

ECONOMIC CONSEQUENCES OF THE SIZE OF GOVERNMENT IN AUSTRALIA

A thesis submitted in fulfilment of the requirements for the degree of Doctor of Philosophy

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DECLARATION

I certify that except where due acknowledgement has been made, the work is that of the author alone; the work has not been submitted previously, in whole or in part, to qualify for any other academic award; the content of the thesis is the result of work which has been carried out since the official commencement date of the approved research program; any editorial work, paid or unpaid, carried out by a third party is acknowledged; and, ethics procedures and guidelines have been followed.

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SUMMARY

The aim of this thesis is to contribute to the economics literature by providing a theoretical and empirical investigation of the effects of changes in the relative size of government on Australian economic performance.

The theoretical literature indicates that an expansion in government size is likely to induce adverse effects upon economic growth for a host of reasons. These include the distortionary effects of taxation imposed to finance government expenditures, the displacement effects of private sector economic activity attributable to public sector interventions, and the growth in governmental activity encouraging economic participants to divert their attentions away from direct market activities and towards seeking benefits through the political process.

The historical experience suggests that all levels of Australian governments have grown in terms of size and scope of functions and activities undertaken, and that this growth has transpired over a broad range of public policy interventions including expenditure, taxation and revenue-raising and regulation. An assessment of various statistical measurements of public sector size tends to confirm the general proposition that the public sector in Australia has grown over the long run.

This thesis analyses the effect of government size on economic performance in Australia using annual time series data for the period 1960 to 2010.

The hypothesis that an increase in the relative size of government leads to a lower per capita economic growth rate is tested using a variety of econometric specifications, including multivariate ordinary least squares and simultaneous equation techniques. The empirical results suggest an increase in government size by ten percentage points is associated with a lower annual GDP per capita growth rate of between 1.2 and 2.5 percentage points.

This study also reveals the empirical significance of various underlying determinants of public sector growth to overall government size.

The increase in public sector service costs relative to the private sector, the greater ease of tax collection attributable to rising female labour market participation, and increasing government expenditures provided as insurance for the effects of economic openness are found to exert significant effects upon growth in public sector size. However, the empirical results indicate that ‘Wagner’s law’ of increasing government expenditure arising from general economic development does not hold for Australia.

Chapter One

Introduction

‘A state structure which aligns incentives to minimize predation outperforms economically one that provides incentives for the predation by the powerful over the weak.’ (Peter Boettke 2005, p. 209)

1.1 Background

A longstanding element of intellectual inquiry within public sector economics concerns trends relating to the size and growth of government activities, the underlying forces that determine changes in government size and scope, and the consequences of growth in the public sector for the performance of economies.¹

Macroeconomic events in Australia and other advanced economies of recent years have ensured that these elements of inquiry have transcended the academic economics literature to become a public policy concern of great significance.

The so-called ‘global financial crisis’ (GFC), conventionally perceived to have commenced with the collapse of financial institutions such as US investment bank Lehman Brothers in late 2008, was associated with a significant tightening of credit conditions as financial institutions exhibited a greater degree of risk aversion toward corporate and personal lending.²

The onset of significant financial market instability had attendant implications for the macroeconomic performance of numerous economies particularly in the Western world, given the global integration of financial and other markets. Specifically, severe credit constraints detracted from business investments whereas less confident households reduced their consumption expenditures. These changes contributed to an observed reduction in world trade volumes and industrial production.

Although relatively unscathed in economic terms compared with Europe and the United States, Australia was not immune to the impact of a synchronised international economic downturn precipitated by the GFC. According to national accounts data provided by the Australian Bureau of Statistics (ABS), one important measure of economic performance – real gross domestic product (GDP) per capita (in seasonally adjusted terms) - fell by 0.2 per cent in 2008-09 (ABS 2012).

The GFC and its associated macroeconomic instability created a political pretext for governments to invoke a suite of unprecedented economic policy measures in the modern era. These included stringent financial market and corporate regulations, taxpayer-funded financial support for the

¹ Unless otherwise specified, the terms ‘government,’ ‘public sector,’ and ‘non-market sector’ will be used interchangeably in this thesis.

² The underlying causes of the GFC continue to elicit intellectual controversy. One interpretation, usually associated with the Austrian school of economics, points to the dual roles of low official interest rates, and government interventions encouraging mass home ownership, which generated significant economic distortions in the United States the effects of which were subsequently transmitted throughout the global economy (Booth 2009; Horwitz 2009; Kates 2010).

financial, manufacturing and other sectors, and Keynesian-style fiscal stimulus policies in an attempt to bolster private sector activity.³

There is little question that such policies have increased the size and scope of the public sector in Australia and the OECD. However, there remain divergent views regarding the effect of such changes on overall economic activity.

One viewpoint is that an increase in public sector expenditure is conducive to improved economic performance. The 2010-11 Commonwealth Government budget statement, for example, indicated that the substantial fiscal stimulus of about \$80 billion enacted by the government contributed to a better than previously expected growth outcome for Australia. More generally, 'the fiscal multipliers in those countries that enacted large and timely fiscal stimulus packages appear to have been larger than expected' (Commonwealth of Australia 2010a).

An alternative view is that an expansion in the size of government will impair economic performance. For example, Kirchner (2009) stated that 'beyond a certain size, government hinders rather than helps the private sector to capture gains from trade and generate income and wealth.' Invoking an open economy framework with international capital flows augmenting the domestic stock of savings, Makin (2009, p. 32) suggests '[f]iscal 'stimulus' in the form of unproductive spending retards, not improves, national income growth reliant on international borrowing by raising the cost of capital, and crowding out private investment.'

As important as the implications of governmental activity during the GFC period may be from an academic and policy perspective, the longstanding intellectual concern about the fundamental determinants of economic performance has lent itself to a significant focus upon the implications of public sector size and growth in the longer term.

Theoretical insights into the negative association between public sector size and economic growth have pervaded the economics literature for centuries. However, empirical studies investigating the causal factors of growth since the 1970's have largely, but not exclusively, identified the relative extent of government involvement in the economy as a factor which detracts from growth.

The American economist Daniel Mitchell (2005) produced an extensive literature survey revealing numerous empirical studies alluding to the negative correlation between larger government and economic growth or productivity. More recently, Bergh and Henrekson (2010, p. 51) concluded from their own survey that '[a] negative correlation between various measures of government size and economic growth in rich countries is the most frequent result presented in the recent literature.'

Others have disputed the notion that an expansion in the relative size of the public sector has diminished long run economic performance. Referring to historical trends of growth in governmental spending for redistributive purposes, Peter Lindert (2004, pp. 16-17) stated that:

'Knowing that higher tax rates and higher subsidies to people who don't produce could discourage productivity, many of us naturally suspect that taxes and transfers should reduce the productivity of the whole economy. ... If

³A number of OECD countries also pursued an aggressive easing of their monetary policy settings in response to the GFC. In December 2008, the US Federal Reserve reduced its official cash rate to 0.25 per cent. The Bank of England announced a 0.5 per cent cash rate in March 2009, while the Reserve Bank of Australia reduced the official Australian interest rate to a low of three per cent the following month (RBA 2012).

the welfare-state countries ... are now spending between 25 and 35 percent of their national product on less productive people, and are taxing the more productive to pay for it, doesn't this damage economic growth?

...

Yet the history of economic growth is unkind to this natural suspicion. Neither simple raw correlations nor a careful weighing of the apparent sources of growth shows any clearly negative net effect of all that redistribution.'

Based on these differences in view it is clear that the economic consequences of changes in government size and scope remain the subject of intense intellectual debate. However the weighting that Australian insights into this issue can lend to this debate is limited, given the relative paucity of Australian empirical studies that attempt to shed light on the relationship between the size of government and aspects of economic performance.

The current thesis aims to contribute to the literature by providing a theoretical and empirical investigation on the effects of changes in the relative size of government on Australian economic performance.

1.2 Research aims and objectives

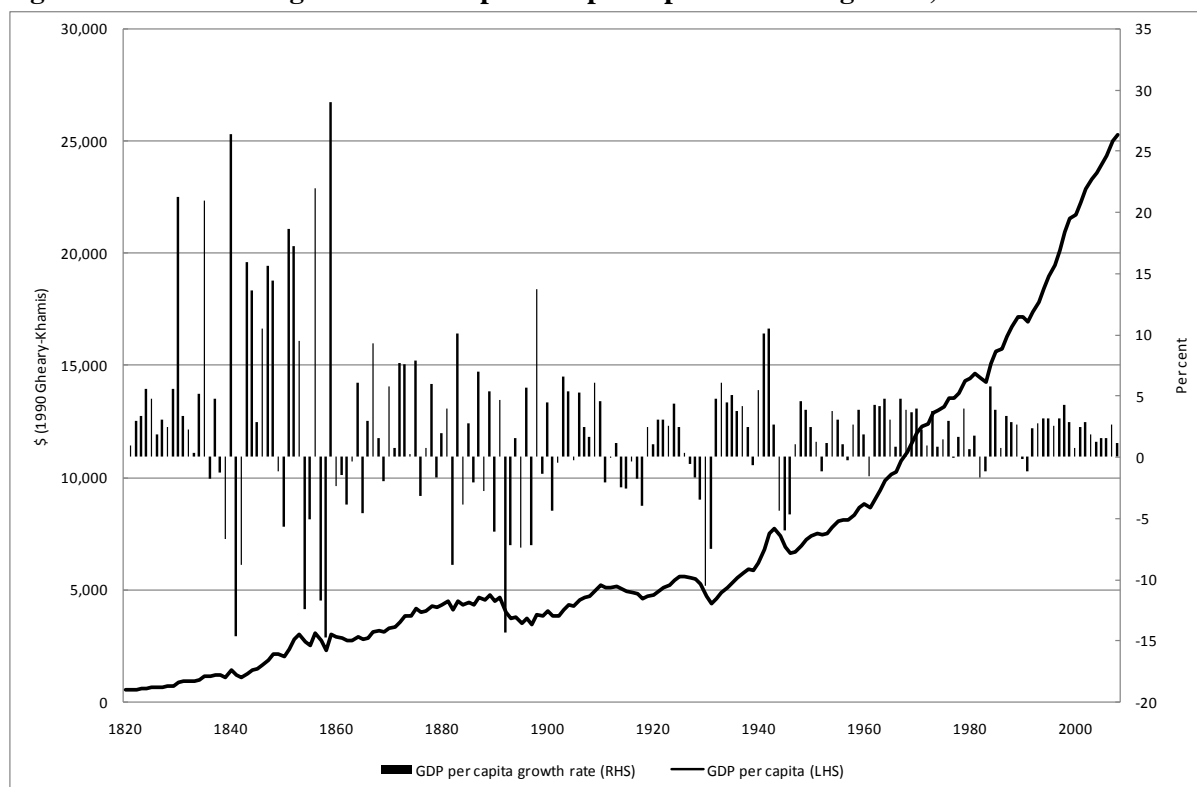
To paraphrase the seminal tract of Adam Smith ([1776] 1999), successive generations of economists have attempted to establish the nature and causes of the observed increase in 'the wealth of nations.'

The substantial implied increases in living standards on a global scale have been reported by economic historian Deirdre McCloskey (2006, p. 16) as follows: '[t]he amount of goods and services produced and consumed by the average person on the planet has *risen* since 1800 by a factor of about eight and a half.'

For Australia changes in the level of output produced per person has been no less spectacular. According to historical statistics compiled by Angus Maddison, Australian GDP per capita (expressed in 1990 Gheary-Khamis dollars) increased from \$518 in 1820 to \$25,301 in 2008 - a forty-eight fold increase over the period. Figure 1.1 provides information on the evolution of Australian GDP per capita and its annual rate of change.⁴

⁴ Information on GDP per capita is presented in this section for illustrative purposes only. As explained in chapter 3 details of long run trends in Australian public sector revenues and expenditures will be provided, using a different GDP series (drawing upon the work of Noel Butlin) for the period from the late nineteenth to early twentieth centuries.

Figure 1.1: Australian gross domestic product per capita level and growth, 1820 to 2008



Data expressed in international Geary-Khamis dollars, with base year of 1990.

Source: Maddison 2008.

Using Maddison's data the average annual growth rate of Australian GDP per capita from 1820 to 2008 was in the order of 2.1 per cent. However during the course of the twentieth century the rate of improvement in living standards was more subdued, with the GDP per capita growing at 1.8 per cent per annum from 1901 to 2000 (even accounting for the above-average growth recorded since the 1950s).

Modern economic growth theory has identified a host of proximate, if not fundamental, determinants of economic growth (Acemoglu 2009), most of which lend support to the notion that public sector institutions may exert effects (of varying degrees) upon growth outcomes in the long run.

The neoclassical models of economic growth, attributable to Robert Solow (1956) and Trevor Swan (1956), state that growth rates are a function of capital and labour accumulation and total factor productivity. Formal and informal institutions tend to play a relatively minor role within the neoclassical framework, despite some exceptions (for example, Arrow and Kurz 1969), in influencing the growth path of economies in the long run although public policy interventions are likely to make themselves felt in terms of changes to output levels.

Endogenous growth theories such as those developed in important studies by Romer (1986), Lucas (1988) and Barro (1990) refer to the importance of innovation, human capital investment via education and training, and the composition of government expenditures and taxes respectively as additional factors influencing long run growth rates.

More broadly, the emergence of institutional economics and public choice theories since the 1960's have emphasised the importance of institutions, and the role of government policies, in explaining growth within and between countries. For example, Porter and Scully develop a model of the relationship between the 'rule-space' (or institutional framework) and economic growth in which they conclude '[b]ecause of political distortions, it is likely that wealth-reducing rules will be added to the rule-space. ... With inefficient rule change, the growth path of per capita income may become negative' (Porter and Scully 1995, pp. 26-29).

Based on the general *prima facie* acceptance that extra-economic phenomena, including public sector policy settings, can render a powerful influence over an economy over time, the central research problem that will be addressed in this thesis is as follows: is there a systematic relationship between Australia's size of government and its long run economic performance?

Australian budget and other data are often used in cross-section or panel studies for a sample of countries (for example, the thirty OECD member nation-states) on the correlation between the size of government and selected indicators of economic performance, such as economic growth, market productivity or business investment.

Despite the proliferation of studies in the field over the past three decades or so, there remain several difficulties in making comparisons across countries. According to Agell, Lindh and Ohlsson (1999, p. 360):

'Our agnostic punchline is that the literature on cross-country growth regressions is unlikely to come up with a reliable answer to the question of whether a large public sector is growth promoting or growth retarding. This is due to severe problems of data quality and methodology, which allow the international evidence to admit no conclusion on whether the relation between growth and the public sector is positive, negative, or non-existent. First, there are potentially severe measurement errors in the right-hand side variables in the estimating equations. Second, there is the issue of omitted variables that are correlated with the size of the public sector ... Third, there are problems of endogeneity and simultaneity, which may occur along several dimensions.'

However, that there may be a mixed relationship between governmental size and economic performance across a sample of countries does not necessarily imply that an economically or statistically insignificant relationship (either positive or negative) also exists in the case of a given country. Indeed, an empirical focus on this issue for individual countries may help to overcome biases exerted by the inability of researchers using cross-section or panel data to fully control for the heterogeneity of circumstances between countries.

A limited number of single-country studies exploring the economic consequences of public sector growth are applicable to Australia (for example, Grossman 1988b and Kompas 2000). By filling the analytical gap on the theoretical and empirical relationship between government size and economic performance in the Australian context, this thesis will have three particular objectives:

- investigate the historical context of growth of government, and changes in the composition of public sector activity, in Australia since the early period of European settlement;
- assess the effects of the size of the public sector on economic performance from theoretical and empirical perspectives, with a view to informing the empirical strategy to be undertaken in this thesis; and

- empirically identify the effects of changes to government size on the Australian economy, and to assess how economic performance might have changed had the size of government varied from what has been previously observed.

In fulfilling these objectives it is envisaged that this thesis will focus on trends in the composition of public sector activities undertaken by Australian governments, and consider how the various forces underlying trends in government size in Australia impinge upon changes to public sector size and scope.

The public sector is generally conceived as a significant economic actor in its own right, however there exists alternative understandings as to which entities comprise it and what activities they should undertake. In addition to this a range of factors have been cited in the public economics and political science literatures that are supposed to lead to changes in the relative size and scope of governmental activities vis-à-vis those undertaken within private markets.

These considerations lead to the following research questions:

- What is an appropriate definition of the public sector? How does the definition of government compare and contrast with that of private sector activities undertaken within the marketplace?
- What are the underlying determinants of growth in the size and scope of activities undertaken by the government? What roles do the demand and supply of public services, and institutional factors, play in influencing the domain of collective action?

Following endorsement of an appropriate definition of the public sector, issues concerning the accurate measurement of the size of government assume a degree of salience. That said measuring the public sector remains the subject of intellectual controversy especially as numerical changes in the size of government are often confounded with substantive alterations in the types of activities undertaken within the non-market sector.

From the perspective of Buchanan's ([1975] 1999c) distinction between protective, productive and redistributive functions of the state, Australian governments have expanded their activities in all three areas to varying degrees. In particular, governments have assumed a broader role in the allocation of resources during the twentieth century with the provision of a wide range of public and merit goods and have engaged in efforts to stabilise fluctuations in the macroeconomy. Governments have also engaged in redistributive activities in an effort to reduce income and wealth disparities.

Accordingly, other research questions to be covered by this thesis include:

- What is an appropriate measure, or measures, of the size of the expenditure, taxation and regulatory activities of the Australian public sector?
- How has the size of Australian governments changed in historical context? How do alternative measures account for changes in the nature of governmental activity?

In a general sense there are two conflicting views about the effects of public sector activities upon the performance of an economy, which in turn directly influences the level of controversy this topic continues to solicit within the academic literature as well as in contemporary public policy debates.

There is a substantial theoretical literature which points to the idea that government interventions in the economy can positively affect the level of economic development, if not its growth rate. In modern societies, governments are responsible for the legal enforcement of contracts and private property rights, the enforcement of monetary stability, and the provision of basic services such as defence, judicial services, policing and sanitation works (Scully 1992).

In addition to these basic services it is generally agreed that the provision of certain economic infrastructures by governments (for example, roads, railways, and ports) (Aschauer 1989), as well as the financing of certain activities such as education and health care, can further enhance economic growth and productivity.

The regulatory activities of governments are often justified on the basis of correcting 'negative externality' effects, such as pollution, which otherwise harm some market participants not directly involved in transactions. To the extent that regulations achieve such objectives they are conceived as having enhanced the efficiency of markets, thus improving overall economic performance.

Contrasting these views are theories which contend that as governments continue to intervene in markets their previously beneficial effects on economic performance will be increasingly subject to diminishing returns. In the terminology of Schleifer and Vishny (1998), the 'grabbing hand' of government may become increasingly influential in deleteriously affecting economic outcomes.

Higher taxation may exert disincentive effects by distorting private economic choices with respect to work, savings, investment and undertaking commercial risks. Government borrowings may represent deferred taxation in the short run, but can in certain circumstances increase interest rates applicable to loans and 'crowd out' private investment activities (EPAC 1990; Mueller 2003).

Similarly, some forms of government expenditure – for example, spending on social security transfer payments – may reduce work effort, savings and risk-taking. The adverse effects upon economic behaviour as a consequence of such spending activities may, in this case at least, reduce the effective supply of labour and detract from economic growth (Chao and Grubel 1995).

As these expenditures by the public sector continue to expand, it becomes increasingly likely that spending will become channelled into less productive activities. In particular, governments may become involved in the provision of private sector goods for which the benefits typically accrue to individual consumers. Absent the existence of the profit-and-loss mechanism disciplining public sector conduct, there is little reason to expect that the public sector will provide such goods more efficiently than private agents (Gwartney, Holcombe and Lawson 1998).

Finally, there exist incentives for private sector agents and other organised interests to seek pecuniary and other advantages through the political process at the expense of general taxpayers. The amount of expenditure devoted to such 'rent-seeking' activities effectively represents a diversion of productive resources into unproductive wealth transfers, diminishing economic growth and productivity (Buchanan 1980; Olson 1982).

It follows from these issues that additional research questions to be addressed include:

- To what extent do the activities of Australian governments affect economic performance? Does the available evidence best reflect the idea that public sector activities enhance, or detract from, economic performance?
- How might the composition of Australian public sector activity influence the performance of the economy?

1.3 Definition of the state

Having stated the argument that the activities of government will exert some influence upon economic performance it is necessary to define the concept of ‘government,’ and indeed the broader conception of the ‘state,’ and to contrast these with activities undertaken by entities outside these realms.

The German sociologist Max Weber stated that a ‘compulsory political organization with continuous operations ... will be called a “state” insofar as its administrative staff successfully upholds the claim to the monopoly of the legitimate use of physical force in the enforcement of its order’ (Weber [1922] 1978, p. 54).⁵ Further, ‘[s]ocial action, especially organized action, will be spoken of as “politically oriented” if it aims at exerting influence on the government of a political organization; especially at the appropriation, expropriation, redistribution or allocation of the powers of government’ (Weber [1922] 1978, p. 54).

Classical liberal and libertarian economists generally conceive of the state in a similar fashion to that expressed by Weber. Murray Rothbard suggested that the state is defined as an organisation that ‘arrogates to itself a monopoly of force, of ultimate decision-making power, over a given territorial area’ (Rothbard [1982] 1978, p. 172).

Similarly, Ludwig von Mises provided a useful delineation of the state and its functions as follows: ‘[w]e call the social apparatus of compulsion and coercion that induces people to abide by the rules of life in society, the state; the rules according to which the state proceeds, law; and the organs charged with the responsibility of administering the apparatus of compulsion, government’ (Mises [1929] 2006, p. 35).

The coercive activities of government, as the administrative and organisational agent of the state, are in sharp contrast to voluntary actions undertaken by private sector agents in markets:

‘[f]undamentally, there are only two ways of co-ordinating the economic activities of millions. One is central direction involving the use of coercion. ... The other is voluntary co-operation of individuals – the technique of the marketplace. ... The possibility of co-ordination through voluntary co-operation rests on the elementary ... proposition that both parties to an economic transaction benefit from it, *provided the transaction is bi-laterally voluntary and informed*. Exchange can therefore bring about co-ordination without coercion. A working model of a society organized through voluntary exchange is a *free private enterprise exchange economy* – what we have been calling competitive capitalism’ (Friedman [1962] 2002, p. 13).

⁵ Holcombe (1994) raises a set of objections concerning the Weberian conception of the state. Federalist political systems, in which more than one level of government can simultaneously enforce rules, are inconsistent with the notion of a spatial governmental monopoly. In addition, historical accounts of territorial conquests by states attest to the fact that ‘there seems to be no geographic limit to the area in which governments will try to enforce certain rules of social conduct’ (Holcombe 1994, p. 82).

Individuals acting in accordance with their self-interest will respond to market signals ensuring that scarce resources are allocated to their greatest valued uses – as if ‘led by an invisible hand to promote an end which was no part of ... [their] ... intention’ (Smith [1776] 1999, p. 32). In other words, the operation of competitive markets leads to a Paretian-efficient allocation of resources in which no allocation of goods and services can make any individual worse off.

There is an ongoing philosophical debate surrounding the legitimacy of governmental actions that may abrogate the freedom of action exercised by individuals in their economic and other capacities. One strand of thought posits that the state, and its legitimacy, is created and maintained by individuals who agree to submit themselves to the coercive activities of government for the sake of protecting life and property, and to secure the provision of public goods.

Thomas Hobbes ([1651] 1985) famously conceptualised a dystopian state of nature as a ‘war of all-against-all’ that translates into a ‘life of man, solitary, poor, nasty, brutish and short.’ While individuals may attempt to invest in their own protective services against harm and theft, production is curtailed under this scenario because of the ever-present threats of predation by others. Thus, to avoid this state of nature Hobbes considered that people would agree to establish an absolute sovereign state in order to maintain internal peace and order, and security against external threats.

John Locke concurred with Hobbes that the state of nature for humanity could well descend into full-scale conflict between individuals. However, for Locke, since civil society precedes the state individuals would observe moral norms leading to an existence conducive to upholding the right to life and liberty (Locke [1690] 2004).

Nonetheless, according to Locke, to ameliorate the possibility of a state of war individuals would agree to contract together to form a state, and civil government, with limited powers of coercion. Nozick (1974) developed a similar theory of the ‘minimal state’ in which government is accorded limited functions.

Modern contractarian political theory has revived the notion of the social contract underpinning state formation and maintenance. Rawls (1971) described this social contract as having been devised behind a ‘veil of ignorance,’ where individuals know nothing of their future circumstances. Since people do not know in this situation if they will be rich or poor after the contract has been devised, they will seek to design a contract that not only ensures that the state protects their personal liberties but also provides a redistributive welfare state to minimise inequalities.

Buchanan ([1975] 1999c) conceptualises a similar scenario whereby the community is plunged into Hobbesian anarchy, and must define a social contract defining the rules by which people are to interact thus restoring order. Individuals would agree to form a state which prohibits theft and protects private property, and also agree to the government coercively providing a limited range of public goods thus eliminating the ‘free rider’ problem concerning the satisfaction of collective wants.

In a recent contribution, Barzel argued that individuals will rationally agree to submit to third-party enforcement of the means of private market exchanges by the state:

‘[r]ealizing the gains to be had from specialization requires exchange, and exchange agreements must be enforced. The parties themselves may enforce the agreements. Self-enforcement, however, works well only for some agreements. Third-party enforcement often works better, because third parties are able to provide the

principals to an agreement an altered set of incentives such that their net gains from interacting will exceed those they could attain under self-enforcement' (Barzel 2002, p. 34).

The social contract model of state formation and maintenance has been subjected to intense criticism and debate by economists, historians, philosophers and political scientists.

The eighteenth-century classical liberal philosopher David Hume agreed with John Locke that the consent of the governed, rather than the arbitrary rule of statesmen over the governed, is the only basis upon which civil government may be legitimised. However, '[a]lmost all governments which exist at present, or of which remains a record of history, have been founded originally, either on usurpation or conquest, or both, without any pretense of a fair consent or voluntary subjection of the people' (Hume [1748] 2008, p. 279).

David Schmidtz observes a dilemma in social contract theory as follows: 'if people are able to make and keep contracts, Leviathan may be emergently justifiable, but it will not be teleologically justifiable because it will not be necessary. On the other hand, if people are unable to cooperate with each other, Leviathan will be teleologically justified, but it will not be emergently justifiable because people by hypothesis lack the wherewithal to create a Leviathan by consent' (Schmidtz 1990, p. 94).

More generally, Schmidtz (1991) hypothesises that because consent-based justifications for the state lack explanatory power it is necessary to consider non-consensual processes by which the state has emerged equipped with its array of political powers.

A number of theorists mainly based in continental Europe (for example, Say [1803] 2006; de Molinari [1849] 2009; Bastiat [1850] 2001; Oppenheimer [1914] 1975) discounted the salience of social contract theory by distinguishing between individuals possessing comparative advantages in production against those with a comparative disadvantage in such activities. The latter groups have greater incentives to use the apparatus of the state in developing policy technologies (such as taxation and regulation) which facilitate the forcible taking of wealth from producers.

Political deliberation within Western majoritarian democracies with universal adult voting franchise is commonly justified on the basis that the outcomes of political processes, particularly the election of political representatives through general elections, reflects the collective will of the populace.⁶ In a much-cited economic extension of this basic paradigm, Wittman (1989) argued that democratic deliberation by rational voters choosing among competing politicians yields efficient outcomes similar to that found in markets.

Such conclusions have elicited major controversy amongst academics specialising in public choice theory, with a range of theoretical propositions – particularly the inefficiencies posed by non-unanimous voting rules, voter irrationality, budget maximisation incentives by politicians and bureaucrats, rent-seeking demands by special interests, and political incentives to engage in 'fiscal illusion' - all being levelled against the 'democracy-is-efficient' hypothesis.

⁶ These considerations are separate from questions about how majoritarian democracies emerged throughout the West, including Acemoglu and Robinson's (2000) theory that political elites extended the franchise in order to avert the prospect of popular revolution.

Indeed, even if individuals participate in politics in an deliberate effort to achieve various ends government activities may still be conceived as ‘forced exchanges’ in that:

‘[i]t is fine to say that taxes are the price we pay for civilization. This doesn’t mean, however, that the relationship between citizens and the state is the same as the relationship between customers and the retail outlets they frequent. A customer can refuse to buy and, moreover, can generally return merchandise that turns out to be defective or otherwise unsatisfactory. There is no option to do this in politics. To say that civilization is being priced too highly and to withhold payment will only land the protester in prison. And there is certainly no point in asking for a refund by claiming that the state’s offering weren’t as good as its advertisements claimed them to be’ (R Wagner 2007, p. 17).

As such there appear to be strong conceptual grounds to suggest that the distinguishing feature of the state, and its administrative and organisational apparatus known as the government, is its reliance on coercive power to achieve politically preferred ends, with attendant consequences for participants in private markets to achieve their preferred economic ends and hence the realisation of satisfactory economic performance more generally. As noted by Holcombe (2004a, p. 335), ‘[i]f government is inevitable, and if some governments are better than others, then citizens have an incentive to create and maintain pre-emptively a government that minimizes predation and is organized to preserve, as much as possible, its citizens’ liberty.’

1.4 Determinants of government size and growth

As will be noted in subsequent chapters, Australian governments have expanded in size and scope over the long run. Several explanations have been propounded by economists in an effort to explain such phenomena, with these focussing on different aspects of changing state activities from economic, fiscal, institutional or political perspectives and often accompanied by the formulation of empirical tests of the determinants of government size and growth over time and across countries.

A recent study by Australian economist Stephen Kirchner (2011b) provides a useful classification of the varied explanations of public sector growth into several categories. The first can be defined as ‘citizen-over-state’ theories, in which growth of government size is determined by demands for additional public sector activity, while ‘state-over-citizen’ theories suggest that the size of government is influenced by forces that increase the supply of government activity.

Other theories of public sector size and growth do not fit neatly into the two categories outlined above, and will be listed separately below.

Arguably the most prominent of ‘citizen-over-state’ explanations of growth in government is attributed to the work of nineteenth-century German economist Adolph Wagner ([1883] 1958).

According to Wagner’s Law the increasing complexity of industrial societies, including the emergence of impersonal relations through growing private markets, will lead to greater pressures placed upon governments to spend on social services ranging from policing and courts to education services, and to regulate industries. In empirical studies this theorem is usually interpreted as an income elasticity of growth in government greater than one, reflecting that the relative size of government will increase as national income per person increases (Kirchner 2011b).

Subsequent developments in public choice theory widely attribute changes in government size and growth in majoritarian democratic political systems to the median voter, or more specifically expenditure growth can be attributed to changes in factors affecting the median voter's demand curve for government services (Holsey and Borcharding 1997). An important extension of this general proposition, largely attributed to a paper by Meltzer and Richard (1981), essentially indicates that changes in the income of the median voter relative to average incomes earned explains the growing demand for income redistribution through the public sector.

In essence, the modern 'state-over-citizen' theories seek to explain public sector growth as a function of factors which increase the supply of government activities essentially providing greater rewards for those groups in society who seek their wealth through the coercive apparatus of the state.

Becker (1983) and Olson (1982) conceive the growth of the public sector as a product of governments obliging the demands of organised, special interest groupings demanding privileges, such as expenditure providing direct benefits or preferential tax and regulatory treatment, at the expense of less organised cohorts (say, individual taxpayers) within society.

Becker viewed the process of rent-seeking and lobbying for preferential public policy treatment by government as resembling something of a competitive process between the myriad of special interests, whereas Olson depicted a wider narrative suggesting that increasing profitability of organised rent-seeking through the political process, as opposed to profit attainment through competitive markets, as special interests grew in societal influence could both explain poor economic performance within a country and differences in performance between countries.

Niskanen (1971) explained that the increasing supply of governmental goods and services could be seen as the result of actions by government bureaucrats seeking to expand the operations of government as the means of increasing their own influence within the political process. With bureaucrats possessing more detailed or accurate information about the cost of public services provision compared with members of the legislature, the bureaucrats will seek to expand their departmental budgets (and hence services) beyond what is socially optimal hence contributing to the overall growth in governmental size.

The depiction of the government as a revenue-maximising 'leviathan' is another prominent component of the 'state-over-citizen' theories of public sector size and growth. In their seminal work, Brennan and Buchanan ([1980] 2000) depict political agents as representing a monopolist which exploits the power to impose taxation in order to maximise the size of government.

To curtail the proclivity of leviathan to increase governmental size beyond what is economically and politically tolerable to citizen-voters, Brennan and Buchanan suggest explicit constitutional constraints relating to the imposition of tax rates and bases, the ability of governments to borrow as well as on money creation. Imperfect substitutes for explicit constitutional constraints, such as fiscal decentralisation with no intergovernmental transfer payments, are also advocated as ways to restrict the revenue-maximising leviathan government.

Numerous other theories exist which seek to illuminate the process by which the public sector grows over time, which do not fit neatly into the two categories described above.

Relatively lower productivity growth in the public sector leads to increases in the relative price of governmental services over time, translating into a rising share of government expenditure to GDP via price rather than quantity changes (Kirchner 2011b). This phenomenon has often been described by economists as an application of Baumol's (1967) 'cost disease' theorem.

The ability of the government to grow in size relative to the total economy is also conditioned by the ability of political agents to acquire revenues at reasonable administrative cost.

Kau and Rubin (1981) point to demographic changes, such as increasing female labour market participation which increases the taxable income base, and economic circumstances, including the prevalence of self-employment and associated issues of potential tax evasion, as factors which can affect the ease of revenue collections confronting governments. Cowen (2009) nominates a range of communication and other technologies as having reduced the costs of tax collection and enforcement.

In modern Western democracies, globalisation has been cited as a force contributing to the observed increase in the relative size and scope of government (Rodrik 1998). Specifically, citizens will demand more redistributive expenditures to be undertaken by the government in response to structural economic adjustments posed by the opening of nation-states to international flows of outputs as well as factors of production.

Other theories suggest that the public sector grows as a result of historical upheavals such as wars, economic depressions and national emergencies.

Peacock and Wiseman (1961) described the existence of a 'ratchet effect' during the World War II period in the United Kingdom, in which the government substantially increased its size and scope as part of its war efforts but did not fully reverse this expansion after the cessation of the war. Economic historian Robert Higgs (1987) applied similar themes in his historical account of public sector growth in the United States.

Part of the difficulty in establishing a definitive cause for the growing share of public sector activity in the economy is that different explanations may have greater explanatory power during some periods of time than in others. The strength of each of these factors in explaining government growth has been subject to extensive empirical investigations, including a number of Australian studies (for example, P L Swan 1990; Hackl et al 1993; Dollery and Singh 2000; Kirchner 2011a), however these studies tend to provide inconclusive results regarding which effects predominate as determinants of public sector growth.

1.5 Thesis outline

The existing size and scope of the public sector in the present is a product of a multiplicity of events and forces, of an economic, historical, legal and political nature, that have occurred in the past. Chapter 2 will provide a largely qualitative account of the growth of commonwealth, state and local governments over the last century, describing those factors which have shaped the development of the modern public sector in Australia.

To establish how changes to the Australian public sector may affect economic performance over time, it is necessary to obtain a suitable measure of the size of government. Accordingly, chapter 3 will provide a profile of statistical indicators of public sector size and growth, drawing from a range of

sources. For each indicator there will be a discussion of the theoretical rationale for their selection, methodological strengths and limitations, and their statistical suitability as an appropriate measure of government size.

Chapter 4 of this thesis will provide a literature review of the effects of public sector size and growth on economic performance.

This review will incorporate previous Australian and international theoretical and empirical literature. Specific attention will be given to the intellectual evolution of the main concepts underpinning the effect of governmental size on the performance of economies and, with regard to the empirical literature, attention will be accorded to the econometric techniques adopted in the key papers reviewed including the use of empirical strategies to overcome much-cited problems in the literature such as endogeneity bias in the estimates.

Chapter 5 will serve to add to the literature presented in the previous chapter by highlighting the empirical consequences of Australia's public sector growth for economic performance. In essence, the objective of the empirical exercise to be presented in this chapter will be the quantitatively establish the extent to which the growth of governments either contribute to, or detract from, per capita economic growth, and how the econometric methodologies employed serve to overcome some of the key criticisms in the literature.

Chapter 6 provides a summary of the main findings and insights presented in this thesis, and discuss potential future avenues for research in this field. This chapter will also present a discussion of public policy implications stemming from the outcomes of the study.

Chapter Two

Public Sector Size and Growth in Australia: A Historical Context

2.1 Background

Governments in Australia have long exerted an influence on economic performance through various means, including their exploitation of sources of revenue, commitment of expenditure priorities, and application of regulations.

That numerous forms of intervention are potentially available to governments to achieve their policy objectives implies that the nature of public sector activity is essentially multi-dimensional. Taxation and other forms of revenue-raising have changed to fulfil public expenditure preferences, which in turn have changed in their size and composition, while new and additional regulations have been invoked in an attempt to alter the course of private sector activities.

In this context the types of revenues, expenditures and regulations implemented have tended to change, at times quite dramatically, over the course of time. This, in turn, has been affected by a variety of complex factors such as economic and social developments, historical events, and political changes including shifts in ideological perceptions concerning the appropriate economic roles of the state.

The purpose of this chapter is to provide an account of the size and growth of Australia's commonwealth, state and local governments from a long run perspective, with reference to some of the critical factors that have contributed to the observed trends. This also provides a broad context for the discussion of statistical measurements, and empirical assessments of the effects, of the size of government that will appear in subsequent chapters.

2.2 The eighteenth and nineteenth centuries

2.2.1 Settlement, economic development and state consolidation

With the thirteen American colonies declaring their independence from Britain in 1776, culminating in war over the very question of their independence, Britain required an alternative site to locate its prison population (Blainey 2010). The British government duly decided to transport convicts to Australia, a move described by the Australian economic historian Noel Butlin as 'at least as risky as modern efforts to send a man to the moon' (Boot 1998, p. 74).

During the early years of settlement from 1788 the government was mainly responsible for the provision of foodstuffs for a colony lacking in agricultural self-sufficiency, as well as works and services attributable to the colony's primary function as a prison (Abbott 1959). Australia's first taxes, on wheat and liquor, and fees on other commodities and shipping were imposed, although often evaded by the relatively small numbers of free-settling taxpayers, in order to finance such expenditures (Mills 1925; Abbott 1959).

Given the limits of the available supply of currency in New South Wales (NSW), bartering systems emerged to provide the necessary medium of exchange. The bartering of rum was one method for paying wages for a period of at least twenty years, while flour became a bartered commodity more acceptable to the authorities. The issuance of private promissory notes had also become prominent (S Butlin [1953] 2002).

Despite the imposition of alcohol taxes by previous administrations, including wharfage fees and duties on imported alcohol by Governor King in 1802 (Boot 1998), the newly appointed Governor William Bligh in 1806 more forcefully attempted to eradicate the Corps' monopoly on the rum trade and public drunkenness more generally. The unpopularity of such measures led to the only military coup in Australian history, when the Corps overthrew Governor Bligh and arrested him on 26 January 1808 (S Butlin [1953] 2002).

The Corps remained in absolute power for two years until Lachlan Macquarie was commissioned by London as Governor of NSW in 1810. Macquarie was not only installed with his own regiment of troops, but established a new coin-based medium of exchange (nicknamed the 'holey dollar') to replace the rum barter system. Eventually the British government finally settled the question of the monetary standard in Australia by imposing the gold-based pound sterling as the official currency (Dowd 1992).

This initiative by Macquarie represented an important step in the decoupling of relations between colonial government officials and the fledgling economy (N Butlin 1994). Prior to that period, however, the colony could have been aptly described as a 'command economy' supported by an array of British government expenditures including:

'paymaster's bills covering the remuneration of the officers and men garrisoning the gaol, both military and civil; stores directly dispatched from Britain for distribution within the gaol; and treasury bills given in return for the store receipts issued by the Commissariat, or government store, for foodstuffs and other purchases ... [amounting] ... to as much as 70 per cent of the national Australian gross domestic product (GDP) in 1801 and still greater than 25 per cent at the end of the 1830s' (White 1992, p. 49).

It was from this difficult period of early settlement that the wellsprings of a robust private market economy emerged. Although the Governors of the colony tended to rule with effective powers far beyond those legally delegated to them by Westminster, and the NSW Commissariat (Treasury) remained a key supplier of goods, money and foreign exchange, individual rights in property and labour were recognised and private markets began to function (Attard 2004).

Due in large part to the efforts of entrepreneurial pioneers such as Captain John Macarthur and Samuel Marsden, the production of fine sheep wool heralded further diversification of the private sector within the colony (Shann 1930). A significant influx of people to Australia including more free settlers, and the gradual emancipation of convicts, also fostered economic specialisation.

The emergence of a self-sustaining private sector economic base in Australia was noted by Jackson (1998, p. 1): '[p]eople flowed in, bringing skills, techniques, aptitudes, and expectations formed in their homelands; bringing plants and animals new to the continent; bringing or borrowing the funds to finance the building of new settlements; bringing laws, forms of government, and institutional structures conducive to economic growth; and learning to adapt each of these to their new environment.'

At about the same time a deliberate policy strategy, pursued from 1821, reduced British financial commitments towards the colony to promote economic self-determination and ameliorate the United Kingdom's costly maintenance of colonies.

At the same time important institutional developments transpired with the establishment of a constitution and parliamentary system in 1823, the rule of law replacing the quasi-military system of rule, formalisation of a civil bureaucracy, and reform of colonial public finances with the imposition of taxes subject to approval by the Legislative Council and scrutinised by the British Treasury (White 1992; Boot 1998). These developments arguably represented the wellsprings of a formalised Australian regulatory state that subsequently assumed great importance by way of the public sector's involvement in economic affairs.

Legislation was also enacted to establish a system of local governments, such as the *Act for the Government of New South Wales and Van Diemen's Land* passed by the British government in 1842. The duties of councils were wide-ranging and included: development and maintenance of roads, streets, bridges and public buildings; the establishment and support of schools; purchasing, sale and management of property; making regulatory orders and by-laws; and raising revenues to contribute to the cost of maintaining police and justice services (Knibbs 1919).

By the early 1840s Australia's arguably first major depression transpired caused by the interrelated factors of general recessionary conditions in Britain, a drop in migration to Australia, reductions in wool prices and a significant reduction in British capital inflows (N Butlin 1994). In 1841 Australian GDP fell by 18 per cent compared to the previous year, and did not recover to its previous level until 1847 (N Butlin 1987).

The collapse of the pastoral industries during the 1840s had an adverse effect on the ability of colonial governments to acquire revenues from the sale of Crown land, which were in turn used to fund migrant transportation to Australia. According to Golder (2005), revenues from land sales in NSW alone realised a meagre £14,574 in 1842 compared to a previous record level of revenue of £316,626 in 1840.

As a response to the recessionary conditions governments both in Australia and Britain sought greater economies in government spending. The legislatures of NSW and the far-flung colonies of Van Diemen's Land (Tasmania) and Swan River (Western Australia) reduced their collective expenditure in absolute terms from about £1,618,900 in 1840 to about £788,100 in 1843 (N Butlin et al 1987).⁷ Expenditure reductions, at least in NSW, were broadly based with reductions in budgetary allocations for police and public works and other functions (N Butlin 1994).

2.2.3 The 'golden age' and emergence of 'colonial socialism'

In what would prove to be an important economic event, significant coal reserves were discovered by convicts in the Newcastle region in 1791. The exportation of Newcastle coal commenced in 1801 with a shipment to India. Important discoveries were also made in Queensland, initially about the Moreton region, in the mid-1820s and in the South Gippsland region of Victoria (ABS 1982).

⁷ Including expenditure from NSW Colonial, Commissariat and Land Funds.

While isolated gold fields of some repute were discovered in NSW during the 1820s the location of substantial deposits of gold in central Victoria during the 1850s precipitated a ‘gold rush’ drawing in significant numbers of people from around Australia and internationally, including China, the United Kingdom and the United States, in the search for ore.

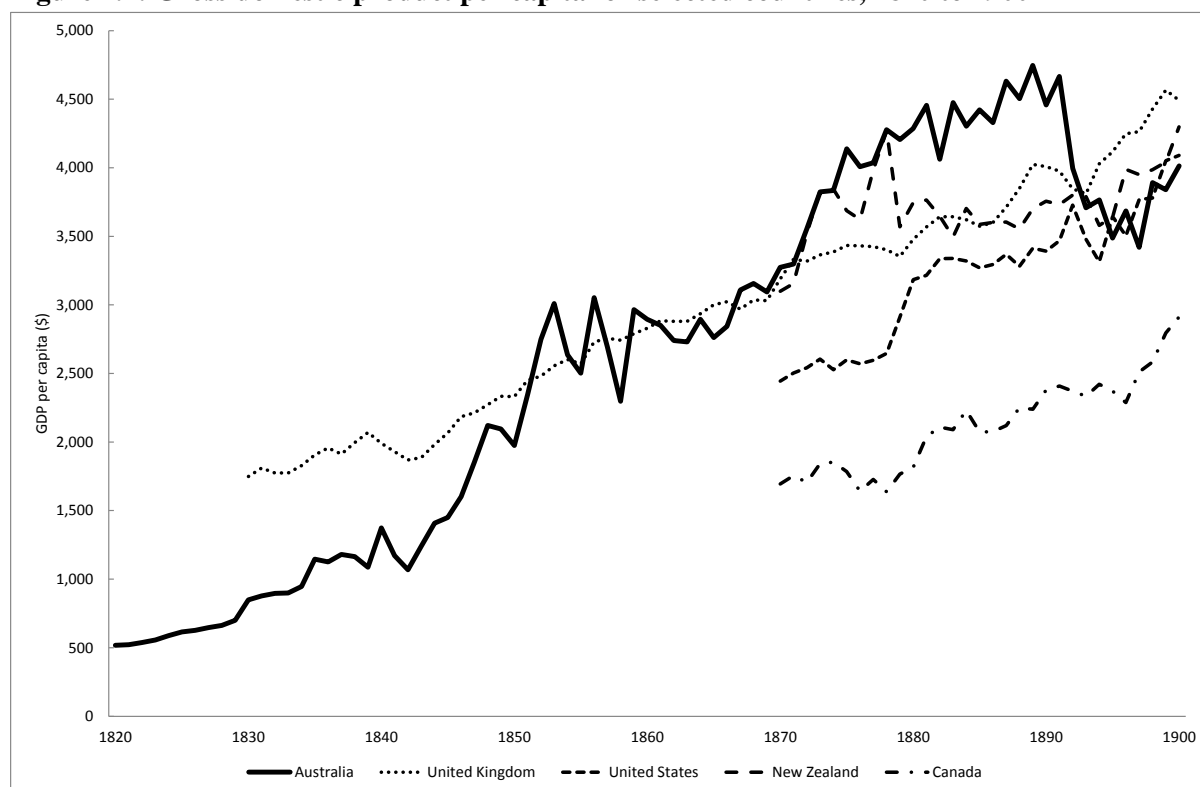
Problems concerning access to land, and the ability of prospectors to privately retain the proceeds of extracted gold, contributed to riots and other social frictions in the goldfield precincts. Attempts by governments to extract revenues only added to the existing tensions. In what may be conceived as arguably Australia’s first ‘tax revolt,’ miners in Ballarat organised a rebellion against high levels of license fees imposed by the Victorian colonial government on gold found by the miners (Blainey 2003).

While labour shortages occurred in a number of industries as labourers tested their fortunes on the goldfields, new industries that complemented the mining sector such as agriculture and, later, manufacturing and services prospered:

‘[a]s a result of the gold discoveries a great internal migration to the gold fields occurred, denuding pastoral and agricultural activity, industrial crafts, and service occupations of labor and contributing to a distortion of wages and prices which was still apparent in 1860. The pastoral industry responded to this situation partly by realizing assets through the conversion of output from wool to meat, partly by initiating far-reaching technological changes which were destined to reduce greatly the rural demand for labor. The growth of population and wealth encouraged an expansion of commercial activity and the promotion of trading and financial enterprises which place Melbourne in a position of financial leadership in the Australian colonies’ (N Butlin 1959, p. 28-29).

It is widely agreed by economic historians that a strong natural endowment base, population growth and factor accumulation, high productivity levels and the importation of British institutional and legal standards conducive to economic development (McLean 2007; Kasper 2010), all contributed to Australia’s emergence by the 1870s and 1880s as the wealthiest economy, in per capita terms, in the world (Figure 2.1).

Figure 2.1: Gross domestic product per capita for selected countries, 1820 to 1900



Data expressed in international Geary-Khamis dollars, with base year of 1990.

Source: Maddison 2008.

Economic development during this period were increasingly complemented by political freedoms with self-government being progressively proclaimed for each of the colonies of Australia, including through the *Australian Colonies Government Act 1850* enacted by Westminster. The colonial legislatures were accorded much greater levels of political discretion, particularly in terms of the management of local interests including public administration and finances, than was previously the case.

This development coincided with the gradual emergence of majoritarian democracy, and the universal adult voting franchise which was completed in the 1890s or early 1900s for females. These trends had the profound effect that political representatives, at least nominally, became obliged to entertain the demands of the general public in the formulation of government policies, at least to some extent, if politicians were to successfully acquire office.

During the second half of the nineteenth century, the size and scope of colonial governments had changed in numerous ways. As famously described by Noel Butlin in his various works, what had emerged from the 1860s was a pattern of ‘colonial socialism’ in which governments actively sponsored private enterprise growth through the erection of public works, including in transport and communications, supporting continued immigration into Australia and manipulating land settlements particularly in regional areas.

Aided by an influx of capital from London’s financial markets, Australian colonies built new forms of economic infrastructure, most notably in the form of rail lines and associated works across the landscape. Public sector capital formation grew to 60 per cent of gross domestic capital formation by

1900, making government by far the largest effective investor and employer in the Australian colonies (Boot 1998).

As observed by Coghlan (1969, p. 1410-1411) during the five years between 1886 and 1890 ‘the market for Australian loans was easier than it had ever been, and all the Governments fairly hustled one another to have their loans placed in London’ and further noted that ‘[t]he ease with which money was obtained had a demoralizing effect on the Australian Governments, who now began to regard their ability to borrow as illimitable, and each successive issue was taken as a further invitation to plunge deeper into debt’ (Coghlan 1969, p. 1412).

The amount of construction activity devoted to railways was significant during the second half of the nineteenth century, with the number of miles of rail track opened in NSW, Victoria, Queensland and South Australia more than quadrupling from 953 miles in 1870 to 3,347 miles in 1880. By 1900 over 10,500 miles of rail track was open for use in these colonies (Jackson 1977).

A number of economists have argued that the rapid public sector investment in railways had effectively ‘crowded out’ private sector investment activities in other sectors of the Australian economy. For example, N Butlin (1964) argued that government borrowings during the period raised the cost of capital depriving private sector agents of funds that they might otherwise be inclined to access. Other criticisms noted the apparent lack of concerns for economic efficiency within the political process for determining extensions to existing, or new, rail lines (Goodwin 1966; Sinclair 1970).

While there remains a debate as to whether the rapid development of the rail system and other public infrastructures promoted or hindered private sector activities (see B Davidson 1982 and Loughheed and Tamaschke 1991 for alternative views), there is little doubt that ‘[i]t was the common pattern of positive government intervention, with the central feature of large-scale outlays for capital formation ... and defines a particular ... pattern of partnership between government and private institutions to which the Australian economy was subject for most of the second half of the nineteenth century’ (N Butlin 1959: 27).

2.2.4 The ‘state experiments’ of the late nineteenth century

Aside from their intensive involvement in the erection of long-lived assets financed by loans, colonial governments throughout Australia during the second half of the nineteenth century became particularly active in the fields of recurrent expenditures and regulation.

While variations existed between the colonies, governments increasingly subsidised education and erected schools, provided subsidies for hospitals and other health facilities and increasingly devoted expenditures for the purposes of promoting social welfare including for young, orphaned children and the elderly who lacked financial means to care for their own needs (Greenwood 1955).

While the argument for social expenditures to care for those who struck financial misfortunes during periods of growing, and indeed unprecedented, wealth was found to be politically persuasive, concerns were expressed in some quarters that a regime of government financial transfers directed to those on lower incomes would erode civil society.

For example, in a general discussion of proposals made during the late nineteenth century to compulsorily impose taxes for the purpose of providing sustenance to low income individuals, the Australian liberal Bruce Smith ([1887] 2005, p. 305) remarked ‘*compulsory* contributions ... is calculated to sap the springs of the charitable and sympathetic motives among the people, which motives play a necessary and important part in the social organism, and which, therefore, it is highly undesirable for the state, in any way, to diminish or discourage.’

While colonies had provided some measure of indoor and outdoor relief to varying degrees, a significant step towards the development of an Australian welfare state was the establishment of the old-age pension in NSW and Victoria, within six months of each other, in 1900.

As described in the 1904-05 New South Wales Statistical Yearbook, ‘[t]he old-age pension is a gift by the State to citizens who have contributed by taxation, and who, ... have during the prime of life helped to bear the public burthens of the State by the payment of taxes, and by opening up its resources by their labour and skill’ (New South Wales Government Statistician’s Office 1906, p. 697).

Economic regulation became another increasingly prevalent pursuit for colonial governments during the last three decades of the nineteenth century. For example, in response to the sometimes strident advocacy of emerging trade unions for more favourable working conditions governments became especially involved in establishing legislation to regulate the nature of economic relationships between employees and employers.

In 1873 Victoria established the *Supervision of Workrooms and Factories Act* which set out minimum hours of work for women and children, as well as standards for cleanliness of working conditions in manufacturing establishments including appropriate sanitation. Following an inquiry which found a lack of enforcement of the regulatory standards, the Victorian Solicitor-General Alfred Deakin introduced a *Factories and Shops Act* in 1885 that set even tighter limitations on the conditions of work.

Employment of children under the age of 13 was forbidden under the legislation, and boys under 14 and girls under 16 were not permitted to work between 6am and 6pm without permission. An inspectorate was established to enforce the legislation, and a system of compensation for injured workers was also introduced (CBCS 1925).

As prescriptive as these regulations were, they were insufficient to placate the demands of unions and community advocates including ‘anti-sweating leagues’ which demanded further legislative amendments to quell manufacturing ‘sweatshops’ in which it was claimed companies exploited workers during the course of the production process (Métin [1899] 1977). In response to the concerns of these interest groups over working conditions, the Victoria government amended the *Factories and Shops Act* in 1896 to establish a regime of minimum wages and an administrative apparatus of industry-based wages boards to negotiate industrial disputes.

The expansion of the expenditure, regulatory and administrative commitments of governments contributed, at least in part, to the active searching by political agents for new and lucrative sources of revenue.

From the period of colonial self-government during the 1850s governments maintained tariffs on selective commodities, such as wine, tobacco, tea, sugar and wine, with a view to merely raising

revenue from these instruments. However, in 1866 Victoria passed tariff legislation with the explicit aim of also protecting local manufacturing concerns from interstate and international import competition, in contrast to the generally free-trade stance of New South Wales. The Victorian tariffs were further raised in 1871 and again in 1877 (Athukorala and Chand 2007).

