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During the Global Financial Crisis of 2007–09, advanced economies saw reason to reduce their structural fiscal balance by an amount equal on average to 5.1 per cent of GDP. In 2010, according to IMF estimates, about half of that loosening was reversed. These drastic swings in fiscal stance will keep alive the debate over the prudence or imprudence of discretionary fiscal policy. In this Symposium, five contributing papers reflect on aspects of Australia’s recent experience with ‘fiscal stimulus’.
Stimulusgate

Sinclair Davidson

Abstract

The Australian government’s 2010 Budget Papers present econometric evidence that purports to show a positive and ‘highly statistically significant’ relationship between the size of stimulus spending and subsequent economic growth in a sub-set of G20 countries. The analysis concluded that those countries, such as Australia, that adopted early and large fiscal stimulus packages had subsequently outperformed those that had not done so. This analysis, however, turns on an untenable and substantial truncation of the available sample, and suggests a failure of quality-control processes with Treasury.

Introduction

Sometime over the weekend of 11–12 October 2008, then Secretary of the Treasury Ken Henry coined the phrase ‘Go hard, go early, go households’ (Taylor and Uren 2010: 78). By the time the Australian government had stopped pursuing this policy, some $79.1 billion had been committed to be spent. This spending was announced over four packages. The Economic Security Strategy announced in October 2008 committed $10.4 billion. The Nation Building package announced in December 2008 committed $4.7 billion. The Nation Building and Jobs Package announced in February 2009 amounted to $41.5 billion, while the 2009 Budget committed an additional $22.5 billion. There can be little doubt that the government’s fiscal response to the Global Financial Crisis (GFC) was large and rapid.

By early 2010 there was some debate as to whether the government had gone ‘too hard’. Taylor and Uren (2010: 216) suggest that, ‘it is hard to resist the conclusion that the government spent more than was needed, no matter how reasonable its actions appeared at the time’.

1 School of Economics, Finance and Marketing, RMIT University, and the Institute of Public Affairs; sinclair.davidson@rmit.edu.au. I would like to thank Wolfgang Kasper for suggesting the title, two anonymous referees and the editor, William Coleman, for comments on a previous version of this paper.
The head of the Macroeconomic Group within Treasury, David Gruen, defended the early timing and size of the various packages in a December speech to the Australian Business Economics Annual Forecasting Conference. As to the size of the Australian fiscal response, Gruen (2009: 14) argued that Australia had been in a position to pursue a large fiscal response because the pre-existing fiscal position was strong. In addition, there was no reason why all economies should pursue a similar response to economic downturn. While both these arguments are reasonable, as far as they go, the problem is that Treasury forecasts were too pessimistic, as Gruen (2009: 6) conceded, and the economy performed much better than expected (see especially the charts at page 8). Gruen (2009: 6) consequently argued:

It appears that the expansionary macroeconomic policy response was large enough and quick enough to convince the community — both consumers and businesses — that the slowdown would be relatively mild (indeed much milder than most forecasters, including the Australian Treasury, had earlier expected). If that inference is correct, it is also important. It implies that, on this occasion, expansionary macroeconomic policy was able to generate a favourable feedback loop in the economy. Macroeconomic policy supported economic activity, which in turn convinced consumers and businesses that the slowdown would be relatively mild.

In December 2009 that view might have been conjecture. But the May 2010 Budget papers appeared to contain evidence — a chart — supportive of that proposition. At the time Scott Steel, of Crikey, characterised the chart as:

… arguably the most politically important piece of data in the entire budget, as it justifies not just the very existence of the stimulus program and the political baggage that is coming with it, but also shows the likely consequences of the alternative “what if the stimulus was smaller or didn’t exist” scenario (Steel 2010).

The present paper does not address whether the stimulus packages ‘worked’ or not. Economists will debate that issue for years, if not decades. Rather, this paper highlights the errors contained in the chart that purported to show that the then Rudd government policy of going hard, going early and going household had succeeded.

### The Budget Chart

The Budget Papers are prepared by Treasury. Budget Paper No.1 includes a ‘Chart A’ supposedly showing that those economies that had ‘enacted large and
timely fiscal stimulus packages’ subsequently outperformed growth expectations (Budget Strategy and Outlook: 2-23–2-24 Chart A). Chart A reports a regression analysis with a very specific claim: ‘The relationship shown is highly statistically significant, with a t-statistic on the slope coefficient of 3.3.’ The sample was the G20 economies. The dependent variable was the excess of 2009 actual GDP growth over 2009 forecast GDP growth. (These data are from online IMF databases). The independent variable was the size of stimulus as a percentage of 2009 GDP. The data for the independent variable was drawn by Treasury from a table (‘Annex Table 2 G20 Countries: Fiscal Expansion’) prepared by the IMF and published in November 2009 (IMF 2009: 36). The problem with the analysis is that only 11 of the 19 observations presented in the IMF’s Annex Table 2 were used in Treasury’s Chart A. The table below shows the data that could have used relative to the data that was used.

