tax revenue) amounted to $310 billion, or 38 per cent of GDP. See the Australian Bureau of Statistics *Government Finance Statistics* (2005), 7.

[32] Australian Bureau of Statistics, *Government Finance Statistics* (2005), Table 31, 41.

[33] J. Hausman, 'Labour Supply' in H. Aaron and J. Pechman (eds) *How Taxes Affect Economic Behaviour* (Washington D.C.: The Brookings Institution, 1981).

[34] Ballard, Shoven & Whalley, 'General Equilibrium Computations of the Marginal Welfare Costs of Taxes in the United States', 128-138

[35] Jorgenson & Yun, 'Tax Reform and US Economic Growth'.

[36] Jorgenson & Yun, 'The Excess Burden of Taxation in the United States'.

[37] M. Feldstein, 'Tax Avoidance and the Deadweight Loss of the Income Tax', *Review of Economics and Statistics* 81:4 (1999), 674-680.

[38] In Australia, personal income taxation is the major source (47.3 per cent in 2003/04) of Federal government tax revenue. See Australian Bureau of Statistics, *Taxation Revenue* (2005*),* Table 3, 12.

[39] Australian Bureau of Statistics, *Government Finance Statistics* (1999), Table 31, 41.

[40] A recent and welcome exception to this rule is C. Emerson, 'Dead Weight on Path to Dead End', *The Courier-Mail*, 7 April 2005.

[41] There are many subtleties in the correct definition and computation of the MCF which we are glossing over here. For a rigorous discussion of the issues, see C. Jones, *Applied Welfare Economics* (Oxford University Press, forthcoming, 2005).

[42] References include C. Ballard and D. Fullerton, 'Distortionary Taxes and the Provision of Public Goods', *Journal of Economic Perspectives* 6:3 (1992), 117-131; D. Fullerton, 'Reconciling Recent Estimates of the Marginal Welfare Cost of Taxation', *American Economic Review* 81:1 (1991), 302-308; Ballard, Shoven and Whalley (op cit); E. Browning, 'On the Marginal Welfare Cost of Taxation', *American Economic Review* 77 (1987), 11-23; C. Stuart, 'Welfare Costs per Dollar of Additional Tax Revenue in the United States', *American Economic Review* 74 (1984), 352-362; H. Campbell, 'Deadweight Loss and Commodity Taxation in Canada', *Canadian Journal of Economics* 8 (1975), 441-447; B. Dahlby, 'Progressive Taxation and the Social Marginal Cost of Public Funds', *Journal of Public Economics* 67:1 (1998), 105-122; E. Diewert, and D. Lawrence, 'The Deadweight Costs of Taxation in New Zealand', *Canadian Journal of Economics* 29:0(1996), S658-673.

[43] H. Campbell, and K. Bond, 'The Cost of Public Funds in Australia', *Economic Record* 73 (1987), 22-34.

[44] C. Findlay, and R. Jones, 'The Marginal Cost of Australian Income Taxation', *Economic Record* 58 (1982), 253-262. In 1991 the US government modified its cost-benefit procedures to assign a cost of $1.25 to every dollar of expenditures raised out of tax revenues.

[45] The *Laffer curve* of a tax shows how tax revenue responds to changes in the tax rate. All taxes have Laffer curves which, when no other distortions are present, indicate that tax revenue must fall if tax rates are increased above a certain level. Despite the debate surrounding the Laffer curve in public discussions

of taxation, the fact that revenue may fall following an increase in tax rates is perhaps one of the most uncontroversial and uninteresting propositions in all of economics. It is also an extremely old idea, having been discussed by the French economist Jules Dupuit over 150 years ago [see J. Dupuit, (1844) 'De la Mesure de L'utilitié des Travaux Publics', *Annales des Popnts et Chaussées.* Published in English in Jackson, P. (ed), *The Foundations of Public Finance* (Cheltenham: Elgar, 1996)].

46 M. Feldstein, 'Tax Avoidance and the Deadweight Loss of the Income Tax'.

47 J. Slemrod and S. Yitzhaki, 'The Costs of Taxation and the Marginal Efficiency Cost of Funds', *IMF Staff Papers* 43:1 (1996), 172-198 show how to estimate (but do not in fact compute) the MCF when avoidance costs, evasion costs, administrative costs and compliance costs are present.

48 P. Trostel, 'The Effect of Taxation on Human Capital', *Journal of Political Economy* 101:2 (1993), 327-350 develops an endogenous growth model allowing for human capital accumulation. He argues simulations, that higher income taxes have a significant negative effect on human capital formation. Specifically, for plausible parameter assumptions, he finds that a one-percentage point increase in a flat income tax rate causes the long-run stock of human capital to decline by 0.97 per cent.

49 R. Kleine, 'State and Local Tax Levels and Economic Growth—A Regional Comparison', *Proceedings of the Annual Conference on Taxation of the National Tax Association—Tax Institute of America* (1977), 162-173.

50 R. Grierson, 'Theoretical Analysis and Empirical Measurements of the Effects of the Philadelphia Income Tax', *Journal of Urban Economics* 8 (1980), 123-137.

51 R. Grierson et al, 'The Effect of Business Taxation on the Location of Industry', *Journal of Urban Economics* 4 (1977), 170-185.

52 L. J. Helms, 'The Effect of State and Local Taxes on Economic Growth: A Time Series—Cross Section Approach', *Review of Economics and Statistics*, 67:4 (1985), 574-582.

53 A. Mofidi and J. Stone, 'Do State and Local Taxes Affect Economic Growth?', *Review of Economics and Statistics* 72:4 (1990), 686-691.

54 The literature on the relationship between taxation, GDP and economic growth is briefly surveyed in A. Robson, 'Taxation, Individual Incentives and Economic Growth', Second Prize, IREF Essay Contest on Taxation and Economic Growth, February 2005.

55 Per-capita growth data are taken from the Penn World Tables data set, available at http://dc2.chass.utoronto.ca/pwt/.

56 Interestingly, performing the same exercise for transfers and subsidies using Fraser Institute data (not reported here) leads to the result that higher subsidies and transfers are associated with lower per capita economic growth, which supports the results of Barro's (1991) study and more recent evidence. R. Barro, 'Economic Growth in a Cross Section of Countries', *Quarterly Journal of Economics* 106:2 (1991), 402-443.

57 Illustrations of this general proposition can be found in most good public finance textbooks. See, for example, R. Jha, *Modern Public Economics* (London: Routledge, 1998), 184-185l; S. Cassou and K. Lansing, 'Growth Effects of Shifting from a Graduated-Rate Tax System to a Flat Tax', *Economic Inquiry* 42:2 (2004), 194-213 simulate changes in the income tax schedule from a graduated-rate tax system to a flat tax. They examine both an endogenous growth model and a standard neoclassical growth model. For the former, they predict that a flat tax would permanently increase per capita economic growth by up to 0.143 percentage points per year.

58 For a theoretical analysis and empirical evidence of this proposition, see G. Becker and C. Mulligan, 'Deadweight Costs and the Size of Government', *Journal of Law and Economics* 46 (2003), 293-340.

59 The practice of counting costs as if they were benefits is widespread in many discussions of government spending projects, and is one of the primary reasons why 'pork-barrelling' is so widespread. For a detailed discussion and a recent Australian example, see A. Robson, *Sweet and Sour Pork Barrelling: The Case of Queensland Sugar*, Issue Analysis No. 45 (Sydney, Centre for Independent Studies, March 2004).

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