The policy application of protectionist sentiments was politically controversial and earned the intellectual censure of people who subscribed to the philosophies of free trade. The politician, and future NSW Premier and Australian Prime Minister, George Reid (1875, p. 1) explained in the introductory section of a pamphlet ‘inscribed to the electors of Victoria’ that:

‘any community, whether young or old, which leaves enterprise as free and living as cheap as possible pursues a policy the most likely to promote both individual happiness and national greatness. I believe that any system which places enterprise in leading strings, in order that it may become bold and adventurous, which represses commerce in order that it may thrive, which tears Industry in its infancy from the generous breast of Nature to suckle it on duties of Customs, and compels it in youth to lean on crutches that it may become strong in mature age, is as disastrous in its consequences as it is contradictory in its principles.’

Inspired in part by the ideas of Henry George that a ‘single tax’ on land could alleviate inequalities in wealth distribution, a deficit-ridden South Australian government established Australia’s first land tax system, and general income tax, in 1884 (Mills 1925).

The good economic fortunes enjoyed by many Australians from the 1860s was not to last, as a severe depression transpired from 1891 with the level of real GDP not surpassing the previous peak until about eight years thereafter (N Butlin 1987). This period was accompanied by a substantial degree of deflation, with retail prices falling by more than 20 per cent from 1891 to 1897 due, in part, to a decline in house rents as the property market corrected from previous buoyant conditions.

Coinciding with these economic pressures a severe financial crisis also afflicted the Australian economy, with more than half of the trading banks of note issue suspending their payments together with the failure of a large number of non-bank financial institutions (Sykes 1998; Fisher and Kent 1999).

An enduring repercussion of the 1890s depression in Australia was the consolidation of the trade union movement as an active force within civil society and, ultimately, politics. In reaction to moves by employers to reduce wage rates and hire non-union workers (including foreign labour) in key industries during this economically difficult period, the unions engaged in a series of damaging strike actions including the 1890 maritime dispute and the shearers’ strikes of 1891 and 1894.

Influential identities within the labour movement came to believe their objectives could be best served through the direct infiltration into the political process itself. According to a committee of the NSW Trades and Labor Council:

‘[t]he role that Trades Unionism must steer clear of politics was a golden rule when there was so much work to be done within our present industrial environment. But that time ... is drawing to an end, and ere we can radically improve the lot of the worker we must secure a substantial representation in Parliament. Then, and only then, can we begin to restore to the people the land of which they have been plundered, to absorb the monopolies which society at large has tended to create, and to ensure to every man, by the opportunity of fairly remunerated labor, a share in those things that make life worth living’ (Fitzpatrick 1944: 40).

The process of undertaking political action in the interests of organised labour culminated in the formation of the Australian Labor Party, which first won government (albeit for six days) in Queensland under Anderson Dawson in 1899.

The emergence of a national sentiment, no doubt fostered by transport and communications technologies that assisted in overcoming the ‘tyranny of distance’ in a geographically expansive Australian continent (Blainey 2010), also led to growing calls for a form of unification of the six colonies into an Australian nation.

Economic issues coloured the debate over federation during the last decade of the nineteenth century. Some viewed that federalism would be economically beneficial in the sense that it would inspire renewed confidence on the part of British investors to channel their finances into Australian economic ventures, removing the economic dent in confidence engendered by the 1891 depression. As described in a publication written by Australian pastoral interests in 1893:

‘Federation would re-establish Australian credit ... and lead to further, but wiser, output of British enterprise throughout this continent ... What Federation needs to promote is that confidence which is so conspicuously absent in Australia now’ (Meredith 2001, p. 10).

With the debate about the economic implications of federation deliberated and decided upon by a vote by the Australian public, the *Commonwealth of Australia Constitution Act* (UK) was passed by the British Parliament on 5 July 1900 and given Royal Assent by Queen Victoria four days later. The Act was proclaimed on 1 January 1901 in Centennial Park, Sydney, with Sir Edmund Barton sworn in as interim Prime Minister of Australia.

By the end of the nineteenth century extent of governmental involvement in the Australian economy was already extensive:

‘[b]efore 1890, the State was already the great landlord, the chief employer of labour, was virtually the sole owner of the land transport, as well as of the telegraphs and telephones. It undertook the business of land registration and transfer ... In addition to the duties of land-settlement, nearly all the colonies had supplied the labour-market by importing many thousand immigrants. Protection for native industries was a general policy, and bonuses were offered, notably the Victorian bonuses on exported butter. In addition to railway-making, the Governments were spending millions on roads, bridges, harbour works, and water-supply. They had always taken the completest powers of inspection over flocks and herds, and in the eighties were beginning to inspect factories in the interests of women and children workers. Last, but not least, by a series of Acts, chiefly passed between 1873 and 1880, they had broken with clerical schools, and had developed their own systems of primary education’ (Reeves 1902, p. 50).

The emergence of a multi-dimensional public sector created during the eighteenth and nineteenth centuries also provided the springboard for the continuing growth in government size and scope within a federated Australia during the following one-hundred years.

2.3 The twentieth century

2.3.1 A new Australia: The first three decades

The Australian Constitution assigned to the newly-formed commonwealth government a range of economic and other powers that were previously the preserve of the colonies, such as responsibility

for defence, international trade, immigration, banking and finance (except state government entities) and communications.

With these and other powers at its disposal, the commonwealth government moved quickly to fashion a suite of policies, known later as the 'Australian Settlement,' which was grounded upon:

'... faith in government authority; belief in egalitarianism; a method of judicial determination in centralised wage fixation; protection of ... industry and jobs; dependence upon a great power (first Britain, then America) for its security and its finance; and, above all, hostility to its geographical location, exhibited in fear of external domination and internal contamination from the peoples of the Asia/Pacific. Its bedrock ideology was protection; its solution, a Fortress Australia, guaranteed as part of an impregnable Empire spanning the globe' (Kelly 2008, p. 2).

Arguably the most durable element of the Australian Settlement remains the system of labour market regulation, the basic elements of which were established during the late nineteenth and early twentieth centuries.

By the early 1900s all states had developed their own systems of labour regulation whereby industrial tribunals or boards would determine the pattern of wages, hours and working conditions and, in the case of tribunals, settle labour market disputes. In 1904 the commonwealth introduced the *Conciliation and Arbitration Act 1904*, which established the institutional machinery of the commonwealth's involvement in labour regulation.

A Conciliation and Arbitration Court was afforded both arbitral and judicial powers, so that it could make an award specifying wages and conditions in settlement of an interstate dispute as well as interpret and enforce the award (including sanctions) where necessary.

Following this, and as part of a 'New Protection' policy plan, the Deakin government introduced an *Excise Tariff (Agricultural Machinery) Act 1906* under which an excise upon Australian manufactured agricultural machinery at half the rate of the customs tariff was to be imposed. The Act outlined that the excise would not be imposed upon manufacturers paying 'fair and reasonable' wages (Plowman 1992).

The commonwealth Court of Conciliation and Arbitration, presided over by Mr Justice Henry Bournes Higgins, ruled in 1907 in accordance with the *Excise Tariff (Agricultural Machinery) Act* that Hugh Victor McKay, the owner of an agricultural harvesting machinery concern, was obliged to pay his employees a 'fair and reasonable wage' of 42 shillings per week that guaranteed them a standard of living which was reasonable for 'a human being in a civilised community.'

While the constitutionality of the *Excise Tariff (Agricultural Machinery) Act* was successfully challenged in the High Court, the commonwealth maintained a regulatory presence in the field of industrial relations. Indeed the Nationalist Prime Minister unsuccessfully sought, via referendum in 1926, to transfer industrial relations powers to the commonwealth. An advantage of the proposal, according to the government at the time, would be that the conflicting and overlapping state and federal awards would be rationalised thus enhancing national economic efficiency (Frazer 2001).

Another key component of the Australian Settlement was the extensive tariff regime developed by the commonwealth.

The first commonwealth tariff was regarded in some circles as being ‘weakly’ protective in nature, designed to compromise between the former revenue tariff of NSW and the protectionist tariffs of Victoria (Forster 1975; Athukorala and Chand 2007). However, tariff increases in 1911, 1914 and the 1921 Greene Tariff led to average tariff rates at that time being twice that of the 1907-08 Lyne Tariff (Athukorala and Chand 2007).

As noted by Mills (1925, p. 201), ‘there was plenty of evidence to justify the opinion that, apart from the purely revenue obligations towards the States which the Constitution imposed upon the Commonwealth for at least ten years, Australian Tariffs of the future would be of the Protectionist type.’ In other words, tariffs were supported to promote a manufacturing base which would then encourage employment growth with attractive wages and conditions, and that a larger population and diversified economy induced by tariffs would strengthen national security (Brennan and Pincus 2002). Thus, the basis for an ‘Australian case’ for protection was created.

The Bruce government in 1927 commissioned a group of economists and statisticians led by J B Brigden, and including Copland, Dyason, Giblin and Wickens, to inquire into the tariff regime. The inquiry report justified tariffs on the basis that they were economically necessary to support a larger Australian population.

While these pro-protectionist arguments held sway in political circles, there remained pockets of economic dissension including those expressed at the time:

‘some industries which now need Protection would nevertheless have prospered under Free Trade. The necessity of meeting external competition might well have stimulated the efficiency of the management, and energy which has been directed towards obtaining tariff increases might have been directed towards the improvement of organisation, methods, and machinery’ (Benham 1926, p. 23).

Two areas of policy are not widely recognised as representing a part of the original Australian Settlement policy compact, yet provided an impetus for significant growth in the size and scope of commonwealth government activity.

The first relates to the regulation of money and credit. Despite the Constitution assigning power to the commonwealth government in relation to currency, coinage and legal tender, the money used in Australia at the time of Federation was issued by private trading banks, the Queensland Treasury and state mints (Dowd 1992; Kenwood 1995).

In 1910 this situation changed as the commonwealth passed two legislative instruments to monopolise the issuance of currency. The *Australian Notes Act* vested control of the issuing of notes in the Commonwealth Treasury, thereby prohibiting the circulation of state notes. It also authorised the Treasurer to issue notes in denominations of 10 shillings, £1, £5 and £10, and any multiple of £10, with these notes to be legal tender and payable in gold coin on demand at the Treasury (CBCS 1966).

The commonwealth government also introduced the *Bank Notes Act* in 1910. This statute imposed a tax of ten per cent per annum on ‘all bank notes issued or re-issued by any bank in the Commonwealth after the commencement of this Act, and not redeemed’ (CBCS 1966), thus discouraging private sector currency creation and free banking in Australia.

From the time of the bank crises of the 1890s a number of prominent political figures, such as the Federation-era Labor politician King O'Malley, called for the establishment of a 'people's bank' whereby the government could not only monopolise coinage and note issuance but provide 'general regulation of the movement of credit and money volume' and maintain low interest rates (Boehm 1993).

This objective was realised in 1911 when the Fisher Labor government established the Commonwealth Bank of Australia. In contrast to private sector financial intermediaries during the period, the Commonwealth Bank conducted both trading and savings bank activities. By 1913 it became the sole banker on behalf of the commonwealth government, and later to the governments of Western Australia and Tasmania (1914), South Australia (1916) and Queensland (1920) (Kenwood 1995).

The second area which could be conceived as an additional component of the Australian Settlement was the development of welfare state.

The commonwealth Parliament passed the *Surplus Revenue Act 1908* which enabled the commonwealth to retain, for the purpose of setting up an old-age pension trust fund, receipts in excess of those needed to fulfil its obligations to return at least 75 per cent of customs and excise revenues to the states (Mathews and Jay 1972).

The commonwealth government later added invalid (now known as disability) pensions to old age pensions in late 1910, following a similar move by NSW since 1907. The invalid pension was available to people over the age of 60 who were permanently incapacitated for work (Daniels 2011). Two years later the Fisher government introduced a maternity allowance; a fixed amount payable to a mother, married or unmarried and regardless of character, on the birth of each child.

State governments became particularly active in terms of enacting new means of providing welfare to selected groups.

In 1923 Queensland introduced an unemployment insurance scheme, initially nine pennies per week, for those working under state awards. The scheme was funded by employer and employee contributions, with a subsidy from the government (N Butlin et al 1982).

Three years later New South Wales introduced a widows' pension with a fixed rate, means tested structure similar to that of the commonwealth age pension. In April 1927 the Lang government introduced a child endowment payment on a sliding scale so that no endowment was available to a family whose weekly income exceeded the state's 'living wage' rate plus five shillings for each dependent (N Butlin et al 1982).

This development was followed by the introduction of a system of workers' compensation insurance in NSW to provide benefits to those people injured in their workplaces. The premium was funded by mandatory employee contributions paid to insurers, with the level of benefits paid related to earnings and free of means testing (Herscovitch and Stanton 2008).

By contrast with the pace of new developments at the state level, the commonwealth largely maintained its existing suite of welfare payments during the 1920s. Pressure by the Labor Party and vested interests on the perceived lack of 'social experimentation' spirit that existed during the early

Federation years forced the commonwealth to instigate inquiries into the national system of social welfare.

In 1923 the Bruce Nationalist government established a royal commission, which recommended a European-style system of compulsory national insurance to provide sickness, invalidity, maternity and superannuation benefits to all insured members and their families, as well as limited payments for children of members unable to work (Ratchford 1959).

In 1928 the government introduced a *National Insurance Bill* to establish the proposed scheme, described as 'the most comprehensive and progressive measure of social reform ever brought forward in any parliament in Australia.'

However the proposal was castigated by employers, who feared that it would represent an additional cost to employment insofar as wages would increase to cover the compulsory employee contribution, while the fraternal societies viewed the scheme as a threat to their viability (Belcher 2004). The Bill lapsed upon the defeat of the Bruce government in 1929.

In 1901-02 the only source of revenue available to the commonwealth were customs and excise duties, and three-quarters of that revenue was dedicated to the states to rectify financing gaps as a consequence of Federation. The states mainly relied upon direct taxes such as estate duties and income taxation on individuals and businesses (via a tax on dividends).

By assigning to the commonwealth government the largest source of revenue at the time of Federation presented significant problems for the capacity of the state governments to finance their responsibilities. This problem was worsened by the implementation of various taxes by the commonwealth government, simultaneously with the states, to either finance Australian efforts during World War I or for equity and other reasons.

In 1910 the commonwealth government, led by Labor Prime Minister Andrew Fisher, implemented an election campaign promise to introduce its own tax on the unimproved value of land. Four years later the commonwealth joined the wealth tax field by introducing a national estate and succession duty. During the First World War the Hughes Labor government also introduced a commonwealth entertainments tax on the price of admission into a place of entertainment.

Despite previous governments publicly stating their disposition to not enter into the states' income tax field the commonwealth introduced its own income tax in 1915. The original commonwealth income tax had an exemption of £150 and a rate scale ranging from 2.5 per cent to 25 per cent, with the latter being imposed at a relatively high income threshold of £7,600 (D'Ascenzo 1999).

With the commonwealth retaining its income tax subsequent to the First World War alongside state income taxes the growing complexities and compliance costs associated with paying tax on similar bases to multiple levels of government led to numerous, yet futile, attempts to rationalise the utilisation of the personal income tax base.

When the commonwealth introduced its personal income taxation regime in 1915, companies were also taxed on their profits after the deduction of dividends, which was later extended in 1922 (Groenewegen 1990; Reinhardt and Steel 2006).

By the 1920s the smaller states in particular had become increasingly dependent upon untied transfers of funds from the commonwealth, made on various grounds including to rectify the cost 'disabilities' imposed on the states as a result of commonwealth tariff and other policies.

Despite the development and maintenance of roads being a state constitutional responsibility, the commonwealth offered the states a specific purpose grant of £500,000, on a fifty-fifty matching basis, for the development of main roads in 1923 (Maxwell 1967). In 1926 states of Victoria, NSW and South Australia challenged the enabling legislation in the High Court, however the Court argued that the grants represented a valid application of Section 96 of the constitution which states that the commonwealth parliament 'may grant financial assistance to any State on such terms and conditions as the Parliament thinks fit.'

This development in Australian fiscal federalism became the realisation of a warning by former Prime Minister Alfred Deakin that if the commonwealth 'provides money for the States it will exact tribute from them in some shape. ... The rights of self-government of the States have been fondly supposed to be safeguarded by the Constitution. It left them legally free, but financially bound to the chariot wheels of the central government. Their need will be its opportunity' (La Nauze 1952).

The extent of commonwealth intervention in states' fiscal affairs grew even further, as concerns grew over the sustainability of state public sector debt.

The commonwealth and the states approved a Financial Agreement under which the commonwealth would pay the states an annual amount as a contribution towards interest on state debts, and also provided for commonwealth contributions towards sinking fund payments against past and future state debts. A Loan Council was later established whereby the commonwealth and states coordinated their borrowing programs, with the commonwealth casting the binding vote of approval (Mathews and Jay 1972).

2.3.2 The 1930s Great Depression and economic recovery

Another pivotal event in the historical growth of government in Australia was in the form of responses by commonwealth and state governments to the Great Depression of 1929-31, which was characterised by severe commodity price reductions, a decline in industrial production and rising unemployment.

The deflationist 'Niemeyer Plan' and 'Melbourne Agreement' between jurisdictions announced in 1930, and a report presented to the Premiers' Conference by economists Copland, Giblin, Melville and Shann, formed the basis for the June 1931 'Premiers' Plan.' The Premiers' Plan of mid-1931, as agreed to by the Prime Minister and state Premiers, incorporated:

'[a] reduction of 20 per cent in all adjustable Government expenditure, as compared with the year ending 30th June, 1930, including all emoluments, wages, salaries, and pensions paid by the Government, either fixed by statute or otherwise, such reduction to be equitably effected ... The same general principle is extended to all pensions provided out of Government funds – old-age and invalid pensions, war pensions, superannuation pensions, and the maternity allowance. Over the whole field of this expenditure, the cut will amount to 16 per cent' (Shann and Copland 1931, p. 127-128).

The insistence of the Commonwealth Bank and the trading banks that reductions in government expenditure and borrowings, as agreed through the guise of the June 1931 Premiers' Plan, as well as a reduction of bank advances during the Depression drew the ire of Labor politicians who claimed that financiers were undemocratically compounding economic and social hardships experienced during this period (Merrett 1997; Myers 1959).

The commonwealth government also devalued the Australian pound in March 1930, after having suspended the operation of the gold standard some three months earlier. By December 1931 the Commonwealth Bank moved to strengthen its influence within the financial system by announcing official buying and selling rates for Australian currency against sterling. Initially, the fixed rate was A£125 for £100 sterling (Schedvin 1992; Kenwood 1995).

During the Great Depression, and in light of the significant increase in unemployment during this period, the commonwealth Conciliation and Arbitration Court temporarily abandoned the 'needs' principle of wage fixing and introduced a ten per cent wage reduction for all awards under its jurisdiction in early 1931 (Kates 2002).

According to Novak and S Davidson (2009) in an internationally comparative perspective Australia enjoyed a relatively swift recovery from the Great Depression as early as 1931, whereas by contrast the United States recovery was much more subdued as a consequence of President Franklin D Roosevelt's 'New Deal' expenditure, taxing and regulatory policies which increased investor uncertainty and raised business costs (Higgs 1997; Shlaes 2008). Indeed, the relatively swift recovery of the Australian economy as a consequence of the Plan was noted by British economist John Maynard Keynes, who stated that it 'saved the economic structure of Australia' (Keynes 1932).

With the unemployment rate reaching a record high of just under 30 per cent in 1932, governments found themselves confronting the challenge to provide various forms of relief as well as contribute to economic recovery. According to Kewley (1947, p. 258) 'no new forms of responsibility were assumed by state governments until the depression of the 'thirties, when the task of relieving great numbers of the unemployed had grown beyond the capacity of voluntary organisations. Special taxes were then imposed, and Government food relief systems were improvised.'

The Queensland government paid unemployment benefits since the early 1920s however most others only provided food relief, sustenance payments, medical assistance and, eventually, relief works from 1933. In some cases, special taxes on wages and salaries were imposed to finance such activities. It is estimated that as many as 673,800 families received some form of relief during the Depression (White 1992).

As observed by Pincus (1987), as taxation revenues increased (due, in part, to the fact that state income taxes were applied on even modest incomes) governments also provided some assistance in the form of employment on public works projects. It had been estimated that the states spent a total of £111 million on unemployment relief from 1929-30 to 1937-38 (Ratchford 1959).

Governments sought a variety of tax increases to fund the additional expenditures undertaken during the Great Depression period. In 1930 the commonwealth government, seeking an additional means of raising revenue to fund a budget shortfall during the Great Depression, introduced an *ad valorem* tax on the value of wholesale transactions which flowed through to final retail prices (Burton 1930).

In addition to the sales tax, Labor Prime Minister James Scullin substantively increased some tariff rates and introduced a number of 'emergency' duties between 1929 and 1931 representing the largest average tariff rate increase in Australia during the twentieth century (Lloyd 2008).

The Scullin tariff bypassed the possibility for policy advice by the Tariff Board, and instigated retaliatory measures by other countries including the raising of French tariff rates on Australian wheat and butter (Price 1931).

The extension in the commonwealth's tariff regime partially explained growing secessionist pressures in Western Australia over the economic treatment of that state under the Australian federal system. Although a majority vote in the state favouring secession was not recognised by British authorities, the commonwealth established the Commonwealth Grants Commission in 1933 to provide an impartial mechanism through which recommendations about the distribution of commonwealth funding to state governments could be made.

After the Great Depression, a period in which governments raised existing taxes and introduced new forms of taxation such as the wholesale sales tax, tax burdens were eased in some respects. For example, the commonwealth land tax was cut by a third in 1932 and by a half a year later. Meanwhile, the commonwealth revoked its entertainment tax, providing states which chose to impose it sole jurisdictions over this area of taxation (J Smith 1993; Edmonds 2010).

Political pressures to extend the nascent welfare state at the commonwealth level led the United Australia Party Prime Minister Joseph Lyons committing himself in the late 1930s to introduce a national insurance scheme. This revisitation of social insurance reflected a conservative political belief at the time that direct contributions should be made, to some extent, by the public towards financing of the social services that they consume. The *National Health and Pensions Insurance Act 1938* were passed by parliament in June 1938.

Although the legislation to enable the national insurance scheme to operate passed, it was never proclaimed. As explained by N Butlin et al (1982, p. 177), numerous sources of opposition to the scheme contributed to this situation:

'the particular provisions of this Act aroused opposition in many quarters. Potential beneficiaries heedful of Labor claims objected to being called on to meet any of the cost, and would have objected even more strongly had they realised that the employers' and Commonwealth government's share would have been largely met from beneficiaries' own pockets in any case. Those who were excluded because they were self-employed even though, like farmers, their cash incomes might be very low, opposed the scheme because it left them disadvantaged. To friendly societies and insurance companies, national insurance operated through government auspices posed a direct threat that might eliminate a substantial part of their business. Other professional interests joined the opposition: the medical profession and pharmacists; State public servants whose careers were threatened by a successful national insurance scheme; and State politicians who resented the Commonwealth's centralising intrusion into areas formerly outside its reach.'

The looming prospect of international conflict centred in Europe, which came to realisation in 1939, also played a role in ensuring the end of this proposal for all practical purposes.

2.3.3 'The octopus of control:' Government during World War II

The onset of World War II in 1939 led to a substantial increase in government control over most aspects of economic production, distribution and exchange in Australia: '[f]rom an economic system in which private enterprise was dominant, although subject to a considerable degree of public control, we have moved into a system which, if judged by its legal framework, appears to be a planned economy, with economic freedom restricted to much narrower limits' (Walker and Riley 1939, p. 161).

The 'octopus of control' (Wilson 1942) extended to the limitation of profits by private enterprise, the organisation of industry to sustain Australia's war effort, rationing of consumer goods and centralised agricultural organisation. Tighter capital controls were also put in place in order to devote additional funding towards governmental defence expenditures (Merrett 1997).

The government imposed military conscription, as well as redirected employment into defence service industries and construction work (Greenwood 1955). At the height of the war in 1942, the Chifley government pegged wages to the general price level as part of its broader suite of wages and prices controls. The government also established a Manpower Directorate within a Department of Labour and National Service to coordinate human resources to meet Australia's wartime needs, with every worker subject to classification and with the movement of workers subject to the approval of the Directorate (Ellem 1986).

Factory employment increased from 550,000 to 750,000 between 1939 and 1944 (Greenwood 1955), whereas the total numbers of public servants employed by the commonwealth government rose from 70,000 in 1939 to 192,000 in 1945 as new departments and functions associated with the war effort, or created in response to perceived national post-war priorities such as post-war reconstruction, national development and social services provision (Barnard et al 1977).

The commonwealth also introduced a range of new taxes, or increases to existing tax rates, in order to finance its wartime expenditures.

The government imposed a tax on payrolls and a duty on gifts in 1941 and a year later introduced a uniform entertainments tax (with the states reimbursed for lost revenues). A special war duty on most imports at a ten per cent rate was imposed (Lloyd 2008), and the commonwealth land tax was doubled in 1940 to acquire additional revenues for the war effort (Edmonds 2010).

During World War II, the existing rebate of tax on dividends received by individual shareholders and non-resident companies was removed. The company tax rate was increased and an undistributed profits tax was imposed on public companies (Reinhardt and Steel 2006), and a gold tax, equivalent to 50 per cent of the gold price in excess of £9 an ounce, was introduced by the Menzies government as a wartime revenue raising measure (Collier 2010).

Arguably the most enduring development in Australian taxation policy also occurred during World War II, in the form of the centralisation of income taxing powers.

Menzies proposed at a Premiers' Conference in June 1941 that the commonwealth take over all of the income taxing power for the full duration of World War II, plus one year, with the states receiving financial compensation for revenues lost (J Smith 1993). However, the states did not agree to this proposal suggesting that such a move would significantly diminish their financial autonomy.

Under new Prime Minister John Curtin two additional Premiers' Conferences were convened in February and May 1942 to discuss the issue of uniform income taxation. A committee appointed by Curtin, and chaired by economist Richard Charles Mills, recommended the original Menzies proposal for a uniform tax imposed by the commonwealth for the duration of the war plus one year.

Despite state opposition to the proposal, leading to High Court challenges, the commonwealth introduced the *Income Tax Act 1942* and the *States Grants (Income Tax Reimbursement) Act 1942*. The first Act enabled the commonwealth government to collect all personal income tax on a uniform basis throughout Australia, with the second Act providing grant assistance to states on the condition that they impose no income tax.

The centralisation of income tax powers in 1942 was also instrumental for the advancement of macroeconomic policy by the commonwealth during World War II. As discussed by N Butlin et al (1982, p. 115), this measure added 'much greater strength to budgetary controls through which allocative influences operated as a crucial part of macro-management.'

In addition to governmental expenditure on defence services, governments also enacted significant changes to the Australian welfare state to the extent that 'Australia entered World War II with only a fragmentary welfare provision; by the end of the war it had constructed a 'welfare state'' (Herscovitch and Stanton 2008, p. 54).

The Menzies United Australia Party-Country Party Coalition government introduced a commonwealth child endowment scheme in 1941, to be financed by a payroll tax, which superseded existing state schemes. The endowment of five shillings per week was payable to each child (except the first born, who was presumed to be covered under the basic wage) under the age of 16.

The intent of the commonwealth scheme was 'to ameliorate the lot of many persons who are at present being penalised for performing what is a valuable national service, and to encourage the more adequate population of a continent which is at present woefully under-populated' (Dowsett 1941: 240).

This was followed by commonwealth widows' pensions (1942), funeral benefits for invalid and old-age pensioners (1943) and sickness and unemployment benefits (1944) introduced by the Labor government. Extended benefits under existing schemes were also provided, including the provision of an allowance to the wife of an invalid pensioner and to her first child under sixteen years of age (Kewley 1947), while rates for age and invalid pensions and maternity allowances were increased (Ratchford 1959).

Responding to a High Court decision of 1945 to render pharmaceutical benefits legislation to be constitutionally invalid, the Chifley government responded in 1946 by framing a referendum question to the Australian public extending the constitutional powers of the commonwealth to provide a range of welfare payments and social services. Despite some concerns expressed at the time about the implications of formalising a further extension of commonwealth influence, the referendum proposal passed.

An important aspect of the wartime economic controls imposed by governments relates to the operation of the financial sector, which led to a significant debate by the late 1940s over the question of public sector ownership and control of large banking institutions in particular.

In 1941 the Commonwealth Bank was equipped with powers to determining trading bank advances policy and interest rates. All private banks were obligated to lodge funds with the Bank in special accounts, whereby the Commonwealth Bank could freeze (and itself hold) part of the trading banks' funds and thus control the volume of credit that the banks could grant (Boehm 1993). Australian banks were also licensed with their profits explicitly restricted to pre-war levels, while interest rate ceilings were imposed in 1942 (Australian Bankers' Association 2004).

In addition the *Commonwealth Bank Act 1945* equipped the Commonwealth Bank with formal powers to operate as a central bank that would 'best contribute to the stability of the currency of Australia, the maintenance of full employment in Australia, and the economic prosperity and welfare of the people of Australia.' The *Commonwealth Bank Act* maintained a range of powers that the Bank had already exercised during World War II, including the fixation of interest rates, controlling the lending of private trading banks and bank licensing (Commonwealth Department of the Treasury 2003).

These developments effectively formalised the Australian system of monetary policy, in which controls over the supply of money and credit by government were aimed at stabilising the level of economic activity. As noted by Pincus and Withers (1983, p. 26), '[u]ntil 1939 monetary policy was largely under control of the Australian private banks. The experience of the 1930s, war emergency powers and the rise of Keynesian interventionism all led to the postwar assertion of central banking and associated establishment of financial controls.'

In 1947 the Chifley Labor government undertook an audacious bid to nationalise the Australian banking sector. The government issued a directive that 200 local government bodies transfer their deposits to the Commonwealth Bank by 1 August 1947, which raised the ire of those trading banks which held local government deposits (Myers 1959).

With the support of the Melbourne City Council and Coreen Shire (New South Wales), the trading banks successfully appealed through the High Court that Section 48 of the *Banking Act*, relating to government deposits in trading banks, was constitutionally invalid. Undeterred by this decision, the Chifley government quickly pressed ahead with more formal measures to invoke nationalisation of private banking. On 16 September 1947 Chifley explained that:

'the government is convinced that, because of the problems of the postwar period, of employment, of development, of trade, are of such magnitude and involve such serious consequences, the government must accept responsibility for the economic condition of the nation and must have complete powers over banking policy to assist it in maintaining the national economic health and recovery' (Myers 1959, p. 177).

In November of that year the *Banking Act 1947* was introduced in Parliament, with provisions outlawing private banks and forcing them to sell their assets to the Commonwealth Bank (Crawford 2005).

Emboldened by their previous legal success, and with a highly charged political campaign opposing bank nationalisation, major banks and three state governments challenged the constitutional validity of the Act in the High Court. The judgment of the Court, handed down about a year after the Bill had been introduced in Parliament, was that the *Banking Act 1947* violated the constitutional guarantee of interstate freedom of trade and commerce (Myers 1959). A subsequent appeal by the Chifley government to the Privy Council in London had proved unsuccessful.

2.3.4 The era of post-war prosperity: 1949 to 1971

The post-war period from the late 1940s to the early 1970s had generally been characterised by a 'long boom' of economic prosperity.

Countries directly affected by the Second World War were being reconstructed, and the liberalisation of international economic relations brought with it new opportunities for global trade, international investment and migration. Primary producing nations, such as Australia, benefited from global demands for foodstuffs and other commodities, and economic growth and political priorities favouring industrialisation led to the growth in Australian manufacturing (Lougheed 1988; Meredith and Dyster 1999).

Relative political stability at the commonwealth government level was another feature of the post-war period, with the Liberal-Country Party Coalition retaining political power from 1949 to 1972 and Robert Menzies retaining the Prime Ministership for 17 of those years. In a general assessment of the Menzies record, Hyde stated 'the Menzies Governments from 1949 to 1966 respected the rights of individuals, did not nationalise major industries, did reduce the public debt left from the war and, after the Korean War wool-boom, controlled inflation. Australia thus avoided some of the industrial strife and unemployment that beset, for instance, Britain' (Hyde 2002, p. 20).

Even so, it could be argued that the apex of Keynes-Lerner macroeconomic 'consensus' was reached during the Menzies era, and followed by his political successors Holt, Gorton and McMahon, with countercyclical fiscal policies designed to maintain a high-growth, full employment equilibrium. This coincided with the manipulation of the supply of money, including foreign currency reserves under a fixed exchange rate regime, and credit to preserve balance of payments and control inflation (Harris 2006).

A surge in Australia's terms of trade in the early 1950s, driven primarily by an increase in international demands for wool during the Korean War, raised domestic incomes which spilled over into private consumption in turn contributing an increase in the consumer price index by 13 per cent in 1950-51 and over 20 per cent a year later (Goldbloom, Hawkins and Kennedy 2008).

In addition to fiscal consolidation by the Menzies government Treasurer Arthur Fadden in the 'horror' 1951-52 Budget, which curtailed public expenditure including through a reduction in the public service by some 10,000 staff as well as raising company and sales tax rates (Artis and Wallace 1971), monetary policy was tightened with interest rates increasing for the first time since the commencement of World War II.

Tensions continued to simmer between the commonwealth government, led by the Robert Menzies Coalition parties from 1949, and the trading banks over the potential for conflicts of interest between the Commonwealth Bank's central banking and commercial roles including the possibility of the Bank enjoying an unfair advantage in the financial system over its trading bank competitors.

The Menzies government attempted to placate these concerns by establishing the Reserve Bank of Australia (RBA), which commenced operations in 1960 and had assumed all of the Commonwealth Bank's central banking responsibilities including bank note issuance. The Commonwealth Banking

Corporation was also established, comprising three branches: the Commonwealth Trading Bank; the Commonwealth Savings Bank; and the Commonwealth Development Bank (Boehm 1993).

In the early 1960s inflationary pressures within the Australian economy once again led the government, through the RBA, to enforce a restriction in the supply of credit. The commonwealth government also manipulated its fiscal policy settings to ameliorate inflation, including via an increase in the rate of wholesale sales tax and company tax as well as a reduction in the rate of growth of expenditure (Artis and Wallace 1971).

The significant increase in loan interest rates, and restrictive fiscal policies, contributed to a succession of company liquidations, with adverse electoral consequences for the Menzies government leaving it with a threadbare one-seat majority in the 1961 election (Starr 2001).

Governments in the post-war period were also concerned to maintain stability in the balance of payments, and used import protection policies as a mechanism to ensure such economic outcomes.

The Menzies government initially favoured quantitative import restrictions, which were later supplanted by high tariffs. However, with the growing influence of Country Party Trade Minister 'Black Jack' McEwen the Menzies government promoted an extensive regime of 'protection all round' through differentiated tariff protections and selective quotas (Pincus 1994; Kenwood 1995).

During the 1960s the regime of import protections for the Australian economy increasingly came under disrepute on economic efficiency grounds. In 1965 a committee appointed by the government released a report critically appraising the state of the Australian economy. While accepting of the need to continue tariff protection, a key recommendation was that a systematic review was required on the basis that 'there is no case for the indiscriminate application of tariff protection' (Vernon Committee 1965, p. 367).

This set the tone for further critical discussion about the relative costs and benefits of protection during the 1960s, including its effects upon industry productivity and national economic efficiency, independently prosecuted by high-profile economists and public servants such as Max Corden and Alfred Rattigan and parliamentarians such as Charles Robert 'Bert' Kelly.

In particular, Corden's research on the effective rate of assistance showed that high protection levels benefited manufacturing industries but effectively imposed costs upon agricultural and mining industries that relied on imported manufactures as inputs into the production process.

Despite acute ideological differences between it and the Labor opposition, the Menzies Liberal-Country Party government from 1949 did not seek to substantially scale back the extensions to welfare expenditure introduced by Labor during the Second World War.

Indeed, for much of its period in office from 1949 to 1972 rates for many payments, such as age and invalid pensions, were increased on a regular basis, in excess of the cost of living (N Butlin et al 1982).

From the 1950s the government introduced a host of new benefits including free medical and hospital treatment for pensioners (1951), supplementary assistance for pensioners paying private rents (1958), and a higher rate of pension for single pensioners (1963). It also undertook a major liberalisation of

the means testing provisions on pensions, including the exclusion of income from property in 1954 and a doubling of the income and property limits at which pension eligibility ceased in 1969 (Kewley 1973; N Butlin et al 1982).

Meanwhile, the Menzies government effectively doubled those eligible for the child endowment by providing a weekly payment of five shillings for the first child in each family from 1950 (Ratchford 1959). The commonwealth later extended the child endowment to student children aged between 16 and 21 in 1964 (N Butlin et al 1982).

The subsidisation of services such as non-government schooling and university education and medical care emerged during the Menzies era as a prominent feature of commonwealth social policy (Roskam 2001), leading to a significant growth in the number of income support recipients during the 1960s (Cox 1986).

The Coalition government continued to make selective changes to the welfare system, including the introduction of a wife's pension in 1972 under Prime Minister McMahon replacing the less generous wife's allowance.

In the same year the Liberal Treasurer Billy Snedden announced the introduction of a free-of-means-test pension for all aged 65 and over to be implemented over a three year period (Mendelsohn 1979). However, the election of a Whitlam Labor government a few months later scuttled such plans by the Coalition.

While the model of 'colonial socialism' that characterised Australian economic development from the late nineteenth to early twentieth centuries had waned by the 1950s and 1960s, certain state governments persisted with policies aimed at fostering growth in private sector economic activities through capital investment or industrial policy.

In South Australia the post-war Premier Thomas Playford actively encouraged industry development in the state, including the establishment of automotive manufacturing, using heavy tax concessions, cheap electricity supply through state enterprises, the granting of cheap or free public land, and the subsidisation of housing for manufacturing workers.

Similarly Tasmanian Premier 'Electric' Eric Reece, who served variously through the 1960s and 1970s, sought to expand economic activity particularly through the provision of cheap electricity inputs to production, including by flooding Lake Pedder in 1972 to build a dam for hydroelectricity generation purposes.

These strategies were undertaken, in some part, as a result of post-war restrictions on the ability of state governments to acquire taxation revenue, notwithstanding the efforts of the commonwealth in vacating the land and entertainments tax fields in the early 1950s.

In the late 1960s Western Australia, followed by Victoria, introduced a receipts duty on payments and salaries. This new tax was regarded by the commonwealth as a *de facto* income tax in breach of the wartime uniform tax agreement and was, in any case, invalidated by another High Court ruling with respect to excises (Grewal 1995).

In 1971, and against the background of political pressure upon Liberal Prime Minister John Gorton to assist the states in accessing a genuine ‘growth tax,’ the commonwealth transferred its payroll taxation system to the states. The payroll tax has been used intensively by the states to the extent that it is now the single largest tax revenue-raising instrument at their disposal.

2.3.5 Growth of government and economic stagnation in the 1970s

After 23 years of political rule at the commonwealth level by the Liberal and Country Parties, the Labor Party under Gough Whitlam won the 1972 election. As Kelly (2008, p, 21) perceived it, ‘[t]he Whitlam credo was belief in state power and central government, in racial and sexual equality, social progress, economic justice, ethnic pluralism, nationalism at home, internationalism abroad, and government intervention to secure better education, health and welfare.’

Consistent with this, the government undertook an ambitious program of social reform, characterised by additional welfare expenditures and social infrastructure investment as a means of reducing inequities.

Government payments, which had been relatively steady in previous years as a proportion of GDP, increased from about 18 per cent to about 24 per cent in 1975-76. The commonwealth government’s budget deficit increased to almost two per cent of GDP in 1975-76, as the government sought to play a relatively greater role in national resource allocation (Commonwealth of Australia 2010a).

A key aspect of the enlargement of the public sector under the Whitlam government was its extensive application of intergovernmental transfer payments, as a way of ensuring that states’ policy and service delivery mechanisms were applied in ways to realise the commonwealth’s preferred policy outcomes. In the three years to 1975-76 total specific purpose grants more than quadrupled, led mainly by significant increases in education, health, urban and transport payments to the states (Mathews and Grewal 1997).

Whitlam also developed a formal grants funding relationship between the commonwealth and local governments, as part of the commonwealth’s effort to bypass state governments and enhance the status of local government in Australia (McNeil 1997).

The policy actions undertaken by the Whitlam government during its slightly less than three years in office had a significant bearing on the size and scope of government in Australia. Indeed, it led the then Secretary of the Commonwealth Treasury some 35 years later to remark that the commonwealth was responsible for an ‘enduring’ increase in the size of government that ‘has never been reversed. And I think I can safely say that it never will be’ (Henry 2009).

The previous period of relative economic stability stretching through the 1950s and 1960s had ended during the early 1970s, with a global recession attributable to an oil price shock contributing to a slowing in domestic economic growth and rising unemployment.

However, increasing government spending and wage rises also led to a twenty-year high in the inflation rate at 16.7 per cent in 1974-75 (Meredith and Dyster 1999). The phenomenon of ‘stagflation’ – simultaneously high unemployment and inflation – had arrived in Australia, and the post-war Keynes-Lerner consensus of macroeconomic management broke down in the face of these events.

Subsequent to the dismissal of the Whitlam government from office in November 1975, the Fraser Coalition government was elected a month later espousing a policy agenda to reduce the size of government.

While some expenditure reductions were enacted especially during the first term of the government, and the government flirted with some elements of institutional reform (including a temporary regime of indexing income tax scales, allowing states to impose income tax surcharges or rebates, and the initiation of a financial system review) the Fraser administration is widely regarded as having foregone opportunities for economic reform.

Accumulating evidence during the 1970s and early 1980s of weak economic growth and poor productivity performance led increasing numbers of economists, business groups and commentators to suggest that the growth in the size and scope of government activities had contributed to the structural rigidities besetting the Australian economy.

In the late 1970s, economist Michael Porter pointed to the adverse effects of regulations upon the exercise of entrepreneurial activity by the private sector:

‘[t]ariffs and trade restrictions have encouraged us to produce non-competitive cars and clothing. And volatility of trade restrictions has caused us to do what little we do with some trepidation, causing a general shrinkage of activity. Capital controls, and their volatility, have reduced competitive pressures in the domestic capital markets and have worsened the terms and scale on which investment projects could be financed. Variable restrictions on foreign exchange cover have discouraged traders, all in the grand name of "stabilization" of the capital account. Air transport regulation has lumbered us with the services of one non-competitive bureaucratic giant, Qantas, rather than having us enjoy the cheap and varied services resulting from the competitive interplay of world airlines. The jumpy nature of official regulation of exchange rates and interest rates has shattered expectations in the market place and had convinced many entrepreneurs that risk taking is a hazardous enterprise, and induced them instead to pursue cosy market relationships protected by governmental agreements, tariffs, quotas, industry councils, etc’ (Porter 1978, p. 12).

The Confederation of Australian Industry (1980) identified a host of regulatory compliance costs faced by its member companies including the direct costs of engaging with regulatory agencies and ‘secondary costs’ such as project delays and resource misallocation effects. It also identified a general correspondence between the growth in regulation and the general increase in the size of government during the 1970s.

Within the Liberal Party, a number of classical liberal ‘Dries’ dissatisfied with the direction and pace of economic reform within the Fraser government, such as Charles Robert ‘Bert’ Kelly and John Hyde, were publicly campaigning for deregulation and smaller government. These efforts were supported by policy ‘think tanks’ such as the Centre for Independent Studies, established in 1976, and the Institute of Public Affairs.

2.3.6 The economic reforms of the late twentieth century

The Hawke Labor government was elected in March 1983, in the aftermath of a 1981-82 recession characterised by negative growth and double-digit unemployment and inflation. These conditions yielded a political climate conducive to economic reforms which, in some respects, effected substantial changes to the size and scope of government.

Arguably the most important economic reform enacted was the abolition of exchange controls, enabling the value of the Australian dollar to be determined on the open international currency market. This was described by then Governor of the Reserve Bank, Bob Johnson, as ‘the overt breaking of our isolationism ... The float linked the Australian economy, for better or for worse, with the rest of the world’ (Valentine 1993: 34).

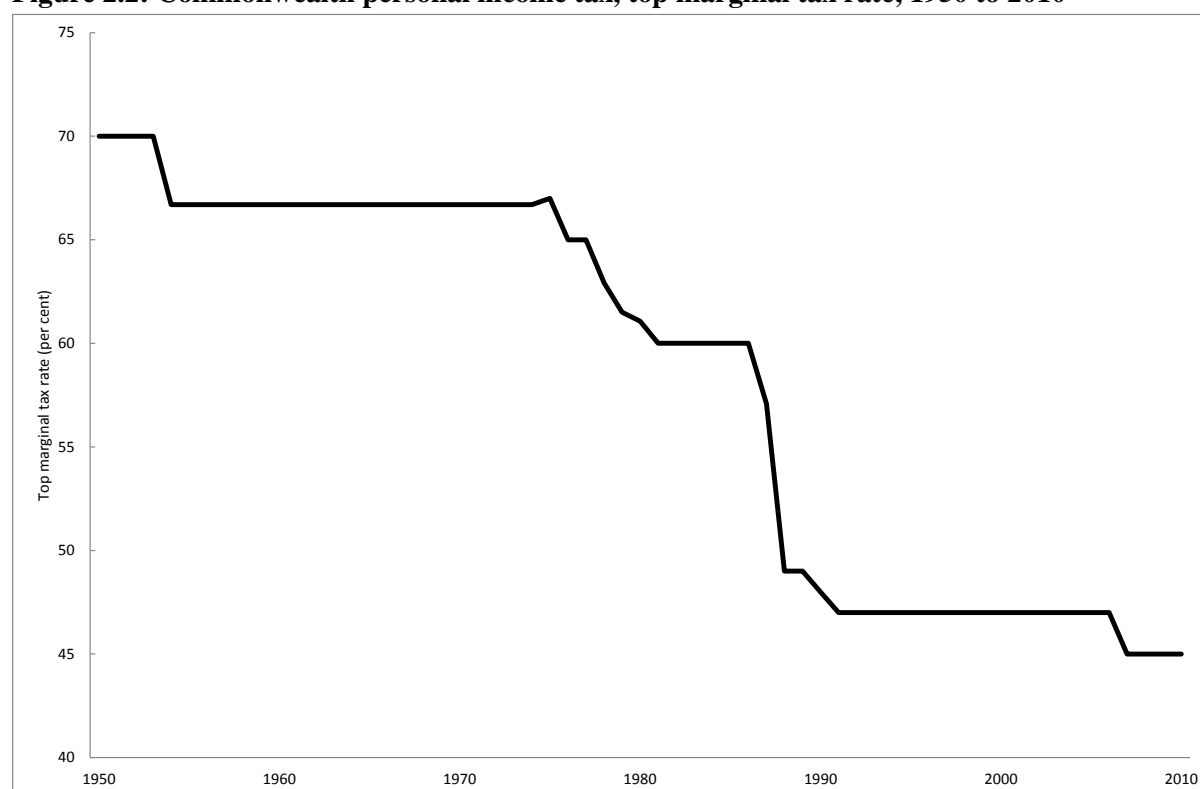
In spite of the establishment of industry plans, entailing significant amounts of expenditure for certain manufacturing industries, the Hawke government also implemented substantial phased reductions in tariffs (excluding passenger motor vehicles and textiles, clothing and footwear) as well as reductions in agricultural sector assistance (Productivity Commission 1998). The policy basis for the reduction in protectionism was announced by Treasurer Paul Keating as follows:

‘[i]n the past many of the so-called industry assistance arrangements introduced by successive governments have been anything but of assistance. Their legacy is of a less flexibly economy, too reliant on protection and regulation. The way forward for Australia is not to be closeted and sheltered, but to be open and dynamic, trading aggressively in the world. Only this kind of economy can provide the employment and the rising living standards that Australians aspire to’ (Walsh 1993, p. 16-17).

The Hawke government also undertook significant changes to the commonwealth taxation system, with a particular emphasis on reforming the structure of direct taxes.

In response to concerns that income taxes were discouraging work effort and investment, and encouraged widespread tax avoidance and evasion, the commonwealth streamlined the progressivity of personal income taxes by reducing the top marginal tax rate (Figure 2.2) and the number of steps within the rate structure. The income tax-free threshold was also increased over time to reduce disincentives to labour supply as a result of the interaction between means-tested welfare benefits and income taxation.

Figure 2.2: Commonwealth personal income tax, top marginal tax rate, 1950 to 2010



Data refers to financial years. Excluding additional levies, including Medicare Levy introduced in 1984.

Source: Downing et al 1964; J Smith 1993; Barber 2004.

The Hawke government also reformed corporate income taxation, introducing a dividend imputation system in 1987 whereby resident shareholders received a credit for tax paid at the company level thereby eliminating double taxation of dividends. In 1988 the government reduced the tax rate from 49 per cent to 39 per cent, and to 36 per cent by 1995 (Reinhardt and Steel 2006).

The reductions in personal and corporate income tax rates were conducted within the broader policy framework of significant extensions to the Australian direct taxation system that created new revenue raising opportunities for the government. The commonwealth introduced a capital gains tax on real gains or losses realised on assets after 19 September 1985, and a fringe benefits tax on non-cash forms of employee remuneration was also imposed (Reinhardt and Steel 2006).

The commonwealth also introduced a Petroleum Resource Rent Tax, with a tax rate of 40 per cent applied on the rents (above a threshold of the long term bond rate plus 15 per cent) earned by Australian offshore oil and gas industries in waters under commonwealth jurisdiction (Groenewegen 1990; Hogan 2003).

Taxation reforms were not extended to the indirect taxation system, despite the advocacy of Labor Treasurer Keating at a 1985 National Tax Summit for a 12.5 per cent consumption tax (including on food) which would replace the wholesale sales tax (Kelly 2008). The 1993 election loss of the John Hewson-led Coalition, which advocated a 15 per cent goods and services tax (GST), also frustrated efforts at indirect tax reforms at the commonwealth level.

In the area of workplace relations the Hawke and, later Keating, government reached a series of agreements with trade unions in what was to become known as the 'Prices and Incomes Accord.' The Accord entailed a centralised wage-fixation system with unions agreeing to restrict wage demands, in return for improvements to the so-called 'social wage' through superannuation concessions, tax reductions or social welfare expenditures (Terry, Jones and Braddock 1988).

The Accord agreements were renegotiated on a regular basis as economic circumstances changed, however in the face of ongoing inadequacies in Australia's economic performance, including by high inflation rates and low productivity growth, there were growing calls to deregulate the labour market. Some groups indicated that the Accord process remained too rigid for a flexible, increasingly open economy:

'[w]hat we have developed in Australia is an industrial relations system in which the trade unions have too much scope to exert industrial muscle, employers have too little incentive to resist, the structure of unions and awards speeds up the transmission of wage pressures and there is no power with the tribunals to ensure observance and enforcement of awards. We have a system almost 'designed' to impair productivity and to abort growth at regular intervals' (Business Council of Australia 1989: 6).

While Paul Keating as Labor Prime Minister won the 1993 election partly on the basis of a negative political campaign against Coalition proposals to deregulate the labour market, he soon moved to engender significant changes. Arguably the most significant element of the Keating workplace relations reforms were the promotion of bargaining over wages and conditions at the enterprise level which could override the award system without union veto (subject to Australian Industrial Relations Commission approval) (Sloan 1994).

In the early 1990s, amidst the privatisation of government enterprises and deregulation of product markets undertaken at all levels of government, the commonwealth government initiated a process to modernise existing trade practices regulations. In 1992 an independent review on competition policy, chaired by Fred Hilmer, was established. The final report, delivered to heads of government in 1993, recommended six broad policy proposals:

- extending the reach of the Trade Practices Act to unincorporated businesses and state and territory government enterprises so that its competitive conduct rules apply to all business activities;
- provision for third party access to nationally significant infrastructure;
- introduction of competitive neutrality so that government businesses do not enjoy unfair advantages when competing with the private sector;
- restructuring public sector monopoly businesses to increase competition, and the review of all laws which restrict competition; and
- extending prices surveillance arrangements to state and territory government enterprises where all other competition policy reforms prove inadequate (Kain et al 2003).

At the August 1994 meeting of the Council of Australian Governments (COAG) it was agreed that a national competition policy would apply to all jurisdictions from 1 July 1995. The states and territories would receive payments from the commonwealth to progress reforms and compensate for any losses in revenue resulting from the reform of government enterprises and other monopoly service providers.

During the 1980s state governments had come under increasing budgetary pressure, to varying degrees, as a result of a reduction in the growth of commonwealth grant funding and persistently high rates of spending for both economic and social purposes. These factors, and accumulated financial losses borne by taxpayers in Victoria and South Australia due to bad loans undertaken by government-owned financial interests, contributed to persistent structural budget deficits and unsustainable levels of public sector debt.

As a consequence of these developments, as well as the growing policy appreciation of the need for institutional change to bolster national economic performance, state governments particularly in New South Wales (under Premier Nick Greiner), Victoria (Jeff Kennett) and Western Australia (Richard Court) adopted, and in a number of respects led the way on, a host of microeconomic reforms.

This state-level reform agenda, pursued from the late 1980s to late 1990s, included reductions in government expenditure growth and public indebtedness, privatisation of government assets (such as electricity generation and distribution in Victoria), reforms to workplace relations regulations, and the development of 'quasi-markets' in areas such as education, health and public transport services.

Significant increases in the scope of commonwealth government expenditures, particularly in health and social welfare, were also enacted during the 1980s and early 1990s.

In 1984 the commonwealth introduced Medicare, a taxpayer-financed system of health insurance accessible to all Australians replacing the previous reliance on private health insurance supplemented by health care subsidies to low income earners. The system provides free (at the point of entry) surgical and other treatments in state government public hospitals, and subsidised health care through general practices and various medical specialists.

Despite the claims of government at the time that Medicare would provide timely and affordable patient care, critics have questioned the perverse effects of Medicare in reducing private health insurance memberships, encouraging the development of treatment waiting lists and bed rationing by state governments, and increasing regulatory burdens on private health providers (Sammut 2009; Novak, Berg and Wilson 2010). The long term fiscal sustainability of Medicare, in light of the prospective ageing of the population, has also been raised as a concern.

Expenditure by the commonwealth for social welfare purposes also increased significantly during the Hawke-Keating era, including in the areas of disability support pensions, family assistance and social parenting payments.

The government attempted to reign in such expenditure through the tightening of eligibility for selected welfare payments, and the introduction of 'work tests' for unemployment benefits. In 1992 the Keating government introduced a system of compulsory superannuation (with matching employee and employer contributions), on the grounds of promoting long term financial self-reliance and the ameliorating fiscal pressures resulting from projected increases in age pension expenditure.

While budgetary measures of the size of government had remained relatively stable during the 1980s and early 1990s the commonwealth government presided over a substantial increase in regulations during this period, in particular 'the last two decades have witnessed the rise of a new wave of regulation associated with causes such as gender equity, multiculturalism, environmentalism and political correctness' (Ratnapala 1996, p. 2).

While the reform process may have enhanced the long run competitiveness of the Australian economy, the late 1980s and 1990s were punctuated by macroeconomic disturbances that eventually led to Australia's worst recession since the 1930s Great Depression.

A substantial increase in the availability of credit from 1983 to 1988 contributed to a notable rise in corporate gearing during a wave of leveraged corporate takeovers in 1984-87 and in a property boom after 1987. The subsequent rise in business investment, coupled with a decline in private savings, led to a worsening of the current account deficit and increase in foreign indebtedness despite the commonwealth government's fiscal consolidation efforts (Beaumont and Cui 2007).