Table 1: Available data and utilised data

<table>
<thead>
<tr>
<th>Country</th>
<th>2009 Stimulus % GDP</th>
<th>IMF Forecast Error</th>
<th>Country</th>
<th>2009 Stimulus % GDP</th>
<th>IMF Forecast Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argentina</td>
<td>1.5</td>
<td>2.365</td>
<td>Argentina</td>
<td>1.5</td>
<td>2.365</td>
</tr>
<tr>
<td>Australia</td>
<td>2.9</td>
<td>2.774</td>
<td>Australia</td>
<td>2.9</td>
<td>2.774</td>
</tr>
<tr>
<td>Brazil</td>
<td>0.6</td>
<td>1.116</td>
<td>Brazil</td>
<td>0.6</td>
<td>1.116</td>
</tr>
<tr>
<td>Canada</td>
<td>1.9</td>
<td>-0.103</td>
<td>Canada</td>
<td>1.9</td>
<td>-0.103</td>
</tr>
<tr>
<td>China</td>
<td>3.1</td>
<td>2.215</td>
<td>China</td>
<td>3.1</td>
<td>2.215</td>
</tr>
<tr>
<td>France</td>
<td>0.7</td>
<td>0.766</td>
<td>France</td>
<td>0.7</td>
<td>0.766</td>
</tr>
<tr>
<td>Germany</td>
<td>1.6</td>
<td>0.641</td>
<td>Germany</td>
<td>1.6</td>
<td>0.641</td>
</tr>
<tr>
<td>India</td>
<td>0.6</td>
<td>1.145</td>
<td>India</td>
<td>0.6</td>
<td>1.145</td>
</tr>
<tr>
<td>Indonesia</td>
<td>1.4</td>
<td>2.051</td>
<td>Indonesia</td>
<td>1.4</td>
<td>2.051</td>
</tr>
<tr>
<td>Italy</td>
<td>0.2</td>
<td>-0.588</td>
<td>Italy</td>
<td>0.2</td>
<td>-0.588</td>
</tr>
<tr>
<td>Japan</td>
<td>2.4</td>
<td>1.000</td>
<td>Japan</td>
<td>2.4</td>
<td>1.000</td>
</tr>
<tr>
<td>Korea</td>
<td>3.6</td>
<td>4.211</td>
<td>Korea</td>
<td>3.6</td>
<td>4.211</td>
</tr>
<tr>
<td>Mexico</td>
<td>1.5</td>
<td>-2.867</td>
<td>Mexico</td>
<td>1.5</td>
<td>-2.867</td>
</tr>
<tr>
<td>Russia</td>
<td>4.1</td>
<td>-1.923</td>
<td>Russia</td>
<td>4.1</td>
<td>-1.923</td>
</tr>
<tr>
<td>Saudi Arabia</td>
<td>3.3</td>
<td>1.059</td>
<td>Saudi Arabia</td>
<td>3.3</td>
<td>1.059</td>
</tr>
<tr>
<td>South Africa</td>
<td>3.0</td>
<td>-1.471</td>
<td>South Africa</td>
<td>3.0</td>
<td>-1.471</td>
</tr>
<tr>
<td>Turkey</td>
<td>1.2</td>
<td>0.357</td>
<td>Turkey</td>
<td>1.2</td>
<td>0.357</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>1.6</td>
<td>-0.834</td>
<td>United Kingdom</td>
<td>1.6</td>
<td>-0.834</td>
</tr>
<tr>
<td>United States</td>
<td>2.0</td>
<td>0.311</td>
<td>United States</td>
<td>2.0</td>
<td>0.311</td>
</tr>
</tbody>
</table>


2 The list of G20 countries is shown in Table 1. As the EU is a member in its own right, only 19 countries are shown.
There is no obvious reason why those countries should have been excluded. The sample isn’t just advanced economies and isn’t just resource-rich economies.

What is the effect of using the truncated sample? Table 2 estimates the regression analysis that Treasury must have undertaken in order to determine the t-statistic of 3.3 that they report. The Treasury result is shown in the first column. As indicated, the slope coefficient is statistically significantly different from zero, it has a t-statistic of 3.3 and a corresponding p-value of 0.0090. If correct, this result would strongly vindicate stimulus spending as Quiggin (2010) indicated. Unfortunately, that result is not sustained when the full sample that could be employed is actually used in the regression. This result is shown in the second column. The coefficient is now much smaller (about one-fifth of its previous size) and the statistical significance has declined from a t-statistic of 3.3 to a t-statistic of 0.5 and a corresponding p-value of 0.68.

**Table 2: Replicating the Treasury t-statistic**

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Treasury Sample</th>
<th>Full Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>IMF Forecast Error</td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>-0.8807</td>
<td>0.2801</td>
</tr>
<tr>
<td></td>
<td>(-1.3265)</td>
<td>(0.3374)</td>
</tr>
<tr>
<td>2009 Stimulus % GDP</td>
<td>1.0290***</td>
<td>0.1856</td>
</tr>
<tr>
<td></td>
<td>(3.3161)</td>
<td>(0.5006)</td>
</tr>
<tr>
<td>Adj-R2</td>
<td>0.4999</td>
<td>-0.0434</td>
</tr>
<tr>
<td>Observations</td>
<td>11</td>
<td>19</td>
</tr>
</tbody>
</table>

Values in parenthesis are t-statistics. No adjustment is shown for potential heteroskedasticity.

*** statistically significant at the 1 percent level.

This result then does not support the ‘go early, go hard, go household’ argument. To be sure, this does not mean that stimulus spending did not assist the Australian economy withstand the adverse effects of the financial crisis, but it does mean that the government did not have a quick and easy ‘proof’ that its policies had succeeded as advertised. The question as to whether fiscal policy works to stimulate economic activity in downturns is not ever going to be resolved in a single variable regression with 11 (or even 19) observations.

**How did this happen?**

This error was pointed out in a blog, Catallaxyfiles, on 13 May 2010. In response to a line of questioning from Senator David Bushby in Senate Estimates on 2 June 2010, the head of the Macroeconomic Group within Treasury, David Gruen, read
a prepared statement concluding that the chart and the explanation to the chart contained errors (Gruen 2010. See also Senate Estimates 2010: E26–E27). The explanation he provided was that a series of compounding errors had occurred. An initial coding error led them to an erroneous conclusion, and Treasury had then truncated the sample from 19 to 11 for expositional simplicity, to see whether the same (or similar) result held. As it did, the chart was published. A subsequent quality-control check also failed to pick up the coding error.

The important point to note is that this isn’t a debate about the meaning of the numbers, or even whether the research method is appropriate. Treasury was unable to accurately transfer data from a database to an econometrics package, and its quality-control process didn’t pick up such a basic and obvious source of error.

The second analysis

Treasury then produced an additional analysis, this time employing OECD data (not G20 data), to demonstrate a positive and statistically significant relationship between the size of the fiscal stimulus and IMF forecast errors (Gruen 2010: 4). The independent variable, slightly different from before, is now the size of the 2009 stimulus as a percentage of 2008 GDP (OECD 2009: 63). 3 This allowed Treasury to increase its sample size from 19 to 30 data points. Yet Treasury excluded four countries (Greece, Hungary, Iceland and Ireland) on the basis that ‘their dire fiscal circumstances’ were ‘not relevant to the question of whether countries that implemented sizeable fiscal stimulus outperformed growth expectations to a significant extent relative to those that did less’ (Gruen 2010: 3). It would be more appropriate to undertake a formal test to determine whether that set of countries are outliers or not. It appears that Treasury discarded those economies that had negative scores for the independent variable. But if that were the criterion for exclusion, why not also drop Italy from the analysis? The stimulus for Italy in 2009 was negative too. To be fair, Treasury admits that ‘including Greece, Hungary, Iceland and Ireland in the regression generates a statistically insignificant slope coefficient’ (Gruen 2010: 3). Various versions of the subsequent Treasury analysis are shown in Table 3.

---

3 The OECD (2009: 63) reports an overall size of the various fiscal packages and the timing of the packages. The Treasury then calculated a pro-rata share of the fiscal package for 2009. The OECD captured the data as at 11 June 2009.
Table 3: Replication the subsequent Treasury analysis

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Full Sample</th>
<th>Treasury Sample</th>
<th>Italy excluded As well</th>
</tr>
</thead>
<tbody>
<tr>
<td>IMF Forecast Error</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>-0.0312</td>
<td>-0.8188</td>
<td>-0.8601</td>
</tr>
<tr>
<td></td>
<td>(-0.0824)</td>
<td>(-1.4062)</td>
<td>(-1.3331)</td>
</tr>
<tr>
<td>2009 Stimulus % GDP</td>
<td>0.2247</td>
<td>0.6760**</td>
<td>0.6962*</td>
</tr>
<tr>
<td></td>
<td>(1.1406)</td>
<td>(2.0430)</td>
<td>(1.9367)</td>
</tr>
<tr>
<td>Adj-R2</td>
<td>0.0103</td>
<td>0.1127</td>
<td>0.1028</td>
</tr>
<tr>
<td>Observations</td>
<td>30</td>
<td>26</td>
<td>25</td>
</tr>
<tr>
<td>excludes</td>
<td></td>
<td>Greece</td>
<td>Greek</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hungary</td>
<td>Hungary</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Iceland</td>
<td>Iceland</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ireland</td>
<td>Ireland</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Italy</td>
</tr>
</tbody>
</table>

Values in parenthesis are t-statistics. No adjustment is shown for potential heteroskedasticity. Data are sourced from IMF World Economic Outlook Database April 2009, IMF World Economic Outlook Database April 2010 and OECD Economic Outlook June 2009.

** statistically significant at the 5 percent level, * statistically significant at the 10 percent level.

The first column replicates the Treasury analysis with the entire dataset. As Treasury indicates, the slope coefficient is not statistically significantly different from zero — the t-statistic is 1.14 and the p-value is 0.2637. The Cooks distance criteria identify no country as being an outlier. 4 The second column replicates the analysis using the Treasury sample. The slope coefficient is 0.6760, with a t-statistic of 2.04 and a p-value of 0.0522. Column three shows the results of excluding all those economies with a negative score for the independent variable: this includes Italy and the four economies excluded by Treasury. The slope coefficient now has a t-statistic of 1.94 and a p-value of 0.0652.

The problem with the Treasury’s subsequent analysis is that the basis for excluding four economies from the analysis is not well explained and this difference in the sample selection gives rise to a large difference in the results. In any event, with a p-value of 0.0522 its preferred version is barely statistically significant and a strict interpretation of the 95 percent confidence level criterion would suggest that it isn’t.

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4 The rule of thumb for this measure is a score of one or more. Iceland has the highest Cooks distance score of 0.66.
Conclusion

Ultimately, the chart was a political statement and it is the politicians, not the public servants within Treasury, who should accountable for it. It is not unreasonable, however, to expect that Treasury could correctly estimate a 19-observation regression — something first-year students used to do with a hand calculator in the 1980s. Nor is it unreasonable that Treasury should advise government that a single regression cannot resolve a long-standing controversy in economics.

References


In the Long Run, the Multiplier is Dead: Lessons from a Simulation

Ross Guest and Anthony J. Makin

Abstract

This paper re-examines the significance of the fiscal multiplier from an inter-temporal perspective using simulation results derived from a standard overlapping-generations framework. It reveals that even if fiscal stimulus in the form of extra public consumption spending is assumed to increased output and employment in the short run, the negative medium to long-term consequences of the stimulus will ultimately exceed, in present-value terms, the short-term macroeconomic benefits of that stimulus. This is due to the interest rate and tax effects of the stimulus-induced budget deficit which lowers future private investment, household consumption, and labour supply.

Introduction

Under the auspices of the G20 group of economies, Australia enthusiastically participated in the largest internationally co-ordinated fiscal expansion the world has ever seen to offset the predicted recessionary impact of the 2008–09 global financial crisis (GFC). Yet, despite the globally co-ordinated response, a case can be made that fiscal stimulus, especially the emphasis on unproductive government spending rather than tax cuts, was unnecessary for Australia. Interest rates remained significantly above the zero bound, so further relaxation of monetary policy remained an option. Moreover, the trade-weighted exchange rate had depreciated by nearly 30 per cent, boosting competitiveness and net exports (Makin 2010).

Nevertheless, if interest rates are low or zero, the enduring appeal of fiscal stimulus is that it seemingly provides policymakers with a costless economic solution for counteracting recession and unemployment. However, this Keynesian perspective neglects that boosting aggregate spending to expand output expansion has harmful future macroeconomic consequences due to the budget deficits and higher public debt that arise.

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Fiscal multipliers have been estimated for different countries and for different fiscal instruments using general equilibrium models and econometric approaches (see, for instance, Blanchard and Perotti 2002; Cogan et al. 2010; and Formi et al. 2009). These estimates vary considerably, prompting Auerbach et al. (2010) to comment in a recent survey of multiplier estimates that the range is ‘almost embarrassingly large’. Most are positive because they are either based on Keynesian assumptions or, in the case of general equilibrium models, are derived by setting interest rates low with little, if any, regard to longer-run public-debt related implications.  

When gauging the size of fiscal multiplier, a key issue is the time frame over which the macroeconomic effects are estimated. If a fiscal multiplier happens to be positive in the short run, but negative over a longer time interval, then from an inter-temporal perspective fiscal ‘stimulus’ is a deceptive term. The main focus of this contribution is to examine the size of the fiscal multiplier for an economy like Australia over both the short and long term. To do this it refers to a simulation model which uses parameter values adopted by Treasury, but which also explicitly allows for longer-run interest rate, tax, and wage effects stemming from fiscal expansion and the associated budget deficit.

In preview, for the purposes of argument we accept the Keynesian premise that extra spending leads to increased output in the short run. However, after allowing for reasonable interest rate and tax effects, the negative longer-run consequences of fiscal stimulus soon begin to outweigh short-term macroeconomic benefits. The upshot is that the sum of the discounted changes in employment and GDP are negative in the long run. In other words, we show that, even if it has a positive short-run impact, in the long run the fiscal multiplier is dead.

The simulation model

The key assumptions of the model are as follows. A representative firm produces output of a single tradable good according to a Cobb-Douglas production function.

The usual first-order conditions determine the capital stock and the wage rate for a unit of aggregate labour, and both competitive factor markets and goods...
markets clear. In this neoclassical set up, unemployment is implicitly ruled out. However, it is assumed that fiscal stimulus provides a short-run boost to employment (and therefore GDP) by increasing both labour supply and labour demand at the going wage rate. This is an expedient in order to focus on the longer-run effects of fiscal stimulus through its effect on the interest rate, taxes and the real wage.