By the second half of 1989, GDP was growing by five per cent and domestic demand by eight per cent. The strongest growing components of expenditure were on imports (increasing by 29 per cent) and commercial construction (22 per cent), while inflation was ranging between seven and 12 per cent. The corporate sector was heavily geared despite the pursuit of restrictive monetary policies which saw interest rates increasing to high levels (of up to 21 per cent for business loans) (MacFarlane 2006).

Such conditions increased the exposure of the Australian economy to international shocks, which occurred in the form of major recessions in the United States, the United Kingdom and Japan from 1990. The 1990-91 'recession we had to have,' as coined at the time by Treasurer Keating, led to a substantial decline in economic output (especially in the manufacturing-intensive states of Victoria, South Australia and Tasmania) and contributed to the unemployment of more than one million Australians.

An outcome of the recession was the resumption of low price inflation, as described in the following terms by Keating: '[i]nflation is cracked, not cracking. ... We've heard the crack in every factory in the country' (Kelly 2008, p. 645). In his then capacity as Deputy Governor of the RBA in 1992, Ian Macfarlane provided an explanation for the explicit and substantial tightening of monetary policy pursued during the late 1980s:

'It was clear by the late eighties that policy, including monetary policy, had to be tightened to bring a substantial slowing of the economy. The economy was growing too fast, we were living beyond our means and there was an unsustainable amount of debt financed asset speculation occurring. The dynamics of a modern capitalist economy are such that it is hard to believe that this excess could be followed by a gentle slowing; it was far more likely that it would be followed by an absolute contraction.

Some people think that if only the instruments of monetary policy had been adjusted in a more skilful and timely manner, we might have avoided a recession, but I very much doubt it. The business cycle is a fact of life; it can be ameliorated, but not fine-tuned away. ... on this occasion we had to run monetary policy somewhat tighter than in earlier recessions, and take the risk that the fall in output would be greater than forecast. To do less than this would be to throw away the once-in-a-decade opportunity for Australia to regain an internationally respectable inflation rate ... It is true that we paid a substantial price to reduce inflation, but we had to do it at some stage ... We have paid the cost, the task now is to maintain low inflation when we return to growth' (Garnaut 2004: 6-7).

After 13 years in office the commonwealth Labor government was defeated by the Liberal-National Party Coalition, led by John Howard, in March 1996.

Faced with a significant structural budget deficit, and public sector debt to the tune of \$96 billion, the Howard government in its first term abolished a range of expenditure programs in an effort to reduce the overall growth in government expenses. It also reduced the number of commonwealth public sector employees, including through the abolition of the Department of Administrative Services and privatisation of Telstra, by over 111,000 staff from 1996 to 2003 (ABS 2007).

The government also engendered reforms to labour markets, including through the introduction of statutory individual agreements between employers and employees, employment services through the privatisation of the Commonwealth Employment Service, changes to the welfare payments system, and promoted productivity-enhancing reforms to selected sectors of the economy such as transportation and the waterfront.

In 1998 the Howard government released the details of a tax reform package, centred on redesigning the structure of Australian taxation to promote economic efficiency objectives, culminating in significant changes to commonwealth and state taxes in 2000.

The centrepiece of the tax reform package was a ten per cent GST on most goods and services, with all revenues to be provided to the states in exchange for the abolition of various state taxes on financial transactions. The commonwealth also lowered income tax rates and streamlined tax progressivity, and introduced increases to welfare payment rates, as compensation for the indirect price effects of the GST.

2.4 The twenty-first century

For much of the first decade of the twenty-first century most Australians had enjoyed the economic benefits attributable to a period of macroeconomic stability known as the ‘Great Moderation,’ characterised by strong economic growth punctuated with minimal output combined with persistently low inflation. This period stood in contrast with sustained periods of low economic growth with high inflation and, at times, high unemployment, particularly during the 1970s and early 1980s (Table 2.1).

Table 2.1: Key indicators of recent Australian economic performance

		Whitlam	Fraser	Hawke-Keating	Howard
		Dec 1972-Nov 1975	Nov 1975-Mar 1983	Mar 1983-Mar 1996	Mar 1996-Aug 2007
Economic growth	Annual per cent	2.1	2.4	3.6	3.6
Inflation	Annual per cent	14.5	10.3	5.2	2.5
Employment	Annual per cent	1.5	0.7	2.2	2.0
Participation rate	Per cent	62.0	61.2	62.4	63.6
Unemployment rate	Per cent	3.3	6.3	8.5	6.3

Data based on period averages.

Source: Kryger 2007.

These advantageous conditions contributed to a rebound in Australia’s international ranking in per capita GDP from sixteenth in 1990 to sixth in 2010, a performance which had earned Australia the praise of various international observers as a ‘miracle’ economy.

A number of factors were identified by economists as contributing to the beneficial economic circumstances experienced from 2001 to 2008.

The strengthening of Australia's terms of trade – the ratio of export prices to import prices – has been attributed both to growing international demands for our mineral commodities, including from fast-growing developing nations in the Asian region such as China and India, as well as import price reductions which tended to place downward pressure on domestic inflation (Commonwealth Department of the Treasury 2002).

Another feature of the Australian economic experience that contributed to strongly rising incomes, particularly from the last half of the 1990s through to the first half of the 2000s, has been a significant surge in labour and multi-factor productivity growth.

The enhanced productivity performance was, in turn, attributed to microeconomic reforms undertaken by Australian governments from the 1980s. These reforms were seen to promote greater economic flexibility so that resources could be redirected, largely by changing market circumstances, to where they could be used most effectively, improving efficiency and international competitiveness in individual production activities, and fostering a more dynamic, entrepreneurial and innovative business culture (Parham 2002, p. 9).

These reforms included the introduction of the WorkChoices industrial relations reform package, including provisions to enable employers and employees to enter into individual agreements with respect to workplace pay and conditions, completion of the Telstra privatisation process, and the reduction in income taxes as part of the introduction of a goods and services tax (GST).

Due in part to increasing revenues from strong economic growth, and the legacy of fiscal consolidation efforts most prominently undertaken during its first term of office from 1996 to 1998, the Howard government presided over a period typified by continuous budget surpluses at the commonwealth level peaking at 1.7 per cent of GDP in 2007-08.

While the maintenance of these surpluses were seen as necessary to augment national savings, reduce commonwealth net debt and, later, to dedicate amounts into funds for specialised purposes such as financing public servants' future superannuation payments, the surplus outcomes led to growing criticisms by interest groups that the commonwealth government had failed to expend sufficient funds in selective areas of public policy.⁸

Additional concern about flagging Australian productivity performance during the second half of the 2000s led to particular demands, including from the federal opposition Labor Party, for the Howard government to undertake additional spending in infrastructure and innovation in an effort to extend the long run productive capacity of the national economy.

Meanwhile, increasingly influential environmental interest groups contended that the surplus presented an opportunity for additional commonwealth expenditure to address climate change and

⁸ This anecdotal experience was in contrast with views expressed by some public choice theorists in the United States that the emergence of budgetary surpluses in that country during the 1990s was consistent with reductions in rent-seeking activity by special interest groups (Sobel 2001).

environmental degradation, while also criticising the government for failing to sign the international Kyoto climate change pact to mandate greenhouse gas emission reductions in coordination with other countries.

By contrast, sections of the business community and some economists expressed a view that large commonwealth budget surpluses presented scope for the government to undertake additional taxation reforms, albeit in a 'revenue neutral' fashion to maintain expenditure levels (Australian Chamber of Commerce and Industry 2004).

Despite the protests of Prime Minister Howard and Treasurer Peter Costello that the government presided over a smaller government as a share of GDP,⁹ a number of classical liberals, for their part, castigated the record of the Howard government in terms of its inability to contain the size of government. A representative view along these lines was provided by the Australian classical liberal John Roskam (2005), who wrote that:

'[p]rosperity has created a death spiral of higher government spending, leading to higher community expectations of government, leading to higher taxes, leading back into higher government spending again. Whether such a situation is sustainable when world commodity prices are not booming only time will tell.'

Specific criticisms were also levelled at the extension of the welfare state payment programs to middle and upper middle income earners and the perverse incentives they entail for labour supply in conjunction with a progressive income tax system (Saunders 2004; S Davidson 2012; Novak 2012).

By contrast to the political complexion of the commonwealth government during the Great Moderation period, the political scene at the state and territory level for much of the first decade of this century was characterised by the election of Labor administrations in each jurisdiction. This led to significant tensions in intergovernmental relationships as the commonwealth sought to increase its effective policy influence at the expense of state government autonomy particularly in the areas of education, health care and industrial relations.

Despite clear incursions, or threats of incursion, by the commonwealth government in traditional areas of state expenditure responsibility the state governments largely did not resist such manoeuvres by the commonwealth and, in most cases, actively participated in initiatives to reduce their effective policy autonomy and scope for unilateral policy differentiation.

To be sure, state premiers and territory chief ministers occasionally expressed opposition to the commonwealth encroachment of their powers. While the states challenged the Howard government's *WorkChoices* legislation, which aimed to take over the powers of states to regulate the rights and entitlements of employees of corporations, in the High Court, it has been argued that this challenge was not challenge on the basis that centralisation of industrial relations has long been an article of policy faith for the Australian Labor Party and its trade union supporter base (Leeser 2007).

Many of these criticisms of the Howard commonwealth government, irrespective of their political or ideological origin, were applied in the political realm by the then federal opposition Leader Kevin

⁹ For example, in a 2009 letter to The Australian newspaper John Howard noted that in 2007 Australia had the third lowest general government expenditure levels in the OECD and, on this basis, stated '[t]he commitment of the government that I led to the containment of government spending went well beyond rhetoric' (Howard 2009).

Rudd prior to the 2007 election to prosecute the case for a change of government, an event which came to fruition in November of that year.

For example, Rudd capitalised on this by caricaturing the Howard government as being unprepared to adopt policy action in areas such as climate change, education and training, infrastructure and innovation. At the same time the Labor Party portrayed the Coalition as engaging in ‘reckless’ spending that was contributing to restrictive monetary policy, with Rudd painting himself as a ‘fiscal conservative’ who would act to prune back government profligacy if elected.

However in less than twelve months after the change in government at the commonwealth level, Prime Minister Rudd announced a range of Keynesian-style fiscal stimulus measures to counterbalance feared reductions in domestic consumption and investment expenditures. These measures were designed to stave off potentially adverse domestic effects of the financial market dislocation originating in the United States known as the ‘global financial crisis’ (GFC).

The Prime Minister expressed the challenge in provocative terms that effectively repudiated the economic reforms pursued by both major Australian political parties, and which received broad bipartisan support, from the mid-1980s to late 1990s. As expressed by Rudd (2009, p. 20) himself:

‘From time to time in human history there occur events of a truly seismic significance, events that mark a turning point between one epoch and the next, when one orthodoxy is overthrown and another takes its place. ... There is a sense that we are not living through such a time: barely a decade into the new millennium, barely 20 years since the end of the Cold War and barely 30 years since the triumph of neo-liberalism – that particular brand of free-market fundamentalism, extreme capitalism and excessive greed which became the economic orthodoxy of our time. The agent for this change is what we now call the global financial crisis. ... This is a crisis spreading across a broad front: it is a financial crisis which has become a general economic crisis; which is becoming an employment crisis; and which has in many countries produced a social crisis and in turn a political crisis. ... It is a crisis which is at once institutional, intellectual and ideological. It has called into question the prevailing neo-liberal economic orthodoxy of the past 30 years – the orthodoxy that has underpinned the national and global regulatory frameworks that have so spectacularly failed to prevent the economic mayhem which has now been visited upon us. Not for the first time in history, the international challenge for social democrats is to save capitalism from itself.’

In order to ‘save capitalism from itself’ it had been estimated that from October 2008 to May 2009 the commonwealth government announced a total of \$80 billion in expenditure and taxation initiatives (Taylor and Uren 2010).

The policy decisions made by the government effectively transitioned the budget surplus, bequeathed by the former Howard government, into a significant deficit spanning four years with the commonwealth incurring significant net debts compared with a negative net debt position in 2006-07. The amount of commonwealth expenditure as a proportion of GDP also rose significantly in a relatively short span of time.

While senior government officials indicated that the fiscal stimulus was effective in staving off a recession in the Australian context (Gruen and Clark 2009), this conclusion has been subject to a vigorous debate. Some economists have pointed out that Australia did not in fact avert a recession (Kates 2009; Makin 2010), while others raised concerns about the long run implications of stimulus expenditure components upon economic performance (Davidson and de Silva 2009; Ergas and Robson 2009; Kirchner 2009).

Others referred to the role of previous microeconomic reforms, such as tariff reductions, financial deregulation and labour market reform, pursued by successive commonwealth governments from the 1980s to the late 2000s in strengthening Australia's capacity to respond to economic shocks.

In 2008 the government commissioned then federal Treasury Secretary Ken Henry to examine Australia's taxation and transfer system, including state and local taxes, and make recommendations for improvements to these modes of governmental intervention that 'designed for humans, now vastly exceeds human scale' (Henry 2008).

The final report, released in 2010, contained over 120 recommendations including a proposal, accepted by the government, to introduce a resource rent tax upon Australian mineral commodities levied at a rate of 40 per cent. A substantially amended form of the original tax proposal, the Minerals Resource Rent Tax of 30 per cent (with allowances reducing the effective rate of tax, and deductibility for state royalty payments), was introduced on 1 July 2012 applicable to the rents generated by coal and iron ore mining activities.

Aside from the Henry Tax Review process, the government also sought to implement a regulatory 'cap-and-trade' Carbon Pollution Reduction Scheme (CPRS) to redress an issue once described by Prime Minister Rudd as 'the greatest moral challenge of our generation.'

However, faced with significant voter animosity concerning the implications of the CPRS for industry structural change and the prices for basic goods and services the CPRS was eventually deferred by Rudd in early 2010. This factor, as well as community opposition to the mining rental tax, led to the replacement of Kevin Rudd as Prime Minister by Julia Gillard in June 2010.

Undeterred by previous opposition to introducing a carbon dioxide tax, the re-elected minority Gillard government in February 2011 proposed a temporary fixed-price carbon tax for three to five years followed by CPRS-style emissions trading regulatory scheme. A carbon tax, initially set at \$23 per tonne, combined with expenditure subsidies for trade-exposed industries, welfare recipients and low income earners to partially offset the price effects of the tax, was implemented in 1 July 2012.

A number of aspects of previous commonwealth government policies were substantially amended from late 2007, with direct consequences also for the design and effect of regulations. Arguably the most important area of regulatory change in recent years was in the area of industrial relations, with the Rudd opposition winning the 2007 election with a mandate to reverse the Howard-era *WorkChoices* labour market reform program.

While these measures were lauded by trade unions as a 'rebalancing' of workplace relationships which were argued to have been shifted in favour of employers under the previous government, a debate has ensued concerning the economic effects of such changes.

According to Moore (2008b, p. 10), 'the legislative and institutional changes proposed by the new Labor government in regard to regulating workplace relations constitute a serious risk to the efficient functioning of the labour market both in terms of employment and productivity, as well as an unwarranted infringement of personal freedom. It will further reduce the capacity of employees and employers to themselves determine the major components of employment agreements. The effects on employment are likely to be adverse, particularly (but not only) when the economy slows.'

Surveys of employers in the Australian mining industry revealed a significant reduction in employer confidence in the workplace relations regime, with concerns over the right of entry of unions into the workplace, inflated claims and outcomes for improved pay and conditions, and the prospect of strike action and unfair dismissal claims (Karvelas 2011).

Numerous other changes to the regulatory framework under which economic participants operated in Australia were conducted by the commonwealth in conjunction with state and territory governments through COAG, as a result of agreements to harmonise regulatory settings across jurisdictions in order to engender a ‘seamless national economy.’

The genesis of this program could arguably be attributed to a ‘National Reform Agenda’ (NRA) program initially promoted by the Victorian Labor government in 2003. The NRA not only incorporated regulatory harmonisation but incorporated commonwealth funding to encourage states to adopt consistent changes to services delivery, including in the areas of education, health care, disability and welfare services and transportation.

Apart from the consequence of regulatory harmonisation of recent years in further eroding the capacity of states and territories to promote unilateral policy changes promoting competitive federalism complaints were expressed of promised COAG policy deliverables not being satisfactorily progressed, a point conceded in various official reports (COAG Reform Council 2010).

2.5 Conclusion

This chapter provides an updated account of the evolution of Australian governments, represented by changes in expenditure, revenue and regulatory policies, since European settlement in 1788.

The discussion presented in this chapter illustrate the inherent complexities involved in providing simplistic accounts of the elements informing changes to the size and scope of the public sector. This is especially since economic, legal, political, social and other events impacting upon the functions and activities of government invariably occur in simultaneous fashion and, at times, seemingly at cross-purposes to each other.

Nonetheless an acknowledgement of factors underpinning the multi-faceted nature of, and changes to, public sector intervention in the Australian economy highlights certain elements which could be construed as being relatively more important to the overall picture of what determines public sector growth, at least during certain periods of time.

There seems to be little question that governmental growth, especially at the commonwealth level, has been facilitated by constitutional, political and other opportunities to enhance the means by which the supply of public services can be financed. The maintenance of a centralised income tax structure, arguably a relic of the World War II economy, is a case in point.

As much as the size of Australian governments today reflect developments that transpired decades, if not centuries, ago, the public sector has also proven to be adaptable to change by substituting between various instruments of policy control in efforts to maintain or enhance economic influence.

The economic reform process from the 1980s, for example, can arguably be best explained as a set of policy responses to changing economic circumstances, including long run commodity price reductions, falling transportation costs, factor mobility and the growing significance of human capital (Brennan and Pincus 2002). Despite what some critics of the reforms have claimed, the reforms have entailed changes in the structure of government intervention rather than a substantial reduction in the size and scope of government.

In conjunction with ‘supply-side’ factors influencing the supply of government interventions, changes to the size and scope of the public sector are also nurtured by widely held beliefs regarding the appropriate functions of government in the economy and society more generally.

Individual citizens have long been active, especially through the period of representative democracy in Australia, in calling for various changes to, if not extensions of, governmental functions. Public opinion about the appropriate role and size of government, say in the areas of industry protectionism, industrial relations regulations, macroeconomic stabilisation policies or, more recently, climate change, is also shaped by the contributions of special interest organisations, academics and others to public policy debates.

With the multi-dimensional aspects of government intervention having altered substantially through time, an important issue is raised concerning whether such changes are amenable to meaningful statistical interpretation. The matter of measuring public sector size will be the subject of investigation in the following chapter.

Chapter Three

Measurements of Australian Public Sector Size

3.1 Background

Establishing the consequences of the growth in government in Australia for economic performance requires the identification of appropriate statistical measurements of public sector size.

Despite the pervasive role of governments and the implied influence of their interventions in shaping economic outcomes, the task of measuring the size of the public sector remains the subject of intense debate in the economics literature. In part, these controversies are derived from the inherent difficulties associated with reducing governmental activity into a quantifiable, yet empirically tractable, form.

These difficulties are apparent for Australia as they are for other countries. At the outset, the Australian public sector is structured such that three levels of government – the commonwealth, state and territory, and local governments – simultaneously undertake the roles, functions and activities of the public sector as a whole.

Adding to the complications of accurately measuring the size of government is that a number of roles have been assigned to it over a lengthy period of time. Groenewegen (1990) and Gemmell (1993) explain that the public sector allocates and redistributes economic resources, produces and provides goods and services, employs resources, owns assets, controls institutions, borrows funds, attempts to stabilise economic fluctuations, and regulates the conduct of businesses and individuals.

The multi-faceted nature of government involvement in the economy compounds the degree of difficulty in establishing statistical indicators of the size of the public sector. Further, measures of government size are compromised by changes in the roles and functions of governments over the long run.

The purpose of this chapter is to outline some of the most commonly used measures of the size of government for Australian circumstances. Where relevant these measures are supplemented by statistical refinements, to either present improvements on what is currently available or, at least, to highlight conceptual or statistical problems associated with conventional approaches toward measuring public sector size.

While available data to quantify changes in the size and growth of governments are subject to consistency, data quality and other statistical and methodological caveats, the clear suggestion drawn from the available measures is that governments in Australia have grown in size over the long run and especially since the second half of the twentieth century.

3.2 Revenue

3.2.1 Definition

A key activity of government is to acquire financial resources, known as revenues, from the private sector for varied purposes, which in turn effectively reallocate resources within the economy. There are practically a variety of ways in which modern governments may acquire their revenues.

Governments may impose a range of revenue raising instruments to collect monies for services provided, which appear at least on the surface to be indistinguishable from the market prices that private sector entrepreneurs charge for the provision of their goods and services. Specifically, they may impose fees or charges for services, prices (either at cost or less than cost) upon sales of goods and services undertaken by their entities, acquire income by virtue of their ownership, or rental, of non-financial assets, or attain incomes through their possession of financial assets.

In limited cases these classes of revenues are earned by governments by virtue of their active engagement in markets of goods and services populated by competing private sector producers and discerning purchasers. In other words governments only acquire revenues to the extent that they produce goods and services for subsequent sale or lease, or own income-generating assets.

As the fiscal history of Australia and other advanced economies attest, revenues are usually earned from the sale of goods and services, such as energy, water or transport utilities, that are monopolistically provided by governments. As discussed in chapter 1, these elements of revenue generation can be appropriately perceived as resulting from ‘enforced exchanges’ between governments and affected private sector entities (Wagner 2007).

Governments could also, through regulation, readily transform what might appear to be a voluntaristic relationship of revenue collection arising from mutually agreeable exchanges of goods, services and assets into a relationship informed by state compulsion. For example, governments may compulsorily acquire property, financial or other assets from private sector owners that subsequently generate income for the state.

Furthermore, governments collect revenues as a result of certain regulatory activities which find no analogue in the private sector. For example seigniorage profits can be acquired from the monopoly issuance by government of notes and coins, while royalty income can be acquired from private sector entities that use natural assets, such as minerals or forests, on the basis that such assets belong to the broader community (ABS 2005).

Governments may also collect revenues through the imposition of civil or criminal fines earned from individuals, businesses and other entities that violate existing laws and regulations. Indeed, such revenue streams have long represented a lucrative source of revenue for Australian governments at all levels.

In addition to the forms of revenue cited above, governments may also collect taxation revenue which is conveniently defined by the Australian Bureau of Statistics (ABS), following international government financial accounting conventions, as representing:

‘revenue arising from compulsory levies imposed by government. There is usually no clear and direct link between payment of taxes and the provision of goods and services. Taxes are levied, inter alia, on incomes, wealth, production, sale and use of goods and services, and the performance of activities. The amount of tax revenue accruing in a period is the amount generated when the underlying transactions or events which give rise to the government’s right to collect the taxes occur in that period’ (ABS 2005, p. 35).

Numerous scholars in the fields of public finance and political science have argued that the ability to impose taxation most unambiguously distinguishes the nature and role of government against all other institutions and entities compromising civil society. This proposition implies that revenue burdens should therefore form the basis of an appropriate indicator of the size of government.

Joseph Schumpeter ([1918] 1991, p. 108) once wrote of the nature of taxation as follows:

‘[t]axes not only helped to create the state. They helped form it. The tax system was the organ the development of which entailed the other organs. Tax bill in hand, the state penetrated the private economies and won increasing dominion over them. The tax brings money and calculating spirit into corners in which they do not dwell as yet, and thus becomes a formative factor in the very organism which has developed it.’

Public choice theorists Geoffrey Brennan and James Buchanan ([1980] 2000, p. 11) wrote that ‘[f]or the ordinary citizen, the power to tax is the most familiar manifestation of the government’s power to coerce. The power to tax involves the power to impose, on individuals and private institutions more generally, charges that can be met only by a transfer to government of economic resources, or financial claims to such resources – charges which carry with them effective powers of enforcement under the very definition of the taxing power.’

Consistent with these views, Levi (1988) suggests that the extent to which governments can undertake expenditure activities is constrained by the amount of revenues collected:

‘[o]ne major limitation on rule is revenue, the income of the government. The greater the revenue of the state, the more possible it is to extend rule. Revenue enhances the ability of rules to elaborate the institutions of the state, to bring more people within the domain of those institutions, and to increase the number and variety of the collective goods provided through the state’ (Levi 1988, p. 2).

While some commentators claim that individuals or businesses statutorily liable to taxation voluntarily pay them and that some are, in fact, willing to pay more, propositions that are supported by a burgeoning literature on the concept of ‘tax morale’ or the preparedness of taxpayers to pay their legal liabilities (Frey and Torgler 2007), Charles Bastable alternatively suggested that:

‘a tax is ‘compulsory.’ This does not mean that all tax revenue is paid unwillingly, but merely that the will of the payer is legally immaterial. The amount, the mode and time of levying, the persons affected are all determined by the sovereign or its delegate, and individual preferences or dislikes are allowed no place in the act’ (Bastable [1892] 2003, p. 243).

The array of taxes imposed by a government can be generally classified as either ‘direct’ or ‘indirect’ taxation. According to Atkinson (1977) the distinction between the two types of taxes historically rested upon administrative practices, whereby taxpayers paid some of their taxes *directly* to tax authorities whereas others were paid *indirectly* through the purchase of goods.

Atkinson refines this historical distinction to refer to direct taxes as being any which may be adjusted in accordance with the individual characteristics of the taxpayer, while indirect taxes are imposed upon transactions irrespective of the circumstances of buyers and sellers. Such treatment of tax classification can be made without reference to the final incidence of taxation.

In a federal system of government, such as Australia, it is also important to ascertain the extent to which the different levels of government collect funds from the varied revenue instruments at their disposal. The interjurisdictional assignment of revenue and taxation powers has significant implications for the capacity of each level of government to finance the provision of public services in an autonomous, self-sufficient manner, which in turn promotes fiscal and political accountability to general taxpayers (Oates 1972; Wellisch 2000).

When making observations concerning government revenue or taxation over time it should also be considered that changes may reflect explicit policy decisions, such as alterations to taxation rates or bases or substitutions between different forms of revenue raising instruments, in addition to fluctuations in the business cycle affecting the extent to which governments can acquire revenues from liable private sector entities.

3.2.2 Data sources

It is possible to derive an approximate, albeit not statistically consistent, series of government revenue data stretching back to the early 1800s with data on revenue collections derived from a variety of secondary sources.

Revenue data from calendar year 1810 to financial year 1981-82 was drawn from a compilation of statistics published in recognition of Australia's bicentenary in 1988 (Barnard 1987; N Butlin et al 1987).¹⁰

From 1802 to 1899-1900 the six colonial governments, and local government instrumentalities contained therein, raised all of the government revenue collected in Australia. From 1900-01 commonwealth consolidated revenue fund receipts were added to derive figures for total revenue of all Australian governments. Data were presented in calendar year terms from 1802 to 1849 inclusive, and in financial year terms thereafter.

The early colonial data is somewhat unreliable with, for example, revenue data missing in some years, while Barnard (1986) indicates there is a break in the series between 1906 and 1907 although the nature of this statistical break is unspecified.¹¹

The data prior to 1962-63 relate only to the budget transactions of governments specifically authorised by parliaments or local government authorities. In effect, these 'current revenues' exclude revenues acquired by semi-governmental authorities or through special accounts under treasurers' control (Barnard 1985; Vamplew 1987). This reflects the manner in which the former Commonwealth Bureau of Census and Statistics (CBCS) collected government financial data during this period.

The data for commonwealth and state-local revenue to 1961-62 also excludes the proceeds of long-term borrowings. Another feature of the revenue data from 1900-01 to 1961-62, inclusive, is that it excludes 'unrequited' intergovernmental financial transfers between levels of government affecting recipients' consolidated revenue or loan funds (Barnard 1985).

¹⁰ Local government data is deficient or non-existent between 1916-17 and 1920-21, between 1940-41 and 1944-45, and in 1955-56, affecting the integrity of the time series for those years (Barnard 1987, p. 256).

¹¹ For a general discussion of the difficulties of early NSW colonial governments in tendering official statistical returns, see Forster (1985).

A structural break appears in the revenue data from 1962-63 due to substantial revisions in data collection methodology by the ABS. From this point, transactions for all public authorities of each government are recorded on an integrated basis, with no distinctions made between current and loan funds, in an effort to eliminate double-counting. Intergovernmental transfers, other than for goods and services, between all funds are netted out from the total revenue figure from 1962-63 (Barnard 1987).

In addition the data from 1962-63 are prepared on a national accounting basis, with changing classifications of sources of funds including the treatment of surpluses of government trading enterprises (Barnard 1985).

From 1982-83 to 1994-95 data for commonwealth and state-local non-financial public sector revenue was supplied by an online historical statistics database maintained by the Reserve Bank of Australia, with information in turn drawn from ABS government finance statistics (GFS) (Foster 1996).

The non-financial public sector is defined in the Foster series as the general government sector (including central borrowing authorities) plus government trading enterprises. Revenues raised by other financial enterprises operated by the government are excluded from the series from 1962-63 to 1994-95 (Foster 1996, p. 70).

From 1995-96 to 2009-10 total revenue data for the non-financial public sector (including the 'multi-jurisdictional' sector comprising mainly universities) were obtained from the published ABS GFS series (ABS 1997, 1998a, 1999, 2000b, 2001a, 2011c). The public sector coverage of the data for this period of time is similar to that presented by Foster.

It should be noted that, since 1995-96, the ABS has separately classified the multi-jurisdictional sector alongside commonwealth, state and local governments. Previously the financial transactions undertaken by this sector were incorporated in state and local general government sectors (ABS 1998a).

This classification change implies that, while revenues acquired by the multi-jurisdictional sector remain incorporated in total revenue across the time series, the amount of revenue collected by state and local government appears smaller from 1996-97 as a result of the exclusion of multi-jurisdictional sector revenues from the state-local figures.

The introduction of accrual accounting of government financial statistics from 1998-99 presents another structural break compared with previous data constructed using cash accounting methods.

While it may be possible to use the supplementary GFS cash flow data subsequently presented by the ABS to correct for the structural break, important disaggregated revenue and taxation data are unavailable on a cash accounting basis. In light of this, the approach taken in this chapter is to utilise the accrual accounts even though this creates another structural break in the time series data.

Finally, the sum of commonwealth, state and local revenues do not necessarily equal the separately calculated figures for total revenue, due to transfers within the respective public sectors. This adds a further level of complexity with regard to the interpretation of the time series data presented.

Data on the amount of taxation revenue acquired by Australian governments were derived from similar sources as for total revenue, with an exception for the period 1810 to 1849 in which calendar

year data for New South Wales and Van Diemen's Land (Tasmania) were drawn from a working paper prepared by N Butlin et al (1986).¹² There were no separately identified taxation revenue data for Western Australia and South Australia, and thus tax collections in these two jurisdictions are subsumed within the total revenue data referred to above.

Barnard (1987) represents the major secondary source of taxation revenue data for the period spanning the financial years 1849-50 to 1981-82, with taxation including collections credited to consolidated revenue funds as well as credits to special funds in the form of 'earmarked' taxes. The structural breaks that applied to the total revenue data series also apply to the tax data series.

An important issue relates to the treatment of regulatory fees and fines in the estimation of aggregate taxation revenue. From 1962-63 to 1981-82 taxation excludes fees, fines and some miscellaneous taxes (Barnard 1986).¹³ However the series provided by Foster from 1982-83 to 1994-95 provided a combined figure for taxes, fees and fines. In effect the Foster series slightly overstates the amount of taxation raised by commonwealth, state and local governments.

The ABS data series for 1995-96 and 1996-97 also included fees and fines. From 1997-98 all fines have been reclassified as 'other current revenue' whereas fines were reclassified in the following manner:

'[g]overnments may regulate certain activities by issuing licenses for which fees are payable. If the issue of such licenses involves little or no work by the government then the revenues raised are deemed to be taxation revenue. However, if the government uses the issue of licenses to exercise some regulatory function, such as checking the competency or qualifications of a would-be licensee, then the revenues raised are deemed to be revenues from the sale of services by government unless they are clearly out of all proportion to the costs of providing the services' (ABS 2005, p. 35).

While the differences in methodology concerning the treatment of fees and fines across the sources used in this chapter poses another level of inconsistency for the time series of taxation revenue data, a lack of precision in the classification of revenue data prevents further adjustments to the historical series to provide greater data consistency.

It is possible to provide a detailed breakdown of Australian taxation by level of government and type of tax instrument used by governments. Further information is provided below.

Finally, it should be reiterated that annual data for Australian government revenue and taxation has not been compiled on a consistent basis of time. In general terms, but with some exceptions at the state and local levels, data were compiled on a calendar year basis (i.e., year ended 31 December) during the nineteenth century, whereas data during the twentieth and twenty-first centuries were collected on a financial year basis (i.e., year ended 30 June).

¹² Whereas Butlin, Ginswick and Statham (1986) provide a disaggregated revenue series that allows for the identification of taxation revenue (mainly customs, excises and taxes on sales of goods), total revenue figures were instead drawn from the subsequent contribution by these authors in the edited Vamplew (1987) compilation of Australian economic statistics.

¹³ It is unclear if, or to what extent, revenue from fees and fines were removed from the taxation data prior to 1962-63.

Due to the fragmentary nature of data collection during the early colonial period, and later during the First and Second World Wars, revenue and taxation data for some years only refer to a portion of a year or, in others, for a longer period of time (for example, eighteen months). This may have implications for the representativeness of the statistics reported in the following section.

3.2.3 Trends

The available data on total revenue collected by Australian commonwealth, state and local governments demonstrates significant growth in revenue takings during the twentieth century, a trend which has persisted through the first decade of the twenty-first century.

Figure 3.1 shows the growth in nominal revenues collected by governments, both in absolute terms and when compared to the growth in the Australian population, since 1802.

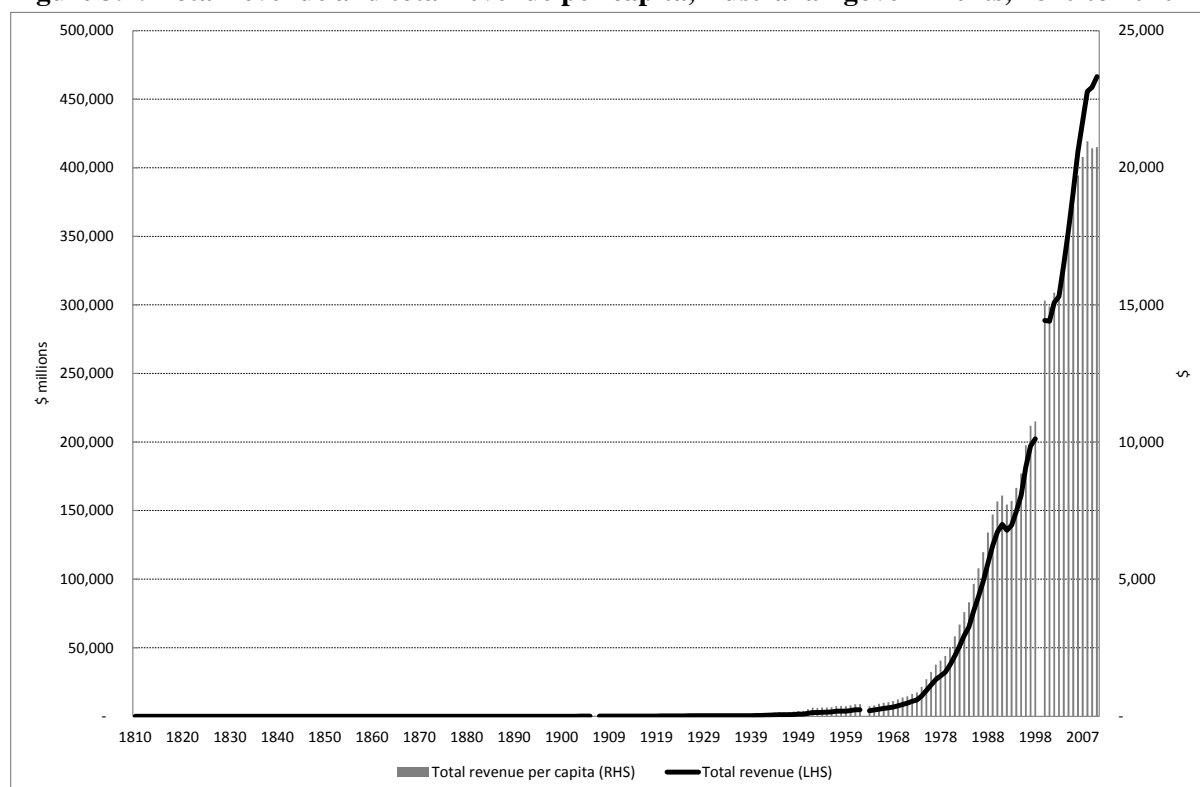
Revenues raised by colonial and local governments increased from about \$6,500 in 1810 to about \$64 million in 1900, equivalent to growth on a compounded annual basis of about 11 per cent. For each Australian resident, the revenue burden increased from about 30 cents to about \$17 over the same period.

Given the exponential growth in revenue collected since the 1970s, it is difficult to discern from Figure 3.1 the extent of growth in colonial and local government revenues during the nineteenth century.

From the perspective of absolute revenue collected, it is instructive to note that it took governments over forty years to raise \$10 million in revenue on an annual basis with this milestone first achieved in 1853. From that point it took another 19 years to increase revenues from \$10 million per annum to \$20 million per annum, and then only another five to further increase annual revenue collections to \$30 million.

Until the 1880s taxation (especially customs and excises) and land sales receipts represented the main source of revenues collected by colonial governments. However a decade later receipts on sales of Crown land had waned as a revenue source, while taxes were displaced by revenues from business undertakings as the major source of revenue (Barnard 1987).

Figure 3.1: Total revenue and total revenue per capita, Australian governments, 1810 to 2010



Data expressed in terms of current prices. Structural breaks occur in the revenue series in 1906-07, 1962-63 and 1998-99.

Source: ABS 1997, 1998a, 1999, 2000b, 2001a, 2008, 2011a, 2011c; Barnard 1987; Foster 1996.

It was during the twentieth century, and especially since the 1970s, that government revenues dramatically increased to the record levels witnessed today. From 1901 to 2000 revenue of the commonwealth, state and local governments increased from about \$68 million to about \$288 billion, growing at a compounded rate of almost nine per cent per annum.

From 1972 to 1976, coinciding roughly with the period in office for Labor Prime Minister Gough Whitlam, revenue collections by governments more than doubled from about \$11 billion to about \$23 billion. It took a similar period of time for revenues to almost double again, to \$44 billion in 1981, and then to about \$87 billion in 1986.

However, it took another decade for government revenues for all levels of government to double to about \$197 billion in 1997 due, in part, to the effect of recessionary conditions during the early 1990s and a patchy economic recovery in the short term thereafter on revenue growth.

During the first decade of the twenty-first century revenues grew from about \$302 billion in 2001 to about \$466 billion in 2001. This trend, which occurred after a significant change in the tax mix towards indirect taxation of goods and services, represented an increase in revenue over the period by about 55 per cent, or five per cent on an average annual basis.

Another measure of the size of government is the amount of total revenue collected by governments expressed as a proportion of gross domestic product (GDP). In similar fashion to the public finance data presented in this chapter, the GDP time series measure has been drawn from a number of secondary sources.

From 1810 to 1860 calendar year estimates of GDP at factor cost are derived by grossing up estimates of the value of selective industrial activities including pastoral, mining, manufacturing, public services and construction, personal and other services and imputed housing rents. From 1861 to financial year 1938-39 a similar approach to GDP estimation is undertaken albeit with more detailed factor cost estimates spanning a wider range of industries (N Butlin 1962, 1987).

From 1939-40 to 1948-49 estimates by the CBCS of ‘national income,’ reflecting a summation of factor returns but excluding taxes and subsidies and depreciation, are included in the series used in this chapter (Butlin 1962), whereas from 1949-50 to 1958-59 estimates of GDP at factor cost published by Foster (1996) are used.

From 1959-60 the time series estimates of GDP at factor cost (referred to recently in published national accounts as ‘total factor income’) were sourced from the latest edition of the ABS compilation of national accounts, which are derived on a consistent methodological basis (ABS 2009a).

Although there are numerous issues concerning the validity of revenue-to-GDP ratios as a measure of the size of government, including the fact that fluctuations in the business cycle can affect revenue collections (and government spending) as well as private sector components of GDP (D Smith 2006), there is a view expressed by some economists that GDP at factor cost is a preferred variant of national income measures that should be used when comparing public sector fiscal indicators against the prevailing level of economic activity.

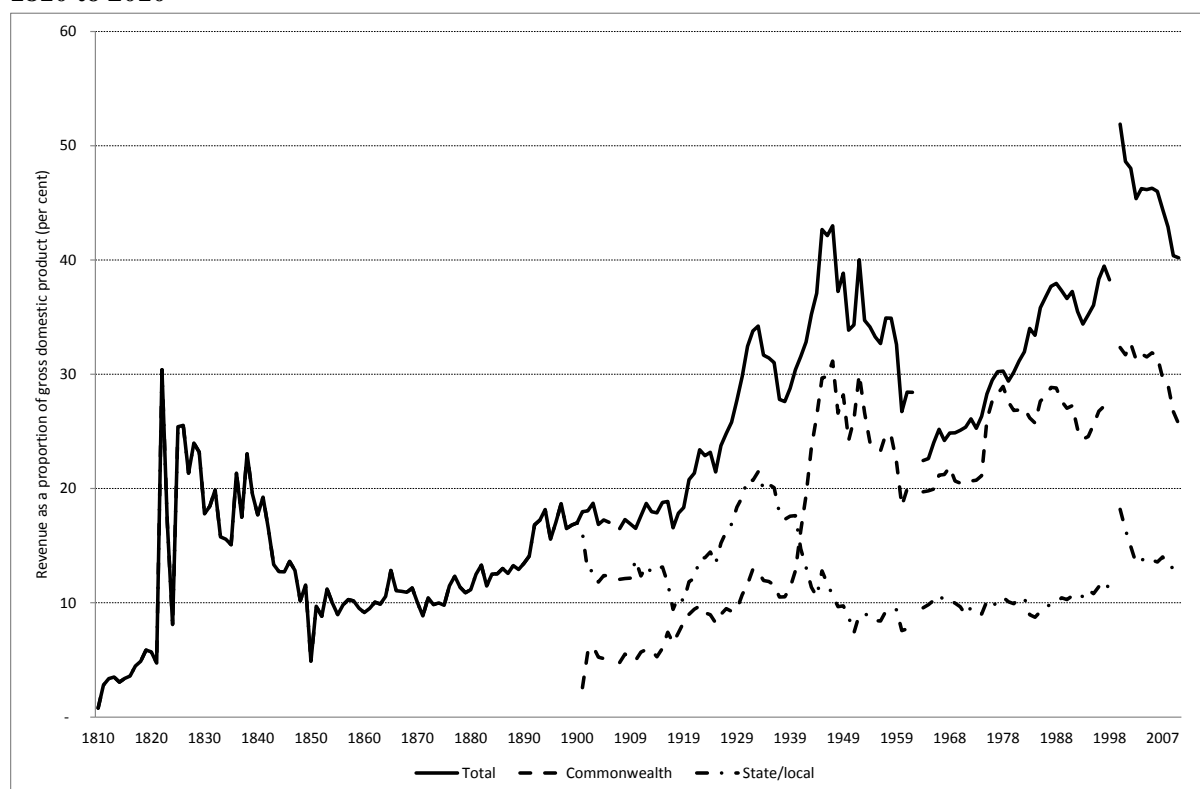
One reason for this is that changes in estimates of GDP at market prices are sensitive to changes in the tax mix imposed by policymakers. An increase in reliance upon indirect taxes on goods and services flowing through to final prices as paid by consumers can lead, *ceteris paribus*, to an increase in market price-GDP, even if underlying output has not changed (Peacock and Wiseman 1961; Saunders 1987; Groenewegen 1990; D Smith 2009). By contrast GDP at factor cost excludes indirect taxes, and government subsidies which may reduce market prices, from the estimation framework.

It is important to note that the GDP statistics used in this chapter remain an intellectually contestable issue within the Australian economics literature. Haig (2001) disputed Butlin’s historical GDP estimates from 1861 on a number of grounds including the potential understatement of manufacturing output during the second half of the nineteenth century.

It is notable that the prominent historian of national accounting measurement, Angus Maddison (2006), rejected most of Haig’s findings when retaining Butlin’s GDP estimates for the period 1861 to 1911 in his compilation of historical global growth statistics. This chapter retains Butlin’s GDP estimates for the 1911-12 to 1938-39 period and, unless otherwise specified, refers to the measure of GDP at factor cost.

Figure 3.2 illustrates the long term growth trend in non-financial public sector revenues in Australia as a share of GDP.

Figure 3.2: Total revenue as a proportion of gross domestic product, Australian governments, 1810 to 2010



Data expressed in terms of current prices. Structural breaks occur in the revenue series in 1906-07, 1962-63 and 1998-99.

Source: ABS 1997, 1998a, 1999, 2000b, 2001a, 2011b, 2011c; Barnard 1987; N Butlin 1987; Foster 1996.

Revenues collected by the colonial governments, namely New South Wales and Van Diemen's Land, continued to grow steadily through the period from the early 1810s until the 1840s, when an economic depression exacerbated by a decline in wool commodity prices led to a significant reduction in revenues as a share of the economy.

From that period revenues as a proportion of GDP remained relatively stable from the mid-1850s until the mid-1870s, with revenue increasing gradually during the 1880s. During the final decade of the nineteenth century colonial and local government revenue collections grew from about 14 per cent of GDP in 1890-91 to about 17 per cent in 1899-1900. Revenues from an array of government business undertakings began to increase significantly during this period, and colonial governments continued to implement new taxes on estates, land and general income (J Smith 1993).

As a result of the provisions of the Australian Constitution, including the transfer of customs and excise revenues from the colonies (states) to the commonwealth, the states' revenues as a proportion of GDP fell from about 17 per cent in 1899-1900 to about 13 per cent two years later. Despite this initial reduction the states' revenues increased to reach a post-federalism high of about 21 per cent during the early 1930s.

As discussed in chapter 2, the commonwealth acquired monopoly income taxing powers during World War II. The effect of this initiative was to increase commonwealth revenue from about 11 per cent of GDP in 1938-39 to 30 per cent by 1945-46. Despite the deprivation of revenue powers for the states, revenues collected by all levels of government still increased as a share of GDP from 29 per cent to 42 per cent over the same period.

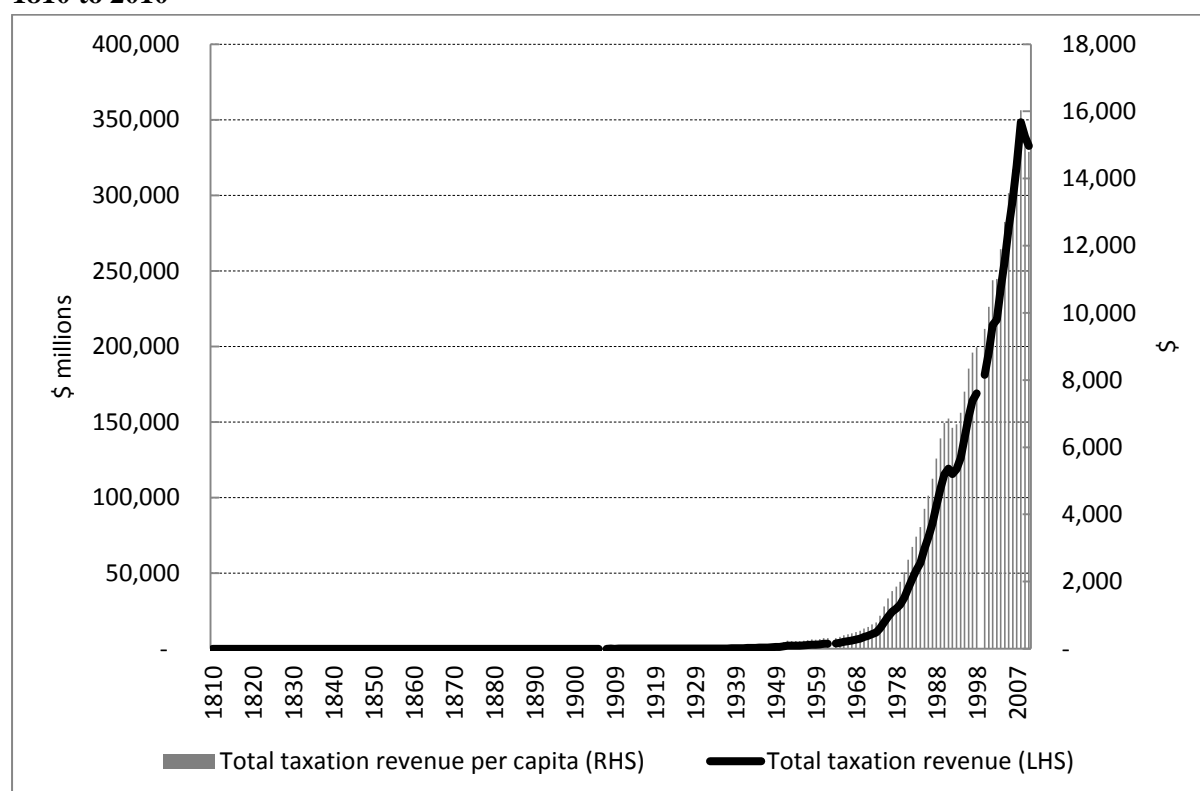
Since World War II the commonwealth has collected the lion's share of total revenue in Australia, including a substantial spike in commonwealth revenue takings from about 21 per cent of GDP in 1971-72 to about 26 per cent in 1974-75 and 29 per cent three years later. On the other hand the states and local governments have seen the amount of revenue they collect, as a share of the economy, decline in the immediate period after World War II and stabilising at about ten per cent of GDP for the remainder of the twentieth century.

The apparent decline in revenue as a proportion of GDP during the first decade of the twenty-first century appears to be primarily due, in the first instance, to the conversion by the ABS from cash to accrual accounting statistical framework. However, more recently there was an appreciable slowing (albeit not an absolute reduction) in total revenue growth attributable to the global financial crisis (GFC) which led to a decline in revenue-to-GDP by three percentage points in 2008-09 compared to the previous year.

Taxation has long represented an important component of the overall revenue base of Australian governments, and thus similar measures with respect to taxation revenue collections can also be used to represent changes to the size of government over time.

Figure 3.3 provides information on the absolute amount of taxation and the amount of tax revenue collected per head of Australian population from 1810 to 2009-10. The historical trend of the growth in taxation revenue generally mirrors that for revenue collected by all Australian governments as a whole.

Figure 3.3: Total taxation revenue and taxation revenue per capita, Australian governments, 1810 to 2010



Data expressed in terms of current prices. Structural breaks occur in the taxation revenue series in 1906-07, 1962-63 and 1998-99.

Source: ABS 1997, 1998a, 1999, 2000b, 2001a, 2008, 2011a, 2011c; Barnard 1987; Foster 1996.

Taxation revenue collections rose significantly during the colonial era from about \$4,300 in 1810 to about \$442,000 in 1849-50 and about \$24 million in 1899-1900; equivalent to a compounded annual growth rate of about ten per cent. Most of the tax revenue increases occurred during the second half of the nineteenth century, with taxes collected by colonial governments and their local government instrumentalities growing by \$23 billion over the fifty years since 1849-50.

Increases in taxation revenue per head of population also occurred during the nineteenth century, with taxes increasing from about 40 cents for each Australian in 1810 to \$6 per head in 1899-1900.

The most prominent aspect of the trend towards greater tax revenue collection in Australia has been the exponential trend in taxation growth since the post-World War II period. During the 1940s taxation collections more than tripled from about \$364 million in 1940-41 to about \$1.2 billion in 1949-50.

While the growth in taxation was relatively more restrained during the 1950s and 1960s, merely doubling in each decade, tax collections by the commonwealth, state and local governments increased almost four-fold during the 1970s as governments sought to fund their growing expenditure commitments.

The 1980s were also a period of significant growth in taxation revenue, as revenues more than doubled from about \$40 billion in 1980-81 to about \$115 billion in 1989-90. However, the growth in revenues since that period have been more subdued than in previous decades increasing by less than

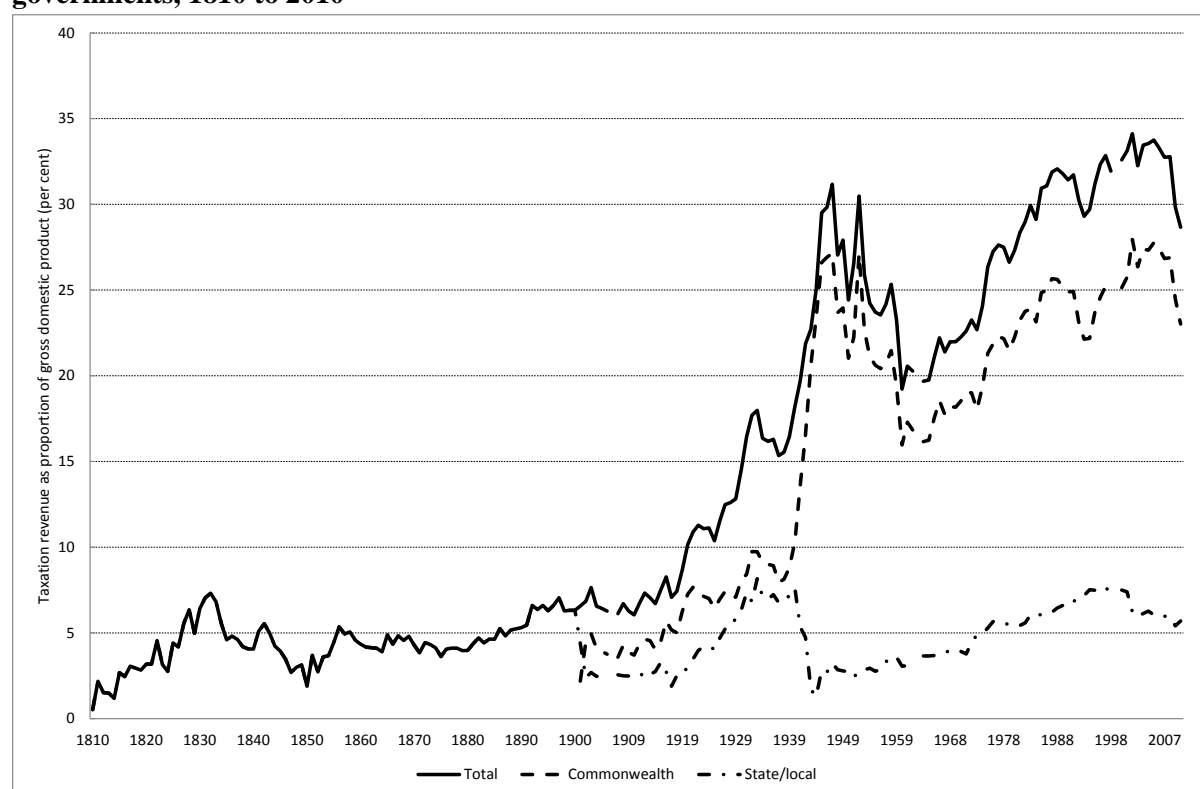
two-fold in both the 1990s and 2000s. The increase in taxation revenues over the past twenty years has tended to replicate the relatively modest taxation growth experienced during pre-World War II period of the 1920s and 1930s.

Reflecting the trend in the absolute growth of taxation revenue, the level of taxation revenue collected per head of population has also increased rapidly over the past few decades, and especially since the 1970s.

Over the ten years to 1974-75 the amount of taxes collected from each Australian man, woman and child tripled from about \$400 to \$1,260. During the ten years thereafter taxation revenue per capita again tripled, to \$4,170 per person in 1984-85. The slowing of taxation per capita growth since that period has been reflected in the fact that it had taken another twenty-five years, from 1984-85 to 2009-10, for overall taxation per capita to increase threefold.

It is also possible to express the level of taxation revenues collected as a proportion of GDP on an annual basis, deriving some insight into the extent to which taxes absorb an economy's productive capacity (Figure 3.4).

Figure 3.4: Total taxation revenue as a proportion of gross domestic product, Australian governments, 1810 to 2010



Data expressed in terms of current prices. Structural breaks occur in the taxation revenue series in 1906-07, 1962-63 and 1998-99.

Source: ABS 1997, 1998a, 1999, 2000b, 2001a, 2009a, 2011b, 2011c; Barnard 1987; N Butlin 1987; Foster 1996.

Despite tax revenue fluctuations, including as a consequence of periodic economic downturns, the overall experience of the nineteenth century was that of a taxation system which largely remained at or below five per cent of GDP. Even so, the evidence suggests that taxes collected by colonial and local governments breached the five per cent of GDP barrier by the early 1890s as the reduction in

taxes, including those recently instituted on income and property bases, during the 1890s depression were more than counterbalanced by a significant decline in GDP.

It was not until 1919-20 that taxation collections represented more than ten per cent of GDP, partly in reflection of the imposition of commonwealth estate duties, and entertainment and income taxes during and after World War I.

Taxation as a share of GDP remained reasonably stable during the 1920s, although a commonwealth sales tax and a raft of tax surcharges were introduced during the Great Depression leading to a significant increase in the tax-to-GDP ratio from about ten per cent in the mid-1920s to about 18 per cent by 1932-33.

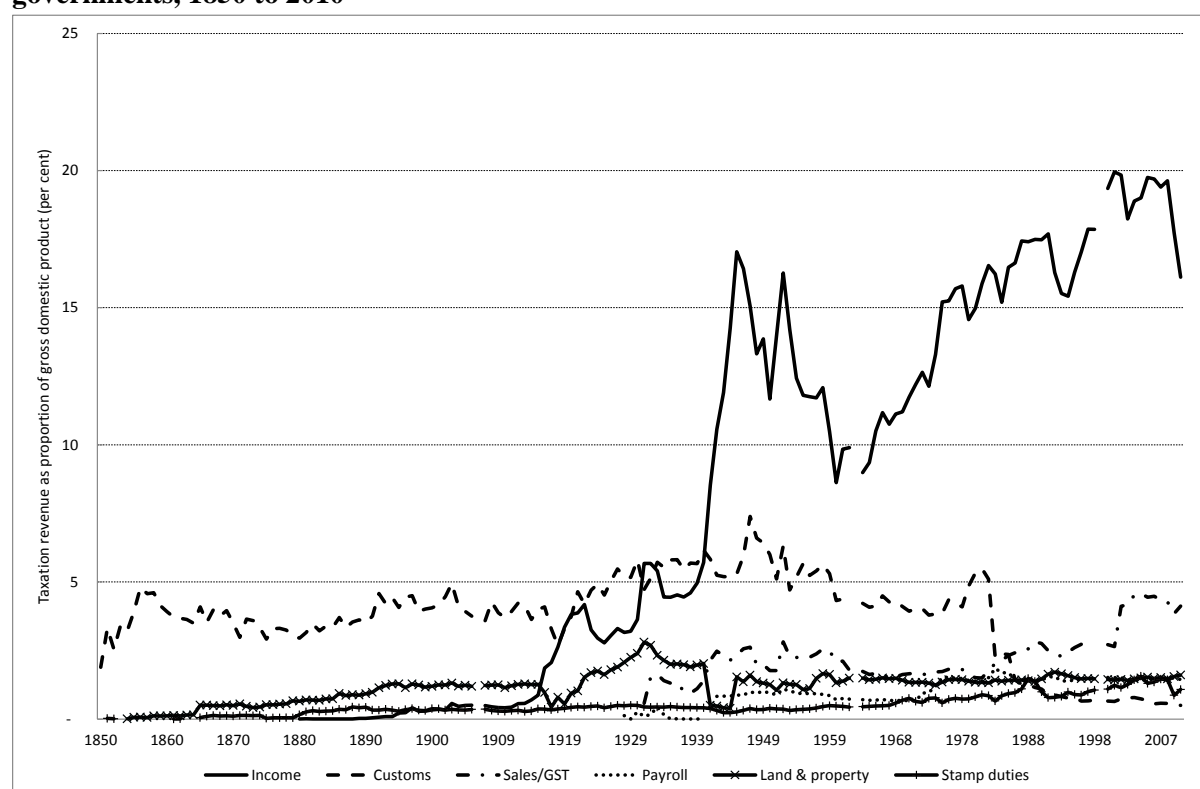
World War II presented significant opportunities for Australian governments to impose a range of new, and increases to existing, taxes to finance the war effort. As discussed previously, the commonwealth also engendered a redesign to Australia's tax assignment with its acquisition of the income taxation system.

These and other policies contributed to a doubling of the tax-to-GDP ratio over a ten-year period before and after World War II, from about 15 per cent in 1936-37 to about 31 per cent in 1946-47. While there was a trend reduction in taxation revenue as a share of GDP during the 1950s and early 1960s, with tax-to-GDP reaching about 20 per cent by 1961-62, this did not represent a complete reversal of the pre-World War II taxation increases.

Since that period taxation revenue as a proportion of GDP has generally continued to increase, with particularly strong increases from the early 1970s through to the late 1980s. Despite discernible fluctuations attributable to the 1990-91 recession and 2008-09 GFC, as well as taxation reform in 1999-2000 by commonwealth and state governments, the overall tax-to-GDP ratio has tended to stabilise over the last two decades albeit at historically high levels.

Underpinning the overall average tax share to GDP especially during the twentieth century is a large number of taxing bases exploited by governments in efforts to collect revenues (Figure 3.5).

Figure 3.5: Selected taxation revenue as a proportion of gross domestic product, Australian governments, 1850 to 2010



Data expressed in terms of current prices. Structural breaks occur in the taxation revenue series in 1906-07, 1962-63 and 1998-99.

Source: ABS 1997, 1998a, 1999, 2000b, 2001a, 2009a, 2011b, 2011c; Barnard 1987; N Butlin 1987; Foster 1996.

With the exception of customs duties, which have declined in importance as a source of revenue particularly since the 1970s, the GDP share of commonwealth taxes on incomes and on sales (including the goods and services tax (GST) introduced in 2000) have increased considerably during the post-World War II period despite significant annualised fluctuations attributable to changes in the business cycle.

By contrast the major taxes collected by the states (including stamp duties, taxes on land and property and, since the early 1970s, payroll taxation) have remained relatively constant as a share of national income.

While the data presented in this section illustrate that the taxation burden, as a proxy for the size of the government, have increased over time, some have suggested that official statistics tend to understate the true extent of the aggregate amount of revenue and taxation collected by Australian governments (Warren 2004; G Smith 2007; Novak 2011). This is due, in some part, to the notion that certain regulations enforce individuals or businesses to expend their own funds in certain ways which, in effect, act as taxes.

Since 1992 Australia has imposed a compulsory superannuation scheme requiring employers to contribute to superannuation funds on behalf of their employees. It is estimated that employers contributed \$72 billion to superannuation funds in 2009-10 (ATO 2011), although some of this amount made voluntarily either under salary sacrifice schemes or in excess of the compulsory nine per cent of employees' salary threshold.

In 2000 the commonwealth government introduced a scheme obligating individuals and families to purchase private hospital insurance, and maintain their cover, or pay a Medicare Levy Surcharge at the rate of one per cent of taxable income. In 2009-10 approximately \$13.5 billion was paid through health insurance funds (excluding premium rebates) (AIHW 2011).

The presence of public sector budgetary deficits has significant implications for the timing of tax payments since a budget deficit today effectively represents future increases in tax liabilities necessary to meet the budgetary shortfall. According to the ABS, the cumulative budget deficit for commonwealth, state and local government general government sectors (and multijurisdictional sector) in 2009-10 was estimated at about \$39.4 billion (ABS 2011c).

Adding these three elements alone to the official taxation statistics shows that the aggregate tax burden in 2009-10 was equivalent to about 39 per cent of GDP (at factor cost), or about ten percentage points higher than the official figure (Table 3.1). Even so, this figure arguably understates the true extent of the taxation burden as it excludes co-payments of various social services (e.g., education, health care), the provision of loans by governments, and the compliance costs of taxation (G Smith 2007).

Table 3.1: Adjusted taxation revenue as a proportion of gross domestic product, 2009-10

	\$ millions	Per cent of GDP
Taxation revenue (official estimate)	332,602	28.7
<i>plus</i> Employers' superannuation contributions	72,000	6.2
<i>plus</i> health insurance contributions	13,500	1.2
<i>plus</i> general government budget deficits	39,400	3.4
Taxation revenue (adjusted estimate)	457,502	39.4

Source: ABS 2009a, 2011c; AIHW 2011; ATO 2011; G Smith 2007.

3.3 Expenditure

3.3.1 Definition

The revenues acquired from individuals, households and businesses are dispensed by government towards maintaining a range of expenditure functions for, or on behalf of, members of the community. The importance of this element of public sector activity is underlined by the following statement by Bastable ([1892] 2003, p. 38): '[t]he question of the nature and amount of public outlays forms ... one of the cardinal branches of Finance.'

Consistent with this, a number of economists have subscribed to the view that the most appropriate measure of the size of government is centred upon the level of expenditures undertaken. For example, Peacock and Wiseman (1961) hypothesised that temporary increases in government expenditure during periods of major crises, such as wars, would lead to permanently higher revenues later as the population demands the retention of the crisis-period spending:

‘[e]xpenditures which the government may have thought desirable before the disturbance, but which it did not then dare to implement, consequently become possible. At the same time, social upheavals impose new functions assumed in wartime (e.g., payments of war pensions, debt interest, reparation payments) and as the result of changes in social ideas. Wars often force the attention of governments and peoples to problems of which they were formerly less conscious – there is an “inspection effect,” which should not be underestimated’ (Peacock and Wiseman 1961, p. xxxiv).

Barro (1974) suggested that an expenditure-induced government budget deficit would lead to lower private savings, as individuals expect higher taxes into the future to amortise the outstanding public indebtedness rendered by the additional current expenditure.

In the context of policy proposals to implement tax-and-expenditure limitations in the United States to ameliorate persistent governmental budget deficits, Friedman (1978) stated that ‘[t]he problem is not that we’re not taxing enough but that we’re spending too much.’

Nutter (1978) and, in the Australian context Laurie and McDonald (2008), also recommend the use of government expenditure on the basis that it provides a reflection of the extent to which a government possesses command over resources.

An important consideration when using public expenditure as a statistical measure of the size of government is that various components of expenditure simultaneously exist for various roles and functions and the fulfilment of numerous policy objectives. In turn the various forms of government expenditure may have different, yet significant, implications for economic performance.

Economists have long acknowledged the existence of ‘public goods,’ which ‘though they may be in the highest degree advantageous to a great society, are, however, of such a nature that the profit could never repay the expense to any individual or small number of individuals, and which it therefore cannot be expected that any individual or small number of individuals should erect or maintain’ (A Smith [1776] 1999, p. 310).

Given that, in sharp contrast with private goods sold on the market, public goods are non-rival and non-excludable in consumption, it is commonly argued by economists that public goods should thus be coercively funded by government through the imposition of taxation and other revenues. The range of outputs that comprehensively satisfy the requirements of the public goods definition are relatively few in number, with national defence and law and order usually cited as one case of a reasonable approximation of a ‘pure’ public good that is, for all intents and purposes, fully non-rival and non-excludable in consumption.¹⁴

In practice, most of the goods and services subject to ongoing governmental expenditure commitments have varying consumption rivalry and excludability characteristics, including as a consequence of technological advances and the deepening of private markets (Foldvary and Klein 2003). These include so-called ‘merit goods,’ such as education and health care, which can be privately provided but are often subject to extensive public sector expenditure and provision due to their widely acknowledged socially desirable attributes.

¹⁴ A number of libertarians have challenged the notion of defence and law and order as public goods that should be subject to public sector provision, citing the possibility of private security services providing more efficient protection for community members (de Molinari [1849] 2009; Hoppe 1999, 2003).

By contrast to these ‘exhaustive’ expenditures, which directly absorb real resources that are otherwise used by the private sector (Tanzi and Schuknecht 2000), governments also undertake expenditures in which cash and other resources are transferred between individuals, households or other entities typically in an attempt to redistribute incomes or achieve some other policy objective.

A proportion of government expenditures are for items that are consumed and used over a limited period of time. By contrast other expenditures, known as capital expenditures, are undertaken by governments for the development and maintenance of long lived non-financial assets (Gemmell 1993). These may include, for example, the construction of a road network, development of a public hospital, or the purchase of machinery and equipment in a government building.

It is possible to use official statistics on government expenditure by functional category to illuminate some of the expenditure distinctions outlined above. However the ability to robustly capture changes in expenditure by function, as is discussed below, may be compromised by occasional changes to statistical methodologies underpinning available data.

The ability to distinguish between various components of government expenditure has been aided further by the advent of national accounting standards during the twentieth century, which distinguish between government consumption expenditures, transfer payments and capital investment in non-financial assets. As will be discussed below, the nature of the inclusion of government expenditure in estimates of GDP has been the subject of longstanding controversy in the economics literature.

In addition, efforts to obtain estimates of governmental size using expenditure data should recognise the disaggregated nature of expenditures by the level of government which committed the usage of funds.

3.3.2 Data sources

In a similar manner to that of revenue, as outlined above, it is possible to derive a time series of data illustrating trends in aggregate expenditures by all levels of Australian government in the long run.

During the early 1800s the NSW colonial government gradually developed sophisticated public financial management systems, whereby expenditure was channelled through specific funds for earmarked purposes such as the maintenance of gaols and police services. Aggregate public expenditure gradually increased as new colonies were established in Van Diemen’s Land (Tasmania), Western Australia and South Australia.

Data for the calendar years 1810 to 1849 were derived from N Butlin et al (1986, 1987). However, it appears to be generally agreed by most Australian economic historians that these early colonial public finance estimates, at least up to the late 1810s or even in some instances beyond that period, should ‘be treated with a good deal of suspicion’ (N Butlin 1994, p. 61). In particular discrepancies between official estimates, including on the matter of bills drawn in the colonies and honoured by the British Treasury, allude to potential problems of double-counting within the available data sources.

Data for total expenditure by all levels of government on a financial year basis from 1849-50 to 1981-82, albeit with state and local government data missing in various years, are provided by statistical compilations prepared by economic historian Alan Barnard (1985, 1986, 1987).

Until 1961-62 expenditures only refer to those recorded within, or between, consolidated revenue or loan funds as authorised by parliaments or local government authorities. Throughout the Barnard series commonwealth payments to or for the states are excluded from the total expenditure figures presented (Barnard 1986).

From 1962-63 expenditures provided by Barnard were devised on a national accounting basis, and include data on net spending by all authorities (including semi-government entities) pertaining to each level of government.

From 1982-83 to 1994-95 ABS data on outlays by the general government sector and non-financial sector GTEs, as reported by Foster (1996), are included in the expenditure time series. From 1995-96 ABS government finance statistics data on spending by the non-financial public sector, including on an accrual accounting basis from 1998-99, are used to complete the time series into the first decade of the twenty-first century (ABS 1997, 1998a, 1999, 2000b, 2001a, 2011c). Aggregate government expenditures used in the constructed series included recurrent spending on goods and services and transfer payments to individuals, and gross fixed capital formation.

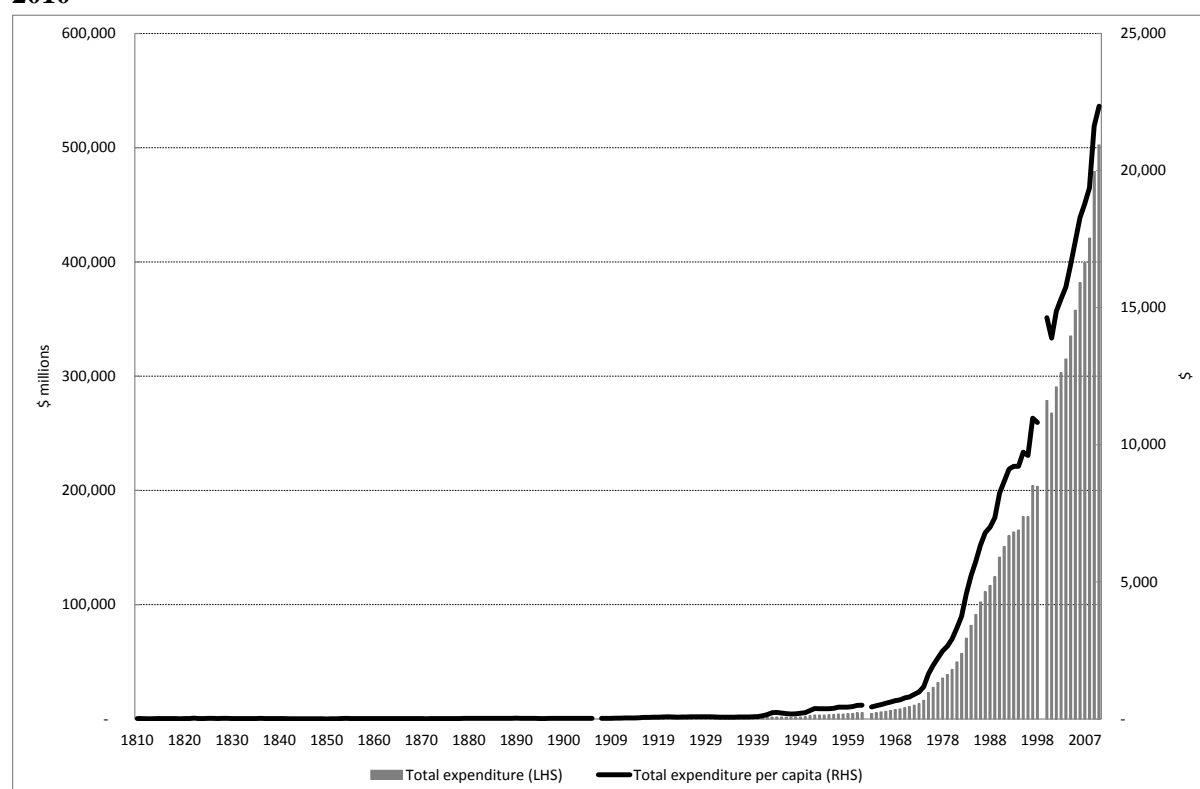
In a similar fashion concerning revenue statistics, the ABS separately classified the multi-jurisdictional sector (mainly comprising universities) alongside the commonwealth, state and local public sectors since 1995-96. Whilst spending by the multi-jurisdictional sector remain included within total expenditure, the amount of expenditure attributable to the state-local public sector appears smaller due to the separation of spending undertaken by multi-jurisdictional sectoral entities.

3.3.3 Trends

The available data suggests that expenditure by Australian public sector entities, at the commonwealth, state and local government levels, have increased significantly in the long run.

Figure 3.6 illustrates trends in total expenditure both in absolute terms and relative to population size. In terms of current dollars absolute levels of spending by all governments had increased from about \$133,800 in 1810 to over \$502 billion in 2009-10. Expressed in per capita terms public expenditures rose from about \$12 to about \$22,300 over the same period.

Figure 3.6: Total expenditure and total expenditure per capita, Australian governments, 1810 to 2010



Data expressed in terms of current prices. Structural breaks occur in the expenditure series in 1906-07, 1962-63 and 1998-99.
Source: ABS 1997, 1998a, 1999, 2000b, 2001a, 2008, 2009a, 2011a, 2011b, 2011c; Barnard 1985, 1986, 1987; N Butlin et al 1986, 1987; Foster 1996.

The significant rates of growth in expenditures since the late twentieth century tend to mask the fact that governmental spending from 1810 to 1890-91 increased from about \$133,800 to about \$81 million, equivalent to an annual compounded growth rate of about 8.2 per cent. As discussed in chapter 2, colonial governments extended their scope of spending activity during that period from defence, policing and justice services toward the construction and maintenance of capital works as well as social services including education, health and welfare.

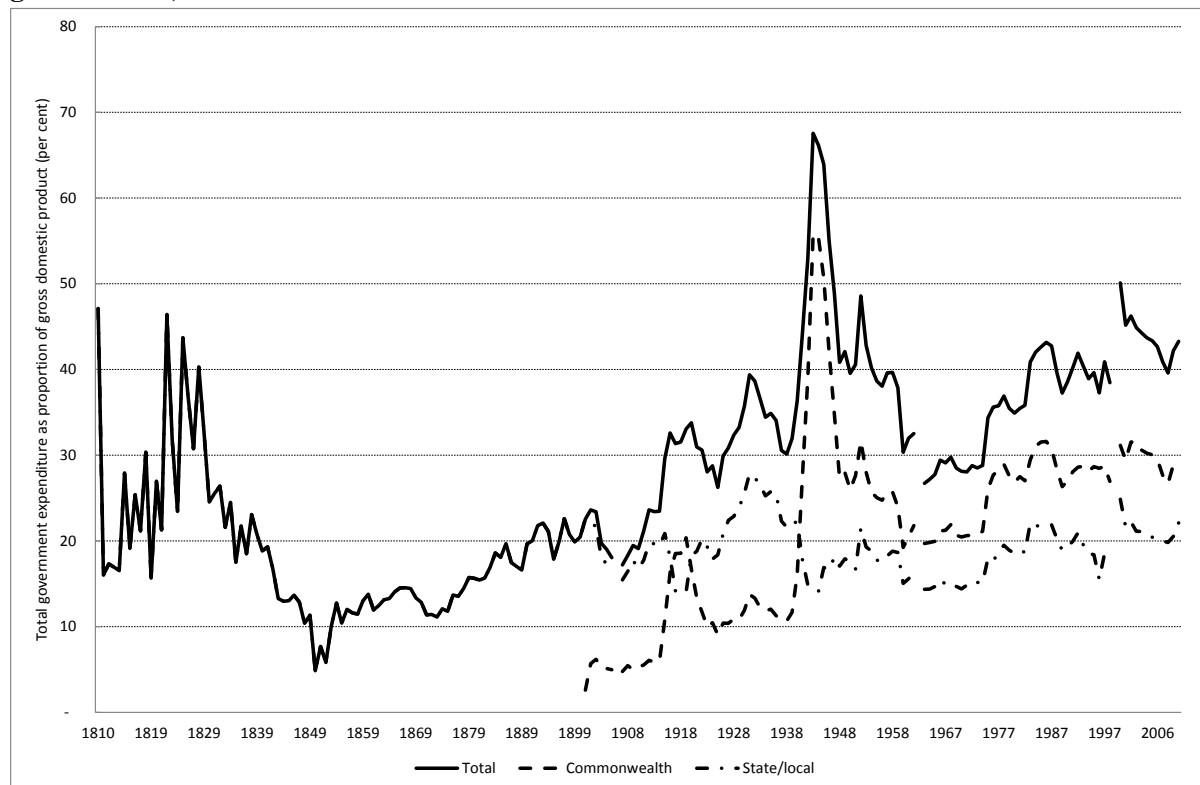
Even so, it was during the twentieth century, and particularly during the second half of this period, that significant momentum for additional spending by public sector entities was realised. From 1900-01 to the cessation of World War II in the Pacific in 1945-46, total spending by Australian governments increased from about \$86 million to about \$1.4 billion.

From 1946-47 to 1999-2000 expenditures by the commonwealth, states and local governments continued to increase from about \$1.3 billion to about \$268 billion, with increases in social and, more recently, environmental services spending particularly evident during the period. In aggregate terms expenditure growth was recorded on a compounded annual basis at about 10.7 per cent, whereas expenditures per capita over the period increased from \$177 to \$13,884.

During the ten years to 2009-10 public spending almost doubled from about \$291 billion to \$502 billion, with an increase in spending by about 26 per cent over the four years to 2009-10 alone. Commonwealth, state and local expenditures per capita increased from about \$14,900 to about \$22,400.

Australian government expenditures have also shown a general tendency to increase over time when expressed as a proportion of factor-cost GDP (Figure 3.7).

Figure 3.7: Total expenditure as a proportion of gross domestic product, Australian governments, 1810 to 2010



Data expressed in terms of current prices. Structural breaks occur in the expenditure series in 1906-07, 1962-63 and 1998-99. **Source:** ABS 1997, 1998a, 1999, 2000b, 2001a, 2008, 2009a, 2011a, 2011b, 2011c; Barnard 1985, 1986, 1987; N Butlin 1987; N Butlin et al 1986, 1987; Foster 1996.

From the 1810s to 1850s expenditures by the colonial governments were trending down as a proportion of GDP as the private sector gradually assumed increasingly prevalent roles in overall economic activity. In addition, the response by governments to the depression of the 1840s was to significantly reduce existing expenditures in order to maintain sustainable budgetary settings.

During the second half of the nineteenth century total government spending increased from five per cent of GDP in 1850 to about 20 per cent in 1900. As discussed in chapter 2, it was during this period that governments actively developed public infrastructures such as railways and telegraphs, and increased postal and other communication services, to support private sector development. With a deficiency of taxation and other revenues, governments extensively sought borrowings from major international financial centres to finance these additional expenditures.

Due in part to the formation of the commonwealth government in 1901 total Australian public sector expenditures continued to increase during the first half of the twentieth century, despite periodic reductions in spending during the mid-1920s and immediate period after the Great Depression.

The period during World War II coincided with a significant increase in total government expenditure, rising from about 30 per cent in 1937-38 to 68 per cent during the height of the War in

1942-43. A major contributing factor toward the increase in expenditure during this period was the significant expansion in military capital to sustain Australia's war effort as well as new social programs. The years immediately following World War II were characterised by a relative reduction in the importance of governmental activity in the Australian economy as military and other war-related expenditure commitments were reduced.

However, the momentum towards relatively smaller government was reversed during the early 1970s as a consequence of the extensive social policy programs implemented by the Whitlam government from 1972 to 1975.

In 1971-72, representing the fiscal year prior to the election of the Whitlam government, total Australian government expenditures represented about 29 per cent of GDP with commonwealth spending at about 21 per cent of GDP. By 1975-76 total public sector expenditure increased to about 36 per cent with the expenditure-to-GDP ratio of the commonwealth government at about 28 per cent. During this period state and local expenditures also increased by about three per cent of GDP.

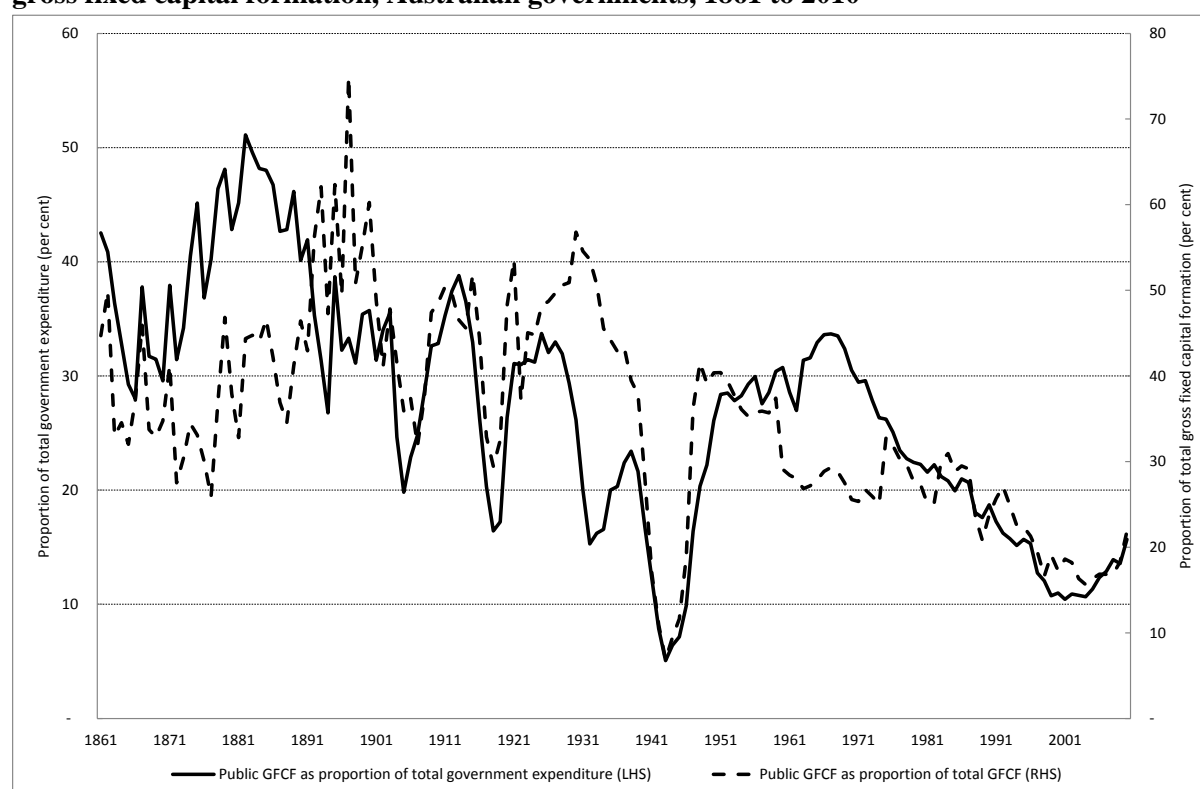
The expenditure initiatives of the Whitlam government were not reversed in their entirety by successive governments. Successive governments from the late 1970s to the 1990s introduced additional social security benefit schemes together with new and additional spending commitments in the areas of education, health, environment, recreation and culture. These activities ensured that the amount of governmental expenditure as a proportion of GDP continued to increase, albeit at a slower rate of growth compared to the Whitlam period.

Relative to the size of the overall economy spending by public sector entities during the first decade of the twenty-first century had declined, as the rate of expenditure growth in absolute terms slowed to about six per cent per annum on a compounded basis and as GDP increased substantially during the final years of a fifteen-year period of strong growth known as the 'Great Moderation.'

Since 2007-08 this trend towards a decline in the relative economic importance of governmental spending was reversed, as commonwealth, state and local public sectors engaged in Keynesian-style fiscal stimulus in an attempt to counter the economic contraction posed by the GFC.

It is possible to use available data sources to highlight trends in investment expenditures by governments on fixed assets (Figure 3.8). The available data reveals a general decline in the relative importance of public sector investment expenditure, both as a share of total government spending and total investment spending, during the post-World War II period.

Figure 3.8: Public gross fixed capital formation as a proportion of total expenditure and total gross fixed capital formation, Australian governments, 1861 to 2010

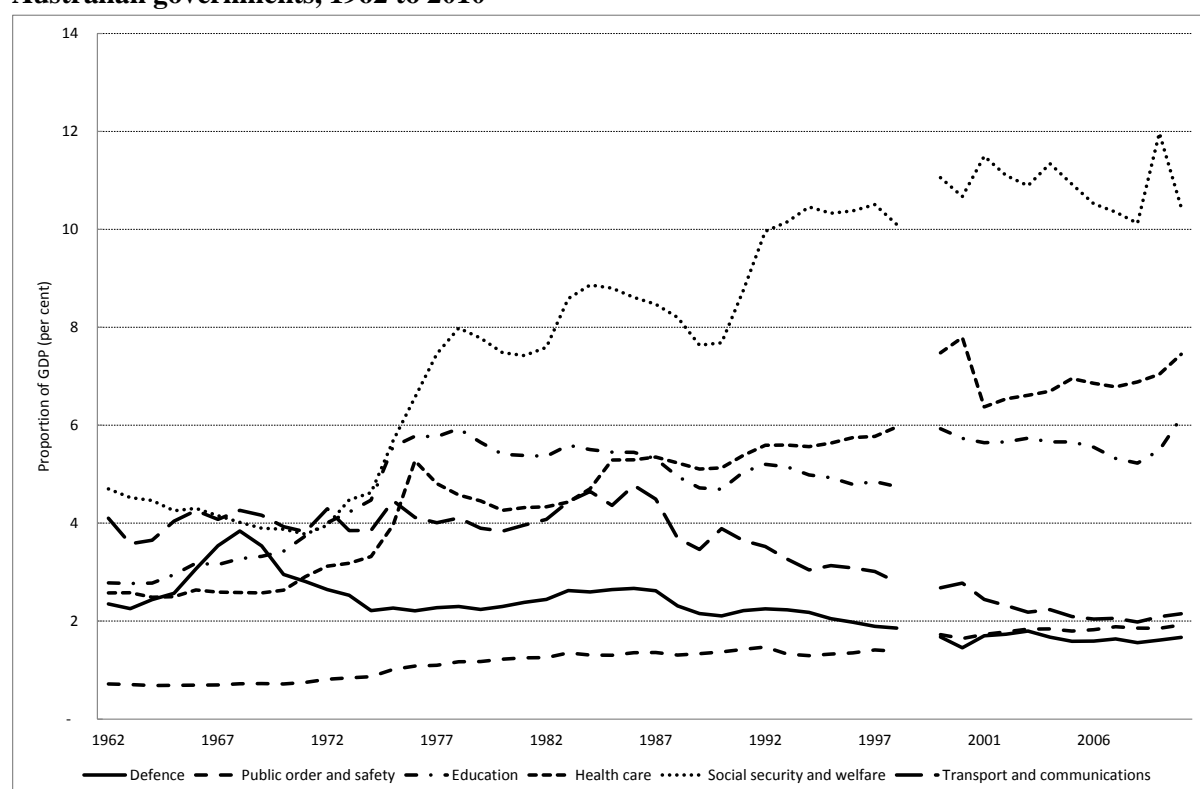


Source: ABS 2011b; N Butlin 1987.

Data is also available providing details of government expenditure classified by functional category, although inconsistencies in the classification of expenditures over time render it impossible to provide a reliably consistent time series over a particularly lengthy period of time.

Figure 3.9 provides information on the amount of total expenditure by governments by major functional category since 1961-62. It illustrates, on the one hand, the relative increases in commonwealth, state and local expenditures, as a share of GDP, towards education, health care, social security and welfare, and public order and safety and, on the other, modest declines in defence and transport expenditures.

Figure 3.9: Total expenditure by functional category as a proportion of gross domestic product, Australian governments, 1962 to 2010



Data expressed in terms of current prices. Structural breaks occur in the expenditure series in 1998-99.

Source: ABS 1997, 1998a, 1999, 2000b, 2001a, 2008, 2009a, 2011a, 2011b, 2011c; Foster 1996.

The data presented in this sector is reasonably comprehensive in scope in that it incorporates expenditures by government entities not directly funded through the budget process, including GTEs whose activities are largely funded through charges imposed on the use of goods and services provided.

Notwithstanding this, official expenditure statistics tend to understate the true level of expenditure by public sector entities. For example, governments may provide ‘tax expenditures’ that reduce the amount of tax payable by certain segments of the community. Most economists contend that tax expenditure effectively acts as a spending measure and, to some extent, are applied as substitutes for direct expenditure financed through government budgets.

The commonwealth and six state governments (excluding Tasmania and the Australian Capital Territory) provided estimates of tax expenditures in 2009-10 (Commonwealth Department of the Treasury 2011; New South Wales Treasury 2011; Northern Territory Department of Treasury 2010; Queensland Department of Treasury 2011; South Australia Department of Treasury and Finance 2011; Victoria Department of Treasury and Finance 2010; Western Australia Department of Treasury and Finance 2011). Despite the problems of a lack of consistency in the type and scope of tax expenditures quantified, the amount of tax expenditures disclosed by governments totalled about \$132 billion – equivalent to about 11 per cent of GDP. The inclusion of tax expenditures to the official estimate of government expenditure would imply that total adjusted expenditure would approximate 55 per cent of GDP at factor cost.

3.3.4 National accounting treatment of public expenditure: A digression

The treatment of government expenditures in national accounting frameworks has represented a contentious issue at least since the earliest manifestations of national accounts produced by government statistical agencies from the early to mid-twentieth century.

While there remains debate about the extent to which GDP may be regarded as a measure of welfare (e.g., Nordhaus and Tobin 1972; Waring 1988), GDP is conventionally recognised as an aggregate measure of the market value of final goods and services produced within an economy during a given time period. As noted by Stiglitz et al (2009) the aggregation of final outputs using market prices is important since market prices are assumed to reflect marginal valuations by individuals concerning the outputs produced.

However the extensive provision of largely non-marketed goods and services by governments, which are invariably provided to consumers at zero or subsidised cost, in modern economies poses numerous challenges to the conceptual and empirical integrity of GDP as conventionally measured.

The prevailing view is that spending on outputs by public sector entities represents an addition to national output and should thus be incorporated into various measures of GDP. While recognising that transfer payments, such as old-age pensions, should be excluded to avoid double counting of expenditures, John and Ursula Hicks (1939, p. 150) argued that remaining expenditures by governments should be included in the GDP measure:

‘[t]he protection of life and limb is presumably a part of final output, so is the use of the roads for pleasure purposes. How do we draw the line between the value of these services and the value of those services which ought to be deducted? The division seems to be entirely arbitrary. Consequently, if we want to measure something and not arrive at a figure for the national income which is what it is just because we say it is, it seems better to disregard this productive utilisation of public services, and to regard them (by definition) as being reckoned entirely into final output.’

In support of the contention that government outputs should be valued at factor costs, Hicks (1940, p. 116) stated that ‘unless we have any reason to suppose that the public services are produced under diminishing costs, we can take their average costs of production as a rough estimate (a lower limit) of their marginal utilities. The public services should thus be valued at cost.’

Similarly, Colm (1937, p. 184) suggested that ‘[m]oney valuations do not have the same significance in the various sectors of the social product. In the exchange sector they are determined by prices that represent the supply-demand relationship. In the realm of public activity they are determined by costs. Here we assume that the political bodies that appropriate the money consider government services at least worth their cost.’

The US Department of Commerce was an early adopter of national income accounting estimates, and had consistently included government expenditures at cost within their measurements. This approach was undertaken on the basis that the purchases of goods and services could be constructed as *final* purchases:

‘individuals, non-profit institutions serving individuals, and general government are ultimate buyers in the sense that they do not buy for resale in the market. Accordingly, their purchases are not elements of cost in the value of other output produced for the market. Hence there is a presumption that their purchases should be regarded as

final products in any measure which purports to give a complete accounting of the entire output of the nation' (Gilbert et al 1948, p. 183).

Further, this view rested on the presumption that consumers elected to obtain certain goods and services through collective rather than private action, and that funded government services typically cannot be resold.

The inclusion of government expenditures in GDP is also supported by some economists in that its inclusion would provide for a comprehensive indicator of economic activity enabling policymakers to more effectively engage in macroeconomic management.

Since the emergence of Keynesian demand-deficiency theories from the 1930s the conventional view in macroeconomic theory and policy is that any reductions in private sector consumption, investment and net exports (all measured at market prices) should be offset by increases in government expenditure (measured at factor cost) to maintain macroeconomic stability. This argument implies, *inter alia*, that government outputs not only affect economic performance in exactly the same way as privately provided goods but that factor cost evaluation is analogous to a market price evaluation under competitive conditions (Spindler 1982).

In contrast to such views, a number of economists have propounded the alternative suggestion that governmental expenditures should instead be excluded from the estimation of national output.

In a critical review of national income statistics produced by the United States National Bureau of Economic Research, Paton (1923) stated '[t]he treatment of government as an industry adding to national income seems ... to be essentially unreasonable. The value of the service of government in a broad sense is of course incalculable; but to assume that payments made by the government (in its various branches) as wages, salaries, pensions, and interest measure the value product of government is quite fantastic. Government is not a "source of production" (except in so far as the state enters into industrial activity). It is rather an agency which directs the expenditure of a considerable part of the income originating in the various branches of industry. That is, through the tax power the state effects a partial redistribution of income.'

One of the leading figures in the development of national income accounting during the twentieth century, Simon Kuznets, initially perceived most government outputs as being intermediate inputs used by the private sector and thus should not be included in GDP measures, which seek to quantify the aggregate market values of final outputs produced. In critiquing national accounts methodology prepared by the United States Department of Commerce implying that most government purchases should be classified as final outputs for inclusion in GDP, Kuznets (1948a, p. 156) stated:

'[a]t all times a major proportion of government activity is devoted not to the provision of services to ultimate consumers (education, health, etc.), but either to services to business (all types of economic legislation, administration, and adjudication) or to the maintenance of internal peace or external security. The latter is not a direct service to consumers: it is rather an antecedent and indispensable cost of maintaining society at large – a condition of economic production rather than an activity directly yielding final economic goods.'

Therefore classifying intermediate outputs provided by governments in national output aggregates would, according to Kuznets, entail a process of duplication that is unwarranted from a methodological standpoint.

In any case, complications arose when attempting to impute an appropriate value for government goods and services for inclusion in national accounts:

‘[h]aving identified the final product of governmental activity we find difficulty in valuing a large part of it – direct services to individuals – in a way comparable to privately produced services. For the latter, market prices to ultimate purchasers are a determining factor in individuals’ choices. For public services no such yardstick is available. We know what they cost the government; we do not know what they are worth to the individuals who consume them’ (Kuznets 1948b, p. 11).

Kuznets nominated an exception to this treatment of government expenditures under circumstances in which a nation is in a state of war, as was the case for Western countries during World War II (O’Brien 1994). During such a period all economic activities, regardless of the sector in which they are undertaken, may be presumed to become subordinate to national efforts for survival and war effort success:

‘most government activities are designed to preserve and maintain the basic social framework and are thus a species of repair and maintenance which cannot in and of itself produce net economic returns. Yet at certain junctures in the life of a country, e.g. in times of a crucial war, this interpretation may seem inadequate: it suggests the subordination of a life and death struggle to the flow of goods to individuals, and thus denies that at such times individuals’ current welfare may be less important than survival of the social framework. The argument would lead toward temporary recognition of success in war and preservation of a country’s social framework as a purpose at least equal in importance to welfare of individuals. The result would be to recognize all goods flowing into the armed conflict as final products; and to include in national income not only consumers’ outlay and net output of government ... , but also all expenditures of government on war purposes’ (Kuznets 1951, p. 184).

Buchanan and Forte (1961) endorse Kuznets’ general position that funding for, and provision of, public sector services which are not subject to direct consumer charges should be excluded from national accounts to avoid the quantitative overestimation of aggregate output. This includes instances in which the supply of publicly provided goods is constrained for whatever reason:

‘[t]he legitimacy of extending the exclusion even to these cases can, perhaps, best be shown by analogy. There are many “free” goods in nature that are strictly limited in supply. The sun shines only four hours per day on the average in some communities; clearly, “welfare” could be increased by more sunshine. But no effort is made to place a positive value on sunshine because no market transaction can produce more of the output. Instead, we assume implicitly that the adjustment processes of the economy act as to take the differential availability of such “free” goods into account. Publicly supplied but limited goods and services seem no different. If the individual secures the enjoyment of these goods without direct charge and cannot resell them through some sort of a market transaction, no value should be included in national output estimates’ (Buchanan and Forte 1961, p. 116).

The American economist Randall Holcombe supported the proposition that government output should be excluded from GDP: ‘[t]he first reason is that national income accounting conventions value private sector output at its market value, and if government output is valued using the same standard, it should also be included at its market value, which is zero. The second reason is that government output is almost always an intermediate good, and intermediate goods are not included in GDP’ (Holcombe 2004b, p. 394).

A significant implication of the inclusion of public sector spending in national income accounts, according to Holcombe, is that it generates a bias in public policy favouring a larger size of government. This is because increasing government expenditures, effectively treated as final outputs and counted at factor cost, will lead to an increase in GDP, even if the rising public spending and the coercive means of financing it displaces productive private sector activities.

Cowen (2011, p. 26, 28) conveys a similar objection to the conventional treatment of governmental expenditures in national accounts:

‘when it comes to national income accounting, and measuring GDP, we are valuing every one of these different expenditures at \$1. In our measurements, we are assuming that the quality, importance, and efficacy of government stays constant as the size of government grows. ... The larger the role of government in the economy, the more the published figures for GDP growth are overstating improvements in our living standard.’

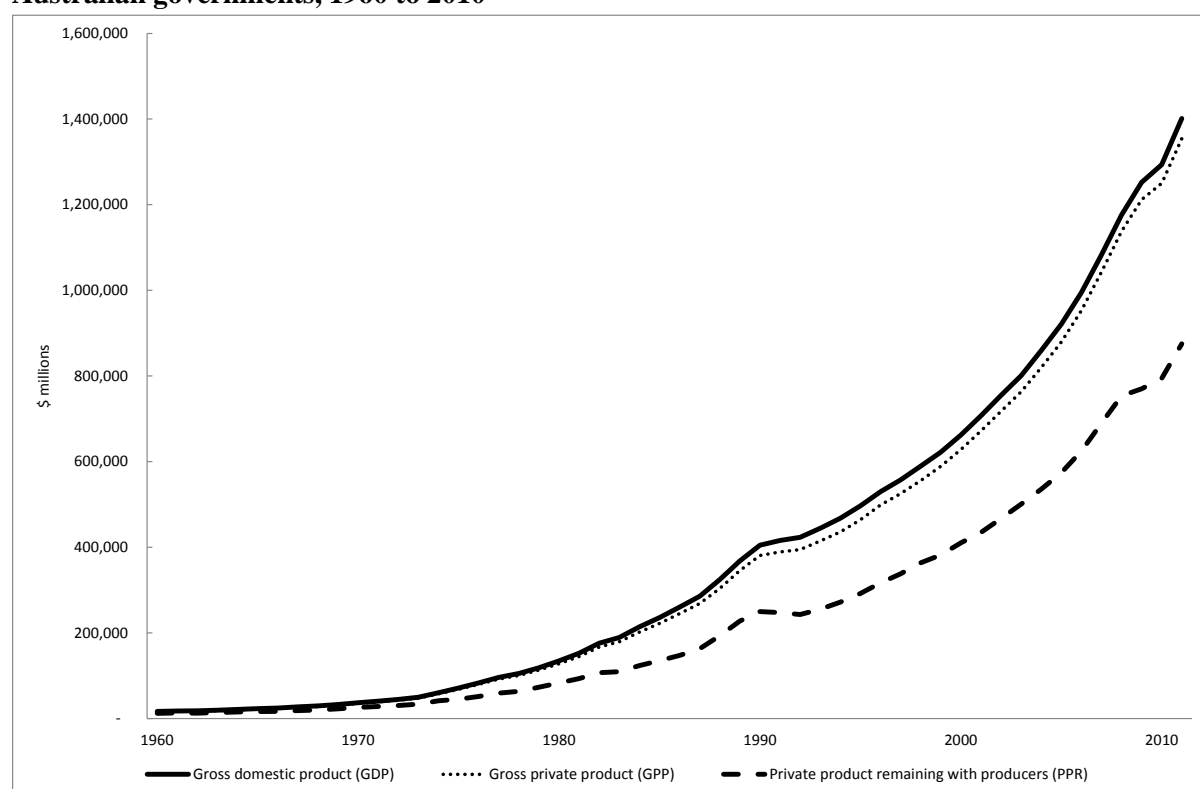
A number of libertarians, most notably Murray Rothbard, have attempted to provide alternative measures of aggregate output that depict governmental activities as harmful detractions from productive economic activities undertaken by the private sector:

‘[s]pending only measures value of output in the private economy because that spending is voluntary for services rendered. In government, the situation is entirely different: government acquires its money by coercion, and its spending has no necessary relation to the services that it might be providing to the private sector. There is no way, in fact, to gauge these services. Furthermore, every government-conscripted dollar deprives the citizen of expenditures he would rather have made. It is therefore far more realistic to make the opposite assumption, ... that all government spending is a clear deprivation upon, rather than an addition to, private product and private output’ (Rothbard 1975a, p. 296).

Consistent with this view Rothbard provides an alternative income accounting methodology that derives a measure of ‘private product remaining in private hands’ (PPR), by deducting both ‘income originating’ within all government entities as well as the ‘depredations’ of total government expenditures or revenue receipts (whichever is higher) from official estimates of GDP at market prices (including taxes less subsidies).

Figure 3.10 provides an adaptation of Rothbard’s methodology for Australia using the historical national accounts series provided by the ABS. The level of PPR is significantly lower than of GDP between financial years 1959-60 and 2010-11, with the proportion of PPR to GDP declining from 70 per cent to 61 per cent over the period. This finding suggests that the relative burdens exerted by government depredations upon the private sector have increased over time.

Figure 3.10: Measures of national output including and excluding ‘government depredations’, Australian governments, 1960 to 2010



Data expressed in terms of current prices. ‘Gross private product’ (GPP) defined as GDP less gross operating surpluses of general government and government trading enterprises. ‘Private product remaining with producers’ defined as GPP less ‘government depredations’ (total government expenditure or revenue plus interest received, whichever is higher). Series excludes incomes payable by public non-financial corporations.

Source: ABS 2011b; Batemarco 1987; Rothbard 1975a.

3.4 Regulation

3.4.1 Definition

In addition to acquiring revenue to subsequently expend upon a range of functions and activities, governments influence economic activities and outcomes by imposing rules, edicts or commands (enforced by the use of penalties) that control the behaviour and conduct of individuals, firms and other economic agents within the private sector.¹⁵ These rules are commonly referred to as ‘regulation.’

A number of scholars have argued that a consideration of legislative activities, required to sanction the use of regulation in modern democratic polities, is an important aspect of governmental activity that requires consideration in any analysis of government size and growth.

Higgs (1987, p. 32) has pointed out that ‘high levels of governmental taxing, spending, and employment derive from but are not themselves the essence of Big Government; the essence is a wide

¹⁵ These exclude the spontaneously-ordered emergence of rules and norms as adhered to by individuals and other participants within civil society in the guise of informal regulations, such as customs, conventions and traditions, and forms of self-regulatory conduct that are conducive to mutually beneficial interactions between individuals and groups without recourse to government intervention (Porket 2003).

scope of effective authority over economic decision-making. Authority comes first: no authority, then no taxing, spending, or employment. Authority arises from executive orders, statutes, court decisions, and the directives of regulatory agencies.’

Similarly, Kirchner (2011a, p. 2) explains that ‘[a]cts of parliament are among the most important outputs of the political process. New ... government policy initiatives and programs typically require enabling legislation, so the growth in federal legislation serves as a proxy for growth in government and may capture elements of both size and scope of government.’

Since the publication of an influential study by Posner (1971), there has been growing recognition within the economics literature that governments may substitute regulation for revenue-raising and thus rendering the apparent fiscal size of government smaller than it would have been if they chose to fulfil all of their policy objectives through revenues. As discussed more recently by Brennan and Kliemt:

‘[t]hose who are at the helm of the ship of state can pursue their aims, ends or values by means of rule fixing or by revenue raising and allocation. For them, the regulatory and fiscal options become substitutes in the pursuit of their own gubernatorial ends. To the extent that there is a relationship between imposing regulations and tax revenue foregone this will possibly put a check on regulatory activities. Vice versa, the expectation of enhanced tax revenues will provide an incentive to deregulate spheres that have been regulated or to enact beneficial GDP-enhancing, rather than harmful, regulations’ (Brennan and Kliemt 2008, p. 251).

There are a number of ways in which regulation can be categorised. They may be classified as either ‘economic’ regulations, which directly affect private sector decision-making in markets such as pricing, competition or entry and exit, or ‘social’ regulations which protect broader community interests in areas including health and safety, environmental amenity and social cohesion (Productivity Commission 2007).

Another method by which regulations may be categorised is with respect to the legal instrument in which they are established. The more explicit forms of regulation are specified in ‘black letter’ laws such as primary and subordinate legislations, formal orders, administrative decisions or guidelines and policies.

It is notable that the extent of regulatory activity by governments is not necessarily limited to these forms of instruments, but can extend into areas of ‘quasi-regulation’ such as industry codes of practice, guidance notes, standards, industry-government co-regulatory agreements, accreditation and licensing schemes (Productivity Commission 1998).

An important, but underappreciated, element of government regulation practiced in Australia and other countries includes moral suasion by politicians to influence the behaviour of market participants, including threats of future regulation if desired practices or standards are not adhered to (Riha 1982). Such practices could also be construed as a form of (albeit implicit) regulation by government of private sector economic activities.

While a limited number of studies have sought to quantify the financial or economic costs of regulatory activity undertaken in Australia (Confederation of Australian Industry 1980; Moran 1987; Productivity Commission 2006), the expansive nature of regulation and the indirect manner in which

it affects relative prices throughout the economy has made it difficult to reliably measure these impacts on a regular or consistent basis.

Given these difficulties, analysts have been forced to resort to indirect measures of regulatory burden which may not necessarily relate to the economic consequences of regulatory edicts in force (Saunders and Klau 1985). A strategy regularly employed in the literature to establish the size of government, as reflected in regulation, is to count the amount of primary or secondary legislation passed by parliaments usually on an annual basis, and the total number of pages of all Acts passed therein.

However, certain criticisms have been levelled against the use of such a measure as a proxy for the amount and growth of regulation.

There is no necessarily unambiguous relationship between the number of pages of ‘black letter’ regulation, enacted or already in force, and the number and extent of regulatory obligations that economic agents need to comply with. This is because the number, of numbers of pages, of legislation does not necessarily reveal the actual degree of prescription exuded by regulation, nor do they entail any information concerning the extent of practical enforcement of regulatory impositions. It is conceivable that lengthy, but well-drafted, legislation could, in some circumstances, reduce compliance burdens by clearly explaining regulatory obligations to affected parties and providing greater certainty by limiting the discretion of regulators (Productivity Commission 2006).

In addition, comparability of the number of pages of primary legislation passed or assented is compromised by the manner in which Acts are published. This is because publishing standards, including font size and formatting style, for legislation tend to vary by jurisdiction and, furthermore, these may change over time.¹⁶

3.4.2 Data sources

Recent analyses of the amount of regulation imposed by Australian governments, most notably Berg (2008) and Kirchner (2011a), has been drawn from commonwealth and state legislation websites which provide information about the amount of primary legislation passed or assented in each calendar year and the number of pages for each legislative item.

This chapter augments these earlier analyses by updating data on the number of pages of legislation passed or assented to 2010, as well as including archived data relating to the numbers of pages legislation passed by each colonial legislature from the period of self-government within each jurisdiction respectively. Excluded from this data series are information on the amount of imperial legislation in force from European settlement in 1788 until the twentieth century.

Data on the number of pages of primary legislation for the commonwealth since 1901, and the six state governments from the 1950s or 1960s until the late 2000s, was provided in Berg (2008). For the purpose of this chapter, data for the states was subsequently updated to 2010 drawing upon state

¹⁶ Mulligan and Schleifer (2003) suggest that the estimation of the number of kilobytes of unannotated legislation may be a feasible alternative measure of the extent of the regulatory burden. While this approach would control for variations in legislative publication standards, it is not possible to pursue this approach for this study due to the existence of archive legislation for a number of states in hard-copy form only.

legislation websites while information concerning the two territories (pertaining to their periods of self-government) was collected from various sources.

The historical coverage of the legislation websites varies across jurisdictions, necessitating that the requisite information also be drawn from available library or other archives. Information for Queensland and Tasmania prior to the 1960s, and that for the Northern Territory prior to 2005, was manually calculated drawing upon hard-copies of available legislation. For some years information providing details of all legislation passed or assented is unavailable.