It is assumed that capital is imperfectly mobile, in the sense that the interest rate is subject to a sovereign risk premium, whereby the interest rate, $r_j$, is a function of the ratio of public debt to GDP ($D/Y$), lagged one period:

$$r_j = \bar{r} + \lambda \left( \frac{D}{Y} \right)_{j-1}$$

For further details, including all parameter values, see the full working paper: Guest and Makin (2011, forthcoming). One-person households consume both the single good and leisure. A household is formed at age 15 and therefore household consumption includes the consumption of children under age 15. A period of time is one-year duration and a new generation of households is born each period. Each household commences working at age 15, retires at age 70 and dies on their eighty-fifth birthday with certainty. Hence there are overlapping generations of working households alive at any time. They commence working life with zero financial assets and have a target financial wealth of zero at death. They pay the same constant tax rate on income from both capital and labour (discussed below).

Households derive utility from consuming private goods, $C$, and leisure, $S$. Government consumption is assumed to provide no direct utility and hence has no effect on the household’s optimal lifetime plan. Households maximise the following lifetime utility function:

$$U = \sum_{i=1}^{k} \frac{M_i^{1-\beta}}{1-\beta} (1+\theta)^{i-1}$$

subject to a lifetime budget constraint, where $M_i$ is a CES index of consumption and leisure, $\theta$ is the pure time preference rate and $\beta$ is the elasticity of marginal utility. For simplicity, there are no bequests, and total transfer payments paid

---

5 The elasticity of substitution between $C$ and $S$ takes the value of 1.2. The results are not qualitatively sensitive to the value of this parameter. The value of $\beta$ is 2.0 and the value of theta is 0.03.
by the government in a given period are allocated evenly across all households alive in that period, rather than being allocated to certain generations. A single tax rate applies to income from both labour and financial assets.

Households know the parameter values with certainty, but the policy shock comes as a surprise. When the unanticipated fiscal stimulus occurs, households will be at various stages of their lifetime plans — young households will be nearer to the start than older households. At this point, they revise their plans for the remainder of their lifetimes.

The government starts with a balanced budget before the unexpected fiscal stimulus shock arrives, after which agents adjust their plans in response to the shock. The fiscal shock is an increase in government consumption expenditure of, in the base case, 2 per cent of GDP over each of N=2 years. From \( j=N+1 \), government expenditure returns to its pre-shock level and the government begins to repay its debt by increasing the tax rate until the debt-to-GDP ratio returns to its pre-shock level. In order to avoid an initial jump in the tax rate, the tax rate is assumed to gradually increase for an initial period \( j=N+1, \ldots, 2N \) following the shock.

Following Uhlig (2010),\(^6\) the dynamic fiscal multiplier at time \( t \) is calculated as the discounted sum of the changes in output from \( j=1 \) (representing the year 2009 when the stimulus is assumed to commence) to \( t \), divided by the discounted sum of the stimulus spending, \( G \), from \( j=1 \) to \( t \):

\[
U = \sum_{i=1}^{k} \frac{M_i^{1-\beta}}{1-\beta} (1+\theta)^{1-i} \tag{3}
\]

The short-run boost to employment and GDP from stimulus in the form of government consumption expenditure is achieved by assuming a contemporaneous employment multiplier of 0.5. This is done by simply inflating the level of employment that exists at the time of the shock by half the percentage increase in stimulus spending. That is, given stimulus spending of 2 per cent, the contemporaneous boost in employment is 1 per cent. This extra employment creates output and, therefore, income for consumers, which in turn creates both consumption and tax revenue for government. The employment multiplier of 0.5 is consistent with empirical estimates (OECD 2009; Australian Treasury 2009).

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\(^6\) The main differences are that Uhlig (i) uses a Ramsey model, rather than an OLG model which allows for an intergenerational welfare analysis; and (ii) assumes that government spending and output follow stochastic processes, whereas they are deterministic here.
Results of simulations

The results are illustrated in Figures 1 and 2 for the base case (sensitivity simulations are briefly discussed below and further details are available in the extended version of the paper).  

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Figure 1 shows the impulse response to the stimulus, defined as the percentage change in GDP from the pre-stimulus level. Figure 2 shows the dynamic fiscal multiplier. The fiscal stimulus of 2 per cent of GDP boosts GDP by 1.5 percent. This implies a first-year fiscal multiplier\(^8\) of 0.75. By the third year, when the stimulus has ceased and taxes start to rise, the GDP response becomes negative. The fiscal multiplier remains positive for several years even though the GDP response has turned negative, because the multiplier is calculated as the cumulative discounted GDP response divided by the cumulative discounted stimulus spending (equation 3).

The initial boost to GDP diminishes almost immediately for a combination of several factors. First the interest rate starts to rise due to the increase in government debt, which lowers investment and, to a less extent, consumption. Second, following the stimulus the tax rate rises in order to start paying off the debt. This reduces the price of leisure, which lowers labour supply. Third, the lower price of leisure is compounded via a lower pre-tax real wage as a result of the lower capital-labour ratio, further reducing the supply of labour. As the debt is eventually paid off, the tax rate and the interest rate return to their original levels and hence so does GDP. This process takes several decades to complete. The fiscal multiplier turns negative after five years in the base case and reaches -1.43 by 2050. The figure of -1.43 means that the long-run discounted decrease in output is 1.43 times the magnitude of the stimulus spending. These values are consistent with the simulation results in Uhlig (2010) who finds multipliers generally less than 1.0 in the short run and negative in the long run. Uhlig’s conclusion, supported here, is that although fiscal stimulus may dampen the severity of a recession in the short run it may extend the duration of the recession for a considerable period.

A number of sensitivity simulations were conducted by varying, within a plausible range, values of the following parameters: the proportion of consumption determined by the rule of thumb; the type of stimulus — government consumption spending or transfer payments; the duration of the stimulus after which the spending drops back to its original level; the employment multiplier; and the speed of adjustment of the tax rate and/or spending following the period of stimulus. The qualitative results found in the base case remained intact: the fiscal multiplier eventually became negative in all cases.

A couple of points about the sensitivity simulations are worth noting. The results are quite sensitive to the interest-rate response to size of public debt. The base case assumed that a 10 per cent rise in the debt-to-GDP ratio resulted in a 30 basis

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\(^8\) The fiscal multiplier is the percentage change in GDP divided by the percentage change in government expenditure.
point increase in the interest rate (supported by empirical estimates), compared with 10 basis points in the sensitivity simulation. The effect the smaller interest-rate response was a larger fiscal multiplier. The long-run multiplier was still negative but of a smaller magnitude: -0.27, compared with -1.4 in the base case. Another noteworthy simulation adopted a sharper increase in the tax rate in order to pay back the debt more rapidly. In particular, for the first four years after the stimulus has ended, the tax rate increases on average by 0.7 per cent of GDP, compared with 0.4 per cent in the base case. This had a positive impact on the long-run fiscal multiplier — the long-run value was still negative but only half the negative value in the base case (-0.7 compared with -1.4). This shows the long-run benefits of a short period of tighter fiscal policy in unwinding the stimulus.