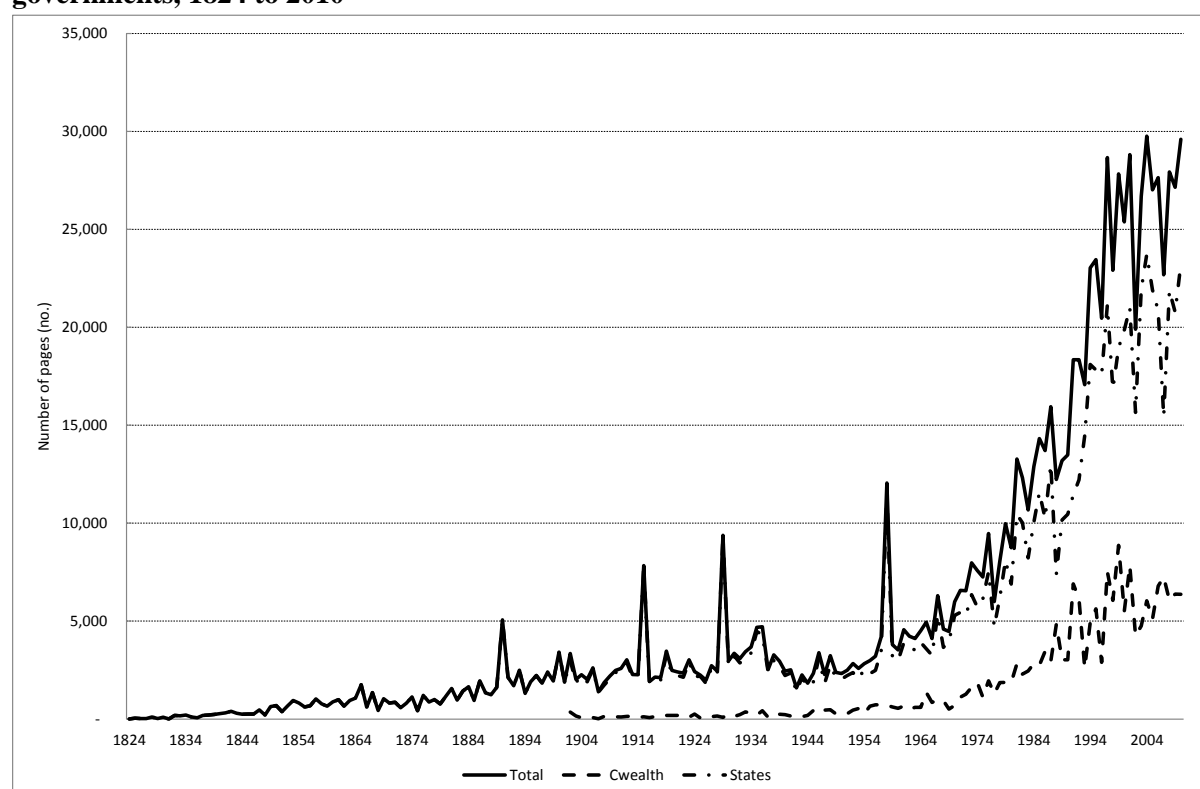
The legislation subject to the page counting process included new Acts passed or assented in each year, as well as amendments to existing legislation and consolidated Acts (given the likelihood that consolidated legislation would include both old and new regulatory provisions). Consideration of these forms of primary legislation contributes to the observed variations in the number of pages counted on an annual basis.

Information was also acquired from these sources in relation to the number of Acts of Parliament passed or assented each year, which is used in this section to provide information about the number of pages per item of primary legislation passed or assented.

3.4.3 Trends

Figure 3.11 illustrates the observed trend in the number of pages of primary legislation passed or assented since the first year of self-government for the colonies (except for Tasmania) and the two territories and the establishment of the commonwealth government.

Figure 3.11: Number of pages of primary legislation, Australian commonwealth and state governments, 1824 to 2010



Data presented on a calendar basis. Does not include all legislation enacted or passed in each year. Commonwealth data for 1902 refers to both 1901 and 1902.

Source: Berg 2008; Government legislation and legislation websites.

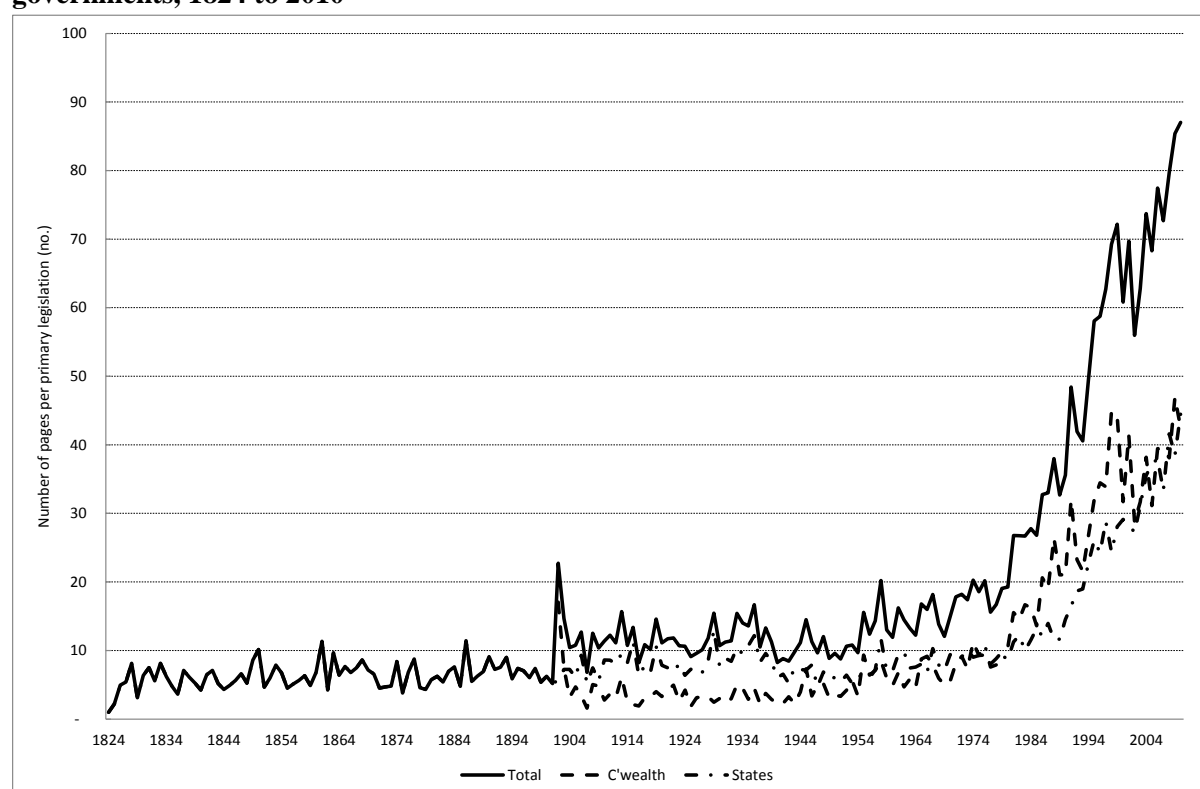
Notwithstanding infrequent instances in which Victoria enacted consolidated versions of existing legislation, such as corporate governance and health Acts, the commonwealth and individual state governments generally did not enact, or have passed under Royal Assent, primary legislation totalling over 1,000 pages on an annual basis prior to the 1960s. From the late 1960s there has been a general tendency by governments to significantly increase each year the number of pages of legislation enacted or assented.

As discussed in chapter 2, the post-1960s trend of growing regulation is attributable, in part, to government policy responses to environmental and social issues which gained political prominence. Australian governments increasingly imposed such legislation in accordance with their acceptance of international treasury obligations (Senate Legal and Constitutional References Committee 1995).

While the objectives of economic reforms pursued by governments since the 1980s were aimed at according greater opportunities for market forces to spontaneously influence resource allocations, government tended to enact new, or reconfigure existing, economic regulations rather than abolishing them altogether. In the areas of competition, financial and labour markets, governments invariably imposed complex legislation including on a harmonised basis between the commonwealth and states.

The growth in the complexity of Australian regulation is proxied by the number of pages per item of primary legislation passed or enacted each year (Figure 3.12). The Figure illustrates the significant increase in regulatory complexity since the 1970s.

Figure 3.12: Number of pages per primary legislation, Australian commonwealth and state governments, 1824 to 2010



Data for states refer to the average number of pages per primary legislation passed by all states and territories. Commonwealth data for 1902 refers to both 1901 and 1902.

Source: Berg 2008; Government legislation and legislation websites.

In terms of the evolution of subordinate legislation in Australia, Berg (2008, 2009) and Kirchner (2011b) confirm that subordinate legislation in the commonwealth and state broadly parallels the increase in total legislation observed over the past four decades.

Given the large numbers of local government authorities in Australia there has been a paucity of information concerning the quantity of regulation imposed by urban and regional councils and shires. In a recent stocktake of the amount of regulation imposed on businesses, the Productivity Commission (2008) found significant differences in the numbers of local laws administered by selected capital city local governments and the number of pages associated with those laws.

3.5 Public sector employment

3.5.1 Definition

Another aspect of public sector activity is the role of government as an absorber of resources which would otherwise be available for use by private sector entities. Of particular interest to researchers is the utilisation of governments of labour resources.

In similar fashion to the use of regulatory indicators, consideration of government employment may conveniently abstract away from the practical problems associated with any attempt to measure public sector size using fiscal variables. However there are a number of issues that need to be taken into account when determining the numbers of people employed by governments.

One factor relates to the distinction between civilian staff largely employed within the administrative apparatus of government, and the numbers of defence force personnel for the purposes of the security of a country and engagement in conflicts overseas. In terms of the latter a further distinction can be made between permanent defence force personnel, and civilians who enlist themselves onto defence force reserves waiting for active engagement when required.

Another key consideration is that estimates of the size of employment by governments may be influenced by the statistical coverage of the public sector more generally. As discussed by Barnard et al (1977), potentially relevant statistical boundaries for public sector employment could range between a 'narrow' limit, restricted to public servants subject to public service legislation, or a broad coverage incorporating staffing numbers in all institutions for which government authority is required to approve appointments of senior personnel.

It could be argued that even the broader conception of public sector employment described by Barnard et al (1977) understates the extent of influence or command by governments over labour resources in an economy.

Staff operating within the private sector may effectively produce or provide goods and services for, or on behalf of, governments as a result of contract or grant arrangements entered into with public sector agencies or other entities. As described by David Smith (2006, p. 59-60), 'there are numerous private sector consultants (including many economists) working on government projects, who are only a paper transaction away from being government employees.'

In addition to this, and as noted above, private sector entities tend to be encumbered by commonwealth, state or local government regulations, ensuring that government objectives are satisfied without recourse to explicit public funding (Light 1999).

3.5.2 Data sources

The availability of civilian public sector employment data during the colonial era is relatively sparse and subject to intercolonial differences in reporting methods.

In 1861, and roughly every ten years thereafter until Federation, the six colonies undertook census surveys of the demographic, social and economic characteristics of their populations. The data collected included information of the number of people employed by various occupational classifications, and were drawn from the Historical Census and Colonial Data Archive, an online portal of census publications and reports maintained by the Australian National University.

The colonial era data reported in this section were restricted to persons employed under general government occupations and other clearly identified public sector occupations such as policing and justice. However this understates the total numbers of people employed by the colonial public sectors, to the extent that personnel worked under generic occupations fully funded or partially subsidised by governments which were not explicitly identified in the census reports.

By contrast employment data for the twentieth and twenty-first centuries are reported on a sectoral basis, more effectively capturing public sector employment including employees working within various GTEs.

Barnard et al (1977) provide a comprehensive time series of public sector employment estimates for commonwealth, state and local governments from Federation, as at 30 June of each year as far as practicable. The coverage of data provided by these authors is reasonably comprehensive, as it includes all staff subject to government appointment including in a range of GTEs.

Notwithstanding a number of limitations concerning data availability and time period applicable to data elements in the series, a shortcoming of the Barnard series is that it excludes public hospital and university employment throughout. To correct for the exclusion of these types of employment attributable to state governments, data on employment in public hospitals and university teaching and professional staff, drawn from the CBCS/ABS 'Year Book Australia' series, are included back into the series.¹⁷

From 1950 to 1994 data on commonwealth, state and local employment was sourced from Foster's compilation of Australian historical data published by the Reserve Bank of Australia (Foster 1996). From 1995 public employment data was sourced directly from the ABS (2007; 2009b; 2010d). These two data sources include total civilian employment by governments, including in public hospitals and tertiary education institutions.

3.5.3 Trends

As noted above official labour market census data for the nineteenth century was categorised on the basis of occupational, rather than sectoral, status (Table 3.2). The available data suggests that the numbers of people employed in explicitly identified government occupations grew considerably since the early 1860s, with significant increases particularly in NSW, Victoria and South Australia.

Table 3.2: Civilian personnel working in selected public sector occupations, Australian colonies, number

	NSW	Vic	Qld	WA	SA	Tas	Total
1861	1,752	273	822	1,010	3,774	230	7,861
1871	3,472	1,646	1,495	615	4,150	432	11,810
1881	5,486	1,401	1,871	627	3,995	483	13,863
1891	7,261	2,265	1,911	963	6,431	483	19,314

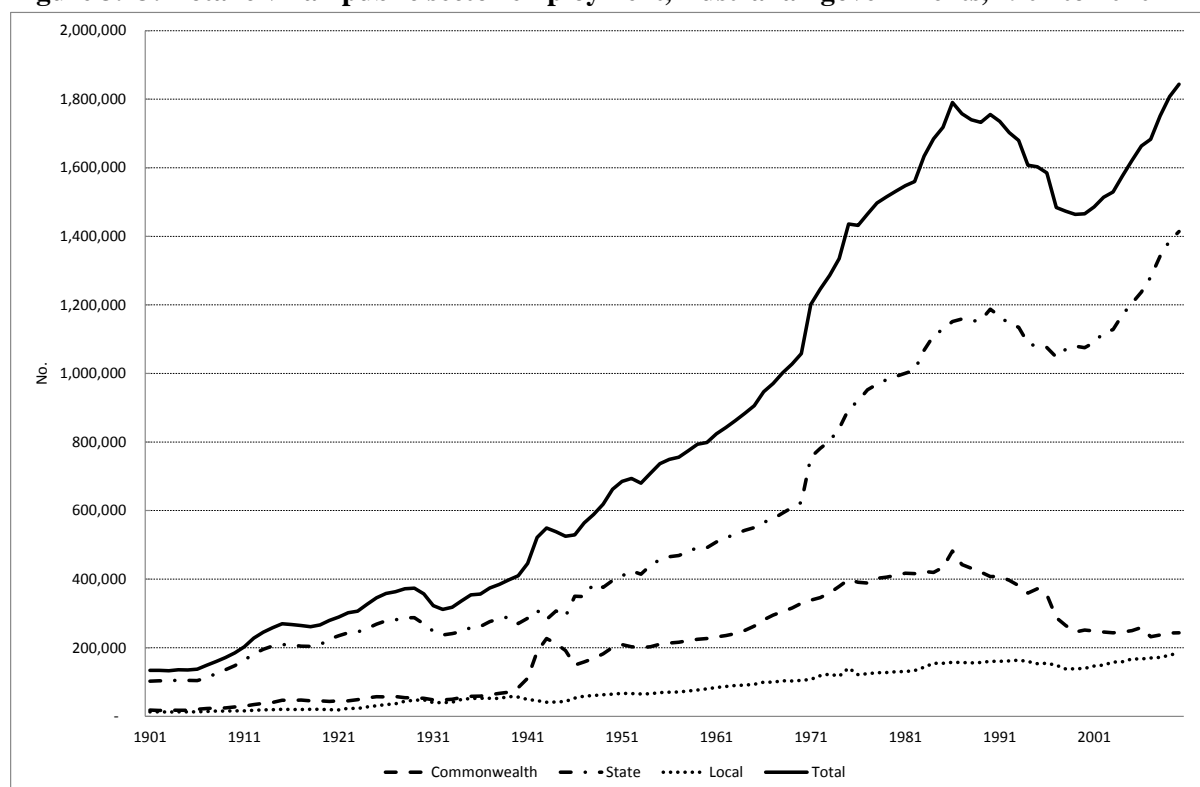
1861 and 1871 Census data for Victoria includes defence personnel, while data for Western Australia excludes females. 1871 Census data for Western Australia and Tasmania is for 1870.

Source: Historical Census and Colonial Data Archive.

The available data on civilian public sector employment from 1901 to 2010, classified on a sectoral basis, also reveals a general trend of increasing numbers of personnel employed by all levels of government (Figure 3.13).

¹⁷ This data in turn is affected by variations in coverage over time. Hospital employment data initially covered government as well as other hospitals available to the general public, whilst university employment initially included professorial and lecturing staff only. This coverage was gradually altered so as to incorporate employment in government funded and managed public hospitals and all teaching and professional (excluding administrative) university staffing.

Figure 3.13: Total civilian public sector employment, Australian governments, 1901 to 2010



Civilian public sector employment data from 1901 to 1949 adjusted to include public hospital and university employment by state governments.

Source: ABS 2007, 2009b, 2010d; ABS and CBCS, various years, Year Book Australia, cat. no. 1301.0; Barnard et al 1977; Foster 1996.

The growth rate of public sector employment remained reasonably stable during the pre-World War II period, notwithstanding a reduction in personnel by all levels of government of about 13 per cent between 1930 and 1932 as governments sought to reduce their expenditures in response to the Great Depression.

During the Second World War there was a significant increase in commonwealth civilian employment, rising from 66,700 people in 1938 to a wartime peak of 227,100 in 1943 – an increase of about 240 per cent over the period. State government employment also increased, whilst the total numbers of local government personnel declined from 52,000 people in 1938 to 41,000 people in 1943.

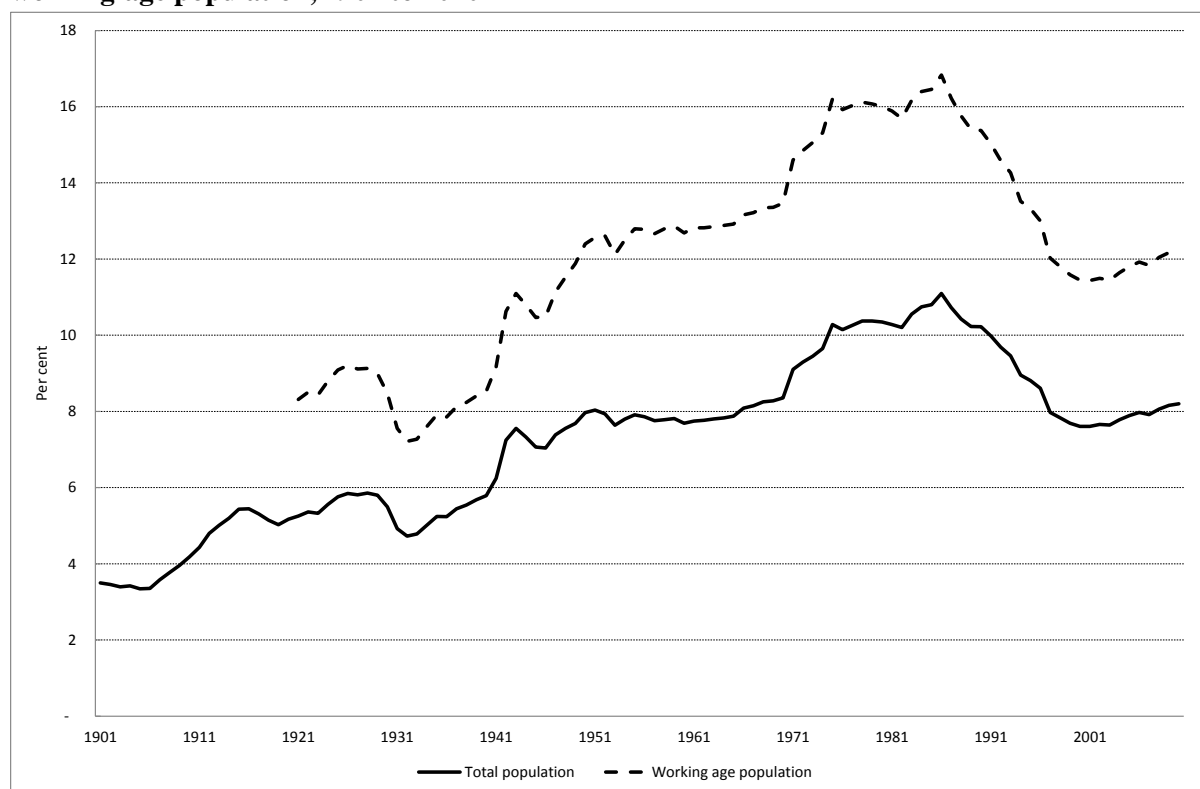
As noted in chapter 2 governments, particularly at the commonwealth and state levels, privatised a range of public sector assets from the 1980s as part of a broader program of reforms to enhance Australia's economic performance. This had the effect of reducing public sector employment particularly as GTEs, or selected operational functions undertaken by these entities, were divested to the private sector.

As a consequence of such initiatives, total civilian public sector employment declined from a then-record high of about 1.8 million people in 1986 to about 1.6 million a decade later. This was equivalent to a reduction in government employees by some 11 per cent. By 1999 the numbers of people employed by commonwealth, state and local governments further declined to about 1.5 million.

This trend decline had been reversed during the first decade of the twenty-first century, as Australian government again increased their employment levels to reach a new post-Federation high of about 1.8 million people in 2010. Most of the increase has been attributed to state and local governments, whilst the overall numbers of civilian staff employed by the commonwealth had fallen slightly over the course of the decade.

It is possible to complement the above analysis by identifying changes in public sector employment as a proportion of either the total or working-age population (Figure 3.14).

Figure 3.14: Total civilian public sector employment as a proportion of total population and working-age population, 1901 to 2010



Total population data as at 31 December of each year (and December quarter from 2006 to 2010). Total working-age population data as at 30 June of each year (and June quarter from 2007 to 2010). Civilian public sector employment data from 1901 to 1949 adjusted to include public hospital and university employment by state governments.

Source: ABS 2007, 2008, 2009b, 2010d, 2011a; ABS and CBCS, various years, Year Book Australia, cat. no. 1301.0; Barnard et al 1977; Foster 1996.

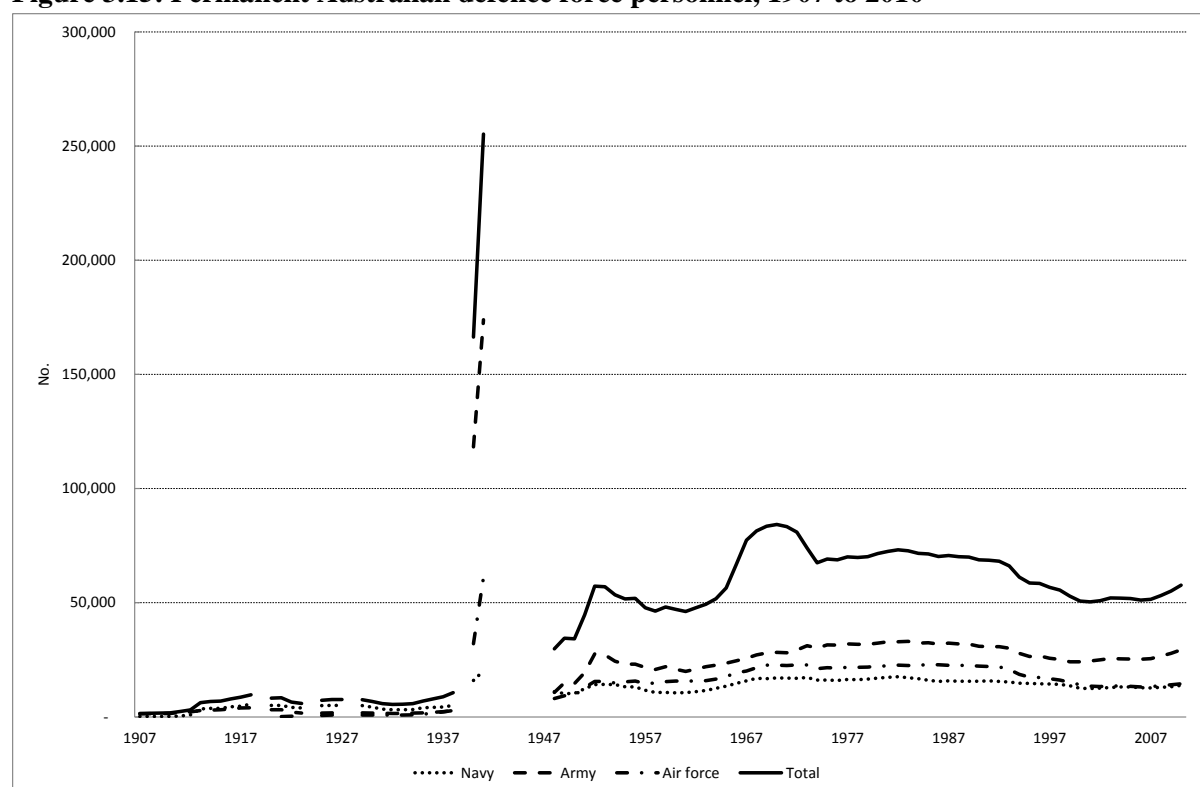
Expressed as either a proportion of total or working-age populations, Australian civilian public sector employment increased in trend terms from the early 1930s to the 1970s. By 1986 employment by all levels of government reached a peak of about 11 per cent and 17 per cent for total population and working-age population respectively. This had been followed by considerable reductions in the public sector employment share, to eight per cent of total population and 12 per cent of the working-age population in 2010.

In addition to civilian employees, the commonwealth government since Federation has employed defence force personnel to protect Australia from external aggression and wage military campaigns in

international theatres of conflict. Figure 3.15 provides information, where available, on the numbers of Australian permanent army, navy and air force personnel since the early twentieth century.

The data illustrates the significant escalation of defence personnel during the Second World War, and to a lesser extent the Korean and Vietnam wars, and the subsequent reduction in defence numbers upon the end of each military campaign. In recent years there has been a modest increase in defence personnel attributable to campaigns being waged in conjunction with international forces in Iraq and Afghanistan.

Figure 3.15: Permanent Australian defence force personnel, 1907 to 2010



Personnel employed by the Army National Service between 1964-65 and 1973-74 included in total.

Source: ABS 2001b; Commonwealth Department of Defence, various years, Annual Reports; McKernan 1987.

In addition to the direct employment of civilian and non-civilian staff, governments maintain contractual relationships with non-government entities (including for-profit and not-for-profit organisations) to provide various goods and services on their behalf. These arrangements, in turn, provide opportunities for the service delivery entity to employ labour in order to fulfil their contractual obligations.

The Productivity Commission (2010) noted that not-for-profit (NFP) organisations actively provide a wide array of education, health, welfare and cultural services on behalf of governments. As a consequence of this service delivery role, in which governments ‘purchase’ selective services from NFPs, NFP organisations received public funding in the order of \$26 billion in 2006-07 representing a third of total NFP revenues.

In addition to selective purchaser-provider arrangements with the private sector, Australian governments have also more broadly fostered the creation of subsidised and regulated ‘quasi-markets’ entailing significant service delivery functions undertaken by private sector organisations.

An example of this was the establishment of Job Services Australia (formerly the Job Network) by the Howard commonwealth government in 1998, in which private, non-profit and government organisations were contracted by the commonwealth to provide various employment services and labour market programs, including for the unemployed (Novak 2003).

Australian governments have also contracted private sector entities to design, build, operate, manage and finance new economic and social infrastructure in what are commonly referred to as 'public-private partnerships' (PPPs). It has been estimated that 39 PPP projects totalling approximately \$17 billion were contracted with private entities in Australia between 2000 and 2006, with such arrangements accounting for about five per cent of public infrastructure investment in 2006-07 (Chan et al 2009).

The commonwealth and state governments (except Tasmania and the Australian Capital Territory) maintain databases containing information on contractual arrangements they enter into with the private sector for the provision of a wide array of goods and services. It is estimated that, for contracts commenced between 1 July 2009 and 30 June 2010, governments expended approximately \$23.4 billion on outputs from the private sector (including capital projects).

In the modern democratic state numerous individuals and organisations, irrespective of the nature of their financial relationships with governments, also seek to influence governmental policies in an effort to fulfil their specific objectives.

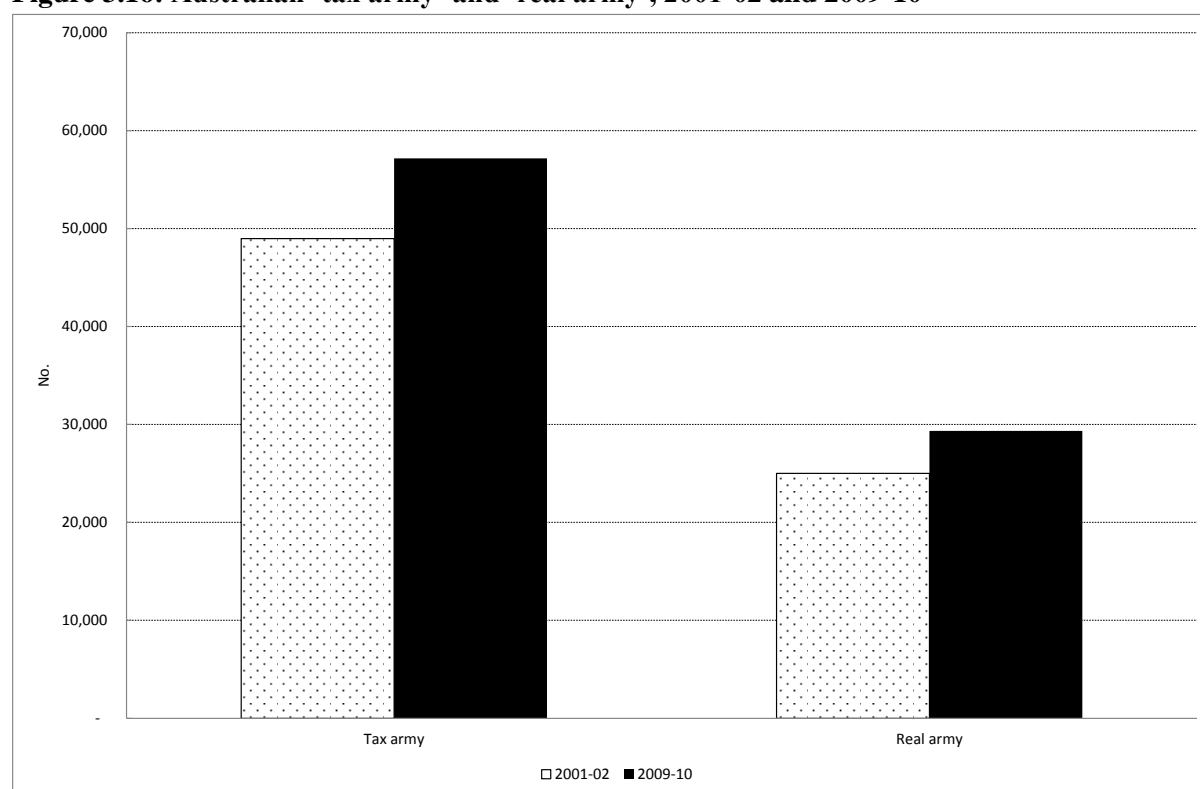
Industry associations, formed to promote the interests of their members within a given industry, often lobby governments concerning public policies that affect the economic or financial viability of the industry concerned. According to Australian market research organisation IBISWorld (2011b) during 2009-10 there were 6,526 industry associations nationally employing over 23,700 people, with a significant proportion of industry association staff directly involved in representing industry concerns to commonwealth, state and local governments.

In addition, individuals or organisations may be engaged to lobby politicians and their staff, or senior public sector officials, in relation to specific policy concerns or issues on behalf of their clients. The commonwealth and the six state governments maintain a formal register of lobbyists, which indicate that 2,070 people in 840 consulting or other businesses were professionally engaged to lobby government representatives as at November 2011.

Another consequence of the growth of the Australian public sector is the emergence of a number of employees within the private sector who undertake work on behalf of their clients to manage compliance with government regulations.

Robson (2005) calculated the size of Australia's 'tax army' – an estimate of lawyers and accountants, and Australian Taxation Office staff – whose primary task is to either assist private sector clients in managing the compliance obligations of taxation laws or administer and enforce these laws. Using a slight variation of Robson's methodology, it is possible to compare the size of the 'tax army' against the 'real army' of Australian permanent army personnel (Figure 3.16).

Figure 3.16: Australian ‘tax army’ and ‘real army’, 2001-02 and 2009-10



Taxation army estimated as ten per cent of total lawyers, 25 per cent of accountants and all ATO officers. Real army estimated as all permanent Australian army personnel.

Source: Australian Taxation Office, various years, Annual Report; Commonwealth Department of Defence, various years, Annual Report; IBISWorld 2011a, c; Robson 2005.

Notwithstanding that the estimated size of the tax army for 2009-10 is almost double that of Australia’s permanent armed forces, the tax army excludes those private sector businesses that play a role as effective taxation collection agents on behalf of governments, say, with respect to the GST or selective other taxes and compulsory financial obligations such as superannuation contributions.

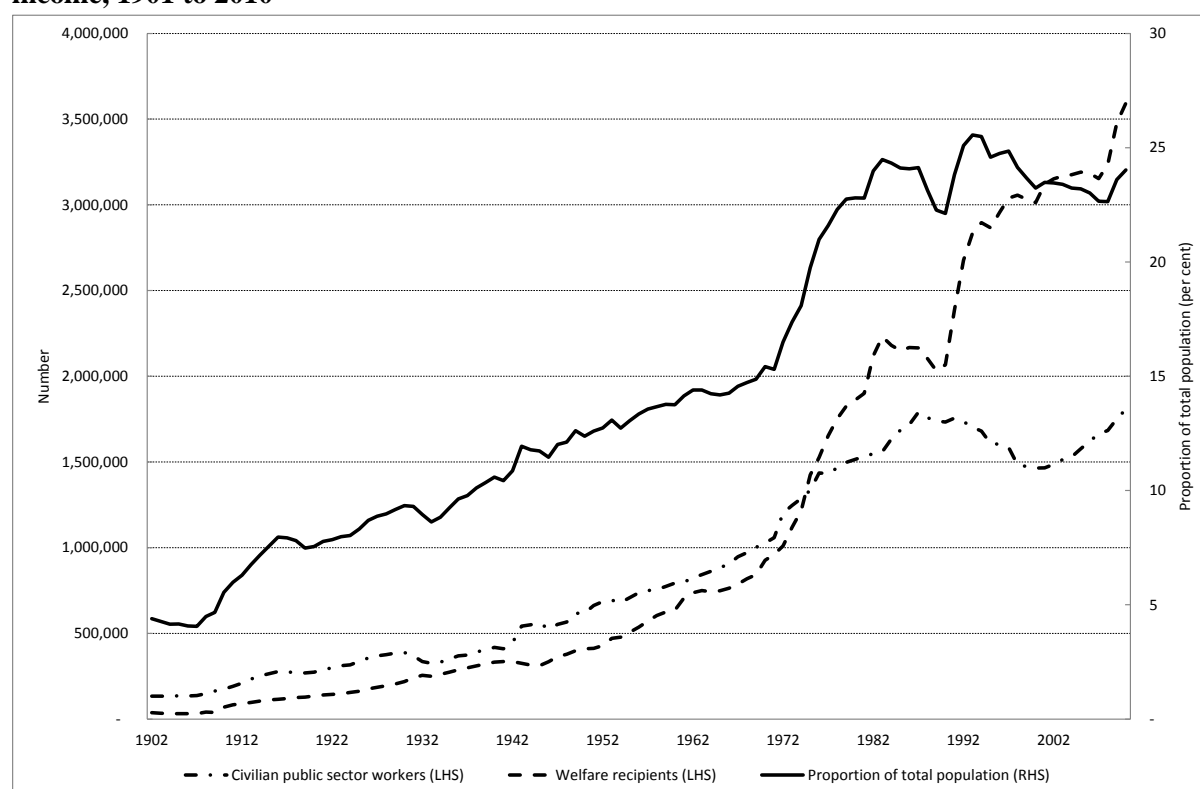
3.6 Other measures

3.6.1 Government dependency

The growth of the Australian public sector has been associated with an increase in the numbers of individuals, households and other groups who depend upon government payments to provide a source, and in some instances the primary source, of income received.

Figure 3.17 provides a measure of the numbers of people directly reliant upon government payments for their primary source of income. This Figure includes civilian public sector workers and recipients of unemployment benefits and Age and Disability Support Pensions.

Figure 3.17: Numbers of Australians receiving government payments as primary source of income, 1901 to 2010



Civilian public sector workers include individuals employed by commonwealth, state and local governments. Welfare recipients include individuals in receipt of Age and Disability Support Pensions and unemployment benefits.

Source: ABS 2007, 2008, 2009b, 2010d, 2011a; ABS and CBCS, various years, Year Book Australia, cat. no. 1301.0; Barnard et al 1977; Daniels 2006, 2009, 2011; Dickey and Suthern 1987; Foster 1996.

In general terms dependency on government payments steadily increased throughout the first six decades of the twentieth century, followed by a significant increase during the 1970s primarily attributable to a significant increase in unemployment as the Australian economy was affected by stagflationary pressures during that period.

Whilst the proportion of government dependents to the total population has tended to stabilise since the 1980s, it is notable that the reduction in the numbers of civilian public sector workers (attributable in part to privatisation and other public sector reforms) tended to be offset by strong growth in the numbers of people reliant upon welfare payments for their income.

The ABS State Accounts provide detailed information on the sources of incomes and payments by households in each state, enabling a comparison between the amount of income (and other current) taxes households pay and the social security payments they receive. In 2009-10 households in all states, except South Australia and Tasmania, paid more on average in taxes than they received in welfare payments (Figure 3.18).

Figure 3.18: Comparison of taxes paid and welfare payments received, Australian states, 1990 to 2010



Data expressed in financial year terms. Excluding Australian Capital Territory and Northern Territory.

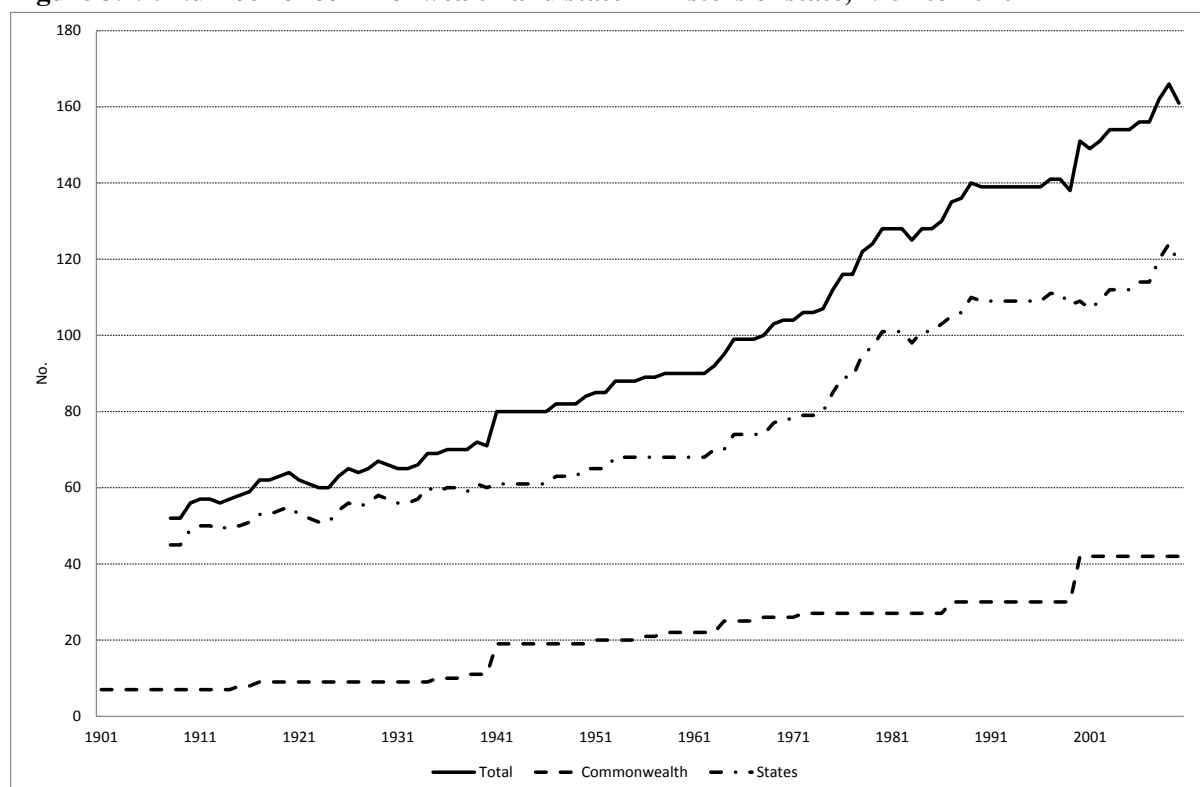
Source: ABS 2010b.

3.6.2 Government ministries and agencies

Insights into the changing profile of public sector size and scope in Australia can also be obtained from an analysis of the number, and responsibilities, of ministers of state and government administrative entities.

Figure 3.19 provides details on the numbers of ministers of state appointed by commonwealth and state governments, as determined by statutory variations to relevant legislation, since 1901.

Figure 3.19: Number of commonwealth and state ministers of state, 1901 to 2010



Source: Kirchner 2011b; ABS, various years, state Year Books, cat. nos. 1300.0, 1300.2, 1300.5, 1301.3, 1301.4, 1301.6; ABS, various years, Year Book Australia, cat. no. 1301.0; state government parliamentary websites.

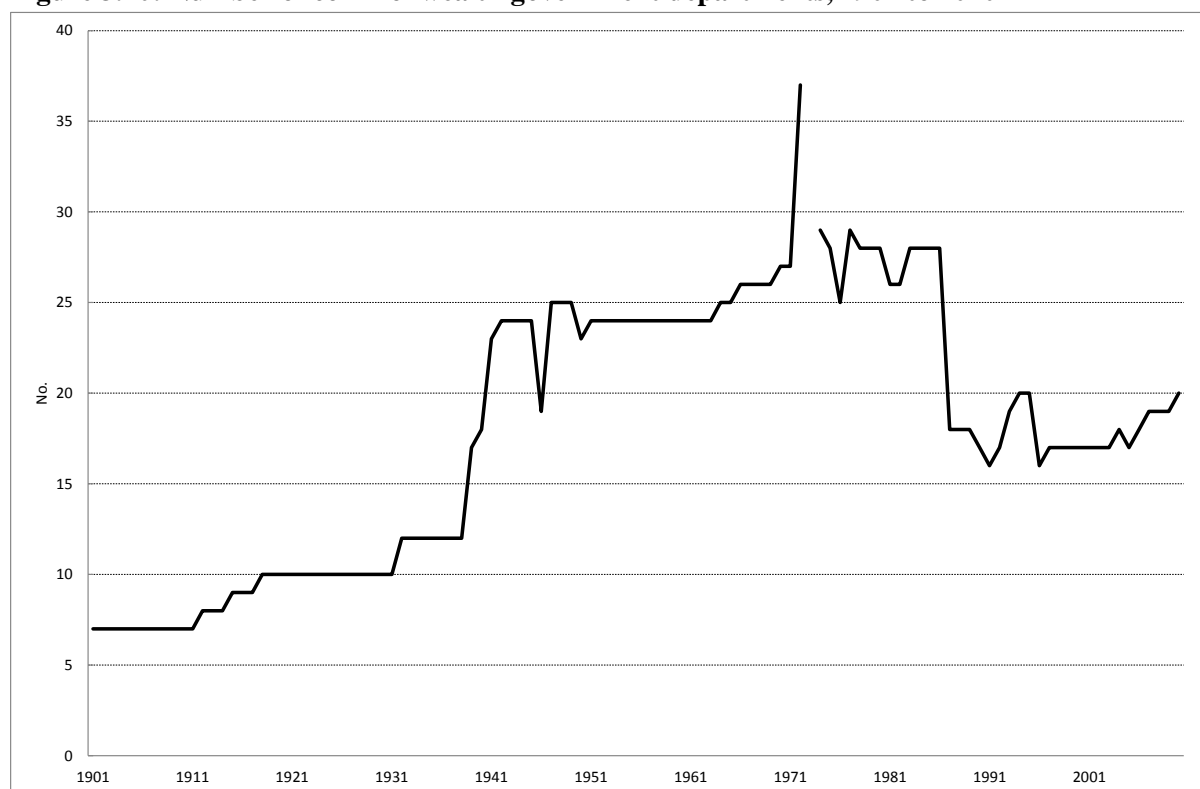
Notwithstanding periodic statutory variations in the total numbers of ministers there was a significant increase in state government ministries from the mid-1970s to early 1980s, partly reflecting a growth in political concern at the state level with respect to social policy issues. For example, during this period Victoria established a minister for immigration and ethnic affairs whilst Queensland added community and welfare services, aboriginal affairs and regional affairs to their list of ministerial responsibilities.

Statutory increases in the numbers of ministers at the commonwealth level have also occurred during the twentieth century, but tended to be less frequent than that exercised by the states. The number of ministers increased from 11 in 1939 to 19 in 1941, on account of new responsibilities in defence support and the wartime regulation of the economy, while in 2000 the numbers of commonwealth ministers rose from 30 to 42.

The National Archives of Australia (2012) maintains electronic copies of administrative arrangements orders instigated by successive commonwealth governments since 1901, providing detailed information on the number of commonwealth government departments and their functions. This information excludes the numerous agencies, boards, committees and other bodies within the portfolios of given departments.

Figure 3.20 illustrates the numbers of departments maintained by the commonwealth government, illustrating growth in total department numbers from Federation to the early 1970s and subsequent consolidation of departments into larger entities responsible for undertaking policy and program delivery functions.

Figure 3.20: Number of commonwealth government departments, 1901 to 2010



Data unavailable for 1973.

Source: National Archives of Australia 2012.

3.6.3 Policy decisions

Changes to the size of the public sector in Australia are also attributable to the number of policy decisions made by governments during a given period of time.

A paper prepared by Commonwealth Treasury officials in 2008 provided a count of the numbers of commonwealth government decisions, including taxation and budget savings (excluding efficiency improvements in government departments, compliance measures or indirect savings) measures, announced in budget or budget updates over the ten years to 2007-08.

The analysis showed that the number of decisions increased from 359 in 1997-98 to 825 in 2007-08. During this period approximately 90 per cent of decisions undertaken each year totalled less than \$100 million. However, the number of decisions valued between \$100 million and \$249 million grew from 16 to 49 over the period whilst the number of decisions worth over \$1 billion rose from one in 1997-98 to nine in 2007-08 (Laurie and McDonald 2008).

3.7 Conclusion

This chapter provides the most comprehensive account, to date, of various measures of public sector size in Australia. In a number of cases, the data presented in this chapter have been derived from primary sources of information and, in other instances, deficiencies or data gaps have been addressed through the use of alternative data sources (appendix A).

As illustrated in this chapter, it is not possible to condense the multi-faceted nature of activities undertaken by Australian commonwealth, state and local governments into a single numerical measurement of public sector size. This fact accords with the notion that public sector activities extend beyond the significant revenue raising and expenditure activities commonly attributed to governments.

Difficulties associated with the establishment of a single representative measure of government size are compounded when governments alter the activities they undertake over time. The three levels of Australian government have become increasingly active in their roles of redistributing final economic resources through taxation and other revenues and spending. They have also retained an influential role in the employment of factors of production (including labour), and influence the nature of market activities through the imposition of an increasingly complex array of regulations.

Measuring the size of government in the long run is hampered by practical issues concerning the availability and quality of data. For example, according to Kirchner (2011b: 3) '[h]istorical data on Australian public finances are of poor quality and subject to numerous methodological breaks that make meaningful comparisons over time difficult.'

More generally concerns about the validity of conventional measurements of public sector size remain the subject of intellectual debates, with some economists suggesting that measures of government size should ideally account for the effect of interventions upon changes in relative prices (Brennan and Pincus 1983).

While such criticisms retain some degree of validity, it is practically impossible to trace all direct and indirect effects of government interventions in a complex and evolving economy. Nonetheless, such limitations should not pose as barriers against the use of reasonably plausible proxy measures in empirical investigations about the economic consequences of governmental size.

Indeed, as discussed in the next chapter, various proxy measures of the size of government have been readily applied by researchers in numerous empirical studies over the past three decades and, with the aid of improvements in empirical techniques, have been shown to identify a statistical association between governmental size and economic performance.

Appendix A: Summary of statistics and data sources for selected government size measures

Measure	Indicator	Time period	Source	Data adjustments
Total revenue	Total revenue	1810-1849 1850-1982 1983-1995 1996-2010	N Butlin et al. 1987 Barnard 1987 Foster 1996 ABS 1997, 1998a, 1999, 2000b, 2001a, 2011c	Nil Nil Nil Nil
	Total revenue per capita	Revenue data: 1810-1849 1850-1982 1983-1995 1996-2010 Population data: 1810-2005 2006-2010	N Butlin et al. 1987 Barnard 1987 Foster 1996 ABS 1997, 1998a, 1999, 2000b, 2001a, 2011c ABS 2008 ABS 2011a	Nil Nil Nil Nil Nil Nil
	Total revenue-to-GDP ratio	Revenue data: 1810-1849 1850-1982 1983-1995 1996-2010 GDP data: 1810-1860 1861-1949 1950-1959 1960-2010	N Butlin et al. 1987 Barnard 1987 Foster 1996 ABS 1997, 1998a, 1999, 2000b, 2001a, 2011c N Butlin 1987 N Butlin 1987 Foster 1996 ABS 2011b	Nil Nil Nil Nil Nil Nil Nil Nil

Measure	Indicator	Time period	Source	Data adjustments
Total expenditure	Total expenditure	1810-1821 1822-1849 1850-1982 1983-1995 1996-2010	N Butlin et al. 1986, 1987 N Butlin et al. 1987 Barnard 1987 Foster 1996 ABS 1997, 1998a, 1999, 2000b, 2011a, 2011c	Nil Nil Nil Nil Nil
	Total expenditure per capita	Expenditure data: 1810-1821 1822-1849 1850-1982 1983-1995 1996-2010 Population data: 1810-2005 2006-2010	N Butlin et al. 1986, 1987 N Butlin et al. 1987 Barnard 1987 Foster 1996 ABS 1997, 1998a, 1999, 2000b, 2011a, 2011c ABS 2008 ABS 2011a	Nil Nil Nil Nil Nil Nil Nil
	Total expenditure-to-GDP ratio	Expenditure data: 1810-1821 1822-1849 1850-1982 1983-1995 1996-2010 GDP data: 1810-1860 1861-1949 1950-1959 1960-2010	N Butlin et al. 1986, 1987 N Butlin et al. 1987 Barnard 1987 Foster 1996 ABS 1997, 1998a, 1999, 2000b, 2011a, 2011c N Butlin 1987 N Butlin 1987 Foster 1996 ABS 2011b	Nil Nil Nil Nil Nil Nil Nil Nil Nil

Measure	Indicator	Time period	Source	Data adjustments
Regulation	Number of pages of primary legislation	1902-2010 (C'wealth)	Berg 2008	Nil
		1824-1958 (NSW)	http://www.austlii.edu.au/au/legis/nsw/num_act/	Nil
		1959-2006 (NSW)	Berg 2008	Nil
		2007-2010 (NSW)	http://www.austlii.edu.au/au/legis/nsw/num_act/	Nil
		1851-1958 (Vic)	http://www.austlii.edu.au/au/legis/vic/hist_act/	Nil
		1959-2006 (Vic)	Berg 2008	Nil
		2007-2010 (Vic)	http://www.austlii.edu.au/au/legis/vic/num_act/	Nil
		1860-1961 (Qld)	Queensland Government, 'Acts of Parliament of Queensland'	Nil
		1961-2006 (Qld)	Berg 2008	Nil
		2007-2010 (Qld)	http://www.legislation.qld.gov.au/Acts_Passed/Acts_Passed.htm	Nil
		1832-1958 (WA)	http://www.slp.wa.gov.au/legislation/statutes.nsf/main_yrbyyrsall.html	Nil
		1959-2006 (WA)	Berg 2008	Nil
		2007-2010 (WA)	http://www.slp.wa.gov.au/legislation/statutes.nsf/main_yrbyyrsall.html	Nil
		1837-1958 (SA)	http://dspace.flinders.edu.au/dspace/handle/2328/1894	Nil
		1959-2006 (SA)	Berg 2008	Nil
		2007-2010 (SA)	http://www.legislation.sa.gov.au/browseActs.aspx	Nil
		1826-1967 (Tas)	Tasmanian Government, 'Acts of the Parliament of Tasmania'	Nil
		1968-2006 (Tas)	Berg 2008	Nil
		2007-2010 (Tas)	http://www.austlii.edu.au/au/legis/tas/num_act/	Nil
		1989-2010 (ACT)	http://www.legislation.act.gov.au/a/default.asp	Nil
Public sector employment	Total civilian public sector employment	1901-1949	Barnard et al. 1977; CBCS/ABS, 'Year Book Australia'	Inclusion of tertiary education institution and public hospital employment.
		1950-1994	Foster 1996	Nil
		1995-2010	ABS 2007, 2009b, 2010d	Nil

Measure	Indicator	Time period	Source	Data adjustments
Public sector employment	Total civilian public sector employment as proportion of total population and working-age population	1901-1949	Barnard et al. 1977; CBCS/ABS, 'Year Book Australia'; ABS 2008	Inclusion of tertiary education institution and public hospital employment.
		1950-1994	Foster 1996	Nil
		1995-2010	ABS 2007, 2009b, 2010d, 2011a	Nil
	Permanent Australian defence force personnel	1907-1959	McKernan 1987	Nil
		1960-1999	CBCS/ABS, 'Year Book Australia'	Nil
		2000-2010	Department of Defence, 'Annual Report'	Nil
Government dependency	Numbers of Australians receiving government payments as primary source of income	1902-1910	ABS 2008; Barnard et al. 1977; CBCS/ABS, 'Year Book Australia'; Dickey and Suthern 1987	Inclusion of tertiary education institution and public hospital employment.
		1911-2010	ABS 2007, 2009b, 2010d, 2011a; Barnard et al. 1977; CBCS/ABS 'Year Book Australia'; Daniels 2006, 2009, 2011; Foster 1996	Inclusion of tertiary education institution and public hospital employment.
	Comparison of taxes paid and welfare payments received	1990-2010	ABS 2010b	Nil
Government ministries and agencies	Number of commonwealth and state ministers of state	1901-2010	CBCS/ABS, 'Year Book Australia'; CBCS/ABS State Year Books; http://www.nt.gov.au/lant/members-of-parliament/Ministries%20-%201974%20to%2026%20August%202001.pdf ; http://www.nt.gov.au/lant/members-of-parliament/Ministry%209th%20Assembly.pdf ; Kirchner 2011b	Nil
	Number of commonwealth government departments	1901-2020	http://www.naa.gov.au/records-management/publications/aaos.aspx	Nil

Chapter Four

Literature Review

4.1 Background

A voluminous literature exists concerning the implications of the size of government, usually proxied by measures of taxation and expenditure activities by public sector entities, upon economic performance.