The dynamic multipliers reported here support the findings in Uhlig (2010) that the positive benefits of fiscal stimulus are short lived. The fiscal multiplier becomes negative in all simulations after 10 years from the time the stimulus was introduced. This qualitative conclusion is robust to a range of assumptions, although the magnitude of the multiplier depends on the size and duration of the stimulus, the degree to which it pushes up interest rates, the rate at which it is unwound and whether it is unwound by tax rises or spending cuts.

Nonetheless, this simulation approach is likely to understate the true longer-term costs of fiscal stimulus and overstate the time it takes for the multiplier to become negative because fiscal activism also undermines business confidence, the effects of which are not explicitly modelled. The oft-proposed Keynesian idea that fiscal stimulus is needed to sustain business confidence contains a contradiction. The contradiction is that the higher-than-necessary interest rates and taxes that result from fiscal expansion must also harm business confidence. This limits asset price recovery, further hampering private investment and the quality of economic growth in the long run.

Prior to the GFC, it was generally accepted that monetary policy (via both interest-rate and exchange-rate effects) influenced the economy in the short run more effectively than fiscal policy. This was because monetary policy was less compromised by recognition, decision and implementation lags, from which the simulation exercise also abstracts. However, the implementation lag (in particular) significantly marred the delivery of Australia’s fiscal response to the GFC, as the government sector’s direct contribution to boosting domestic consumption and investment was minimal at the height of the GFC impact, and peaked well after it was supposed to according to actual national accounts data (Makin 2010).
Conclusion

This contribution highlights numerous mechanisms that have been overlooked or underestimated by advocates of fiscal stimulus with reference to simulation results derived from a standard inter-temporal macroeconomic model. As with any modelling, these results reflect starting assumptions, some of which, if varied, would undoubtedly yield different, more Keynesian-friendly, outcomes. For instance, in this exercise the stimulus is restricted to government consumption expenditure only. This implies there is no accelerator effect which could arise if the public spending boost was assumed to be productive investment expenditure rather than consumption.

In the model, the exogenous short-run boost to GDP and employment is assumed to end when the stimulus ends. Alternatively, introducing a short-run Keynesian effect into the model could have been achieved by introducing wage rigidities in the adjustment process. The justification for assuming that output and employment are exogenously and temporarily boosted by fiscal stimulus in the short run is that it provides a means for examining the medium to long-run offsetting effects of the budgetary consequences of fiscal stimulus. These adverse inter-temporal effects have been largely neglected in current debate.

Specifically, it is important to highlight that following fiscal stimulus, higher interest rates lower future investment and, to a lesser extent, consumption, consistent with the prediction of the short-run Keynesian IS-LM model. Additionally, fiscal stimulus negatively affects post-stimulus output and employment outcomes because it leads to reduced labour supply that arises from higher taxes, as well as from lower pre-tax real wages courtesy of a lower capital–labour ratio.

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China’s Fiscal Stimulus and the Recession Australia Never Had: Is a Growth Slowdown Now Inevitable?

Creina Day

Abstract

China’s timely and well-targeted two-year fiscal stimulus was particularly effective in stimulating growth in Australia’s commodity exports. Using a constructed series of export volumes to China, this paper finds that the post-stimulus GDP growth contribution from export volumes to China is significant. Had growth in export volumes to China been commensurate with pre-stimulus rates, Australia would have experienced three consecutive quarters of negative real GDP growth — a technical recession. China’s gradual and uniquely revenue-based unwinding of fiscal stimulus reduces the risk to Australia of an imminent growth slowdown.

Introduction

One of the defining features of the Great Recession was the ‘sudden, severe and synchronized’ collapse in world trade for the December 2008 and March 2009 quarters (Baldwin 2009). But just as small open economies, such as Australia, were vulnerable to the economic wellbeing of their trading partners, they also especially benefited from the fiscal stimulus implemented simultaneously worldwide.

This paper explores how, and to what extent, Australia benefited from the fiscal stimulus of its most important trading partner, China, and whether we may expect to witness a slowdown in growth as the unwinding of global fiscal stimulus begins in earnest in 2011.

Australia distinguished itself from other advanced economies by escaping a technical recession, defined as two quarters of negative growth in real GDP. The consensus that Australia experienced a slowdown but avoided a recession rests on the positive real GDP growth result for the March 2009 quarter.

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The existing literature analyses the effectiveness of the Australian government’s package of cash transfers and infrastructure investment in countering a recession. Leigh (2009) finds cash bonuses were particularly effective in stimulating consumption. Lim et al. (2010) suggest cash for consumption was more effective in stimulating consumer confidence and that the effect of infrastructure investment, largely introduced at the bottom of the slowdown, is most likely delayed.

On the other hand, Makin (2010) finds that net exports, not Australia’s fiscal stimulus, was primarily responsible for offsetting a fall in private investment due to the Global Financial Crisis (GFC). For the March 2009 quarter, the net positive contributions of private and public consumption totalling 0.3 per cent were minor in relation to the contribution from net exports of 2.0 per cent.

This paper builds on this growth analysis, which tells us how broad category GDP components changed, by exploring why exports rose both during and since the fiscal stimulus. It hypothesises that the rise in exports is in fact due, in part, to fiscal stimulus — that of the Chinese government. Of course, a rise in net exports can be due to a fall in imports, reflecting weakening domestic demand. Consistent with the global contraction in trade (IMF 2010a), for the December 2008 quarter both Australian exports and imports fell by 1.4 and 8.3 per cent, respectively, over the previous quarter. However, in the March 2009 quarter, Australia broke from the pack with modest growth in exports of 1.6 per cent over the previous quarter. Since then, exports have contributed positively to real GDP growth in five out of seven quarters.

This paper adds to the existing literature on fiscal stimulus by examining two key questions that have been overlooked. Firstly, how much did growth in export volumes to China contribute to real GDP growth in Australia? Secondly, how will the unwinding of China’s fiscal stimulus affect Australia’s real GDP growth in the coming decade?

To address the first question, this paper constructs a quarterly data series, March 2000 to September 2010, of export volumes to China, which it then uses to calculate the real GDP growth contribution from the growth in export volumes to China. The quarterly growth contribution series allows us to investigate the counterfactual: had the growth contribution remained at the average pre-stimulus level, would Australia have experienced a recession?

To address the second question, the general budget balances of China are compared with those of other major economies. There is an explanation of why China’s planned composition of fiscal adjustment is unique and the implications of this for the Australian economy are discussed.
China’s Fiscal Stimulus and the Recession Australia Never Had

China’s Stimulus to Infrastructure Investment

China was able to implement one of the largest and most timely fiscal stimulus packages (IMF 2010a). Natural growth in tax revenue provided China with fiscal ammunition unavailable to OECD countries. Accordingly, China’s fiscal package constituted a reallocation of spending to infrastructure rather than burgeoning debt. Policymakers pragmatically decided to accelerate already approved infrastructure projects. By shortening five-year implementation to two years, projects were able to get off the ground fast. A large part of the stimulus spending was diverted to building strategic stockpiles of raw materials.

Figure 1: China’s growth in fixed-asset investment (percentage change, year on year)

![Graph showing China's growth in fixed-asset investment from 2005 to 2010.](source: National Bureau of Statistics of China, Investment in Fixed Assets)

As shown in Figure 1, growth in investment temporarily spiked in 2009 as a result of fiscal stimulus measures. China’s investment in fixed assets totalled 22.48 trillion RMB in 2009, up 30.1 per cent year on year. Since the mid-1990s the share of infrastructure investment was declining while manufacturing gained share. Fiscal stimulus reversed this trend sharply in 2009.

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2 The development of China’s tax system, primarily a consequence of urbanisation, has been sufficient to ensure that increases in tax revenue have accompanied surges in GDP growth (Tyers and Huang 2009).

3 In 2009, China’s fiscal deficit, as a percentage of GDP, was less than a third of the average of advanced G20 economies (IMF 2010b).

4 Government fixed-asset investment was up 60 per cent year on year in 2009 (World Bank 2010).
A priori, we would expect China’s fiscal stimulus to be especially effective in stimulating domestic economic activity for two reasons. Firstly, government investment directly affects aggregate demand, whereas government transfers and tax cuts stimulate household consumption via disposable income (see Gali et al. 2007). Secondly, since the Chinese currency is effectively pegged to the US dollar, China eases monetary policy in line with the United States. Domestic demand increases relatively more because of the low real interest rate. This is consistent with the Mundell-Fleming model, one of the workhorses of open-economy macroeconomics, which predicts that fiscal policy is more effective in stimulating domestic output under pegged, rather than floating, exchange rates.

We would also expect fiscal stimulus in such a large and relatively open economy to have significant international spillovers. Consistent with the Keynesian view of the world, a fraction of the fiscal expansion is diverted to the rest of the world through higher imports.

Recent estimates of multiplier effects, based on ex-ante simulations, support this a priori reasoning. For emerging Asia, Freedman et al. (2010) estimate that the fiscal multiplier of a two-year stimulus is 2.0 and 0.7 on domestic and world GDP, respectively. For the US, the simulated effects on domestic and world GDP are almost half this magnitude. The emerging Asia two-year multiplier is consistent with a one-year multiplier for China of 0.84 (He et al. 2009).

Since a significantly larger share of imported mining products is used in construction than is used in manufacturing, we would expect the Chinese government’s spending on infrastructure to generate spillovers for major exporters of iron ore and coal, in particular. Cova et al. (2010) predict that China’s fiscal stimulus will raise exports from Japan and the rest of the world (including Australia) by four times the rise in exports from the US and euro area.

The significance of these spillovers to Australia is reflected in Figure 2. In 2009, both China and Australia recorded positive but slowing growth. In 2010, real GDP growth rose by 1¼ and 1¾ percentage points in China and Australia, respectively.

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5 Construction uses around 5 per cent of minerals supplied domestically, compared with 35 per cent for manufacturing (National Bureau of Statistics of China).
China’s Fiscal Stimulus and the Recession Australia Never Had

Figure 2: Annual real GDP growth (percentage change, year on year)

Source: ABS, Australian National Accounts, Catalogue 5206.0; National Bureau of Statistics of China; IMF

To sum up, the Chinese government’s spending on infrastructure had:

- a larger effect on both China’s GDP and the rest of the world than any other G20 economy
- significant international spillovers via demand for exports, especially from Australia.

Did Increased Exports to China Avert a Recession?

To quantify the extent to which China’s increased demand for exports averted a technical recession in Australia, we need to:

- estimate the volume of merchandise exports to China; and
- isolate the contribution to growth in real GDP for each quarter.

On account of the significant changes in commodity prices over the critical ‘recession we never had’ period, changes in the total value of merchandise exports to China will mask changes in demand. In Australian dollar terms,
commodity prices peaked in October 2008, falling by around 43 per cent through to October 2009. By January 2011, commodity prices were up 45 per cent from their low, but remained 18 per cent lower than their peak (RBA 2010).

So, to derive a series of export volumes to China, the total value of merchandise exports to China is deflated by the RBA Index of Commodity Prices (ICP) reflected in Australian dollars. Specifically, the monthly volume of merchandise exports to China for the period January 1988 to September 2010 is derived as:

$$\text{Real (Volume of) Merchandise Exports to China} = \frac{\text{Merchandise Exports to China}}{\text{Index of Commodity Prices}}$$

which is then seasonally adjusted, using the X12 method. The monthly series is converted, to allow comparison with quarterly real GDP data.

**Figure 3: Growth in real GDP and export volumes to China (per cent)**

Source: ABS Cat. No. 5206.0, ABS Cat. No. 5368.0, RBA, and author’s calculations

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6 The weights assigned to each commodity in the ICP reflect both the share of export volumes in 2008–09 and the impact of subsequent price changes on export values. Reflective of Australian exports to China, mining commodities comprise almost 90 per cent of the index (RBA 2009). In particular, the ICP weights for metallurgical coal and iron ore closely reflect exports to China. In the absence of an official series of export volumes, by major trading partners, deflating export values by the ICP therefore provides a reasonably accurate measure of export volumes to China.

7 This method is undertaken using Eviews.
Figure 3 reveals that since the global fiscal stimulus, growth in the volume of exports to China leads real GDP growth in Australia on a through-the-year basis. The question of averted recession relates to real GDP growth in each quarter (the bars in Figure 3). Thus, we wish to isolate the growth contribution from export volumes to China in each quarter.

We start with a decomposition of real GDP into expenditure components. With some algebraic manipulation, we obtain the growth contribution from each expenditure component. Specifically, the real GDP growth contribution from exports to China, for quarter $t$, is derived as:

$\left(\frac{\text{Volume of Merchandise Exports to China}}{\text{Real Australian GDP}, \ t-1}\right) \times \text{Growth in Volume of Merchandise Exports to China, } t$

$= \text{Contribution to Growth in Real Australian GDP, } t$

With reference to Figure 3, prior to the global financial crisis and fiscal stimulus, the growth contribution from exports to China is negligible, averaging less than one-tenth of one percentage point. However, there is a significant negative growth contribution in the December 2008 quarter, followed by a positive spike in the March 2009 quarter.