The proposition that changes to government size could affect economic performance has been associated with theories developed at least since the late eighteenth century. Some functions of government, including security from internal and external aggression, are largely seen as conducive to the economic performance of a nation-state.

However the full extent of economically beneficial activities of the public sector is limited, in that the continued expansion of government beyond a certain threshold would ultimately compromise the overall performance of an economy.

Informed by these and other theoretical notions, numerous empirical studies have been undertaken to quantitatively establish the nature and magnitude of the relationship between the size of government and economic performance.

The purpose of this chapter is to critically review relevant aspects of the theoretical and empirical literature on the relationship between government size and economic performance. This review will assist in providing a conceptual framework and practical guidelines for the empirical analysis to be undertaken in this study.

4.2 Review of the theoretical literature

4.2.1 Neoclassical growth theory

The basis for the modern theoretical appreciation of economic growth processes is encapsulated in the basic 'neoclassical growth' models of Solow (1956) and Swan (1956), developed partly in response to the Keynesian-inspired growth theories of Harrod and Domar that ruled out the attainment of full employment in the long run (Harrod 1939).

According to the neoclassical growth model the production function (Y) is determined by the amount of capital (K) and labour (L) inputs, as well as technology (A) which augments input productivity. Assuming Cobb-Douglas technology, with constant returns to scale in production and diminishing marginal productivity of capital and labour, the production function is specified as:

$$Y = A f(K, L)$$

This equation can be re-written in intensive form as follows:

$$Y/L = y = A f(k, 1) = A f(k)$$

where k equals the capital-to-labour ratio.

Capital accumulation conforms to the following process:

$$dK/dt = sY - \delta K$$

where s is the aggregate savings rate and δ the rate of depreciation, which are both constant and exogenously determined (Rogers 2003).

Cass (1965) and Koopmans (1965) subsequently extended the Solow-Swan model by explicitly incorporating households' economic decisions in an economic growth model. Specifically households were assumed to make consumption and savings decisions in order to maximise their welfare, thereby affecting long run economic growth in the process.

Neoclassical growth theories predict that each additional unit of capital, for a given amount of labour, provides a lower return than the previous one. This implies that the rate of economic growth will diminish as it approaches a level of output (referred to as the 'steady-state') in which savings provide investment only to cover depreciation. The steady-state level of output per worker depends positively upon the saving rate, and negatively upon the depreciation rate and (exogenous) population growth rate.

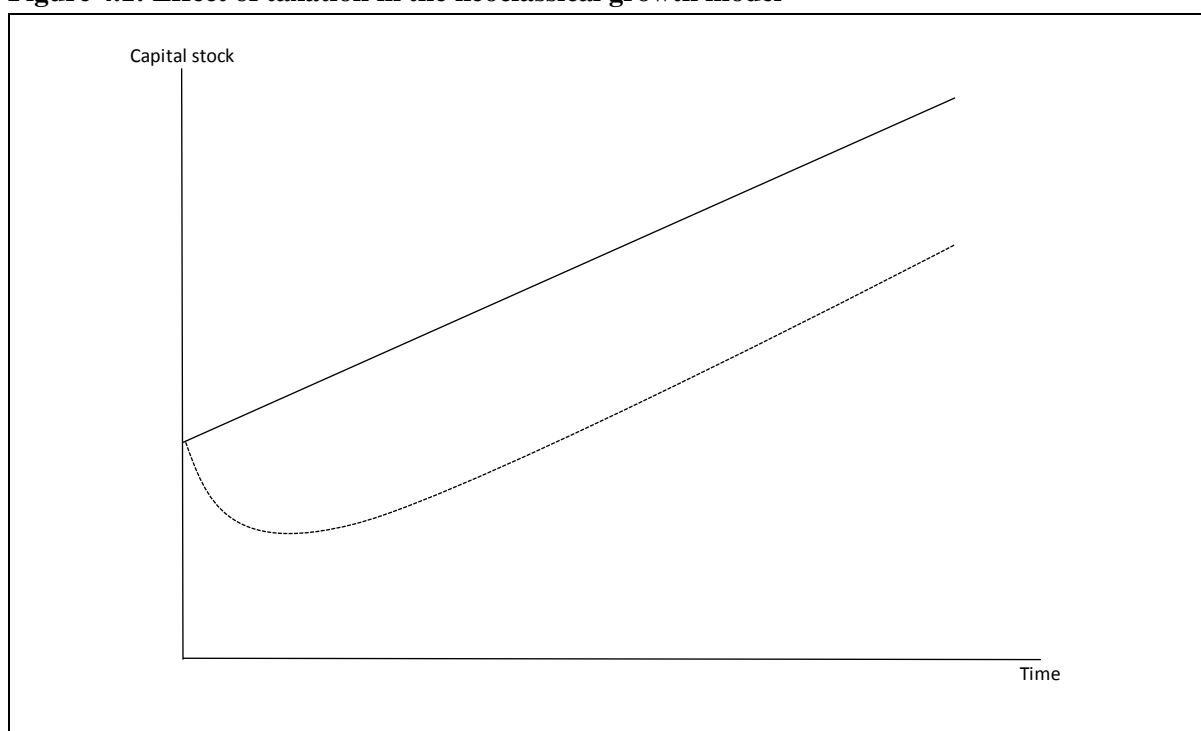
In an important result under the standard neoclassical growth model, exogenously determined technological progress also affects the steady-state level of output per worker. Indeed it is generally conceived that technological progress, in effect, fully explains economic growth from this perspective, given stylised empirical facts presented by Kaldor (1963) of the coincidence between growing US output per capita and stable factor shares and capital-output ratio.

Given the presumption that all sources of economic growth are exogenous in their nature, the role of government interventions in influencing the long run rate of growth are negligible: 'neoclassical growth models ... consign the role of fiscal policy to one of determining the level of output rather than the long run growth rate. The steady-state growth rate is driven by the exogenous factors of population growth and technological progress, while fiscal policy can affect only the transition path to this steady-state' (Kneller et al 1999, p. 73).

Under the neoclassical growth model, distortionary taxation and government expenditures imposes efficiency losses upon economic activities and thereby reduces the level of aggregate output. To the extent that these public sector interventions affect investment, savings or labour supply, short run growth rates could also be affected by tax and expenditure changes. However the growth implications of public sector activities are of a transitory nature as the economy moves towards the new steady-state equilibrium, albeit with permanent effects upon the level of output (Agell, Lindh and Ohlsson 1997; Fölster and Henrekson 1999; D Smith 2006).

To illustrate the growth implications of public policies in a typical neoclassical growth model framework, King and Rebelo (1990) simulated the impact of an unanticipated increase in income tax rates (with ensuing revenue collections used to finance lump-sum transfers) on the capital stock (Figure 4.1).

Figure 4.1: Effect of taxation in the neoclassical growth model



Solid line represents steady-state output in the absence of increased rate of taxation on income. Dashed line represents steady-state output following an increase in rate of taxation on income.

Source: King and Rebelo 1990.

The tax rate increase temporarily reduces the steady-state level of output, as a result of lower net investments, however the long run growth rate is left unaffected by the policy intervention or, at best, has a negligible effect on growth rates (Harberger 1964).

Arrow and Kurz (1969, 1970) developed a neoclassical growth model of public sector capital accumulation financed by a proportional income tax regime.

Consumers derive utility from their private consumptions as well as the benefits derived from the available public capital stock. Although it is implicitly assumed that all public capital provides benefits, income taxes to finance the capital provided by the public sector reduces consumer utilities. The interplay between government expenditure and its tax-financing leads to a situation whereby an increase in government expenditure (and taxes) enhances economic growth up to a certain threshold, but continuous increases in expenditure (and taxation) then reduces the growth rate beyond the threshold point.

Even if capital expenditure by governments provides economic benefits, government policies were exogenously determined in the Arrow-Kurz model therefore the growth effect of policy remained limited to the transition path to the long run steady-state.

A longstanding research question associated with the neoclassical growth literature relates to the length of time required for the transitional impacts of fiscal policies to manifest itself, prior to the return to a new equilibrium configuration leaving the long run growth rate intact.

To answer this question, Sato ([1963] 1996) augmented a one-commodity Solow model with Cobb-Douglas technology incorporating a government sector that imposes proportional income taxes and spends on recurrent and capital goods. The proportion of total savings (private and public) of the national income given by the following equation:

$$\alpha = [x + s(1-x) - g(1-h)]$$

where x is the proportionate income tax rate, s the private saving ratio, g government expenditures for goods and services as a fraction of national income and h is government capital formation as a fraction of governmental expenditures. The adjustment rate of the output-capital ratio is given by the following:

$$tk = \log_e [1 + (\alpha_0 k / \alpha_1 (1-k))] / p + bn$$

where α_0 and α_1 are the initial and final savings ratios respectively, bn is the rate of growth of the labour force, and k is a speed of adjustment parameter and p a technology improvement parameter. In this framework, the adjustment period in response to fiscal policy is longer the greater the initial savings ratio, the smaller the rate of productivity increase, and the lower the growth in population.

Assuming that the proportionate tax rate increases one by percentage point, and given certain parameters for the savings and output-capital adjustment equations that broadly replicated the United States economy, Sato found that ‘the adjustment period is extremely *long*. A complete adjustment from one equilibrium to another is virtually never achieved. In our example, it takes from 50 to 150 years to achieve 90 per cent of the total adjustment’ (Sato [1963] 1996, p. 10).

Sato concluded his analysis by suggesting ‘[t]he neoclassical system of variable proportions by no means rules out the use of fiscal policy to affect the actual growth rate. Where the natural rate of growth is not affected by capital accumulation, an initial increase in the actual growth rate, due to policy measures, will taper off only slowly, so it will continue for a long period’ (Sato [1963] 1996, p. 10).

In something of a precursor to endogenous growth theories that emerged from the late 1980s, Sato also explained that governments that wished to increase the level of income and maintain a higher growth rate could explore policy measures to improve technologies and technological adaptation.

Krzyzaniak (1966) also established a long run neoclassical framework to assess the growth effects of an increase in profits taxation. The tax affects new capital formation implying that capital becomes scarcer than would otherwise be the case. This leads to an increase in the rate of return on capital, ‘allowing substantial but not full recoupment of the tax burden on the rate of return’ (Krzyzaniak 1966, p. 36).

Assuming specific values for the rate of technological progress and the tax rate, Krzyzaniak simulated the length of time required for the output-capital ratio to return to its long run equilibrium level after the imposition of the profits tax. The author noted that ‘a long time has to pass to get 90, 95 or 99 per cent of the tax effect. For 90 per cent between 100 to 140 periods, and for 99 per cent close to 250 periods are needed. ... A politician determining tax policies most likely will forget the long-run implications of his current actions if such implications are liable to appear only after his death. The statesman, however, should not’ (Krzyzaniak 1966, p. 37-38).

A similar result was reported by Feldstein (1974), with an estimated period of twenty years required for the rate of return on capital to recover half its initial loss in response to an increased tax on labour income.

The emergence of optimal taxation theories since the 1970s (Mirrlees 1971; Atkinson and Stiglitz 1976; Judd 1985; Chamley 1986), and an awareness of distinctions between different types of public sector expenditures for growth, inspired neoclassical growth theorists to refine models accounting for the growth implications of varied public spending and taxation configurations.

Turnovsky (2004) developed a neoclassical growth model in which the government undertakes expenditures either for capital goods or consumption goods, financed in turn by various taxes including on consumption, labour and capital.

An increase in government consumption leads to a proportionate increase in (the private and public) capital stock and output, while an increase in public investment leads to proportionate increases in private capital and output but an even greater relative increase in the public capital stock.

Taxes are also ranked in terms of their effects upon growth. An increase in capital taxation reduces public capital and output proportionately, but leads to an even greater decline in private capital. A higher tax on wages or consumption reduces both types of capital and output proportionately.

Turnovsky (2004, p. 884) showed that fiscal policies have no effect on long run growth rates although, as implied above, they will exert significant effects on levels of economic activity: ‘policy changes can affect growth rates for sustained periods of time so that their accumulated effects during the transition from one equilibrium to another may therefore translate to potentially large impacts on steady-state levels.’

The effect of government policies in an augmented neoclassical growth model had also been investigated by Carboni and Medda (2011).

Given the composition of public expenditure, the intention of policymakers is to find the aggregate spending level which maximises growth thus maximising the utility of agents within the economy. However, the growth effects of such spending are non-monotonic by nature:

‘[t]he growth-maximising level of government spending occurs when the marginal product of public capital equals marginal costs. Any public spending beyond this level crowds out private investment and reduces growth and the steady-state level of output per worker. In other words, up to a certain point the distortional effects of tax are more than compensated for by the productive effects of public investment. As government grows, the detrimental effects of a high level of taxation prevail over productive effects’ (Carboni and Medda 2011, p. 161).

The effect of spending on growth outcomes are also influenced by the structure of government expenditures. In the Carboni-Medda model public sector capital is allocated to two types of goods, with the growth effects of increasing one type of good relative to another dependent on the income elasticities associated with each good. To ensure that growth is maximised, the government should also allocate its budget from less to more productive forms of public capital.

While government policies may have short run effects, the assumption of diminishing returns on public sector investment implies the effect of government policies on growth tends to dissipate in the long run in that ‘the transitional dynamics leave the economy with a growth rate determined by the rate of exogenous technological progress’ (Carboni and Medda 2011, p. 164).

4.2.2 Endogenous growth theory

Addressing what were perceived to be inadequacies of the neoclassical growth model, including in terms of its limitations in explaining the growth effects of fiscal policies, economists developed a range of ‘endogenous growth’ models in which the determinants of economic growth were informed by endogenously-determined factors rather than by unexplained phenomena determined outside of the models (such as technological progress).

In what is generally regarded as one of the first contributions to the modern theory of endogenous growth, Romer (1986) conceptualised an economy in which ‘knowledge’ (including investments in human capital and research and development (R&D)) represents a production input exhibiting the property of increasing marginal productivity.

According to Romer, in an economy populated by competitive, profit-maximising firms there is the potential for underinvestment in the production of knowledge and hence suboptimal economic growth since ‘[t]he creation of new knowledge by one firm is assumed to have a positive external effect on the production possibilities of other firms because knowledge cannot be perfectly patented or kept secret’ (Romer 1986, p. 1003).

Specifically, government policies, such as the subsidisation of education or R&D activity financed by lump-sum taxes, which fully account for the external benefits derived from knowledge accumulation could ensure a higher rate of economic growth in the long run. Recognising that investment in knowledge acquisition in the current period represents foregone consumption in the same period, Romer (1986, p. 1026) stated:

‘the amount of consumption at any point in time is too high in the competitive equilibrium and the amount of research is too low. Any intervention that shifts the allocation of current goods away from consumption and toward research will be welfare-improving. As in any model with externalities, the government can achieve Pareto improvements not available to private agents because its powers of coercion can be used to overcome problems of shirking.’

Lucas (1988) developed a similar model endogenously incorporating the accumulation of knowledge, or ‘human capital,’ by individuals as a determinant of productivity movements. Human capital investments not only improve the productivity of individuals directly investing in their own education and skills development but can also provide the external benefits of improved productivity of others that engage with those that have accumulated human capital.

Lucas briefly referred to the potential for government expenditures on education to improve growth rates in an economy with, for example, a subsidy to schooling providing a means to offset the reduction in current consumption attributable to human capital accumulation (Lucas 1988, p. 31).

Complementing previous studies in the endogenous growth theory literature, Barro (1990) arguably provided the first systematic theoretical treatment of public sector expenditure in an economy in which growth is assumed to be endogenously determined.

Using a stylised conception of a closed economy populated by infinitely-lived individuals seeking to maximise utility through consumption, and with the production structure of the economy including productive government expenditure directly entering the production process as an intermediate input, Barro explicitly incorporated a governmental sector that provides goods and services which are financed by flat-rate income taxes.

Assuming Cobb-Douglas production technology and balanced public sector budgets, the growth rate of consumption in the economy is determined by the following equation:

$$\gamma = \dot{c}/c = 1/\sigma \cdot [(1-\tau) \cdot \phi(g/k) \cdot (1-\eta) - \rho]$$

where \dot{c}/c is the growth rate of consumption, τ the tax rate, g the quantity of public services provided, k the amount of capital per worker, ρ the rate of time preference, and σ , ϕ and η represent elasticity terms.

Barro's model with the inclusion of government expenditure and taxation as endogenous determinants of growth illustrates that the relationship between the size of government and economic growth is non-monotonic. Specifically, the effect of a change in the government's share of gross national product on economic growth is given by the following partial derivative:

$$d\gamma/d(g/y) = 1/\sigma \cdot \phi(g/k) \cdot (\phi' - 1)$$

The growth rate increases with g/y if g/k is small enough so that $\phi' > 1$, while a further expansion in government expenditure will reduce the rate of growth if $\phi' < 1$. Under the condition that $\phi' = 1$, 'the government sets its share of gross national product, g/y , to equal the share it would get if public services were a competitively supplied input of production' (Barro 1990, p. S109).

In a refinement of the basic growth model, Barro then distinguishes between government expenditures directly entering the production function of individual firms, such as capital investments, and those entering into households' utility functions, such as transfer payments and other consumption expenditures. With flat-rate income taxes now financing both public productive and consumption services, the growth rate of the economy is given by:

$$\gamma' = \dot{c}/c = 1/\sigma \cdot [(1-\tau_g - \tau_h) \cdot \phi(g/k) \cdot (1-\eta) - \rho]$$

where $\tau_g = g/y$ is the government's expenditure ratio for productive services, and $\tau_h = h/y$ is the ratio for consumption services. The above equation implies that 'the growth-maximizing share of productive government spending is smaller if the government is also using the income tax to finance other types of spending' (Barro 1990, p. S117).

Building on the model developed by Barro, subsequent theoretical contributions have been undertaken to refine the effects of government expenditure composition upon growth outcomes.

For example, Lee (1992) developed a representative-agent endogenous growth model in which governments spend in the areas of consumption, investment and transfer payments. The production function of the economy incorporates congestion effects of inadequate public capital stock, such that private capital productivity falls if the growth rate of public capital stock falls below the economic growth rate. These expenditures are financed by income taxes imposed at proportional rates.

In the Lee model the overall relationship between the size of government and economic growth is non-monotonic, implying the presence of a growth-maximising size of government influenced by the productivity parameter of the public capital stock in the production function.

Increases in the share of government investment in the overall amount of public expenditure will always increase the growth rate of the economy. If consumption or transfer payments are increased by the same magnitude as the amount of taxes collected (for a given share of public investment), economic growth rates would decline if the tax rate is greater than the size of the public stock productivity parameter.

However, ‘if government allocates more of its total spending for consumption and/or transfer payment while maintaining the same relative size of the government sector, the growth rate ... would always decline’ (Lee 1992, p. 430).

The subsequent endogenous growth literature has also sought to examine the effects of alternative tax structures on economic performance in the long run.

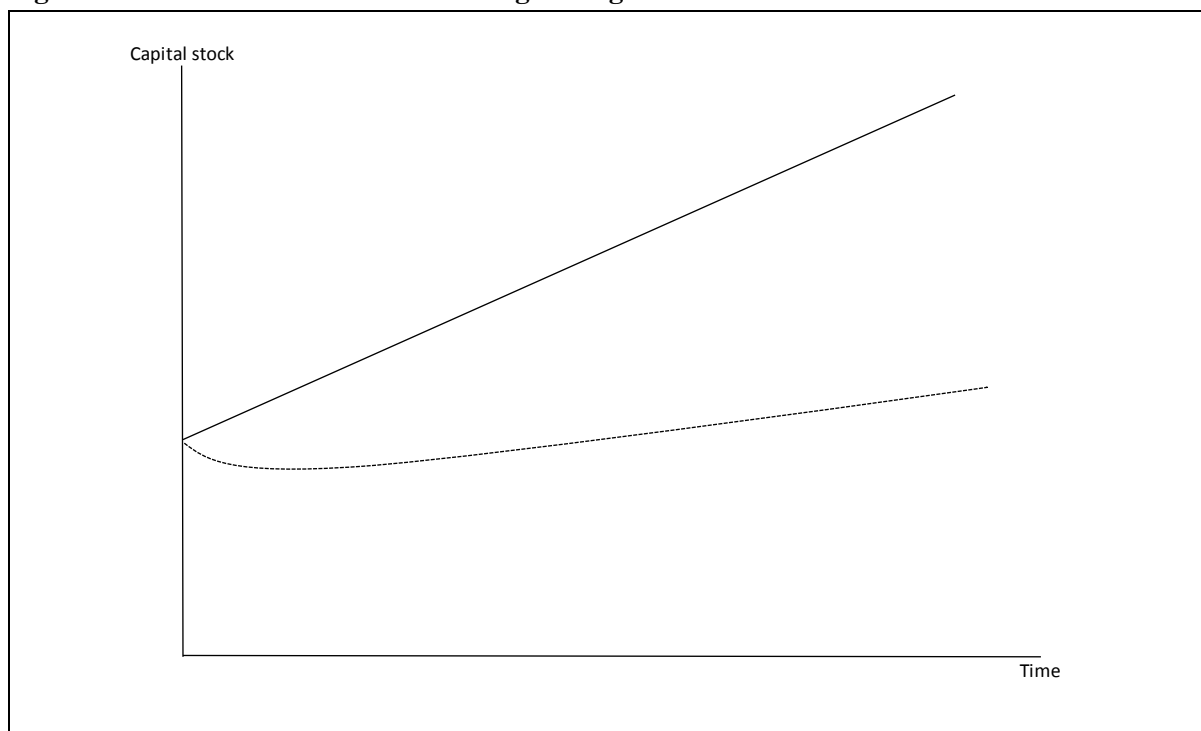
In contrast to Romer (1986) who models an economy exhibiting increasing returns, Rebelo (1991) established a theoretical framework of an endogenous growth model for an economy with constant returns to scale and with steady-state growth paths conforming to Kaldor’s stylised facts of economic growth referred to in the previous section.

A basic model is introduced for an economy with reproducible (e.g., physical and human capital) and non-reproducible (e.g., land) factors of production, and with economy-wide Cobb-Douglas production technology. In this economy the government imposes two types of proportional taxes, one on consumption and the other on investment, with the revenue raised used to finance goods that do not affect production possibilities or consumption utilities.

Under the Rebelo model a higher rate of taxation on investment leads to a lower growth rate by depressing savings. On the other hand, higher consumption tax rates affects the path of consumption but not the economic growth rate: ‘[a] consumption tax does not distort the only decision made by agents in this economy, the decision of consuming now versus later, and so it is equivalent to a lump-sum tax’ (Rebelo 1991, p. 506).

It is also noted that a proportional tax on (gross) income induces a reduction in the growth rate of the economy, as it amounts to taxing investment and consumption at the same rate (Rebelo 1991, p. 506). The effect of increasing the rate of tax on income in an endogenous growth model is illustrated by Figure 4.2.

Figure 4.2: Effect of taxation in the endogenous growth model



Solid line represents steady-state output in the absence of increased rate of taxation on income. Dashed line represents steady-state output following an increase in rate of taxation on income.

Source: King and Rebelo 1990.

Extending the basic model by disaggregating total capital into its physical and human capital components, Rebelo (1991, p. 511) again found generally adverse impacts on endogenous economic growth arising from investment and income taxes. However, the effect of income taxation is weaker compared with the basic endogenous growth model outlined above since the private sector can substitute away from the input whose production is taxed.

Mendoza et al (1997) examined the economic growth implications of the structure of taxation in an endogenous growth model characterised by a Cobb-Douglas, constant returns to scale production technology which explicitly includes the accumulation of human capital.

It is found that taxes will only affect growth to the extent that they affect (either directly or indirectly) the net after-tax rate of return on physical capital. Taxes on the incomes derived from physical capital and labour utilisation affect the rate of return on capital both directly and indirectly via their effects on leisure and labour supply. Consumption taxes only affect the after-tax rate of return to capital through adjustments to work-leisure choices.

The overall strength of the tax effect on growth, in turn, depends on assumptions concerning the subjective valuation of time by households, the technologies available for the accumulation of physical and human capital and the incidence of income taxes (Mendoza et al 1997, p. 101). In subsequent simulations of tax policy changes, the magnitude of growth effects of taxation was found to be small in magnitude.

The growth effects of progressive-rate income tax structures, as opposed to flat-rate taxes that are rarely applied in practice, has become another avenue for theoretical investigations in the endogenous growth literature.

Yamarik (2001) examined the theoretical implications of accommodation non-linear income taxation in an endogenous AK growth model. With average and marginal tax rates as a positive function of income, growth in income induced by an increase in the capital stock leads to a reduction in the after-tax return on capital. This reduction in the return on capital induces subsequent reductions in the growth rates of capital and output (Yamarik 2001, p. 17).

Caucutt et al (2003) established an endogenous growth model, within which economic agents are heterogeneous with respect to income and skills and operate in incomplete markets, in order to consider the effects of progressive taxes, and taxation reform, on long run growth.

Differential taxes are imposed in accordance with whether an agent is skilled or unskilled, with the measure of the progressivity of taxes as follows:

$$\Theta = (1 - \tau_s) / (1 - \tau_c)$$

with the lower tax rate of τ_s applicable to an unskilled agent accumulating human capital, and the higher rate of τ_c imposed on future incomes of the skilled. Progressivity of the tax system increases when τ_s decreases or τ_c increases.

Drawing upon a specification of the production function that incorporates the employment of skilled and unskilled labour, it follows that a reduction in income tax progressivity will have a positive effect upon the rate of economic growth. This result arises from the effect of the presence of the higher tax rate τ_c depressing the returns to attaining skills through human capital accumulation.

Absent the positive externality effects of human capital accumulation ‘[e]ven though an increase in the progressivity could shift the investment in favor of the unskilled through the liquidity effect, it is the intertemporal effect that ultimately dominates and decreases the ... [human capital] ... investments of both types of agents’ (Caucutt et al 2003, p. 559).

4.2.3 ‘Optimal size of government’ theory

Successive generations of economists have contended that public sector expenditure or taxation would tend to compromise economic performance should its amount exceed critical limits.

Referring to the potential for public expenditures to be diverted towards economically unproductive purposes, Adam Smith wrote in *The Wealth of Nations* that ‘[t]hose unproductive hands, who should be maintained by a part only of the spare revenue of the people, may consume so great a share of their whole revenue, and thereby oblige so great a number to encroach upon their capitals, upon the funds destined for the maintenance of productive labour, that all the frugality and good conduct of individuals may not be able to compensate the waste and degradation of produce occasioned by this violent and forced encroachment.’ (A Smith [1776] 1999, p. 442).

Inspired by the writings of Smith, the French economist Jean-Baptiste Say stated that ‘[s]ince the consumption of nations or the governments which represent them, occasions a loss of value, and

consequently, of wealth, it is only so far justifiable, as there results from it some national advantage, equivalent to the sacrifice of value' (Say [1803] 2006, p. 416). On the basis of this proposition, Say made the following observation:

'The consumption effected by the government forms so large a portion of the total national consumption, amounting sometimes to a sixth, a fifth, or even a fourth part of the total consumption of the community, that the system acted upon by the government, must needs have a vast influence upon the advance or decline of the national prosperity. Should an individual take it into his head, that the more he spends the more he gets, or that his profusion is a virtue; or should he yield to the powerful attractions of pleasure, or the suggestions of perhaps a reasonable resentment, he will in all probability be ruined, and his example will operate upon a very small circle of his neighbours. But a mistake of this kind in the government will entail misery upon millions, and possibly end in the national downfall of degradation' (Say [1803] 2006, p. 417-418).

The nineteenth century French economist Claude Frederic Bastiat further refined Say's notion concerning the correspondence between governmental activities and the value derived from them: '[t]he state may make a good or a bad use of the taxes it levies. When it renders to the public services that are equivalent to the value it receives, it makes a good use of them. And when it dissipates its revenues without giving any service in return, it makes a bad use of them' (Bastiat [1845] 2007, p. 217).

Among the former category of public services, which provide benefits that are equivalent to the tax costs to finance them, are 'certain requirements so general, so universal in their nature, that provision has been made for them in the organizing of the public service. Among these is the necessity of security. Society agrees to compensate in services of a different nature those who render it the service of guarding the public safety' (Bastiat [1848] 2007, p. 318).

However, Bastiat noted that governments have a tendency to extend their activities such that their costs exceed the provision of benefits that they provide: '[t]he state is also subject to the law of Malthus. It is continually living beyond its means, it increases in proportion to its means, and draws its support solely from the substance of the people. Woe to the people who are incapable of limiting the sphere of action of the state. Liberty, private activity, riches, wellbeing, independence, dignity, depend upon this' (Bastiat [1848] 2007, p. 318).

Inspired by the French predecessors on the topic of the consequences of the size of government, Paul-Leroy Beaulieu wrote in 1888 a text on public finance in which he stated the existence of a maximum limit of the taxation burden that economic agents can reasonably accommodate without significantly hampering their market activities:

'We consider very moderate when all national taxes, provincial and municipal, does not exceed 5-6p. 100 of income. This is a proportion that should be normal in countries where public debt is low and where politics is not dominated by the spirit of conquest. The impost is still bearable, though heavy, when it does not exceed 10 or 12 per 100 of citizens' income. Beyond 12 or 13 per 100 is an exorbitant proportion: it is possible that the country supports the same rate, but certainly the progress of public wealth are thereby slowed down; the freedom to industry and even citizens are threatened and in this case restricted by harassment, inquisitions and exertions necessarily implied by complicated and elevated taxes' (Beaulieu [1888] 1899, p. 140-141).

During the mid-twentieth century the British-Australian economist Colin Clark (1945, 1950, 1970) forwarded the hypothesis that a level of total taxation in a given country beyond 25 per cent of net

national income (at factor cost) would induce inflationary pressures and hamper overall economic performance. The basic mechanisms informing this general result were explained as follows:

‘taxation ... raises costs partly through discouraging productive effort; more significantly, perhaps, in causing industrialists to become careless about costs (if half of any increase in costs is ‘on the Treasury,’ they will make much less effort to avoid it, whether it be a wage increase, interest charges, or an expense account) and, finally, and in rather a subtle manner, the existence of a high level of taxation alters the whole climate of politics: politicians tend to lose their capacity to resist pressures, whether governmental or private, leading to cost increases, in the more or less unconscious knowledge that a rise in prices will lower the real value of all fixed charges on the budget and in that way lighten their burden’ (Clark 1970, p. 23-24).

Ludwig von Mises also noted the existence of a relationship between the level of taxes and economic performance:

‘[t]axation is a matter of the market economy. It is one of the characteristic features of the market economy that the government does not interfere with the market phenomena and that its technical apparatus is so small that its maintenance absorbs only a modest fraction of the total sum of the individual citizens’ incomes. Then taxes are an appropriate vehicle for providing the funds needed by the government. They are appropriate because they are low and do not perceptibly disarrange production and consumption. If taxes grow beyond a moderate limit, they cease to be taxes and turn into devices for the destruction of the market economy’ (Mises [1949] 2007: 740-741).

The consequences of excessive taxation were described by Mises ([1949] 2007, p. 808) as follows: ‘[c]onfiscatory taxation results in checking economic progress and improvement not only by its effect upon capital accumulation. It brings about a general trend toward stagnation and the preservation of business practices which could not last under the competitive conditions of the unhampered market economy.’

A number of economists in recent decades have postulated the existence of a specifically non-monotonic relationship between the size of government and either the level of output or its growth rate, or some other measure of economic performance, outside of explicitly neoclassical or endogenous growth theoretical frameworks.

Grossman (1987, 1988a) noted that governments make a direct and positive contribution to national output, through their production of specific goods and services such as defence, policing and the judiciary that ‘enable society to attain a higher productivity trading relationship and reap the benefits of voluntary exchange’ (Grossman 1988a, p. 194). Governments also contribute to the growth in output by providing public infrastructures that, in turn, facilitates trade between agents within the private sector.

In addition governments undertake actions, using taxation, regulatory or expenditure instruments, in efforts to correct market failures. According to this ‘Pigouvian’ view of the appropriate role of government, ‘[t]he government ... removes the distortions in the allocation of resources due to positive or negative externalities’ (Grossman 1987, p. 132) which, as a result, improves overall economic performance.

However, according to Grossman, as the size of government continues to expand the beneficial contributions of public sector activities to economic growth are increasingly offset, and indeed more than offset beyond a certain limit, by the adverse economic consequences of a larger government.

Grossman identifies several accounts drawn from public choice theory to substantiate the view that a continuous increase in the size of government would eventually diminish economic growth. These accounts are in addition to the propositions that increases in tax revenue, through raising tax rates, increases both the excess burden of taxes and the relative size of government, and that there exists diminishing returns from additional public spending as governments increasingly misallocate resources.

According to the budget-maximising bureaucrat theorem outlined by Niskanen (1971), bureaucrats receive utility from an expansion in the amount of public sector outputs, and the size of public budgets, which they manage. With an informational advantage over politicians and voters concerning the cost conditions of publicly provided outputs, an incentive exists for bureaucrats to politically bid for a size of government which is greater than that optimally necessary to facilitate economic performance.

Non-bureaucratic special interests also have an incentive to seek additional governmental outputs, which deliver concentrated benefits yet disperse the tax costs of output provision widely among the population (Becker 1983; Olson 1982). To the extent that such rent-seeking activities are successful they are likely to contribute to an increase in the size of government relative to the private sector through a ‘crowding out’ process, inhibiting overall economic performance.

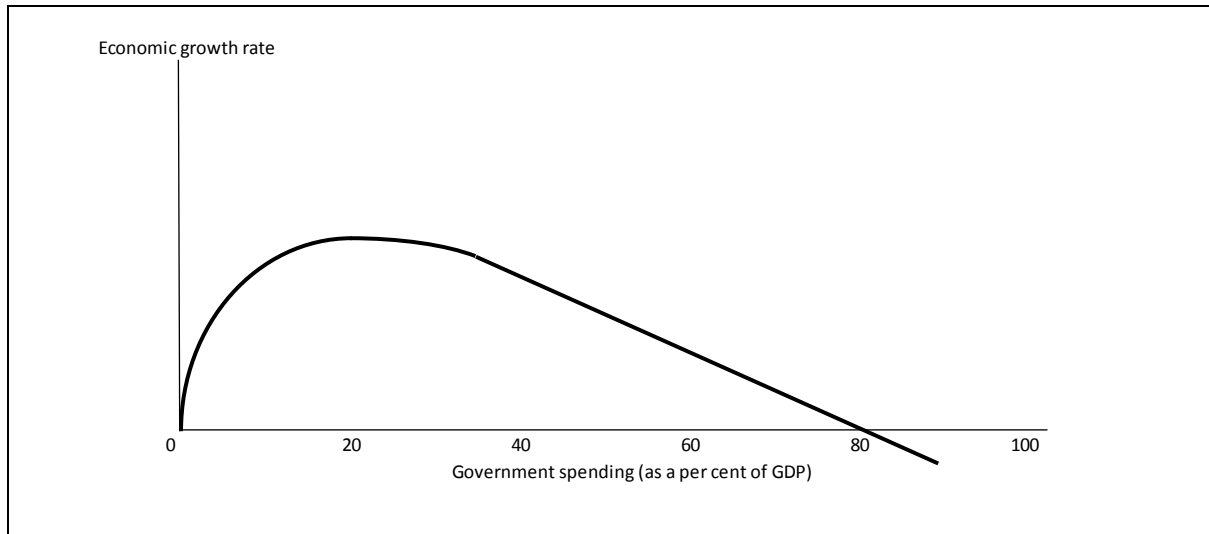
The increasing diversion of scarce resources in efforts to attain rents provided by governments, rather than the competitive search for new sources of economic value through private markets, also contributes to the growth of the public sector and the consequent attenuation in private sector activity (Tullock 1967; Krueger 1974; Kirzner 1985).

A reconciliation of these two contrasting views of government suggests the presence of a non-linear (specifically, quadratic) relation between growth in government and economic performance, with a point at which a given level of public sector activity optimises output or a similar measure of performance (Grossman 1987, 1988a).

Based on research undertaken within the United States Chamber of Commerce two years earlier, the American economist Richard Rahn presented testimony to a Republican Party committee in which a non-linear relationship between government expenditure and economic growth was also described (Rahn 1988).

As explained by Rahn, once governments provide essential goods and services ‘economic growth rates will inevitably decline as the naturally expanding government adopts new spending programs with revenues absconded from over-taxed income-producing factors owned by private citizens’ (Rahn 1988, p. 37). The eventually adverse effect of governmental spending on economic growth beyond a certain point is illustrated in Figure 4.3.

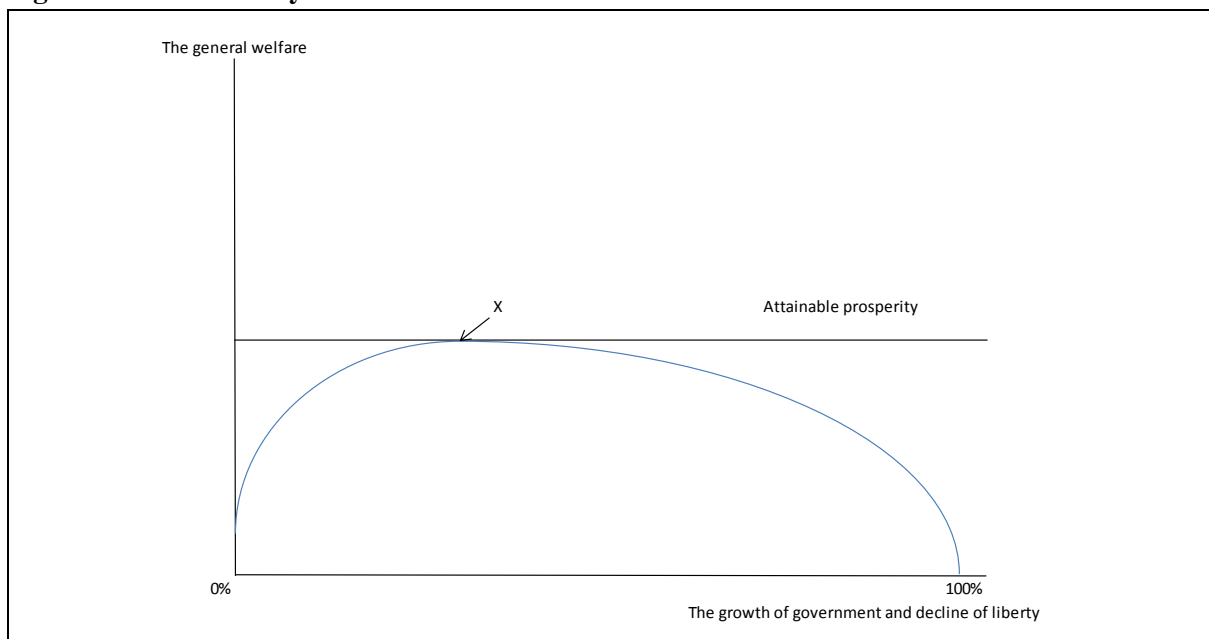
Figure 4.3: The ‘Rahn curve’



Source: Rahn 1988.

During the mid-1990s the quadratic relationship between the size of government and economic performance was popularised by the then United States Congressman Richard ‘Dick’ Armey (Armey 1995) (Figure 4.4).

Figure 4.4: The ‘Armey curve’



Source: Armey 1995.

Armey (1995, p. 92) described the underlying intuition of a quadratic relationship between the growth of government and welfare in the following terms:

‘[c]ertainly, we need government to keep the peace, prevent anarchy, run the national parks, and maybe do the odd job here and there. To this extent government bears some resemblance to its constitutional description as promoter of the general welfare and securer of the blessings of liberty. But at some point government becomes so large that it begins to smother prosperity and thus erode both our general welfare and our liberty.’

Furthermore, Armeý recognised that the economically tolerable limits of government are affected by other factors: '[t]here is a ceiling on how well we can do at any point in time. Progress is represented by that ceiling raised through time. Our ability to raise it depends upon the optimal mix of government, savings, investment, and so on. ... The point "X" ... [in Figure 4.4] ... shows the optimal mix of contained government and private activity that pushes the ceiling up, allowing maximum progress, constrained only by the limits of scientific and engineering knowledge' (Armeý 1995, p. 92-93).

In a series of papers Gerald Scully (1994, 1995, 1996, 2000b) outlined a relationship between the average level of taxation and the rate of economic growth. Contrasting this proposition with the 'Laffer curve' tax rate-tax revenue relationship (Laffer 2004), Scully (1994, p. 1) stated '[r]ather than determining what rates would maximize tax revenues to the government, ... economists should have concerned themselves with what levels of taxation would maximize economic growth.'

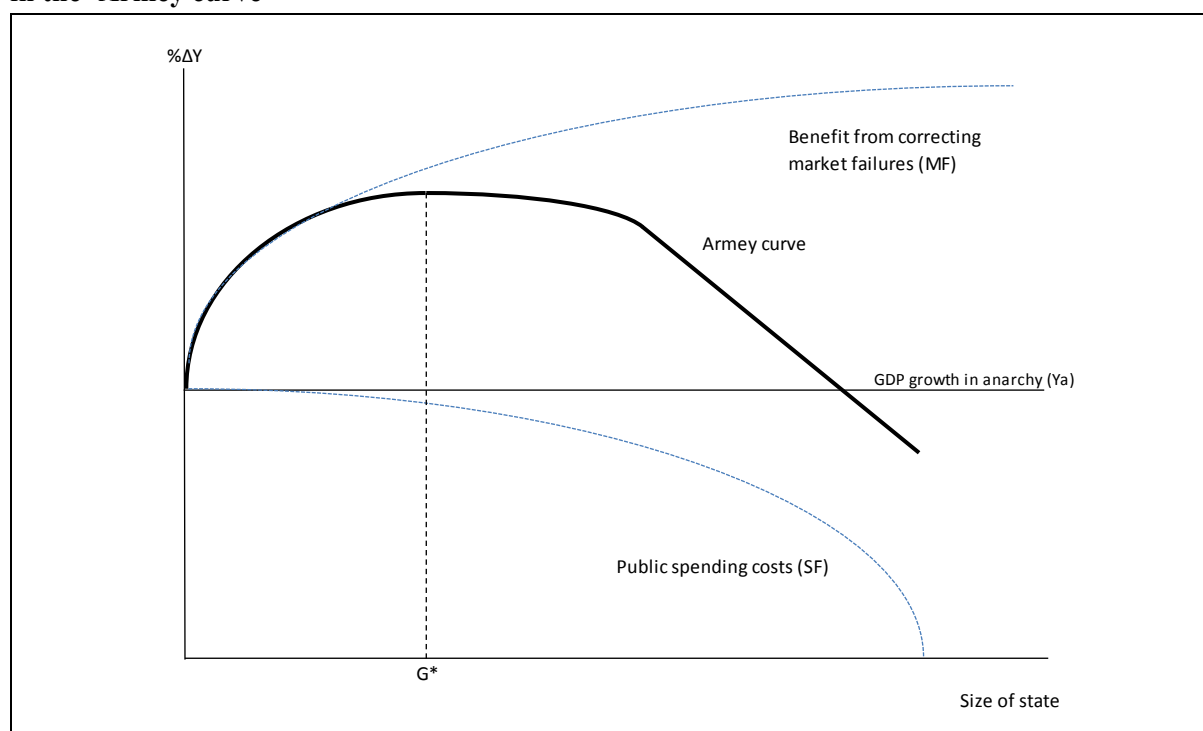
According to Scully, when governments undertake a limited array of expenditure activities conducive to private sector activity, 'a dollar worth of taxes "buys" more than a dollar worth of benefit from government expenditure' (Scully 2000b, p. 21). However, beyond a certain size of government, 'the negative externalities of taxation are greater than the positive externalities of expenditures, and economic growth will be lower as government size increases' (Scully 2000b, p. 21). In other words, the fiscal dynamics characterised by Scully give rise to an inverted 'U-shaped' relationship between taxation and economic growth.

Arguably the most systematic theoretical treatment of the optimal size of government to date has been provided in a recent paper by Facchini and Melki (2011).

An inverted-U curve, referred to by Facchini and Melki as an Armeý curve, represents the non-linear combination of two effects – the benefits to the economy from the correction of market failures (MF curve) and the costs of government failures (SF curve) (Figure 4.5).

The MF curve describes the positive effect of public sector expenditure with a decreasing marginal effect; in turn '[t]he benefits from correcting market failures explain the rising phase of the Armeý curve' (Facchini and Melki 2011, p. 10). The SF curve, by contrast, explains the negative effect of expenditure with an increasing marginal effect which is attributable to a wide range of government failures, including those described previously by Grossman (1987, 1988a).

Figure 4.5: Decomposition of relationship between government spending and economic growth in the ‘Armey curve’



Source: Facchini and Melki 2011.

Notably Facchini and Melki explain that Armey (and, indeed, similar) curves may vary significantly from one country to the next, since:

‘[e]ach country has its market and state cultures. The public spending costs vary according to the level of bureaucratic inefficiency, the willingness to pay tax and the institutions via their consequences on the level of political transaction costs. Inversely, the more market price works, the lower the benefits from correcting its failures’ (Facchini and Melki 2011, p. 13-14).

This insight has significant implications for the explanatory power of empirical models which attempt to quantify the relationship between government size and economic growth, as discussed below.

4.2.4 Critical assessments

The theoretical literature on the implications of the public sector for economic growth has been subject to considerable refinement over the past few decades, leading to an improvement in understanding of the various means through which changes in governmental size can affect the performance of economies.

The neoclassical growth model remains influential within the economics literature largely on account of its basic insight that factor accumulation and technological progress represent underlying determinants of a growing economy over time. However the general consensus that has emerged within the economic growth literature is that the exclusion of fiscal policies as a potential determinant of long run growth compromises the explanatory integrity of the neoclassical growth model.

The growing intellectual dissatisfaction with the treatment of taxation and expenditures in neoclassical growth theory amongst some economists led to intensive theoretical investigations seeking alternative representations of the growth process.

Arguably the most prominent modern manifestation of the intellectual search for alternative growth explanations are endogenous growth models, illustrating that numerous factors, besides technological change, can have a potentially significant impact upon the level of output and growth path of economies over time.

Given the enduring, and indeed growing, extent to which government policies influence economic processes, a strand of the endogenous growth literature seeks to identify the theoretical connections between differing activities of governments and economic growth. These studies have not only served to confirm the intuitive economic reasoning that government policies may exert long run effects upon economic growth, but have contributed to an appreciation of public sector composition upon economic performance.

As noted above, increases in non-distortionary tax financed increases in productive government expenditures are predicted to have a positive effect upon the rate of economic growth, whereas additional unproductive government spending financed by distortionary taxes are likely to have a negative impact on growth. The financing of productive public sector expenditures by distortionary taxes would have ambiguous effects upon the growth rate (Kneller et al 1999, p. 174).

While endogenous growth theories arguably provide an improved theoretical basis for understanding how fiscal policies could affect the long run growth rate, they mainly tend to assume the existence of benevolent and omnipresent public sector planners who influence growth by implementing governmental policies, such as the subsidisation of human capital investments or public infrastructures, in an efficient manner.

With few exceptions, recent endogenous growth models only account for the growth-detracting effects of unproductive expenditures or distortionary taxation on the basis that these activities are not represented as arguments in an economy-wide production function, rather than on political economy (or public choice) theoretical foundations that stress knowledge limitations or incentive problems associated with collective action (Pennington 2011).

Some recent theoretical explorations in this field have attempted to complement the largely pro-growth public sector narrative of endogenous growth modelling by providing representations of the political processes used to determine the selection of fiscal policies. These insights have informed the works of Barro (1990), Rahn (1988), Armey (1995) and Scully (1994, 1995, 1996, 2000b).

While the optimal size of government concept has accounted for a significant proportion of the growth in the theoretical literature, this notion has, in turn, come under intense scrutiny from various analysts in recent years.

Although they are prepared to accept that an increase in the relative size of government will reduce economic growth through attenuation in private sector activities, libertarian economists and philosophers nonetheless tend to reject the idea that government activities could be growth-enhancing up to a certain threshold point. This critique implies a rejection of the quadratic relationship between

government size and economic growth, and hence the existence of an optimal size of government maximising economic growth.

According to this view all activities undertaken by government are by their nature coercive which in turn entails a destruction of personal liberty and wealth creation by private sector economic agents:

‘[i]ndividual freedom is not a reference to government using force (i.e., laws, backed by guns) in an attempt to maximize the increase of the collective productivity of the country’s inhabitants. Individual freedom is not a reference to government using force to increase tax revenues and government spending when the country’s productivity increases. Individual freedom does not refer to government using force to redistribute wealth from those who produce it to those who don’t. All such uses of force in the economy are instances of the very coercion from which the government is supposed to be protecting individuals’ (McKeever 2010).

Consistent with this, a literature has also developed which investigates from a positive theoretical standpoint the feasibility of non-state alternatives to a range of basic functions currently provided by governments (Boettke 2005; Stringham 2007; Powell and Stringham 2009).

While it is theoretically plausible to contend that the competitive private provision of functions such as security services may deliver efficiency benefits over and above those provided by government monopolies (Molinari [1849] 2009; Hoppe 1999, 2003), and that it may be practically feasible for the private sector to deliver such services under certain conditions, it does not necessarily follow that the monopolisation of core functions by the state necessarily detracts from economic growth *per se*.

Indeed, as the institutional economics literature has illustrated, countries which provide certainty for economic actors under the rule of law, as well as efficient policing and justice services, are more likely to be those in which market activity flourishes and economic growth is sustained (Abdiwelli 2003; Rodrik et al 2004; Berggren and Jordahl 2005).

In a separate critique, Kahn (2011) suggested that if governments have inherent tendencies to grow then they could be spending excessive amounts on what are perceived to be core functions. It follows that ‘[o]nce we accept that the vagaries of the political process do not result in efficient levels of spending in some areas, there is no reason to presume that the observed levels of spending in any area are just right’ (Kahn 2011, p. 9), raising questions about the possibility of identifying the optimal size of government.

As will be discussed below, it is possible to address the issue raised by Kahn by adopting several empirical strategies. These could include disaggregating the expenditures undertaken or taxation revenues raised by governments to establish elements of excessive or insufficient levels of public sector activity or, where data exists, incorporating the effects of regulation or economic freedom in order to account for non-fiscal aspects of governmental interventions.

4.3 Review of the empirical literature

4.3.1 Single-country studies

A voluminous literature has emerged investigating the empirical relationship between the size of government and economic growth in the OECD context for single countries.

Grossman (1987) estimated the effect of government expenditures on output in the United States, using data for the period 1929 to 1982. The intent of the study was to empirically identify the point at which the level of governmental spending optimises private sector output.

A Cobb-Douglas production function is specified in which private sector output is a function of private sector labour and capital inputs, and government output that enters the production function both directly as an input and indirectly in a disembodied productivity shift variable.

The estimated function regressed, using ordinary least squares (OLS), the log of private sector income against the logs of the labour force, capital stock, total government expenditure for all levels of government (deflated by the implicit price deflator for the government sector), government expenditure per capita, the unemployment rate and a dummy variable for the war years. Accounting for the potential presence of autocorrelation, most coefficients were significant at the five per cent level.

Grossman separately estimated a log-linear form of production function for government output, again using OLS, in which government output was a function of public sector employment at all levels of government and the real gross stock of fixed capital for general government and government trading enterprises.

Estimation of private and government output functions enabled a comparison of actual and potential private sector output against actual government output. Grossman concluded that government expenditures in the US ‘far exceeded the level that would maximize private sector output’ (Grossman 1987, p. 146) and that ‘[r]educing government output to the optimal level and reallocating the excess labour to the private sector would expand private output by 22 percent’ (Grossman 1987, p. 146).

Another study on the relationship between government size and economic growth was undertaken by Grossman (1988b), for Australia over the period 1949-50 to 1983-84.

A model is established depicting a two-sector economy of private and public sector outputs. Private sector output is a function of labour and capital, governmental outputs, government transfer payments to individuals, and measures of the extent of government-induced resources misallocation (through the excess burden of taxation, disincentives created by transfers, the effect of bureaucracy on the government output mix, and the extent of regulation). Government sector output is a function of government employment and capital.

OLS testing of the time series data showed that changes in government spending has a statistically significant and positive effect on economic growth. The positive influence of government expenditures upon growth is partially offset by the negative output implications of excess burdens and disincentive effects generated by taxation, as well as the growth in the relative share of the population receiving government transfers.

The Grossman study found that the relative size of the bureaucracy and amount of special interest legislation appeared to have an insignificant impact on growth. However, ‘the insignificance of these variables may reflect the poor quality of the variables more than the lack of an influence on the part of factors they purport to measure on economic growth’ (Grossman 1988b, p. 38).

To allow for the inclusion of a budget constraint into the estimation framework, Grossman performed a two-stage least squares (2SLS) procedure. The addition of the budget constraint did not significantly alter the overall results of the model.

The aforementioned studies examined the economic implications of governmental activities and size either at the central government level or by aggregating the activities of all levels of government. By contrast, Evans and Karras (1994) turned their attention to the growth effects of various classes of expenditure by US states between 1970 and 1986.

Evans and Karras (1994, p. 2) found ‘fairly strong evidence that current government educational services are productive but no evidence that the other government activities considered are productive. Indeed, we typically find statistically significant negative productivity for government capital.’ This finding was robust across all of the specifications outlined in the paper, including those using Cobb-Douglas and translog production functions.

Testing for the presence of a quadratic relationship between taxation and economic growth, Scully (1995) found that the average rate of taxation which optimised growth in the United States was between 21.5 and 22.9 per cent of gross national product (GNP) over the period 1929 to 1989.

Estimation was undertaken with two dependent variables (the log of real GNP, and growth rate of real GDP). In the regression with the log of real GNP as the dependent variable, the dependent variable lagged one period was included as a regressor. The log of the variable for the tax rate (τ) and the log of the variable for the proportion of output remaining with the private sector ($1-\tau$) were also included, with both variables lagged one period. Several dummy variables were included, relating to war periods.

After finding that serial correlation was present in OLS regressions, Scully adopted the maximum likelihood method of estimation to account for the serially correlated errors. The empirical results presented were consistent with earlier estimates of the growth-maximising tax rate presented by Grossman (1987).

A year later Scully (1996) applied a ‘parsimonious’ model to estimate the growth-maximising tax rate for New Zealand. A two-sector economic model was specified with a Cobb-Douglas production function whereby output in the current period is determined by government and private sector production in the previous period:

$$Y_t = \alpha(G_{t-1})^b [(1-\tau)Y_{t-1}]^c$$

where Y is output, τ is the tax rate and G is government expenditure. It is assumed that the government balances its budget, so that G is equivalent to τY . A few substitutions yielded the growth rate of the economy as follows:

$$1+g = \alpha \tau^b (1-\tau)^c (Y_{t-1})^{b+c-1}$$

and differentiating the growth rate g with respect to the tax rate τ provides the growth-maximising tax rate:

$$\tau^* = b / (b+c)$$

Using data from 1927 to 1994, Scully identified the growth-maximising rate of taxation for New Zealand to be 19.7 per cent. According to Scully (1996, p. 175), '[t]he deadweight loss to the economy due to taxation above the optimal level ... is 35%. Alternatively, the economy of New Zealand could have produced somewhat more than 53% more output with the same resources had the level of taxation remained at 19.7% of GDP.'