If Australia had continued to export to China, but without such anomalous growth in exports, we would have experienced three consecutive quarters of negative growth in real GDP (see dashed line in Figure 4).

Figure 4: Real GDP growth contribution of export volumes to China (per cent)
In Table 1, the first four columns summarise the key series, depicted in Figures 3 and 4, for the critical period September 2008–September 2009. We now consider the counterfactual: if real exports to China had grown at the average pre-stimulus rate, would Australia have experienced two quarters of negative real GDP growth? The average pre-stimulus rate is taken from 2003–04, which marks the beginning of the commodities boom.

**Table 1: Contribution to real GDP(E) growth (percentage change, quarterly)**

<table>
<thead>
<tr>
<th>(i)</th>
<th>(ii)</th>
<th>(iii)</th>
<th>(iv)</th>
<th>(v)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sep – 2008</td>
<td>0.54</td>
<td>3.14</td>
<td>0.08</td>
<td>0.46</td>
</tr>
<tr>
<td>Dec – 2008</td>
<td>-1.00</td>
<td>-23.46</td>
<td>-0.63</td>
<td>-0.37</td>
</tr>
<tr>
<td>Mar – 2009</td>
<td>0.97</td>
<td>55.85</td>
<td>1.17</td>
<td>-0.20</td>
</tr>
<tr>
<td>Jun – 2009</td>
<td>0.31</td>
<td>20.72</td>
<td>0.67</td>
<td>-0.35</td>
</tr>
<tr>
<td>Sep – 2009</td>
<td>0.65</td>
<td>7.56</td>
<td>0.29</td>
<td>0.35</td>
</tr>
</tbody>
</table>

Source: ABS Catalogue 5206.0; ABS Catalogue 5368.0; RBA; author’s calculations

The final column of Table 1 reveals that, had export volumes to China grown at the average pre-stimulus rate, Australia would have experienced a technical recession. Three quarters of negative growth under the counterfactual scenario is comparable with the actual experience of most advanced economies.

**Will the Unwinding of Stimulus Slow Growth?**

The preceding section’s analysis of the recent past raises questions about the near future. The world economy grew by around 5 per cent in 2010. With the return of buoyant global economic activity, the unwinding of fiscal stimulus is expected to gather momentum in 2011. Figure 5 shows, on the one hand, the structural shift of growing exports to China, commencing 2003–04, and on the other hand, the post-stimulus spike in 2009. Should Australia be concerned that some of the gains from growth in export volumes to China, quantified in this paper, will be reversed in the years ahead?
China ran a budget deficit of around 3 per cent of GDP in 2009, around 2.7 per cent higher than the previous year. While the Chinese authorities held their budget deficit broadly unchanged in 2010, they are expected to reduce it by around 1 per cent of GDP in 2011. Having said this, as shown in Table 2, China has a relatively low deficit (below 5 per cent of GDP). Accordingly, whilst the government has not published medium-term targets, it has voiced a preference for a relatively gradual adjustment in the overall budget balance (IMF 2010b).

**Table 2: General government budget balance (percentage of GDP)**

<table>
<thead>
<tr>
<th>Country</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>-3.1</td>
<td>-3.1</td>
<td>-2.1</td>
<td>-1.5</td>
</tr>
<tr>
<td>United States</td>
<td>-12.7</td>
<td>-10.6</td>
<td>-10.8</td>
<td>-7.2</td>
</tr>
<tr>
<td>Japan</td>
<td>-10.1</td>
<td>-9.4</td>
<td>-9.1</td>
<td>-8.0</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>-10.3</td>
<td>-10.3</td>
<td>-8.1</td>
<td>-6.1</td>
</tr>
</tbody>
</table>

**Source:** IMF Fiscal Monitor Update, 2011

China is unique in that, unlike other countries, budgetary improvements are likely to come largely from the revenue side, given the potential for high revenue growth. Therefore, the risk to growth in Australia’s export volumes to
China lies in the unwinding of government infrastructure spending. Growth in government-influenced fixed-asset investment has decelerated from the high base in 2009. However, the phasing out of active government construction projects will take years, and infrastructure spending on low-income housing projects has been recently announced (Ministry of Finance 2011).

Urbanisation, which underpins growth in not only tax revenue but also construction, is estimated to increase from 47.5 per cent to 51.5 per cent in the next five years (Wen 2011). In 2010, both strong real-estate investment growth and fast recovery in China’s export volumes, reflecting improved global demand, partly offset any slowdown in government-led demand for mineral imports from Australia (World Bank 2010).

On the one hand, the gradual unwinding of China’s government-led investment, strong real-estate investment and recovery in export volumes is good news for Australia. On the other hand, domestic demand is beginning to slow (World Bank 2010), suggesting the current pace of import growth may not last.

**Conclusion**

Australia enjoyed a double bonus during the global financial crisis: the first came from its own fiscal stimulus; the second from the public infrastructure spending of its major trading partner, China, reflected in increased exports. Given the timely implementation of infrastructure projects and a pegged exchange rate, China’s fiscal stimulus was particularly effective in stimulating demand for commodity exports from Australia.

Using a constructed quarterly series of export volumes to China, we find that since the global fiscal stimulus, growth in export volumes to China leads growth in Australia’s real GDP. The real GDP growth contribution from export volumes to China spiked in the March and June quarters 2009. Had export volumes to China grown at the pre-stimulus rate, Australia would have experienced *three* consecutive quarters of *negative* real GDP growth.

Whilst growth in export volumes to China contributed significantly, especially to the positive real GDP growth result for the March quarter 2009, there is no denying the importance of other factors contributing to Australia’s real GDP growth. Rather, the post-stimulus real GDP growth contribution from growth in export volumes to China is a previously unidentified magnitude that is worth considering in light of both the recession Australia never had and the imminent unwinding of global fiscal stimulus. Fortunately for Australia, China’s unwinding of fiscal stimulus is likely to be gradual and uniquely revenue-based.
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An Accelerator Tied to a Brake: Fiscal Stimulus Under a Floating Exchange Rate

Tom Valentine

Abstract

This paper examines the widely accepted proposition that the fiscal stimulus saved Australia from the worst effects of the Global Financial Crisis (GFC). It presents theoretical and empirical arguments supporting the view that fiscal stimulus is ineffective in a floating exchange-rate regime. It underlines this by comparing Australia’s experiences in the East Asian Crisis of 1997 and the GFC of 2008–09. It concludes that a depreciating exchange rate protected the Australian economy in the 1997 crisis, but was prevented from doing so in the 2008–09 crisis by the fiscal stimulus.