The Scully model specification and associated methodological issues, as well as the empirical findings, were subject to intense critical scrutiny among economists both in New Zealand and internationally.

Sieper (1997) presented a wide-ranging critique of various elements of Scully's paper, including the conceptual limitations of presenting a parsimonious model of growth and taxation. According to Sieper, it did not allow for the differential growth effects of various types of taxes imposed by the New Zealand government over time. Further, by focussing on the growth implications of the average rate of taxation neither did the Scully model account for distinctions between productive and unproductive public sector expenditures.

Sieper also considered that the implicit assumption of constant budgetary balance in the Scully model was inconsistent with the historical record of budget deficits in New Zealand, and nor did the model countenance that some proportion of tax revenues may be allocated towards debt servicing.

The underlying treatment of private sector capital was also identified as a methodological shortcoming, with Sieper stating that the Scully model intimates that 'the entire capital stock is used up each year in production (a "corn" model of capital) and that the saving rate be uncorrelated with the tax burden' (Sieper 1997, p. 5)

Criticism of the application of the Scully model to New Zealand also applied to the empirical approach undertaken. Given that collinearity existed between the variables τ and $(1-\tau)$, Scully removed $(1-\tau)$ on the assumption that the coefficients $b+c = b + (1-b) = 1$ providing the following equation for subsequent empirical testing:

$$(1+g) / (1-\tau) = \alpha [\tau / (1-\tau)]^b$$

Referring to this as the restricted regression, Sieper stated 'the *restricted* regression is subject to bias whenever the adding up restriction upon which it depends does not hold. Moreover, the tests for the extent of that bias *lack power* whenever the problems of collinearity which so often plague the unrestricted regression cause it to fail. All this makes the *restricted* regression a potential snare and delusion' (Sieper 1997, p. 2).

Re-estimating the Scully model, using the unrestricted regression with a partitioned sample restricted to the post-war period, Sieper concluded an 'inverted-U' quadratic relationship between the size of government and economic growth does not exist: '[f]or this important sub-sample, the Scully Curve flips over so that the estimator $b/(b+c)$ now represents the *growth minimising* (not growth maximising) tax burden. But not only does this data set stand the Scully Curve on its head. By a remarkable coincidence it identifies the growth minimising tax burden (36.5%) to be the current tax burden (36.6%)' (Sieper 1997, p. 9).

The use of the CPI deflator by Scully, rather than the conventionally used GDP deflator, to estimate the real growth of GDP was also raised as a concern.

Similar concerns were expressed by Chapple (1997), who also stated that the average (rather than marginal) rate of taxation failed to adequately account for the disincentive effects of taxation. The Scully estimates were also possibly subject to omitted variable bias by excluding other potential factors bearing on growth such as population and labour force growth, capital accumulation, technological progress, terms of trade, and institutional changes.

P E Kennedy (2000) not only criticised the form of the production function explicated by Scully, in that it abstracts away from the contribution of capital goods accumulated in earlier periods to current output, but that the restricted regression may have produced spurious estimates of the growth-maximising rate of taxation.

Specifically when g (the growth rate of the economy) is a random variable unaffected by τ (the average taxation rate) the coefficient estimates from Scully's regressions are estimates of the mean τ value. However, if g and τ are related the estimation equation 'produces a growth-maximizing tax rate estimate that departs from the average τ ' (P E Kennedy 2000, p. 90).

In a response to the Kennedy critique, Scully (2000a) argued that the specific inclusion of labour and capital inputs into the original production function was irrelevant 'since it does not change the analytical results, and the inputs, as well as technical change, in the aggregate production function are captured by the term Y_{t-1} ' (Scully 2000a, p. 93).

While stating that Kennedy's finding of spuriousness in the estimates 'is disturbing,' Scully dismissed Kennedy's statement on the basis that no formal proof was provided and provided additional tests to ensure the accuracy of the estimated growth-maximising tax rate for New Zealand. The hypothesis that the estimated coefficient minus the mean is zero was rejected by t -tests, while another equation used to test critical values of the growth-maximising tax rate did not reject the original Scully (1996) estimate.

Hill (2008) also revisited earlier estimates presented by Scully on the growth-maximising tax rate for New Zealand and the United States in order to assess their theoretical appropriateness and empirical robustness in light of updated economic and fiscal data.

While the Scully production function conceived economic growth to be a function of public and private sector productions (proxied by τ and $(1-\tau)$ respectively) lagged one period, Hill successfully replicated Scully's previous US estimates only when growth is dependent upon public and private production in the *current* period.

Further, the empirical results for the US violated the balanced-budget assumption of the Scully model since 'the 'optimal tax rate' is about 16%, while what might be called the 'optimal expenditure rate' is about 28%. This poses something of a paradox, given that the two are supposed to be the same!' (Hill 2008, p. 420).

Hill also found that the empirical results generated by the Scully model were sensitive to the vintage of the data used in regressions. Using revisions of official US data for the period 1959 to 1990 made

publicly available in 2001 broadened the discrepancy between the optimal taxation and expenditure rates to nine per cent and 29 per cent respectively.

Chao and Grubel (1998) adopted the Scully model to estimate the optimal size of government for Canada. A non-linear regression analysis found that the optimal rate of spending and taxation, assuming a balanced budget, was approximately 34 per cent of Canadian national income for the period 1929 to 1946, a result lower than the actual level of government expenditure of 48 per cent of income in 1996.

In a study prepared for a United States congressional committee, Vedder and Gallaway (1998) estimated the growth-maximising level of government expenditure in the United States during the period from 1947 to 1997.

With the real level of annual GDP as the dependent variable, it was hypothesised that variations in the level of GDP were explained by the level of federal spending as a percentage of GDP and its square, the unemployment rate (capturing trend variations in GDP), and a time trend. Using the OLS estimation technique, all independent variables were of the right sign and significant at the five per cent level of better with the growth-maximising spending rate equivalent to about 17 per cent of GDP.

Vedder and Gallaway also tested for the presence of an Armey curve for the period 1801 to 1996, using the growth rate of real GDP as the dependent variable and taking ten-year averages of all relevant variables to smooth out business cycle fluctuations.

An autoregressive-moving average (ARMA) model of the order (0, 5) was estimated to account for serial correlation in the results, and dummy variables were also included to capture the effects of wars. The results of the ARMA regression showed that variables were significant at the one per cent level, and the size of government that maximised economic growth was about 13 per cent of GDP.

The authors also examined US state and local expenditure data for the post-World War II period to establish the existence of an Armey curve for these levels of government. It was concluded that '[t]he size of state and local government that maximizes the growth rate in GDP is 11.42 percent' (Vedder and Gallaway 1998, p. 13).

Kompas (2000) presented a study on the optimal size of government in Australia (and Indonesia), with GDP growth as the dependent variable as a function of government size (represented by the ratio of public expenditure to GDP) and growth in labour hours worked. The square of the government size measure was included in the regression to identify the existence of the growth-maximising public expenditure-to-GDP ratio.

Using the two-stage least squares estimation technique for time series data from 1964 to 1998, it was estimated that the growth-maximising public sector size was 14.3 per cent of GDP. According to Kompas (2000, p. 330), '[t]he results indicate that decreasing the size of government will increase the rate of growth in Australia.'

Mitnik and Neumann (2003) sought to examine the validity of Barro's (1990) hypothesis that the relationship between economic growth and the government spending share of GDP is of a non-monotonic nature.

Based on quarterly West German data from 1968 to 1994, and incorporating both public consumption and investment expenditures, a dynamic time series approach is undertaken that allows the parameters of the model to depend on government size. Observations are sorted in ascending order by government size, and state-dependent coefficient estimates are recursively obtained by employing a moving window least squares estimation technique, with a fixed window length where in each recursion one observation is added and the most distant observation (associated with the lowest value of government size) dropped from the present window.

With a window length of 60 observations and a lag length of four periods, evidence of a non-monotonic relationship between government consumption and the change in the government consumption share on GDP was found to exist. The growth-maximising size of government consumption was between 18 and 19 per cent of GDP.

However, a similar relationship could not be found for public investment with one speculative reason provided that ‘it seems quite plausible that the efficiency of public investment has diminished over the sample period. In other words, public investment funds have increasingly been used for projects that are less productive for private economic activity’ (Mittnik and Neumann 2003, p. 572).

Criticising the inconclusiveness of cross-country studies Schaltegger and Torgler (2006, p. 1183) suggested that ‘an analysis of a full set of sub-federal governments with considerable autonomy in fiscal policy decisions within a country represents a possible alternative. The advantage of such a model selection is that one can focus on rather homogeneous governments with respect to their economic development, their accounting standards and their legal framework.’ To this end, the authors examined the effects of the size of government in Switzerland’s cantons from 1981 to 2001.

Schaltegger and Torgler established a fixed-effects panel regression in which the dependent variable was the log of cantonal GDP growth per capita, and the explanatory variables include the log of government expenditure as a share of GDP (split into current and capital expenditures respectively), initial GDP to capture growth convergence effects between the jurisdictions, and socio-demographic indicators as control variables.

Given that there may exist a bi-directional relationship between government expenditures and economic growth, the authors undertook Granger causality tests finding that government size Granger-causes economic growth. To address simultaneity bias, instrumental variables are used including state dummy variables and lagged values of government expenditure and initial GDP. The degree of government centralisation is also used as an instrument.

The authors found that there is ‘a fairly robust negative relationship between government size and economic growth’ (Schaltegger and Torgler 2006, p. 1189), an empirical result which is robust to changes in specification and the utilisation of various estimation techniques.

Bania et al (2007) point out that Barro models of endogenous growth could all conceivably point to the fact that increases in taxes can enhance, have no effect on, or impede growth depending on the initial level of taxation and how tax revenues are spent:

‘an incremental dollar of tax revenue spent on productive government services has a much more positive effect on growth in the Barro model when taxes are initially low than when they are already high, when the effect may even be negative. This kind of “growth hill” arises because a rising tax share invested in productive public

services initially increases but ultimately decreases the net (i.e., after-tax) return to private capital, crowding out private capital investment' (Bania et al 2007, p. 194).

Based on five-year average data for 49 US states (excluding Alaska) the authors attempted to quantify the optimal size of government, providing an assessment of the extent to which state-local taxes and corresponding public investments are optimal, too low, or too high in terms of growth in state real income per capita.

Various fixed-effects regression and generalised method of movements (GMM) instrumental variable estimates were undertaken of a broad empirical specification in which the dependent variable (log growth in real personal income per capita in each state) is influenced by the ratio of taxes, fees and intergovernmental transfer to state personal income, the square of the tax ratio, the ratio of health, welfare and other transfer payments to state personal income, and the ratio of expenditures on highways, education and other publicly provided inputs to private production. A set of control variables, such as the unemployment rate, the working-age population, union membership, annual state budget surplus (or deficit) and unemployment insurance expenditures, are also included.

The existence of a non-monotonic Barro curve was robust to the various model specifications, with the peak of the 'growth hill' for all states from 1962 to 1997 at about 28.9 per cent of state income per capita. However a number of states was found to have been situated below the growth peak, with the suggestion that excessive spending on transfer payments vis-à-vis productive government services may explain these observations.

Roy (2009) explored the effects of government size on economic growth in the United States using simultaneous equation regression techniques.

Citing the proposition that single equation based studies using data over long time periods are likely to suffer the problem of simultaneity bias, Roy performed three-stage least squares estimation for four equations where the dependent variables are the growth rates of real GDP, the share of government expenditure in real GDP, the sum of real export plus import volumes and the ratio of investment to output.

Each dependent variable, in turn, was influenced by a range of explanatory variables. Roy hypothesised that the real GDP share of government expenditure was affected by income levels, population growth, the relative price of government services, the proportion of the elderly and self-employed in the population respectively, and the share of exports in real GDP.

As a result of the four-equation simultaneous equation model, it was found that government size had an overall significant and negative impact on US economic growth from 1950 to 1998.

An empirical investigation into the relationship between the size of government and growth in GDP for France was undertaken by Facchini and Melki (2011).

Using data from 1871 to 2008, the authors sought to test an augmented Armey curve that included a number of control variables, such as total population, employment and the degree of economic openness, more commonly associated with the economic growth literature. Certain regressions also included the average level of the tax rate, and the inclusion of dummy variables accounting for

changes in political institutions attributable to each French Republic, electoral cycle effects, and political ideology as proxied by the share of left-wing seats in the parliament.

Accounting for the non-stationarity of certain variables, Facchini and Melki regressed the log of growth in French GDP against the log of the share of public expenditure to total GDP and its square (the time series for both variables was found to be stationary via augmented Dickey-Fuller and Phillips-Peron unit root testing) and the first differences in the log of the other variables. Robust standard errors were estimated reflecting potential autocorrelation and heteroskedasticity in the error terms.

The effects of government size on economic growth were found to be statistically significant across various model specifications, with a quadratic relationship between government size and growth identified. Facchini and Melki found that the growth-maximising share of government expenditure to GDP in France was about 29-30 per cent, a threshold consistently exceeded by French governments since 1947.

Comparing their results for France against those of studies conducted for other countries, Facchini and Melki contended that one reason for a relatively higher growth-maximising ratio for France is that there 'does exist a diversity of Armey curves and thus of optimal state sizes according to the countries considered or more generally the institutional patterns' (Facchini and Melki 2011, p. 24-25).

4.3.2 Multiple-country countries

While this study focuses upon the economic implications of public sector size in Australia, important insights concerning empirical strategies quantifying the extent of the relationship between government size and economic growth may be discerned from a review of multiple-country studies limited, as far as practicable, to advanced economies.

In one of the earliest empirical studies in the modern empirical literature on the growth consequences of public sector size, Landau (1983) used data for over 100 countries to examine the relationship between the share of government consumption expenditure in GDP and the rate of growth in real per capita GDP between 1960 and 1977.

As part of the study, Landau performed 2SLS regression on the top 48 countries in the sample ranked by income. The 2SLS procedure was undertaken to counter potential problems of simultaneity in the relationship between government spending and growth. In accordance with *a priori* theoretical expectations, government consumption had a negative effect upon real per capita GDP growth and this result was significant at the ten per cent level.

Kormendi and Meguire (1985) investigated the determinants of real output growth for 46 countries over the period 1950 to 1977.

One of the explanatory variables included in the cross-section OLS regression analysis was the mean growth of the ratio of government expenditure (excluding transfer payments) to output. This variable was included in the regression since '[r]ecent 'supply side' theories hypothesize that the taxes necessary to support government spending distort incentives, generally reduce efficient resource allocation, and hence reduce the level of output. Thus, countries with greater mean growth of

government spending as a proportion of output ... should experience lower economic growth' (Kormendi and Meguire 1985, p. 145).

However empirical testing found that this hypothesis was refuted, with the government expenditure having a positive (albeit statistically insignificant) effect on economic growth for the countries studied.

Grossman (1990) developed a model differentiating between the positive and negative effects of government activities on economic growth. On the one hand, governments may provide goods and services that enhance private sector productivity while, on the other, distortions due to revenue-raising mechanisms may detract from efficient resource allocation.

Using cross-sectional data for a sample of 48 countries, Grossman found that while government has a significant positive effect on overall economic growth the government-generated misallocation of resources are not insignificant. Based on another sample of a smaller set of countries, Grossman (1990, p. 226) considered that the 'net effect of government appears to be marginally negative.'

Cashin (1995) developed an endogenous growth model of the influence of public investment, transfers and taxation on economic growth.

It was hypothesised that the levying of distortionary taxes on output would be balanced against the positive effects of public capital and transfers, both of which increase the marginal product of private capital. Interestingly, the Cashin model conceived public transfer payments as productive inputs in private sector production functions: '[t]ransfers are produce in that they raise the marginal product of private capital, by improving the enforcement of private property rights in the economy, and by inducing relatively unproductive agents to leave the work force' (Cashin 1995, p. 239).

The model was then subjected to empirical testing for 23 developed economies over the period 1971 to 1988. The dependent variable was the average annual rate of growth of real per capita GDP, taken over three five-year time intervals and one three-year time interval, with most explanatory variables (including the mean ratios of public investment, current taxation revenue and transfer expenditures to GDP) taken over the same average time periods.

A variety of empirical specifications, based on random-effects or 'between-effects' (which estimates a group mean intercept for all countries) regressions, with instrumental variables included in certain specifications, were undertaken to assess the nature of the relationship between government size and economic growth. The tests confirmed the initial hypotheses outlined in the paper, namely '[i]ncreased government spending on those items that enter private production functions as productive private inputs enhances economic growth' (Cashin 1995, p. 262) offset by the growth-retarding effects of taxation.

In a review of the theoretical and empirical evidence Agell et al (1997) contended that it was not possible to establish an unambiguous empirical relationship between the size of the public sector and economic growth in a cross-country context.

In addition to difficulties arising from deficient data quality and debates surrounding the appropriate coverage of countries and length of time subject to empirical investigation, the inclusion of control

variables conceived to affect growth rates may, in fact, largely cancel out any effects directly attributable to the size of the public sector.

Following the findings of Levine and Renelt (1992), who found that partial correlations between taxation or public expenditure and growth from a cross-country perspective lack reliability, Agell et al (1997, p. 42) indicated that 'in the future the burden of proof will be greater: only those partial correlations which survive a systematic sensitivity analysis will receive serious attention.'

In response to this paper, Fölster and Henrekson (1999) stated that once a number of specific econometric problems are addressed then the objections raised by Agell et al (1997) are satisfactorily addressed.

Fölster and Henrekson counselled against the inclusion of developed and developing countries in international studies of the government size-growth relationship, since developed countries with larger public sectors are more likely to have a size of government that exceeds an economically optimal threshold than developing countries. The exclusion of developing countries from cross-country regressions ensures that the relationship between government size and growth becomes more robustly negative.

Acknowledging that simultaneity can pose as a significant problem especially for regressions based on average values of government size and growth over long time periods, the authors suggested that 'more efficient estimation accounting for within-country variation and heteroskedasticity yields highly significant and large coefficients for the effects of the tax burden and public expenditure on growth, both with and without control for initial GDP and the demographic structure' (Fölster and Henrekson 1999, p. 350-351).

In another paper, Fölster and Henrekson (2001) undertook a panel study on the government size-growth relationship for a sample of developed countries from 1970 to 1995. Using OLS and weighted least squares (WLS) estimation techniques, and including fixed country and period effects, the models identified a highly significant negative growth effect for total government expenditure and consumption expenditures, and a negative effect of taxation on growth.

Robustness tests of the data were undertaken using extreme bounds analysis, with the tests finding that taxation and total government expenditures were robustly negative across varying specifications of tested regressions.

Bleaney et al (2001) developed an endogenous growth model which contended that the impact of fiscal policies on economic growth was contingent not only upon the level of taxation and expenditure, but on their structure. In other words, government expenditures will have differential growth impacts depending on whether they are productive or non-productive in their effect on private sector production, whilst taxation may either exert distortionary or non-distortionary impacts on economic behaviour.

With 22 developed countries considered for various periods during 1970 to 1995, a two-way fixed-effects model with time and country-specific intercepts were used to quantify the relationship between the size, and structure, of government activities and economic growth. While distortionary taxation and productive expenditures had statistically significant negative and positive effects on

growth respectively, other forms of revenues and expenditures did not have statistically significant growth effects.

To counter the effects of endogeneity between the explanatory variables and the growth rate, the Anderson-Hsaiao (AH) estimator (in effect, a special case of the Arellano-Bond GMM estimator) was used involving first differencing the growth regression and instrumenting the first difference of the lagged dependent variable with lagged levels. According to Bleaney et al (2001, p. 47), the adoption of this estimation techniques ‘does not substantially affect the long-run estimates of the main fiscal variables: strong negative, statistically significant effects of distortionary taxation and similar positive effects of productive expenditures are confirmed.’

Heitger (2001) conducted a regression analysis, based on generalised least squares (GLS) panel estimates for 21 OECD countries from 1960 to 1997, to establish the effect of government activities on economic growth.

The regression analysis found that ‘[t]he relationship between government expenditures and economic growth is negative and statistically highly significant’ (Heitger 2001, p. 15). Specifically, an increase in the government’s share of output by ten percentage points led to a reduction of the average growth rate by 0.5 percentage points per annum.

Additional regressions incorporating a breakdown of government expenditures into consumption and investment spending were undertaken. All forms of consumption expenditures undertaken by governments had a significantly negative impact on economic growth, while public capital formation had a negative (although not statistically significant) growth effect.

Heitger also found that government crowds out private investment in physical capital, whereby the inclusion of government expenditure (or types of expenditures) in the estimation framework makes the relevant private capital accumulation variable lose its statistical significance.

Dar and AmirKhalkhali (2002) extended the basic Solow growth model to illustrate that government size can influence growth through its effect upon factor productivities. A random-coefficients GLS model to quantify the effect of government size on growth is used to overcome the conceptual and empirical problems associated with assuming away inter-country heterogeneity in the variables.

Using data spanning the period 1971 to 1999, Dar and AmirKhalkhali found that government expenditure in 19 OECD countries had a negative, statistically significant impact on economic performance. This overall result was confirmed by further testing, in which countries were grouped in accordance to their size of government, showing that ‘the role of capital in fostering economic growth appears to be adversely affected in countries with big government sectors’ (Dar and AmirKhalkhali 2002, p. 687).

In their general assessment of the effect of government size on economic performance, the authors explained that ‘[t]he advantage of a small government, in general, likely reflects the greater efficiencies resulting from fewer policy-induced distortions (such as the burden of taxation), the greater discipline of market forces which fosters efficiency of resource use, and the absence of crowding-out effects that weaken the incentives to create new capital which embodies new technologies’ (Dar and AmirKhalkhali 2002, p. 679).

Borcherding et al (2004) presented a series of OLS panel regressions on the growth effects of larger government (as proxied by the growth of real government consumption expenditure relative to GDP), with a number of specifications including country and time fixed-effects. The explanatory variables in the estimated equations included the growth of government spending, lagged income per capita, population growth, terms of trade changes, and the savings rate. A consistently negative effect of the growth rate of government size on real output growth was established, a result which was consistent across various regression specifications.

To account for the possibility of bi-directional causality in the relationship between government size and economic growth, Borcherding et al (2004) also performed a three-stage least squares (3SLS) simultaneous equation regression analysis. However the use of this technique did not materially change the overall conclusion that a larger government exerts a negative impact on real GDP: ‘the simultaneous equation estimates give little reason to believe the usual single equation estimate will significantly understate the negative effect of government (consumption) size on income growth or the effect of per capita income on government size’ (Borcherding et al 2004, p. 95).

Afonso and Furceri (2010) examined the effects of government revenue and spending on economic growth and volatility in OECD countries over seven five-year periods from 1970 to 2004.

The authors established two separate regressions (one for revenue, the other for expenditure) with the dependent variable in each the growth rate of real GDP per capita. Government revenue and spending variables as a share of GDP were included, as were the square terms of each variable to test for the existence of an optimal size of government for each variable.

With regard to revenue, total revenue and its main components (including direct taxes, indirect taxes and social security contributions) were included, whereas for spending total government expenditures are broken down into transfers, subsidies, investment and consumption.

Using the findings of robust cross-country growth determinants by Levine and Renelt (1992), the authors included the initial log of GDP per capita, average total investment share of GDP, initial human capital and the average population growth rate as control variables. In addition, variables taking into account the degree of economic openness and fiscal volatility were included in each regression equation.

Incorporating time fixed-effects and using robust standard errors to control for heteroskedasticity, and a Hodrick-Prescott filter to account for outlying observations, the revenue-to-GDP ratio had a negative effect on the real growth of per capita GDP in the OECD. Indirect taxes and social contributions appear to have a greater adverse impact on economic growth than do direct taxes.

In terms of the expenditure equation, Afonso and Furceri found that total government spending also had a negative impact on growth with subsidies and consumption each having significantly negative growth effects. Public investment expenditures also had a negative, albeit statistically insignificant, effect on real GDP per capita growth.

To check for the robustness of the results, Afonso and Furceri included instrumental variables in their revenue and expenditure regressions. Government spending and revenue were instrumented by their lagged values, openness and country size (measured by total population). The inclusion of these

instrumental variables did not materially change the overall conclusions derived from the estimated regressions.

Economic freedom indexes, as a proxy for institutional quality, were incorporated into a recent study on the government size-growth relationship by Bergh and Karlsson (2010).

A panel of (at most) 29 OECD countries for the period from 1970 to 1995 were selected. The dependent variable was the average annual growth rate over five-year periods, while government size was measured as total taxation revenue or public expenditure as a percentage of GDP. OLS and panel regression of this data suggested a negative relationship between government size and growth, controlling for economic freedom and globalisation measures.

To check the robustness of these results, the authors used Bayesian Averaging over Classical Estimates (BACE) to run possible combinations of the variables included in the dataset. Government size, as proxied by tax revenue as a share of GDP, was robust however government expenditures were not considered to be robust according to the BACE analysis.

As an aside, Bergh and Karlsson (2010, p. 196) suggested their results provided ‘support for the idea that countries with big government can use economic openness to mitigate the negative growth effects of taxes and public expenditures.’ This phenomenon was cited to be applicable to Scandinavian countries, with have simultaneously large public sectors and high rates of economic growth.

In a working paper for the European Central Bank, Afonso and Jalles (2011) developed a growth model incorporating an explicit role for government implying that changes in the size of government may alter the underlying optimal growth path of the economy.

A Cobb-Douglas production function was specified in which final output was dependent upon consumption expenditures by government, the stock of physical capital, and a labour-augmenting technical change variable that is affected by institutional quality, political regime, legal systems and other relevant factors affecting the level of technology and efficiency in a given country at a given period of time.

Assessing the relationship between public consumption expenditures and economic growth for OECD countries using panel data between 1970 and 2008, the authors controlled for variable endogeneity by using GMM estimation which jointly estimated equations in first differences using as instruments lagged levels of the dependent and independent variables, and in levels, using as instruments the first differences of the regressors.

Afonso and Jalles found that government consumption was consistently detrimental to growth in GDP, and this result was robust across a range of model specifications with various indicators of institutional quality.

4.3.3 Critical assessments

The conventional view on the empirical relationship between government size and economic growth is that while there are valid theoretical reasons to expect that growth in the size of the public sector would be detrimental to economic growth in the long run, there has been mixed empirical evidence to support such views.

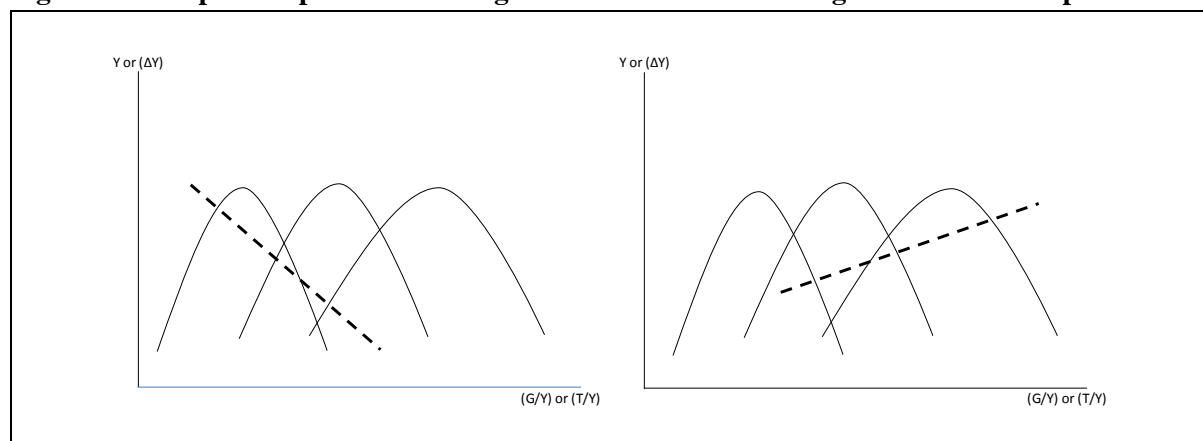
Aside from a range of practical issues routinely confronting researchers seeking to empirically model the government size-growth relationship – such as the selection of countries or levels of government within a country, the time period for empirical assessment, and the statistical definition and coverage of government size - it is increasingly recognised that the empirical ambiguities, particularly evident in the early literature, arose as a consequence of fundamental problems in methodological and statistical approaches contributing to inconsistent, if not biased, results (Nijkamp and Poot 2004; Bates 2010; Coll 2010; Bergh and Henrekson 2011).

A major issue with early empirical investigations into the growth implications of public sector size, particularly those which appeared during the 1980s and early 1990s, was that they undertook linear, OLS regression analysis for what is now generally agreed to be essentially a non-linear relationship between government size and growth.

As explained by Coll (2010) and Facchini and Melki (2011) the non-monotonic relationship between government size and economic growth varies across countries in accordance with factors such as the composition of expenditure and taxation and institutional features, and that this relationship is stochastic as underlying factors affecting the size-growth relationship change.

In a cross-country context, the empirical condition that the relationship between government size and growth is linear may lead to spurious results given that individual countries within the sample may either be situated on the upward or downward sloping segments of the Barro-Armev-Rahn-Scully (BARS) curve (Figure 4.6).

Figure 4.6: Empirical specifications of government size-economic growth relationship



The dashed line refers to a stylised fitted linear regression applied to a cross-country empirical analysis.

Source: Coll 2010.

However, the ability to empirically establish the existence of a BARS curve in a given country critically depends on whether the relevant data (i.e., government expenditure- or taxation-to-GDP ratio, and economic growth) possess non-stationarity attributes, or in other words maintain a constant mean or variance.

As explained in the following chapter if a time series is non-stationarity the first differences of such time series are stationary (Gujarati and Porter 2009, p. 760). In relation to the empirical relationship between government size and economic growth:

‘[r]elating rate of growth to rate of growth reproduces almost literally the formula of elasticity, so that the corresponding equation would yield an estimate of the elasticity of GDP to changes in the relative size of the public sector. However, estimating the elasticity instead of the curves as such imposes the restriction of a constant elasticity, an assumption that may be acceptable when all of our observations lie at one and the same side of the Armey curve, but is compatible with the curve as such when considered in its entirety’ (Coll 2010, p. 5).

Another concern with the empirical literature, even in recent years, relates to the treatment of endogeneity bias amongst included variables in the regression.

The design of numerous expenditure and taxation policies not only suggest that they affect the growth rate of an economy, but that changes in the rate of growth could likewise affect the levels of expenditure or taxation revenue.

During an economic downturn social security expenditures tend to increase, as more unemployed people receive unemployment payments, whereas economic growth is generally associated with a reduction in expenditure as the number of recipients of public sector transfer payments decline. Modern governments also tend to increase discretionary subsidies or investment expenditures during an economic downturn.

In the absence of empirical techniques to account for potential endogeneity in the variables, an identification of a negative correlation between the size of government, measured through expenditure variables, and economic growth would not necessarily imply causality.

As noted above, various empirical methods may be employed to eliminate statistical biases generated by the presence of endogenous variables. For example, the simultaneous equation estimation technique is designed in an attempt to effectively exogenise key explanatory variables (such as the size of government) within a system of equations.

The selection of instrumental variables, or those which are related to the endogenous explanatory variable but uncorrelated with the dependent variable, is another strategy adopted by researchers in the field. However, there remains a debate over whether the selection of instrumental variables employed thus far in a number of studies are effectual in addressing the problem of endogeneity (Agell et al 1997, 1999; Bergh and Henrekson 2011).

Some studies also attempt to avoid reverse causality problems associated with government expenditures by resorting to taxation measures as proxies of government size. As noted by Bergh and Henrekson (2011), as an economy grows it is likely that taxation revenues will increase so that causality runs from economic growth to taxation revenue. This implies that ‘a negative coefficient on taxes actually provides rather strong evidence that high taxes cause lower growth, because reverse causality leads us to expect a positive correlation’ (Bergh and Henrekson 2011, p. 883).

Another criticism of the early literature on the empirical effects of public sector size is that it depicted a non-existent or simplistic representation of the growth process. This has tended to be gradually rectified over time, with estimates of the relationship between government size and economic growth situated within a broader empirical analysis of the growth process. The inclusion of appropriate

control variables, in part influenced by neoclassical and endogenous growth narratives, assists in the amelioration of omitted variable biases and thus enhances the explanatory power of estimated models.

Concerns have also been raised that omitted variable bias could have explained, in part, the observation of mixed empirical results in the early literature.

There appears to be a general consensus that assessments of the government size-economic performance relationship should be situated within a broader growth accounting empirical framework, incorporating the major sources of economic growth drawn from neoclassical and endogenous theories. Indeed this basic principle informs the empirical literature on growth more broadly, whereby most researchers adopt the stance of Barro (1991) and Mankiw et al (1992) by empirically examining economic growth as a function of a wide range of regressors (Myles 2009).

Others have suggested that, for budgetary-based proxy measures of government size, that both expenditure and taxation variables, or a variable representing the government budget constraint, should also be included in government size-economic performance empirical studies. The inclusion of such variables would help ensure that the interactions between fiscal variables are fully accounted for in any modelling exercise (Gemmell et al 2007; Bates 2010).

Coefficient values for the government size variable in regressions should represent the long run effects of changing size on economic performance, and so it is necessary to explicitly account for short run macroeconomic volatility contaminating data series. To achieve this some researchers incorporate either unemployment or inflation among the variables affecting growth (e.g., Vedder and Gallaway 1998) or utilise some 'filtering' process which extracts cyclical processes from the dependent economic growth variable (e.g., Afonso and Furceri 2010).

The growing influence of institutional economics and public choice theories has also led to more empirical studies incorporating variables considering some aspect of the institutional environment or policy quality attribute, for example indexes of lack of corruption or extent of economic freedom. This practice is increasingly commonplace for multiple-country studies, however is arguably of lesser importance in single-country analyses especially where a given country has maintained a relatively stable institutional environment.

Bergh and Henrekson (2010, 2011) contend that once a range of methodological and statistical limitations of the early empirical literature are accounted for, a negative association between government size and economic growth represents a more consistent finding within the literature.

The review of the literature presented in this study concurs with the Bergh-Henrekson thesis, noting the increasing tendency of researchers in the field testing the robustness of their hypotheses using alternative econometric specifications, and accounting for factors such as expenditure or taxation composition, fiscal constraints, variable endogeneity and data quality issues in anticipation of potential intellectual critiques of their research efforts.

4.4 Conclusion

This chapter presents an integrated review of the key theoretical and empirical literature on the relationship between government size and economic performance.

Three strands of theoretical perspectives were canvassed, highlighting variations in the evolution of economic thought concerning the growth effects of changing public sector size. Alongside a range of multiple-country studies, single-country empirical studies, which tend to be overlooked within major literature surveys, were reviewed from the perspective of obtaining insights into the prospects and limitations of performing a similar empirical study in the Australian context.

Growing theoretical interest in the field, together with the emergence of consistent national accounting data and an improvement in computation power, contributed to a large amount of literature from the 1980s quantitatively assessing the nature and extent of the role of government in the economic growth process.

As with most other areas of empirical enquiry in economics, methodologies surrounding the quantification of the relationship between growth in public sector size and economic growth has been, and continues to be, subject to continuous refinement in light of more sophisticated econometric and statistical inference techniques available.

Although there remains disagreement concerning the causal relationship between public sector size and growth, it is revealing that the generic processes of improvement in empirical estimation appears to have led to findings of a stronger, more robust negative correlation between governmental activities and economic growth rates especially in the recent literature.

It is on the basis of this critical assessment of the theoretical and empirical literature that the following chapter will outline the empirical strategy to be employed in this study, and the results arising from this strategy concerning the quantitative effect of growth in public sector size on economic growth in the Australian context.

Chapter Five

Consequences of Public Sector Size and Growth: Estimation Methodology and Results

5.1 Background

The relationship between the size of government and economic performance, most commonly expressed in terms of economic growth or per capita economic growth, has been subjected to extensive empirical investigations for either individual countries or groups of countries.

While there are numerous cross-sectional or panel empirical studies including Australia amongst a sample of countries (usually OECD member states), the number of time series empirical studies exclusively pertaining to the economic consequences of Australian public sector size is limited. As noted in the previous chapter, these include studies by Grossman (1988b) and Kompas (2000).

The purpose of this chapter is to contribute to the literature by empirically estimating the degree to which changes in the relative size of government explains variations in the real per capita growth rate of the Australian economy.

This chapter provides empirical results using the multivariate ordinary least squares econometric technique, as well as several simultaneous equation estimation techniques explicitly taking into account the potentially two-way causal relationship between government size and growth.

5.2 Methodology and data

5.2.1 Overview

In some respects a time series analysis of the relationship between government size and economic performance for a single country has advantages over the more widely-used cross-sectional studies containing information for multiple countries.

As noted by Fölster and Henrekson (2001), cross-section regressions containing data over long periods of time may be inefficient insofar as they discard information on within-country variations which could be pivotal to explaining the nature of the government size-economic growth relationship. These studies also tend to implicitly assume that production functions are identical between countries, potentially producing biased estimates concerning the true relationship between government size and economic performance.

In recent years panel empirical studies combining cross-section and time series data have become more prominent within the literature. Specifically researchers have increasingly incorporated fixed or random country effects, to capture otherwise unobserved heterogeneity between countries and mitigate omitted variable biases (Hansson 2000; Bergh and Henrekson 2011).

While there remains disagreement as to which kinds of effects are more suitable for inclusion in any given model (Bergh and Henrekson 2011; Li and Zhou 2011), these types of empirical studies have

partly contributed to the increasingly observed robustness of findings of a negative correlation between government size and economic growth referred to in the previous chapter.

Notwithstanding such improvements in econometric techniques for cross-country analysis, time series empirical analysis remains valuable in testing the government size and economic growth relationship for single countries. Among other things, this is because common or similar institutional settings within countries provide an empirical opportunity to ameliorate the effects of unobserved heterogeneity that often affect cross-country studies.

Consistent with the majority of studies in the literature, this study empirically investigates the relationship between government size, represented by expenditures by commonwealth, state and local government entities as a percentage of GDP, and economic growth, represented by growth rates in real GDP per capita, for Australia.

It is noted that a limited, but growing, number of recent studies (for example, Bergh and Karlsson 2010; Kirchner 2011a) have applied non-budgetary proxies of public sector size, such as measures of regulation or even composite measures of spending, revenue and regulation (as reflected in, for example, economic freedom indexes), accounting for some difficulties often attributed to expenditure or taxation measurements of the size of government.

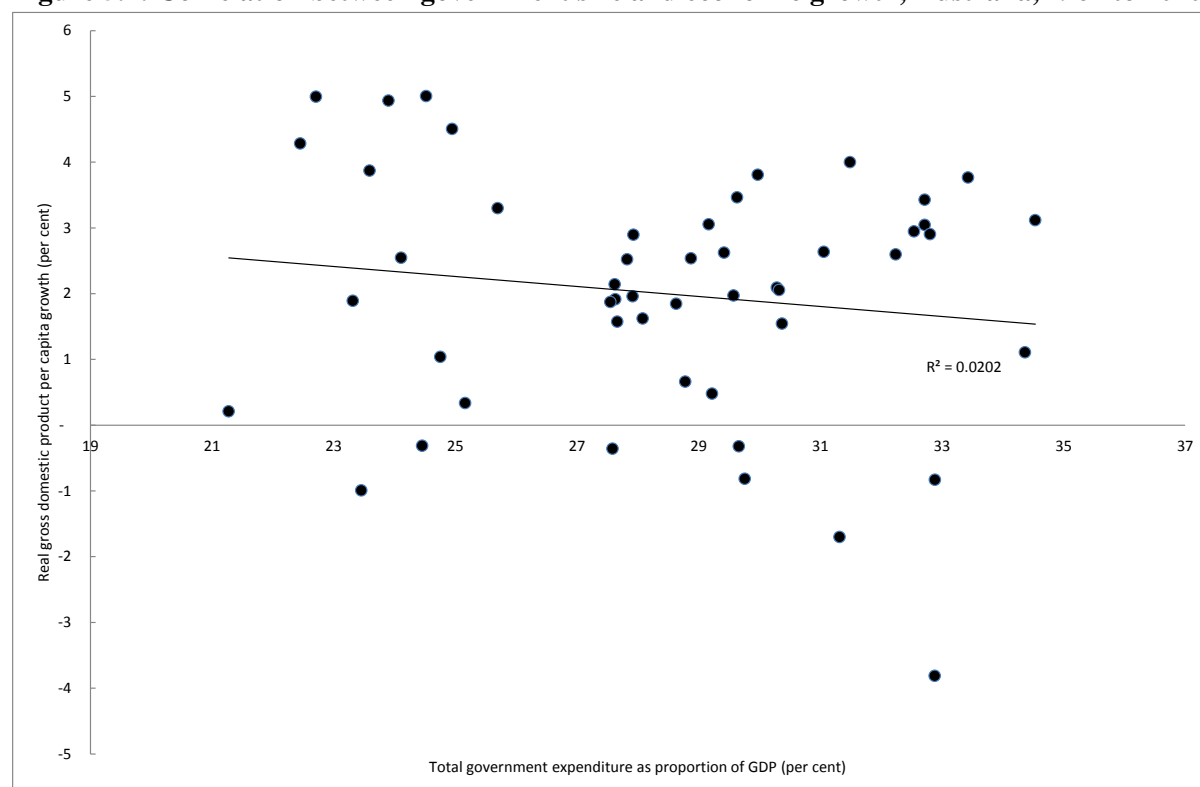
These efforts have been largely motivated by dissatisfaction with conventional budgetary measures: ‘[p]otential endogeneity between government spending, revenue and economic growth has been a significant complication for empirical work. There are often substantial series or structural breaks in public sector accounts. Government spending and taxing may also be incomplete as a description of the size, scope and role of government’ (Kirchner 2011a, p. 2).

While studies relying on non-budget proxy measures of governmental size are important in their own right, this paper proceeds on the presumption that the limited number of Australian studies on the government size and economic growth relationship suggests that the intellectual utility of empirical investigations, using conventional budgetary measures, have not yet been exhausted.

Further, and as discussed below, some of the prominent limitations attributed to single-country time series studies of budgetary proxies of government size, such as the confounding of short and long run economic relationships as well as the presence of simultaneity, can be feasibly addressed using a variety of econometric techniques.

Arguably the fundamental issue in empirical analysis is to identify the existence of causal linkages between variables. Figure 5.1 provides a scatter plot of annual pairs of growth in real GDP per capita and government size for the financial years 1961 to 2010, showing a slightly negative correlation between the size of Australian governments and economic growth.

Figure 5.1: Correlation between government size and economic growth, Australia, 1961 to 2010



Government size defined as expenditure by commonwealth, state and local governments as a proportion of nominal GDP. Expenditure includes consumption expenditure, gross fixed capital formation and total income payable (less commonwealth current and capital transfers to state-local governments) of general government sector, and gross fixed capital formation of public corporations sector. Economic growth defined as annual percentage growth in real GDP per capita.

Source: ABS 2011b.

Extenuating factors must be considered prior to inferring a causal relationship between government size and economic growth from simple correlation analysis. It is widely recognised in the economic growth literature that numerous factors, aside from changes in the size of government, can influence the long run growth rate of an economy. These may include changes in the stock of physical and human capital, macroeconomic fluctuations, as well as cultural or political changes affecting overall institutional quality (New Zealand Treasury 2011).

Regression analysis is conventionally used to ensure that the various additional influences upon growth are accounted for when attempting to quantify the nature of the causal relationship between government size and economic performance.

5.2.2 Model specification and data sources

In similar fashion to the parsimonious models established in several empirical studies by Scully (1994, 1995, 1996, 2000b), a basic regression model can be hypothesised whereby Australian per capita economic growth is determined by a proxy for government size, the budget constraint faced by all levels of government, a time trend, a constant term capturing technological and other influences on the growth rate and, finally, an error term:

$$gdppc = \alpha_0 + \alpha_1 gexp + \alpha_2 surplus + \alpha_3 time + \varepsilon$$

The dependent variable ($gdppc$) is the growth rate of Australian real GDP per capita expressed in chain volume terms,¹⁸ whereas α_0 is the constant and ε represents the stochastic error term.

The explanatory variable $gexp$ is the ratio of government expenditures to nominal GDP. For the purpose of this chapter, government expenditures are defined as: the summation of final consumption expenditures and total income payable by the general government sector, and gross fixed capital formation by the general government and public corporations sectors; less commonwealth general government current and capital transfer payments to state and local governments. The expenditures of all three levels of government (commonwealth, state and local) are included in this measure.

The data series used to devise the government size proxy measure is drawn from national accounts maintained by the Australian Bureau of Statistics (ABS) (ABS 2011b). The ABS national accounts do not provide data on total incomes payable by public sector non-financial corporations prior to the 1990 financial year, and so these figures are excluded from the proxy measure of government size used in this chapter.

Nonetheless, the coverage of government expenditure used here is more expansive than that used in most empirical studies, which typically rely on either government consumption purchases and/or investments for the general government sector only.

While it is often argued that transfer of payments from the government to certain individuals or non-governmental entities does not affect resource allocation, at least as directly as government purchases or investments, transfer payments nonetheless do exert real effects on the economy. Such effects may include increases in average or marginal taxation rates used to fund transfers, altered economic incentives to supply labour or save and invest finances resulting from tax changes and, in the case of interest payments on public debt, transfers may represent a delayed payment for previous public sector real purchases (Kahn 2011). These considerations informed the inclusion of general government sector total incomes payable in the estimated government size measure.

The variable *surplus*, representing the ratio of general government sector budget surpluses (or deficits) of the commonwealth, state and local governments to nominal GDP, is included in recognition of the fact that the fiscal effects of additional governmental expenditures invariably interact with the taxation and other revenue instruments used to finance the expenditure (Bates 2010). The inclusion of this variable also addresses a limitation of many econometric studies in this field which implicitly assume that government budgets remain continuously balanced.

The basic model is subjected to single-equation ordinary least squares (OLS) econometric testing in order to estimate the coefficients of the variables, expressing the relative contribution of each variable to economic growth.

Various augmentations of this basic model, which incorporate previously omitted variables, are also specified for empirical testing. These variables include those identified within the neoclassical growth literature as representing key determinants of growth. The private sector investment (less ownership of dwellings and ownership transfer costs) share of nominal GDP (*inv*) reflects capital accumulation

¹⁸ The real GDP per capita measure used in this chapter is based on market prices, including indirect taxes less subsidies. This contrasts with the factor cost GDP measurements used in chapter 3 of this study.

in the economy, while the total labour force (*lab*) is included to account for the amount of labour inputs available.

Reflecting the empirical strategy of Mankiw et al (1992) to augment the basic Solow neoclassical model of physical factor accumulation with a measure of accumulating human capital, a proxy measure of educational attainment (*edu*) is included among the set of additional explanatory variables. This variable is estimated as the share of Australian university student enrolments to the total population.

Given that output levels vary with the business cycle it is possible that the results of time series regressions are driven by short run macroeconomic fluctuations. Whereas many studies seek to reduce the amplitude of business cycle effects by averaging all variables, typically over a five or ten year period, such adjustments to data are undertaken at the cost of losing information concerning the effect of government size on economic growth (Mollick and Cabral 2011). Alternatively, an unemployment rate variable (*unem*) could be included to address business cycle effects on growth and indeed on government expenditures, which is the approach adopted in this chapter.

Finally, the Australian economy is characterised as a small, open economy in which fluctuations in prices commanded by its exports relative to prices paid for imports will influence changes in overall national income. Accordingly the terms of trade index (*tot*) are also included as an explanatory variable.

The coverage of the data relates to annual financial year observations from 1960 to 2010, coinciding with the period of historical national accounting data made available by the ABS from which key macroeconomic data used in the regression analyses are sourced.

An advantage of using the historical national accounts is that key data series used in the regressions, including for the variables *gdppc*, *gexp*, *inv* and *tot*, are estimated on a reasonably consistent basis, avoiding some of the potentially significant statistical pitfalls associated with splicing longer run data series from alternative data sets (for example, ABS government finance statistics). Data for the other variables are mainly drawn from the ABS, or from Reserve Bank historical statistics which rely upon ABS data (Foster 1996).

When incorporated into the regressions, all variables (with the exception of *surplus*, which includes negative data values within the series) are expressed in terms of their natural logarithms, implying that the first differences of these variables approximate their growth rates.¹⁹

The descriptive statistics and data sources used in all OLS and simultaneous equation specifications presented in this chapter are provided in appendix B.

5.2.3 Unit root testing

Granger and Newbold (1974) noted that regressions involving independent non-stationary variables, containing an inherent stochastic trend, will generate ‘spurious’ results. On other words conventional diagnostic tests, such as t-test or R^2 statistics, may be biased towards finding a statistically significant

¹⁹ In this chapter, all variables expressed in logarithms are prefixed by the letter ‘l.’

relationship between variables or a strong overall goodness of fit, respectively, where in fact none exists.

To detect the presence of non-stationarity in variables and so avoid the spurious regression problem, statistical tests were developed by Dickey and Fuller (1979) and MacKinnon (1991, 1996) based on the estimation of the following regression containing lagged values of the dependent variable:

$$\Delta y_t = \beta_1 + \beta_2 t + \delta y_{t-1} + \sum \alpha_i \Delta y_{t-i} + \varepsilon_t$$

where $\delta = (\rho - 1)$, ε_t is a white noise error term and $y_{t-1} = (y_{t-1} - y_{t-2})$, $y_{t-2} = (y_{t-2} - y_{t-3})$, etc. A test of the null hypothesis that $\delta = 0$ (i.e., a unit root is present) is undertaken, with the alternative hypothesis that $\delta < 0$. If $\delta = 0$ there is a unit root meaning that the time series under consideration is non-stationary (Gujarati and Porter 2009).

Using this test, known as the augmented Dickey-Fuller (ADF) test, it is also necessary to test the orders of integration of the variables to be used in subsequent regressions. If a time series is to be differenced d times to be stationary then the series is integrated of order d , denoted by $I(d)$.

The ADF test was conducted for each of the logarithms of the variables (excluding the time trend) prior to proceeding to OLS estimation. The results of the unit root testing are summarised in appendix C, indicating that all variables were first-order integrated at least at the 90 per cent level of confidence.

Accordingly, the growth regressions testing the relationship between government size and economic growth were performed on the basis of the first differences of the included variables.²⁰ This implies that the coefficients of the regressed variables are effectively expressed as elasticity terms (Arpaia and Turrini 2008), with each coefficient indicating the extent to which the logarithmic rate of growth in per capita national output is responsive to the logarithmic rates of growth of the explanatory variables.²¹

5.3 Results and analysis

5.3.1 Ordinary least squares analysis and results

In the first instance the relationship between government size and economic growth is empirically tested using the single-equation multivariate OLS regression technique.

Table 5.1 provides the results of the basic regression and augmented versions of the basic model which variously incorporate neoclassical and endogenous determinants of economic growth, as well as the unemployment rate and terms of trade effects. In all regressions robust standard error corrections are utilised accounting for potential autocorrelation and heteroskedasticity in the data.

²⁰ This technique is similar to a Cochrane-Orcutt transformation procedure used to account for the presence of potential autocorrelation, which produces larger standard errors than the (underestimated) standard errors of the OLS estimate in the presence of autocorrelation (Montgomery et al. 2008).

²¹ Since the resulting coefficients represent the outcome of regressing growth rates of variables the following regressions do not estimate the growth-maximising, or 'optimal,' government expenditure-to-GDP ratio, which, as explained in chapter 4, is conventionally expressed as the relationship between the *level* of government size and *rate* of economic growth.

The signs of the regression coefficients for the government size variable conformed to *a priori* theoretical expectations, that there existed a negative relationship between the change in the government expenditure-to-GDP ratio and real GDP per capita growth between financial years 1960 and 2010. Depending upon the specification, a ten percentage point increase in the ratio of government expenditure to GDP is associated with a reduction in real GDP per capita growth of between 1.6 and 2.5 percentage points.

Table 5.1: Ordinary least squares regression results, growth variables

	Basic model	Inclusion of neoclassical growth variables	Inclusion of endogenous growth variable	Inclusion of macroeconomic and terms of trade variables
	(1)	(2)	(3)	(4)
Dependent variable: Logarithm of real GDP per growth per capita ($\Delta \lg dppc$)				
Constant	0.028344*** (0.005173)	0.026176*** (0.0046)	0.023941*** (0.005432)	0.022843*** (0.00457)
$\Delta \lg exp$	-0.245701*** (0.055368)	-0.231437*** (0.059238)	-0.213395*** (0.062383)	-0.160547*** (0.063428)
$\Delta \ln v$		0.075909*** (0.030213)	0.08174*** (0.030781)	0.051662* (0.032611)
$\Delta \ln lab$		0.12703*** (0.050386)	0.11702** (0.052566)	0.140569*** (0.058458)
$\Delta \ln edu$			0.028143 (0.023088)	0.023504 (0.026476)
$\Delta \ln tot$				-0.018059 (0.026544)
$\Delta \ln em$				-0.02517 (0.019599)
$\Delta surplus$	0.002572*** (0.000826)	0.001148 (0.001112)	0.001432 (0.001121)	0.001148 (0.001153)
OBSERVATIONS	50	50	50	50
R ²	0.47707	0.558312	0.56391	0.595654
ADJUSTED-R ²	0.442966	0.50812	0.50306	0.516757
D-W ^(a)	1.74554	1.770051	1.824225	2.027147
B-P LM ^(b)	$\chi^2\{1\} = 0.400371$ (0.5269)	$\chi^2\{1\} = 0.189488$ (0.6633)	$\chi^2\{1\} = 0.058479$ (0.8089)	$\chi^2\{1\} = 0.656697$ (0.4177)
	$\chi^2\{2\} = 0.490706$ (0.7824)	$\chi^2\{2\} = 0.278591$ (0.87)	$\chi^2\{2\} = 0.176161$ (0.9157)	$\chi^2\{2\} = 0.727627$ (0.695)
White ^(c)	$\chi^2 = 4.078663$ (0.2531)	$\chi^2 = 5.758119$ (0.3305)	$\chi^2 = 6.770391$ (0.3426)	$\chi^2 = 12.87408$ (0.1163)
RESET ^(d)	F(1,45) = 0.33919 (0.5632)	F(1,43) = 0.694629 (0.4092)	F(1,42) = 0.748394 (0.3919)	F(1,40) = 1.098299 (0.3009)

Data refers to OLS regression estimates for financial year periods 1960 to 2010. Robust autocorrelation- and heteroskedastic-consistent (Newey-West) standard errors apply to each equation. Standard errors are reported in brackets below each coefficient estimate. ***, ** and * denote the 1, 5 and 10 per cent t-test significance levels respectively. The coefficient for the time trend is excluded from this Table. (a) Durbin-Watson d -test statistic for autocorrelation. (b) Breusch-Godfrey LM χ^2 -test statistics for autocorrelation, with number in parentheses referring to first and second order test for autocorrelation respectively. (c) White χ^2 -test statistic for heteroskedasticity, excluding White cross terms. (d) Ramsey specification error F-test statistics for omitted variables and non-linearity.

To assess the statistical integrity of the estimated regression specifications a battery of diagnostic tests were conducted.

The coefficient of determination, R^2 , provides an indication of the overall ‘goodness of fit’ of the model to explain variations in the dependent variable, with an adjusted- R^2 also used which adjusts for the number of explanatory variables in a regression (Gujarati and Porter 2009).

For example, the adjusted- R^2 value for regression equation (4) indicates that about 52 per cent of the variation in real GDP growth per capita is explained by the model’s explanatory variables. A comparison of the adjusted- R^2 values across specifications shows that the inclusion of additional variables hypothesised to explain economic growth generally improves the overall goodness of fit of the estimated model.

To verify the statistical significance for each independent variable the ‘test of significance’ t-test is undertaken, in which the generated t-statistic for each independent variable within a regression must exceed the test critical value in order for the null hypothesis to be rejected (Gujarati and Porter 2009).

With regard to the government size variable, the null hypothesis is that the value of the estimated elasticity coefficient is less than zero. Comparing the generated t-statistic against the one-sided critical value, the coefficient of the proxy variable for government size was found to be statistically significant across the regression specifications.

As for the other variables affecting the growth rate, growth in the labour force remained significant at least at the ten per cent level across the various specifications whereas the explanatory power of the growth in net private investment variable weakened as variables capturing macroeconomic fluctuations were included. The remaining variables (excluding the time trend) had a statistically insignificant effect on GDP per capita growth during the period under consideration.

An important assumption of regression analysis is that autocorrelation, or correlation between observations ordered in time, should not exist in the error terms if OLS estimators are to be best linear unbiased estimators (Gujarati and Porter 2009). Positive autocorrelation occurs when consecutive errors have the same sign, whereas for negative correlation consecutive have opposite signs.

There are several methods to test for the presence of autocorrelation in regressions, including the Durbin-Watson test which is calculated as the ratio of sum of squared differences in successive residuals to the residual sum of squares. The resulting d statistic has a sampling or probability distribution, deriving a lower bound and upper bound such that if the computed d statistic lies outside these critical values a decision can be made concerning the presence of positive or negative autocorrelation (Gujarati and Porter 2009).

A d statistic significantly below two indicates the possibility of positive autocorrelation, whereas statistic values significantly above two suggests negative autocorrelation. The d statistic for most of the regression specifications tended to provide *prima facie* evidence of positive autocorrelation in the error terms, however the statistic is within the critical lower and upper bounds of indecisiveness and so additional diagnostic tests for autocorrelation are required.

A more general test for autocorrelation was by statisticians Trevor Breusch and Leslie Godfrey, known as the Lagrange multiplier (LM) test, which tests the null hypothesis that there exists no

autocorrelation up to lag order p where p is a pre-determined integer (Godfrey 1978; Breusch 1979; QMS 2009). A chi-square statistic is generated with values of the statistic exceeding the critical value at the five per cent level of significance inferring the existence of autocorrelation in the applicable regression.

For each regression the LM test was conducted to detect the presence of first and second order autocorrelation at the one, five and ten per cent levels. The chi-square statistics generated by the test indicates that for each equation the null hypothesis of no autocorrelation cannot be rejected, and therefore the residuals of the estimated regressions are not serially correlated.

Another assumption of underpinning efficient regression estimation is that the variance of the error term is constant, with violations of this assumption leading to the estimation of unbiased but inefficient OLS estimators and the invalidation of tests of significance (Maddala 1989). Detection of the existence of heteroskedastic errors was undertaken using the White test, which provides chi-square test statistics under the null hypothesis of no heteroskedasticity (H White 1980).

The computed test statistics, provided in Table 5.1, were below the relevant critical values at the five per cent significance level therefore the null hypothesis of homoskedasticity cannot be rejected.

It is also assumed that there is an absence of perfect or high degrees of correlation between the explanatory variables, or in other words an absence of multicollinearity (Maddala 1989). In the presence of multicollinearity OLS variances tend to have large variances and covariances, whereas t-statistics for individual coefficients tend to be statistically insignificant although the R^2 can be very high, making precise estimation and interpretation of results difficult (Gujarati and Porter 2009).

One approach to identifying the presence of multicollinearity is to estimate the variance inflation factor (VIF), or the ratio of the actual variance of a given coefficient to what the variance of the coefficient would have been if its associated independent variable were uncorrelated with remaining variables (Maddala 1989).

A conventionally-used rule of thumb is that VIF values of ten or higher may indicate the presence of high degrees of multicollinearity, however according to Table 5.2 no explanatory variable in regression (4) (time trend excluded) has an uncentered VIF value greater than ten.

Table 5.2: Variance inflation factors, growth variables

Variable	Coefficient variance	Uncentered VIF	Centered VIF
$\Delta lgexp$	0.004023	3.176109	2.702901
$\Delta linv$	0.001063	2.688732	2.275698
$\Delta llab$	0.003417	7.215546	3.459718
$\Delta ledu$	0.000701	3.412008	1.461164
$\Delta ltot$	0.000705	3.069722	1.77578
$\Delta lunem$	0.000384	2.977416	2.977376
$\Delta surplus$	1.33E-06	4.876343	3.977487

This Table refers to VIFs calculated for OLS regression (4) in Table 5.1. The coefficient for the time trend is excluded from this Table. Uncentered VIF refers to ratio of variance of coefficient estimate from the original equation divided by the variance from a coefficient estimate from an equation with only one regressor (and no constant). Centered VIF refers to ratio of variance of coefficient estimate from original equation divided by the variance from a coefficient estimate from an equation with only that regressor and a constant.

Other diagnostic tests may be undertaken to assess the inherent stability of the estimated regression models. A commonly-used general test in this context is known as the Ramsey regression specification error test (RESET), which tests for omitted variables, incorrect functional form or correlation between independent variables and the error term caused by measurement errors, simultaneity or the presence of lagged dependent variable values and serially correlated disturbances (Ramsey 1969; QMS 2009).

In Table 5.3, F-test statistics are presented for the RESET tests undertaken for each regression with the null hypothesis that the model estimated is of the correct specification. Given that the F-test statistics do not exceed their critical values at the one, five or ten per cent significance levels, it is concluded that the null of a correct specification cannot be rejected across the estimated regressions.

As discussed in the previous chapter, it is largely accepted within the literature that various components of expenditure by public sector entities will exert different effects upon growth. This proposition has been used to explain the generally mixed findings of empirical studies in this field.

It is generally assumed that government consumption expenditures are unproductive and would, as a result, detract from economic growth. According to Barro (1990) while consumption expenditures may provide utility to households, the taxes required to finance such spending would diminish economic growth through their adverse effects on private investment. Significant levels of government consumption expenditure may also encourage market participants to expend scarce resources to attain the benefits of public consumption spending, rather than on providing goods and services in private markets.

In addition, subsidies and transfer payments by governments are also seen as being inimical to growth because they reduce incentives to work, investment in human capital or the exercise of entrepreneurial talents.

By contrast capital expenditures by governments are generally viewed, especially by endogenous growth theorists, as being of a growth-enhancing character since it increases the capital stock of an economy and directly enables private sector activities to become more productive (Barro 1990).

It should be noted that this demarcation of the growth effects of certain types of governmental expenditure are generalisations. Some categories of consumption expenditure (such as on education or health care) could, in fact, enhance economic growth, whereas some capital expenditures may be

allocated towards projects providing insufficient economic returns. Some economists also argue that subsidies and transfers, such as social safety net payments, reduce the need for precautionary savings and enhance risk-taking aptitudes within societies (Afonso and Furceri 2010).

Table 5.3 presents the results of an amended OLS growth regression in which changes in government expenditures are disaggregated into the natural logarithms of changes in the ratios of consumption expenditures (*lgcons*), subsidy and transfer expenditures (*lgsubtra*) and capital expenditures (*lgkap*) by commonwealth, state and local governments to nominal GDP.²² As shown in appendix C, unit root tests confirmed that each component of government expenditure is I(1) (i.e., first-differenced stationary).

The coefficients for the changes in government consumption and subsidies and transfer expenditures respectively have the expected sign. However, the coefficient of the change in government capital spending is negative (albeit indistinguishable from zero) which is inconsistent with view provided by the endogenous growth literature that public investment expenditures augment economic growth.

The coefficients for *lgcons* and *lgsubtra* are statistically significant at the five per level, whereas the coefficient for the change in capital expenditures had an insignificant effect on per capita growth. The results suggest that a ten percentage point increase in consumption expenditure or subsidy and transfer spending by Australian governments would reduce real per capita economic growth by about 0.7 and 1.0 percentage points respectively.

The regression results in Table 5.3 were also subjected to a range of diagnostic tests, with the tests revealing an absence of autocorrelation and heteroskedasticity. The hypothesis that the regression model was of the correct specification also could not be rejected, whereas a test for multicollinearity using the VIF procedure produced similar results to that for regression (4) as presented in Table 5.2.

²² Consumption expenditures refer to general government sector consumption expenditure. Subsidy and transfer expenditures refer to subsidies and transfer payments components of total incomes payable by the general government sector. Capital expenditures refer to gross fixed capital formation by general government and public corporations sectors. Commonwealth government current transfers to state and local governments were deducted from general government consumption expenditures, and capital transfers to state and local governments were deducted from the general government sector component of total government capital expenditures.

Table 5.3: Ordinary least squares results, disaggregated government expenditures

Dependent variable: Logarithm of real GDP per growth per capita ($\Delta \lg dppc$)	
Constant	0.025617*** (0.004849)
$\Delta \lg cons$	-0.072726** (0.037712)
$\Delta \lg kap$	-0.007574 (0.025156)
$\Delta \lg subtra$	-0.098554** (0.042137)
$\Delta \lg inv$	0.042544 (0.034783)
$\Delta \lg lab$	0.094588* (0.063512)
$\Delta \lg edu$	0.03158 (0.02637)
$\Delta \lg tot$	0.001325 (0.029843)
$\Delta \lg unem$	-0.015659 (0.020205)
$\Delta \lg surplus$	0.001298 (0.001106)
OBSERVATIONS	50
R ²	0.612271
ADJUSTED-R ²	0.512853
D-W ^(a)	1.952318
B-P LM ^(b)	$\chi^2\{1\} = 0.13901$ (0.7093) $\chi^2\{2\} = 0.289657$ (0.8652)
White ^(c)	$\chi^2 = 14.89315$ (0.1360)
RESET ^(d)	F(1,38) = 0.55462 (0.461)

Data refers to OLS regression estimates for period 1960 to 2010. Robust autocorrelation- and heteroskedastic-consistent (Newey-West) standard errors apply to each regression. Standard errors are reported in brackets below each coefficient estimate. ***, ** and * denote the 1, 5 and 10 per cent t-test significance levels respectively. The coefficient for the time trend is excluded from this Table. (a) Durbin-Watson *d*-test statistic for autocorrelation. (b) Breusch-Godfrey LM χ^2 -test statistics for autocorrelation, with number in parentheses referring to first and second order test for autocorrelation respectively. (c) White χ^2 -test statistic for heteroskedasticity, excluding White cross terms. (d) Ramsey specification error F-test statistics for omitted variables and non-linearity.

5.3.2 Simultaneous equation analysis and results

An important assumption underpinning single-equation OLS estimates is that all explanatory variables are exogenously determined, or in other words affect the dependent variable without also being affected by it. However there may be scenarios in which a unidirectional relationship between variables does not exist, rendering spurious the distinction between dependent and explanatory variables and leading to correlation between the explanatory variables and the error term.

Consider the following system of equations:

$$y_{1i} = \alpha_{10} + \beta_{12}y_{2i} + \gamma_{11}x_{1i} + \mu_{1i}$$

$$y_{2t} = \alpha_{20} + \beta_{21}y_{1t} + \gamma_{21}x_{1t} + \mu_{2t}$$

where y_1 and y_2 are mutually dependent variables and x_1 is an endogenous variable and where μ_1 and μ_2 are stochastic error terms, the variables y_1 and y_2 are both stochastic. However, unless y_2 is distributed independently of μ_1 and y_1 is distributed independently of μ_2 , the application of the OLS estimation technique will yield inconsistent estimates (Gujarati and Porter 2009).

It is generally agreed by economists that changes in the relative size of government can negatively affect the growth rate of the economy due to factors such as the distortionary effects of taxation, the misallocation of resources because of political considerations in allocating expenditures, and rent-seeking diluting incentives of market participants to engage in entrepreneurial activities.

However, reverse causation between these two variables could exist in that GDP growth leads to increasing public sector spending and hence a larger size of government (Slemrod et al 1995). The most prominent explanation of this proposition is attributable to the work of Adolph Wagner ([1883] (1958)) and his ‘law of increasing state activity.’ As discussed in chapter 1, this theory suggests that economic development leads to greater demands by citizens for public expenditure, including additional spending on protective functions as well as social expenditures such as education and welfare.

Researchers have attempted to empirically verify the existence of Wagner’s law by estimating the income elasticity of government spending, with an elasticity result exceeding one viewed as affirming the presence of the law. While there is some evidence supporting the Wagner’s law proposition in Australia (for example, Dollery and Singh 2000; Kirchner 2011a), the general empirical literature remains mixed in terms of its findings (Durevall and Henrekson 2010).

Given the potential for a bi-directional relationship between government size and economic growth, it is necessary to utilise econometric techniques which can correct for simultaneity bias. A common approach to empirically capture interrelationships between variables is to estimate a system of simultaneous equations in which the endogenous explanatory variable in one equation may appear as a dependent variable in another equation (Fölster and Henrekson 2001; Borcherting et al 2004; Roy 2009; Coll 2010).

The first equation within the simultaneous equation system is the augmented growth equation replicating the multivariate OLS regression model (4) in Table 5.1. For the second equation, the size of government variable (*gexp*) is specified as the independent variable while on the right-hand side of the equation are a number of variables capturing selected determinants of government size as referred to in chapter 1. These include:

- Real GDP per capita (*gdppc*) representing a proxy for the presence of Wagner’s law.
- The ratio of public to private consumption deflators (*baumol*) representing the theory attributed to Baumol (1967) stating that relatively lower productivity of government activities is reflected in higher prices of publicly provided services compared with the private sector.
- The old-age dependency ratio (*age*), or proportion of people aged 65 and over to working-age (i.e., persons aged 15 to 64) population, reflecting the increasing influence of politically influential interest groups whose demands for additional expenditure will be reflected in overall government size.

- The female labour market participation rate (*female*) capturing the greater ease of tax collection by governments as the number of taxable economic agents expands (Kau and Rubin 1981).
- The ratio of exports plus imports to nominal GDP (*open*) on the basis that more open economies lead to voter demands for greater levels of government expenditure to insure against the economic risks associated with globalisation (Rodrik 1998).
- The ratio of commonwealth general government sector transfers to state-local governments as a share of total state-local revenue (*federal*), accounting for the proposition that greater fiscal centralisation within federal systems is conducive to the enlargement of the relative size of government (Brennan and Buchanan 1980).
- The ratio of commonwealth government indirect taxation revenue to direct taxation revenue (*fisc*) to reflect the potential existence of fiscal illusion in expanding the relative size of government (Buchanan [1960] 2001).

In similar fashion to the OLS regressions the data includes financial year observations from 1960 to 2010.

All variables used in the simultaneous equation system were expressed in terms of their natural logarithms. A time trend variable is included in both system equations, as is a first-order autoregressive disturbance term (AR(1)) which accounts for the possibility of serial correlation in the residuals by incorporating the residual from the past observation into the regression for the current observation (QMS 2009).

ADF tests were performed to establish the presence of unit root among the variables, with the results provided in appendix C of this study. All explanatory variables to be used in the second equation within the system are found to be first-differenced non-stationary at the ten per cent level of significance, with the exception of *lage* which was stationary in levels.

A variety of econometric techniques are available to estimate the parameters of a simultaneous equation system, some of which are applied in this chapter to account for the potentially bi-directional causal relationship between government size and real GDP per capita.

Two-stage least squares (2SLS) is a commonly used estimation method, which involves two stages of estimation. The first entails the regression of each endogenous variable on all exogenous variables. The second stage estimates each equation within the system using OLS, with the estimated values from the first stage as ‘instruments’ (or variables which are uncorrelated with the error term but correlated with endogenous explanatory variables) (Basmann 1957; Thiel 1958; Nagler 1999; B-J Lee 2000).

Three-stage least squares (3SLS), developed by Zellner and Thiel (1962), replicates the 2SLS technique of simultaneous equation system estimation with the exception that it provides a third stage in the estimation process allowing for non-zero covariances between the error terms in the equations (Brooks 2008).

Under 2SLS the potential correlation between error terms across equations are ignored, implying that the error term in one equation is independent of the error term in another. By identifying non-zero covariances between the error terms in the equations, 3SLS is generally viewed as asymptotically

more efficient than 2SLS since the latter ignores information concerning cross-equation error correlations (Brooks 2008).

However 3SLS methods allow misspecification errors in one equation to propagate throughout the entire system whereas the 2SLS technique confines the error to the misspecified equation (Greene 2012).

Another issue to consider when comparing simultaneous equation results is the effect of small sample sizes on the appropriateness of using 2SLS and 3SLS. Some studies indicate that 2SLS is more efficient than 3SLS when using small samples however there is a lack of consensus in support of this conclusion (Intriligator 1984; Belsley 1988; P Kennedy 2003; Johnson et al 2010).

To render the simultaneous equation systems operational, it is necessary to identify the instrumental variables to be used in the system. In this study the levels of GDP per capita and government expenditure variables (both lagged one period) are used as instruments, on the basis that the past values of these variables are fixed and uncorrelated with the residuals in a given financial year period. The levels of the other explanatory variables are deemed to be exogenously determined, and thus are included within the list of instruments (Caplan 1999). With the inclusion of the AR(1) term lagged regressors are also added to the instrument list.

Table 5.4 summarises the results of the simultaneous equation estimates, using the 2SLS and 3SLS specifications cited above, and compares these with OLS estimates of the two equations regressed separately.

The theoretical expectations concerning the sign of coefficients in the first equation were discussed earlier. Concerning the explanatory variables contained in the second equation, it is anticipated that all variables would have a positive effect on public sector growth.

The elasticity coefficient of the government size variable ($\Delta lgexp$) in the first equation has similar values across the specifications, suggesting that the bi-directional causality effect is not particularly strong. The government size variable is statistically significant at least at the ten per cent level.

The other statistically significant coefficients of note in the first equation, in which real GDP per capita growth is the dependent variable, under 2SLS and 3SLS are those of labour force growth and the unemployment rate.

The second equation within the system, which quantifies the empirical strength of various determinants of changes to government size, generally suggests that the determinants of size typically associated with public choice theories – captured by the interest group ($lage$), fiscal centralisation ($\Delta lfederal$) and fiscal illusion ($\Delta lfisc$) proxy variables – were of statistically insignificant effect across most specifications. The elasticity coefficient for the fiscal centralisation variable was of negative sign, with one possible explanation that growth in commonwealth transfers leads to slower growth in state-local revenue (and expenditures), as state and local governments substitute commonwealth transfer payments for their own revenues.

The estimated coefficient of the change in GDP per capita variable in the second equation is statistically significant, and has a negative sign which is robust across all specifications. The

coefficient value suggests that the income elasticity of governmental expenditure is less than one, refuting the presence of Wagner's law during the period under consideration.

The coefficient of the change in the ratio of public to private consumption deflators ($\Delta lbaumol$) also appears to be significant regardless of the specification of the growth of government size equation, as were the proxy variables for the ease of tax collection ($\Delta lfemale$) and economic openness ($\Delta lopen$). These findings suggest that the increasing cost of public services provision, an increase in the numbers of taxable individuals and the greater exposure of the domestic economy to external economic forces all contributed to the observed growth of Australian governments over the past five decades.

Table 5.4: Simultaneous equation results, growth and government size determinant variables

	OLS	2SLS	3SLS
	(1)	(2)	(3)
Dependent variable: Logarithm of real GDP per capita growth ($\Delta \lgdppc$)			
Constant	0.022843*** (0.00457)	0.023975*** (0.006394)	0.025637*** (0.005542)
$\Delta \lgexp$	-0.160547*** (0.063428)	-0.116028* (0.088213)	-0.149726** (0.077182)
$\Delta \lnv$	0.051662* (0.032611)	0.05335 (0.042676)	0.052463 (0.036052)
$\Delta \lnlab$	0.140569*** (0.058458)	0.173665* (0.108087)	0.129702* (0.089805)
$\Delta \lnedu$	0.023504 (0.026476)	0.023875 (0.047981)	0.02731 (0.04117)
$\Delta \ln tot$	-0.018059 (0.026544)	-0.034207 (0.043007)	-0.010196 (0.037688)
$\Delta \ln unem$	-0.02517 (0.019599)	-0.038805* (0.017693)	-0.032458** (0.015305)
$\Delta surplus$	0.001148 (0.001153)	0.00157 (0.001824)	0.001619 (0.001579)
OBSERVATIONS	50	49	49
R ²	0.595654	0.654291	0.647486
ADJUSTED-R ²	0.516757	0.574512	0.566136
D-W ^(a)	2.027147	2.047634	1.989604
Dependent variable: Logarithm of ratio of government expenditure to nominal GDP ($\Delta \lgexp$)			
Constant	0.061934 (0.412686)	-0.112487 (0.575296)	-0.089026 (0.510462)
$\Delta \lgdppc$	-1.338946*** (0.176246)	-1.43974*** (0.311602)	-1.680057*** (0.26752)
$\Delta \ln baumol$	0.62552*** (0.234057)	1.018343** (0.440217)	0.808415** (0.369765)
$\ln age$	-0.009022 (0.164612)	0.060394 (0.229556)	0.054577 (0.203708)
$\Delta \ln female$	0.073871** (0.038691)	0.131797** (0.065972)	0.132111** (0.056555)
$\Delta \ln open$	0.111128* (0.08046)	0.146729* (0.089733)	0.119873* (0.076966)
$\Delta \ln federal$	-0.05737 (0.069378)	-0.094219 (0.073662)	-0.090596* (0.063567)
$\Delta \ln fisc$	-0.017934 (0.03947)	0.015959 (0.058329)	-0.003657 (0.050858)
OBSERVATIONS	50	49	49
R ²	0.595815	0.600264	0.607181
ADJUSTED-R ²	0.51695	0.508017	0.516531
D-W ^(a)	1.546641	1.941739	2.008127
PORTMANTEAU ^(b)		Adj-Q{1} = 0.268611 (0.9917) Adj-Q{2} = 2.939107 (0.9381)	Adj-Q{1} = 0.153144 (0.9972) Adj-Q{2} = 3.072053 (0.9298)
JARQUE-BERA ^(c)		$\chi^2 = 2.540756$ (0.6374)	$\chi^2 = 2.486656$ (0.647)

Data refers to OLS, 2SLS and 3SLS regression estimates for period 1960 to 2010. Robust autocorrelation- and heteroskedastic-consistent (Newey-West) standard errors applied to equation (1). Autoregressive term AR(1) added to equations (2) and (3). t-test statistics reported in brackets below each coefficient estimate. ***, ** and * denote the 1, 5 and 10 per cent significance levels respectively. The coefficient for the time trend and AR(1) term is excluded from this Table. (a) Durbin-Watson *d*-test statistic for autocorrelation. (b) Portmanteau adjusted-Q test statistic for autocorrelation, with number in parentheses referring to first and second order lags (four and eight degrees of freedom) respectively. (c) Jarque-Bera chi-square test statistic for normal distribution of joint sample series.

To test for the presence of autocorrelation in the 2SLS and 3SLS systems, the Portmanteau test was applied which calculates the Ljung-Box Q-statistic (adjusted for small sample size) for up to h lag orders. The null hypothesis is that there is no serial correlation up to lag order h , with the Q-statistic approximating a chi-squared distribution (QMS 2009).

Table 5.4 reports the adjusted Q-statistic for one and two lag orders (equating to four and eight degrees of freedom respectively). The computed statistics are lower than the chi-square critical values at the relevant degrees of freedom values, indicating that the null hypothesis of no autocorrelation cannot be rejected by the Portmanteau test.

Given the relatively small sample size of the systems (less than 100 observations) it is appropriate to test the normality of the data distribution. The computed Jarque-Bera (JB) statistic, with a chi-squared distribution with two degrees of freedom for each equation, is also presented in Table 5.4. The JB statistics computed for the joint 2SLS and 3SLS specifications indicate that the null hypothesis of normally distributed residuals cannot be rejected.

5.4 Economic significance of the results

The t-test of statistical significance has been applied in this chapter to assess the null hypothesis that variable coefficients are not significantly different from zero. As noted above the computed t-statistic for the government size variable was statistically significant from zero across all specifications, at least at the ten per cent level, implying that government size has a statistically significant effect upon real GDP per capita growth in Australia.

In a range of publications the economist Deirdre McCloskey has contended that econometric research has tended to focus too heavily upon diagnostic tests of statistical significance, rather than on the economic significance of the relationships that they aim to empirically test (McCloskey 1992; McCloskey and Ziliak 1996; Ziliak and McCloskey 2004). As explained by McCloskey (1992, p. 360):

“‘[s]tatistically significant’ does not mean ‘substantively significant.’ The two significances have nothing to do with each other. What matters, to use a technical term, is *oomph*. Oomph is what we seek. A variable has oomph when its coefficient is large, its variance high, and its character exogenous, all decided by quantitative standard in the scientific conversation. A small coefficient on an endogenous variable by quantitative standard that does not move around can be statistically significant, but it is not worth remembering.’

Goldberger also states that statistical significance should not be confounded with economic significance:

‘[w]hen a null, say, $\beta_j = 1$, is specified, the likely intent is that β_j is *close* to 1, so close that for all practical purposes it may be treated *as if it were* 1. But whether 1.1 is “practically the same as” 1.0 is a matter of economics, not of statistics. One cannot resolve the matter by relying on a hypothesis test, because the test statistic $[t =] (b_j - 1) / \sigma_{b_j}$ measures the estimated coefficient in standard error units, which are not meaningful units in which to measure the economic parameter $\beta_j - 1$. It may be a good idea to reserve the term “significance” for the statistical concept, adopting “substantial” for the economic concept’ (Gujarati and Porter 2009, p. 123).

Likewise, Wooldridge (2003, p. 131) explains that ‘[t]oo much focus on statistical significance can lead to the false conclusion that a variable is “important” for explaining y even though its estimated effect is modest.’

One method with which to consider the economic, or substantive, significance of the regressed government size variable is to assess the sign of the estimated coefficient against *a priori* theoretical expectations.

For reasons described in this study, it is widely recognised theoretically that growth in the relative public sector size would have a negative impact on economic performance. The regression analyses confirm the expectation of a negative relationship between government size and real GDP per capita growth.

Another method to establish the economic significance of the estimated elasticity coefficients is to compare the effect on real GDP per capita growth of a one standard deviation change in explanatory variables used in the growth regressions (Table 5.5).

Table 5.5: Growth effects of selected variables used in simultaneous equations

Variable	OLS	2SLS	3SLS
$\Delta lgexp$	-1.14	-1.02	-1.16
$\Delta linv$	0.19	0.23	0.19
$\Delta llab$	1.32	1.88	1.16
$\Delta ledu$	0.09	0.11	0.11
$\Delta ltot$	-0.05	-0.15	-0.04
$\Delta lunem$	-0.05	-0.07	-0.05
$\Delta surplus$	0.00	0.00	0.00

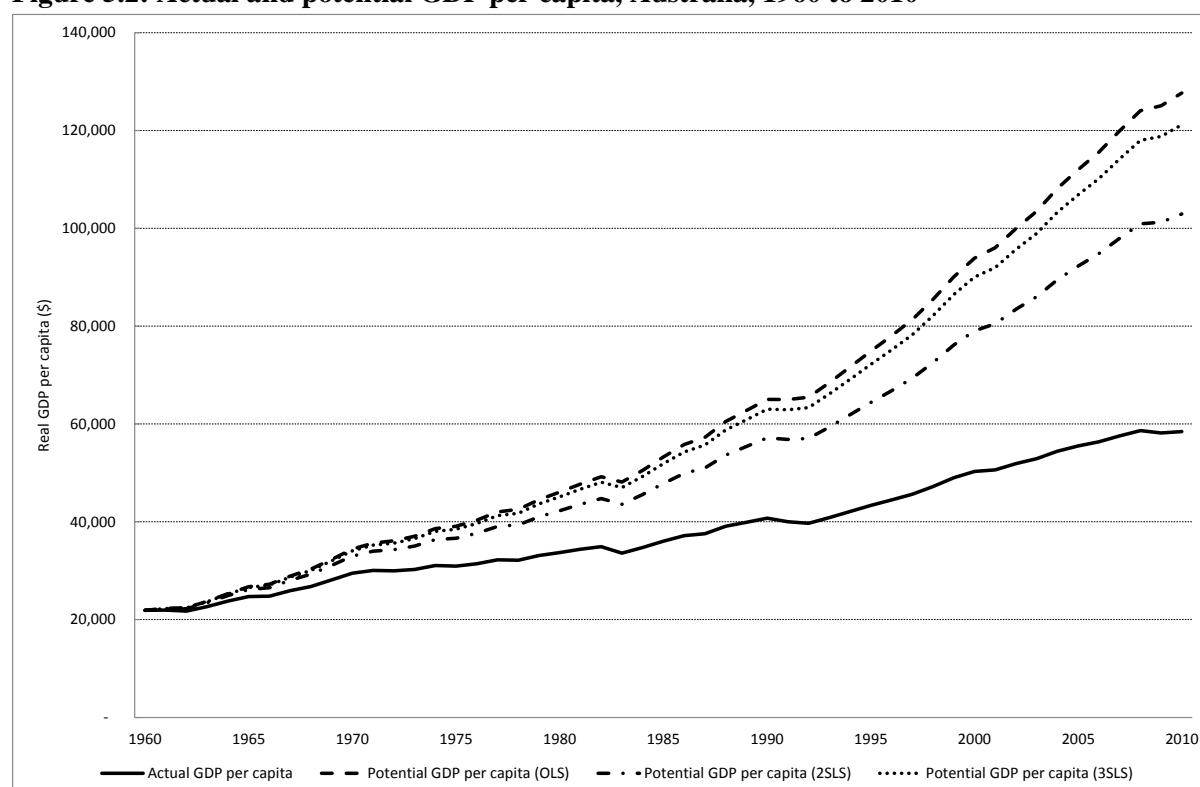
Data in Table represents the estimated growth effect (in percentage points) of an increase of one standard deviation of the selected variable.

Source: Bergh and Henrekson 2010.

An increase in the government expenditure-to-GDP ratio of one standard deviation is associated with an annual real GDP per capita growth rate which is between one and 1.2 percentage points lower. The economic significance of the government size effect is second in importance behind labour force growth in the OLS and 2SLS specifications, and is equally as important as labour force growth in the 3SLS simultaneous equation system.

Finally it is possible to illustrate the additional income per capita that may have been received by each Australian resident had expenditure by all levels of government remained ten percentage points lower per annum than had actually been the case since 1960 (Figure 5.2).

Figure 5.2: Actual and potential GDP per capita, Australia, 1960 to 2010



OLS, 2SLS and 3SLS refer to the effect on annual GDP per capita growth attributable to a ten per cent per annum reduction in the government size variable estimated under each specification.

While the growth effect of changes to government size is dependent upon the mix of expenditures undertaken, and the types of revenues used to finance such expenditure, it is clear that a reduced size of government in Australia over the past fifty years would have led to significantly greater material wellbeing than has in fact been experienced.

If government size was ten percentage points lower each year compounded GDP per capita growth would have been 3.2 and 3.7 per cent per annum, depending on empirical specification, instead of the actual average annual increase of two per cent per annum. Each Australian would have enjoyed between \$81,000 and \$106,000 in additional income over the period from 1960 to 2010, rather than the actual observed increase of \$37,000. To put simply, a larger size of government in Australia has detracted from economic prosperity in the long term.

5.5 Conclusion

This chapter provides econometric testing results of the hypothesis that growth in the Australian public sector exerts economically and statistically significant effects upon the rate of per capita economic growth. Indeed, this empirical exercise constitutes the first study of the government size-economic performance relationship since Grossman (1988) and Kompas (2000), and furthermore represents the first Australian study to undertake a simultaneous equation approach to the investigation of the relationship between these two variables.

As noted in previous chapters there are several theoretical reasons to support the hypothesis of a negative relationship between government size and economic performance. As important as these

notions may be, it remains necessary to assess whether the general proposition that a relatively larger size of government leads to diminished economic performance is borne out by evidence provided through real-world economic data.

Situating the government size-economic performance relationship within a growth accounting framework and using conventional OLS multivariate regression analysis, it is concluded that a ten percentage point increase in the ratio of government expenditure to GDP is associated with a reduction in real GDP per capita growth. Further OLS testing, with government expenditures disaggregated by functional category, suggested that consumption expenditures and subsidies and transfers by Australian governments pose as important factors explaining these results.

However, as is widely acknowledged in the modern empirical literature on government size, single-equation OLS is likely to produce biased estimates since there is, in fact, an expected two-way direction of causality between government size and economic growth. To account for the bi-directional causal relationship between size and growth, this chapter also estimated a series of simultaneous equation regressions which found results similar to those under OLS.

This study does not purport to finalise the intellectual debate about the effects of relative increases in the size of government on economic performance. However, it reports findings that a negative relationship between government size and per capita economic growth, of both economic and statistical significance, in the Australian context does exist, and that these findings are robust to variations in model specification and econometric techniques.

Appendix B: Summary of statistics and data sources for regression analysis

Variable	Description	Mean	St. dev.	Min.	Max.	Source
<i>age</i>	Ratio of people aged 65 and over to working-age population	16.03845	2.266864	13.2	19.9	ABS, Australian Demographic Statistics, cat. no. 3101.0; ABS, Australian Historical Demographic statistics, cat. no. 3105.0.65.001
<i>baumol</i>	Ratio of public to private consumption GDP deflator	86.3676	8.509361	68.29268	100.0	ABS, Australian System of National Accounts, cat. no. 5204.0
<i>edu</i>	Ratio of university enrolments to total population	2.588879	1.404646	0.513774	5.377617	ABS, Year Book Australia, cat. no. 1301.0; DEEWR, Higher Education Statistics
<i>federal</i>	Ratio of commonwealth transfers to state-local total revenue	39.57595	5.827068	28.70733	51.33474	Foster 1996; ABS, Government Finance Statistics, cat. no. 5512.0
<i>female</i>	Female labour market participation rate	46.22549	8.991993	20.4	58.8	CBCS/ABS, Year Book Australia, cat. no. 1301.0; ABS, Labour Force, Australia, cat. no. 6202.0; Withers et al 1985
<i>fisc</i>	Ratio of commonwealth government indirect taxation revenue to direct taxation revenue	46.10422	11.95651	29.43443	81.7924	Foster 1996; ABS, Government Finance Statistics, cat. no. 5512.0

Variable	Description	Mean	St. dev.	Min.	Max.	Source
<i>gdppc</i>	Real gross domestic product per capita (chain volume measure)	38,273.35	11,094.65	21,731	58,648	ABS, Australian System of National Accounts, cat. no. 5204.0
<i>gexp</i>	Ratio of government expenditure (general government final consumption expenditure and total income payable; general government and public corporations gross fixed capital formation; less commonwealth grants to state-local general government sectors) to nominal GDP	28.31343	3.564513	21.17668	34.53619	ABS, Australian System of National Accounts, cat. no. 5204.0
<i>inv</i>	Ratio of private investment (less ownership of dwellings and ownership transfer costs) to nominal GDP	14.46977	2.106964	10.55962	17.86509	ABS, Australian System of National Accounts, cat. no. 5204.0
<i>lab</i>	Total labour force	7,513,039	2,150,286	4,143,000	11,707,600	Foster 1996; ABS, Labour Force Australia, cat. no. 6202.0
<i>open</i>	Ratio of exports plus imports (by market value) to nominal GDP	32.73306	5.773511	24.85946	44.86351	ABS, Australian System of National Accounts, cat. no. 5204.0
<i>surplus</i>	Ratio of general government sector budget surplus (deficit) to nominal GDP	-3.051913	3.30947	-8.319728	3.060003	Foster 1996; ABS, Government Finance Statistics, cat. no. 5512.0
<i>tot</i>	Terms of trade index	69.4451	10.53714	52.4	104.2	ABS, Australian System of National Accounts, cat. no. 5204.0
<i>unem</i>	Unemployment rate	5.482353	2.834973	1.22	10.97	Foster 1996; ABS, Labour Force Australia, cat. no. 6202.0

Appendix C: Results of Augmented Dickey-Fuller unit root testing

Variable	Constant	Constant and trend
<i>lage</i>	-0.112754	-3.62758**
Δ <i>lage</i>	-2.501322	-2.788261
<i>lbaumol</i>	-2.015621	-2.052441
Δ <i>lbaumol</i>	-4.069203***	-4.110621**
<i>ledu</i>	-2.77183*	-1.783132
Δ <i>ledu</i>	-5.60466***	-6.110459***
<i>lfederal</i>	-1.704149	-1.682874
Δ <i>lfederal</i>	-6.414438***	-6.348995***
<i>lfemale</i>	-3.95493***	-5.60377***
Δ <i>lfemale</i>	-7.429048***	-7.942193***
<i>lfisc</i>	-2.631686*	-2.197003
Δ <i>lfisc</i>	-5.884428***	-6.010132***
<i>lgcons</i>	-2.962713**	-2.470893
Δ <i>lgcons</i>	-6.911727***	-7.304704***
<i>lgdppc</i>	-0.92309	-2.004225
Δ <i>lgdppc</i>	-5.707427***	-5.744206***

Variable	Constant	Constant and trend
<i>lgexp</i>	-2.247469	-1.592806
Δ <i>lgexp</i>	-6.51577***	-6.783025***
<i>lgkap</i>	-1.104712	-2.523817
Δ <i>lgkap</i>	-7.682527***	-7.600248***
<i>lgsubtra</i>	-1.768009	-1.142849
Δ <i>lgsubtra</i>	-5.551321***	-5.676779***
<i>linv</i>	-2.664456*	-2.671523
Δ <i>linv</i>	-4.828908***	-4.811759***
<i>llab</i>	-1.264126	-2.263646
Δ <i>llab</i>	-9.577964***	-9.583971***
<i>lopen</i>	-0.916289	-3.07912
Δ <i>lopen</i>	-7.204049***	-7.111847***
<i>ltot</i>	-0.857137	-0.0339
Δ <i>ltot</i>	-5.769673***	-6.133496***
<i>lunem</i>	-1.291096	-1.219937
Δ <i>lunem</i>	-6.835073***	-6.822486***
<i>surplus</i>	-1.812916	-3.891796**
Δ <i>surplus</i>	-6.100396***	-6.04232***

Testing of variable stationarity using augmented Dickey-Fuller (ADF) tests. ***, ** and * denote the 1, 5 and 10 per cent significance levels respectively. ADF tests based on Schwarz Information Criterion with maximum number of lags set to ten.

Chapter Six

Conclusion

6.1 Background

Academic and public policy debates surrounding the desirability of government expenditure, taxation and regulatory interventions are invariably informed by underlying perceptions of the economic implications of changes to overall government size induced by the given policy, or sets of policies, being discussed.

However, understanding the implications of a changing size of government upon economic performance in a systematic manner requires an appreciation of changes to public sector activities previously implemented by policymakers, the appropriate means to statistically measure governmental size, and finally insights from available empirical studies of the economic effects of public sector growth.

As stated in chapter 1, the aim of this study is to contribute to the economics literature by providing a theoretical and empirical investigation on the effects of changes in the relative size of government on Australian economic performance.

This chapter summarises the main findings of this study, emphasising the key contributions made to the existing literature. The limitations of this study, and suggested directions for future research, are also canvassed.

6.2 Summary of findings

A key research objective of this study was to investigate the historical context of public sector growth, and changes in its activities, in Australia since European settlement in the late eighteenth century. In chapter 2 an account of historical changes in the roles, functions and activities of all levels of Australian governments was provided.

Over time changes in public sector activities have occurred in a multi-dimensional fashion, with regular and often simultaneous alterations to revenue, expenditure and regulatory settings. These changes occurred both in response to perceived specific policy problems, such as concerns about unequal income distribution or macroeconomic instability, as well as more generalised economic, legal, political, social and other events, such as wars, providing opportunities for politicians to extend the size and scope of government activity in the long run.

The composition of Australian public sector activity has also altered dramatically over time. Some major features of public sector change have included the gradual shift in expenditure emphasis from public capital investments to recurrent social welfare spending particularly in education, health care and welfare. In addition, there has been a tendency especially from the late twentieth century to significantly increase the amount of economic and particularly environmental and social regulations upon private sector activities.

Consistent with these trends there has been a significant increase in fiscal and regulatory centralisation within Australian federalism, with the commonwealth assuming greater importance in most aspects of public policy affairs relative to states and local governments.

While the evidence provided in chapter 2 inferred an increase in the relative size of Australian government in the long run, statistical measurements are necessary to help confirm, as far as practicable, such trends in public sector size. Chapter 3 presented details of various proxy measurements of public sector size applicable to Australian circumstances.

Conventional, budget-based measures of government size, specifically the ratios of total revenue, taxation revenue and expenditure to either population or gross domestic product (GDP), were reported in this chapter. Given the multi-dimensional nature of public sector activities, details of long run trends in other proxy measures, for example changes in annual regulatory flows and public sector employment, were reported.

While debates over the appropriateness of public sector size measures remains, the proposition that the size of Australian governments have increased in the long run is consistently supported by the available measurements.

Another research objective of this study was to assess the effects of public sector size on economic performance from theoretical and empirical perspectives. Accordingly, chapter 4 provided a review of the theoretical and empirical literature on the relationship between government size (represented by taxation or expenditure as a proportion of GDP) and economic performance (represented by growth in GDP or GDP per capita).

Neoclassical growth theories hypothesise that economic growth is determined by factor accumulation or exogenously-determined technological progress, with fiscal policies reducing the level of steady-state output in the long run but with little or no effect in the long run. On the other hand endogenous growth theories rely on growth explanations determined within their constructed models, lending weight to the view that changes to government expenditures or taxes could permanently alter the steady-state growth rate.

Another theoretical perspective of the relationship between public sector size and economic performance suggests that increasing the size of government facilitates economic growth up to a certain threshold, as taxes are used to finance security services and certain public works which facilitate private sector activities. Beyond this threshold point, continuous increases in public sector size detract from economic performance as distortionary taxation, prescriptive regulations and inefficient expenditures increasingly crowd out private sector activity.

Over the past three decades numerous empirical studies have been undertaken, either for a single country or groups of countries, to test the veracity of these theoretical relationships between government size and economic performance. However, much of the early empirical literature produced mixed evidence of a relationship between the two variables, in terms of the sign of the government size coefficient and the statistical significance of the studied relationships.

Over time a host of significant refinements to methodological approach and statistical techniques have been adopted by empirical researchers in this field. These refinements concern: testing the government size-economic growth relationship within a growth accounting framework; including

both expenditure and tax variables, or budget constraint, in an empirical model; explicitly accounting for short run macroeconomic volatility; testing for the nonstationarity of time series variables; and considering the direction of causality between government size and growth.

When empirical studies incorporate these methodological and statistical improvements, the finding of a negative correlation between government size and economic growth appears as a more robust, consistent finding in recent studies (Bergh and Henrekson 2010, 2011).

The approach used in this study to empirically estimate the nature and extent of the relationship between Australian public sector size and economic performance, and the results of this empirical investigation, was presented in chapter 5. The *a priori* theoretical expectations and significance of the empirical analysis are reported in Table 6.1.

Table 6.1: Summary of empirical results

Variable	Description	Expected sign	Actual sign			Statistical significance			Substantive significance		
			OLS	2SLS	3SLS	OLS	2SLS	3SLS	OLS	2SLS	3SLS
Dependent variable: $\Delta lgdppc$ (logarithm of real GDP per capita growth)											
$\Delta ledu$	Human capital indicator	+	+	+	+						
$\Delta lgexp$	Government size indicator	-	-	-	-	***	*	**	Y	Y	Y
$\Delta linv$	Private net investment	+	+	+	+	*			Y	Y	Y
$\Delta llab$	Labour force	+	+	+	+	***	*	*	Y	Y	Y
$\Delta lsurplus$	Government budget constraint	?	+	+	+						
$\Delta ltot$	Terms of trade	+	-	-	-						
$\Delta lunem$	Unemployment rate	-	-	-	-		*	**			
Dependent variable: $\Delta lgexp$ (logarithm of ratio of government expenditure to nominal GDP)											
$lage$	Age dependency ratio	+	-	+	+					Y	Y
$\Delta lbaumol$	Relative cost of government services	+	+	+	+	***	**	**	Y	Y	Y
$\Delta lfederal$	Government revenue centralisation	+	-	-	-			*			
$\Delta lfemale$	Female labour force participation rate	+	+	+	+	**	**	**			
$\Delta lfisc$	Fiscal illusion indicator	+	-	+	-						
$\Delta lgdppc$	Real GDP per capita	+	-	-	-	***	***	***	Y	Y	Y
$\Delta lopen$	Economic openness indicator	+	+	+	+	*	*	*	Y		

All variables expressed in natural logarithms, and expressed in terms of annual rates of change (except *lage*). Expected and actual sign: + denotes expected/actual positive effect of coefficient on dependent variable; - denotes expected/actual negative effect of coefficient on dependent variable. Statistical significance: ***, ** and * denote the 1, 5 and 10 per cent significance levels respectively. Substantive significance: Y denotes variable in top three of highest one standard deviation changes on dependent variable (excluding time variable and AR (1) term).

Using annual time series data for the financial year periods 1960 to 2010, the size of government was represented by the ratio of expenditure by all levels of government to GDP whereas economic performance was proxied by the annual growth rate of real GDP per capita.

A basic ‘parsimonious’ model was initially established in which real per capita growth is determined by the government size variable, a budget surplus measure and time trend, with other models specified augmenting the basic model with variables identified in the neoclassical and endogenous growth literatures as key determinants of growth. The unemployment rate and terms of trade index were also included in certain specifications to account for macroeconomic volatility and economic openness respectively.

All model specifications were initially empirically tested using ordinary least squares (OLS) regressions. Depending on the specification, a ten percentage point increase in the ratio of government expenditure to nominal GDP is associated with a reduction in real GDP per capita growth of between 1.6 and 2.5 percentage points.

The government size variable was statistically significant across all specifications and, furthermore, a breakdown of expenditure components reveal that growth in consumption spending and subsidy and transfer payments by commonwealth, state and local government contribute to the observed negative relationship between size and growth.

Given the potential endogeneity of government size and economic performance, a two-equation simultaneous equation system was established. The first equation was the full growth accounting regression estimated previously by OLS, whereas the second equation specified that public sector growth is a function of various determinants of public sector growth more generally.

A range of proxy variables were selected for the second equation accounting for Wagner’s law, the Baumol cost disease effect, the presence of interest groups, ease of tax collection, economic openness, the degree of fiscal decentralisation, and the tax mix representing fiscal illusion.

The simultaneous equation results again indicated that a relatively larger Australian public sector is associated with lower real per capita GDP growth; a ten percentage point increase in government size associated with a slower growth rate of between 1.2 and 1.6 percentage points.

The equations also revealed the empirical significance of various underlying determinants of public sector growth to government size. Proxy variables for the Baumol effect, ease of tax collection and economic openness were statistically significant, however the study found that Wagner’s law does not hold for Australia.

The empirical finding that a larger size of government is associated with a slowing growth rate in the Australian economy was statistically significant across the various models specified, and was also substantively significant by way of being equally as important, or only behind in importance to, labour force growth as a determinant of overall real GDP per capita growth.

6.3 Contribution to literature

In showing that the Australian public sector has undertaken a long run growth trajectory, and that this phenomenon has adverse effects on the growth performance of the economy, this study provides several contributions to the literature.

The discussion of the history of public sector size and growth in chapter 2 provides an updated and, arguably, most comprehensive account of the history of Australian public sector growth since N Butlin et al (1982). The chapter contains an integrated account of the changing expenditure, revenue and regulatory activities of governments, and where applicable, drew upon accounts of the evolution of public sector size and scope from a variety of primary and secondary sources.

Chapter 3 provides the most comprehensive time series measurements of Australian public sector size in a single document presented to date.

The data series for the number of pages of state government primary legislation prior to 1960 were manually collected from original legislation. Where data were missing in the secondary literature, efforts were made to collate missing information for example colonial census archives for nineteenth-century public sector employment data.

In addition efforts were made to highlight the limitations of all data sources, and to illustrate how different conceptual and methodological interpretations of the data lead to variations in government size measures.

The literature review represents an updated survey of the theoretical and empirical literature on the effect of government size on economic performance, including discussion of studies or working papers prepared or published in 2011.

The review was comprehensive in its scope, including discussions of the major growth theoretical perspectives and assessment of both single-country and multiple-country empirical studies. The chapter included a 'history of thought' of the intellectual precursors of the modern optimal size of government literature, drawing upon Anglo and continental European perspectives.

The review also presented the notion that the mixed findings of the early empirical literature were mainly the product of econometric or statistical limitations. Once subsequent studies had accounted for underlying methodological and data quality issues, they tended to point in a more consistent direction of a negative and robust correlation between government size and economic performance.

This study also provides the first time series study of the relationship between government size and economic performance for Australia since Kompas (2000). Furthermore, this study provides the first Australian study to investigate the empirical relationship between government size and economic performance using simultaneous equation estimation techniques.

Finally, the study explicitly acknowledges the critique of McCloskey and Zilliak (1996) that the empirical emphasis on statistical significance is not synonymous with economic, or substantive, significance. This study assesses the economic significance of the negative effect of government size, finding it is one of the more economically important relationships in a growth accounting framework.

6.4 Limitations of study

While this study makes a contribution to the literature on the economic implications of governmental size and growth, it does not provide an exhaustive investigation of this issue due to several limitations primarily associated with data deficiencies.

As discussed in chapter 3 revenue, taxation and expenditure data were missing for some years, for example as a consequence of decisions by government statistical agencies to not compile selected public finance data during the World War I and II periods. Missing data also posed as a problem in terms of the presentation of wartime defence force personnel data.

While the missing data problem could not be rectified in all cases, efforts were nonetheless made to improve the accuracy and comprehensiveness of statistical information presented in chapter 3. For example, time series data on employment in tertiary education institutions and public hospitals were added to the published Barnard et al (1977) public sector employment series to provide a more representative picture of the level of employment by state governments.

As noted above, the number of pages of primary legislation enacted at the state level prior to the calendar year 1960 was manually counted, although some items of legislation were missing from publicly available legislative archives. However, the total number of missing Acts in any given year was small thus not unduly impeding the development of the most comprehensive regulatory burden proxy statistics in Australia to date.

Another limitation posed by available government size proxy data in Australia, especially applicable to budgetary-based measures, refers to the numerous structural breaks driven by changing statistical coverage and collection methodologies. As noted in chapter 2, the most recent change to Australian government finance statistics (GFS) occurred in the late 1990s with the adoption of accrual accounting standards.

While the structural breaks severely compromise the comparability of the GFS time series, a consistent series of public sector expenditure data is however provided by the ABS national accounts from the financial year 1960. To avoid the potentially significant problem of structural breaks undermining the integrity of any empirical analysis, this study used the national accounting data for the empirical investigation of the government size and economic performance relationship presented in chapter 5.

That said, although the ABS national accounts provide a high degree of data consistency over a lengthy time period the government size measure drawn from the accounts are non-comprehensive since information on total incomes payable by government non-financial corporations were unavailable prior to financial year 1990. Minimising the possibility of structural breaks corrupting the time series, total incomes payable by government non-financial corporations were excluded from the expenditure-based measure of government size altogether.

6.5 Directions for further research

The literature review in chapter 4 revealed there were relatively few studies adopting simultaneous equation techniques when empirically assessing the relationship between the size of government and economic growth. By contrast researchers have tended to favour the use of single-equation, instrumental variable regressions to account for endogeneity, even though '[t]he lack of good

instruments for government size means the issue of causality has not yet been completely settled' (Bergh and Henrekson 2011, p. 884).

There is the potential to apply simultaneous equation approaches more comprehensively to the research agenda of the economic implications of government size, in either time series or cross-sectional empirical studies for other countries.

Given the endogeneity between government size and economic performance, a simultaneous equation system would most likely need to accommodate a regression incorporating the major determinants of public sector growth. In turn, an equation capturing public sector growth determinants would include proxy variables informed by public choice theoretic conceptions (for example, the variables *lage*, $\Delta lfederal$ and $\Delta lfisc$ presented in chapter 5).

Critics contend that public choice proxy variables either poorly represent the underlying phenomenon to be investigated or tend to possess fragile statistical properties (Caudill 2006). This suggests the need for researchers to undertake further work improving the selection of available public choice proxy variables, and enhancing the quality of data representing these variables.

This study and others (for example, Kirchner 2011b) have criticised the quality and reliability of various statistical sources which could otherwise be used to estimate Australian government size. As noted above missing data and structural breaks appear to be an inherent feature of official public finance statistics, which could induce severe biases if used in long run time series empirical studies.

Accordingly, there is significant potential for collaborations between economic historians and statisticians to rectify existing data quality problems in the interests of encouraging future empirical research in the field of Australian public sector economics.

6.6 Conclusion

Writing in the eighteenth century, the founder of modern economics Adam Smith stated:

'Little else is requisite to carry a state to the highest degree of opulence from the lowest barbarism, but peace, easy taxes, and a tolerable administration of justice; all the rest being brought about by the natural course of things. All governments which thwart this natural course, which force things into another channel or which endeavour to arrest the progress of society at a particular point, are unnatural, and to support themselves are obliged to be oppressive and tyrannical' (Stewart 1829, p. 64).

The extent of governmental involvement in Australian economic and social affairs during the eighteenth and nineteenth centuries was arguably greater than that in other Western countries (Tanzi and Schuknecht 2000), nonetheless the size and scope of governments during this period more closely conformed to the 'minimal state' ideals implied by Smith's statement than at any time since.

During the twentieth and early twentieth centuries Australian governments have greatly extended their allocative, distributional and stabilisation functions and activities and, in so doing, have often circumvented constitutional, parliamentary, fiscal federalism and other constraints in attempting to realise their objectives.

The role of political demands by individual voters or special interest groups is another of the many factors explaining the tendency of governments to continue expanding along various dimensions of interventions. Indeed, some proponents for a larger role for Australian government today implicitly argue that, given the relatively smaller size of government compared with most other OECD countries, additional public policy interventions can be enacted with negligible or even beneficial economic consequences (ACTU 2011; Gittins 2012).

While economists debate the merits of the newly acquired roles assumed by governments over the past century, it is agreed by most that continuous growth in government will, at least beyond some threshold point, compromise the abilities of economic agents interfacing within private markets to generate increasing wealth that underpins improvements in living standards.

These adverse consequences in turn may assume many guises, including the distortionary impact of taxes used to fund government expenditures, the crowding out of private sector activities in factor and product markets, the encouragement of rent-seeking for benefits provided by governments, and the substitution of political for private decision-making in economic arrangements.

This study suggests that an expansion in the size of government in Australia will exert adverse effects upon the growth performance of the economy, and therefore constraining public sector growth in the future would provide opportunities for improved material well-being.

With the widely-held expectation that long run demographic and economic changes are expected to place additional pressures on governments to increase their expenditure, the central conclusions of this study suggests that the absence of explicit policy reforms significantly reducing the relative size of Australian governments will impose significant obstacles upon future growth in private sector economic activity.

In the interests of ensuring that the size of government remains within economically tolerable bounds, it is hoped that this contribution to the literature will induce additional research efforts by others on what is arguably the most important economic policy topic not only of our time but into the foreseeable future.

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