Theoretical Underpinnings

The Mundell-Fleming model (Mundell 1963) throws light on the relative effectiveness of monetary and fiscal policy under different exchange-rate regimes. Here we will consider a very simple example of their results. We assume that capital is internationally mobile. Under this condition, the following relationship (called uncovered interest-rate parity) will be satisfied:

\[ R_A = R_o + e^* \]

where

- \( R_A \) = the Australian interest rate.
- \( R_o \) = the interest rate in a specific foreign currency and for the same term.
- \( e^* \) = the expected depreciation of the Australian dollar against the specified currency in the period concerned.

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Capital flows will ensure that this relationship is satisfied. For example, if $R_o + e^*$ is greater than $R_A$, funds will flow out of Australia to take advantage of the perceived higher expected return overseas. This will cause either:

- an increase in $R_A$; or
- a fall in the value of the Australian dollar which will reduce $e^*$.

Consider the effectiveness of monetary and fiscal policy under different exchange-rate regimes.

**Fixed exchange rate:** Assume that the authorities increase $R_A$. Funds will flow in (and as $e^* = 0$) $R_A$ will fall back. That is, monetary policy is ineffective. In general, $R_A = R_o$ so that the domestic interest rate must be equal to the interest rate in the currency against which the domestic currency is fixed.

If a budget deficit is expanded, the economy will be stimulated. That is, fiscal policy is effective.

**Floating exchange rate:** An increase in $R_A$ will cause an appreciation of the Australian dollar so that $e^*$ increases, maintaining the uncovered interest-rate parity relationship. This appreciation will reinforce the tightening of monetary policy. Monetary policy is effective.

An increase in the budget deficit, however, will cause an appreciation of the Australian dollar, increasing $e^*$. This will offset the expansionary effect of the deficit.

The conclusion of this discussion is that fiscal stimulus is likely to be ineffective in an economy with a floating exchange rate. A fiscal stimulation is an accelerator connected to a brake (the appreciating currency). This point is underlined in the next section by a basic macroeconomic model.

### A Macroeconomic Model Including Exchange-rate Effects

The following macroeconomic model illustrates the points made in the previous subsection.

\[
\text{Expenditure, } C + I = A + aCP + b (Y - T)
\]

\[
CP = \text{commodity price index}
\]

\[
\text{Exports, } X = -eE + gCP
\]

\[
\text{Imports, } M = d (Y - T) + hE
\]
Exchange Rate \( E = mD + nCP \)

\( D = \text{budget deficit} = G - T \)

The rationale for this equation is that increased government borrowing leads to capital inflow, which causes the currency to appreciate. An empirical equivalent of this equation is:

\[
E = 0.517 + 0.00105CP + 4.75GB + 0.010IRD \\
(9.93**) (2.75*) (3.88**) -(2.07*)
\]

\[ R^2 = 0.442 \quad d = 1.38 \quad 1983–2008 \]

where

\( E = \text{A$}/\text{US$ exchange rate} \)

\( CP = \text{RBA commodity price index, in US dollars} \)

\( GB = \text{‘net lending of all public authorities’ (RBA statistical tables)} \)

\( IRD = \text{interest-rate differential based on three-month US and Australian interest rates} \)

The figures under the coefficients are t-values. Asterisks indicate the level of significance, with one asterisk indicating significance at the five percent level and two asterisks indicating significance at the one percent level. (The CUSUM of squares test indicates that the relationship is stable.)

To find the equilibrium income.

\[
AS = AD
\]

\[ Y = A + aCP + bY - bT + G + (X - M) \]

Therefore,

\[ Y = \frac{A}{1-b+d} + \frac{[b-d-(c+h)m]D}{1-b+d} + G + \frac{[a+g-m(c+h)]CP}{1-b+d} \]

Note first that the impact of commodity prices on equilibrium income is reduced by their impact on the exchange rate, then on exports and imports (\( = n[e + h] \)). This outcome illustrates the role that the exchange rate has in adjusting the economy to fluctuations in commodity prices. For example, an increase in commodity prices leads to an appreciation of the dollar, which reduces exports and increases imports. This reduction in net exports reduces the degree of overheating that the increase in commodity prices might otherwise engender. In this way, the floating exchange rate serves to insulate the Australian economy.
from overseas developments. Note also that the impact of the budget deficit is reduced by its effect on the exchange rate, then on exports and imports (\(= m[e + h]\)).

**Two Crises**

It is surprising that the government reacted as it did at the end of 2008 because it had a case study to inform its reactions — the Asian Crisis which began in 1997. That crisis was greeted with the same media hysteria as the GFC. However, the government did not panic or create a huge fiscal stimulus. The Australian dollar depreciated and this insulated the Australian economy from the crisis. This point seemed to be well understood by economists at the time. For example, it is discussed in the widely used textbook Layton, Robinson and Tucker (2009: 555–6).

This point is illustrated by Table 1:

**Table 1: Australian macroeconomic indicators during the East Asian Crisis**

<table>
<thead>
<tr>
<th></th>
<th>A$ per US$</th>
<th>Commodity Prices (US$)</th>
<th>Commodity Prices (A$)</th>
<th>Unemployment Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997</td>
<td>J 0.7455</td>
<td>38.1</td>
<td>37.5</td>
<td>8.2</td>
</tr>
<tr>
<td></td>
<td>S 0.7198</td>
<td>37.4</td>
<td>38.3</td>
<td>8.1</td>
</tr>
<tr>
<td></td>
<td>D 0.6527</td>
<td>35.8</td>
<td>40.0</td>
<td>7.9</td>
</tr>
<tr>
<td></td>
<td>M 0.6634</td>
<td>34.5</td>
<td>38.2</td>
<td>7.9</td>
</tr>
<tr>
<td>1998</td>
<td>J 0.6135</td>
<td>32.4</td>
<td>39.8</td>
<td>7.9</td>
</tr>
<tr>
<td></td>
<td>S 0.5945</td>
<td>31.3</td>
<td>39.4</td>
<td>7.7</td>
</tr>
<tr>
<td></td>
<td>D 0.6139</td>
<td>30.7</td>
<td>36.8</td>
<td>7.3</td>
</tr>
<tr>
<td></td>
<td>M 0.6293</td>
<td>30.7</td>
<td>36.1</td>
<td>7.1</td>
</tr>
<tr>
<td>1999</td>
<td>J 0.6596</td>
<td>30.3</td>
<td>34.2</td>
<td>6.7</td>
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<td></td>
<td>S 0.6536</td>
<td>31.6</td>
<td>36.0</td>
<td>7.0</td>
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<tr>
<td></td>
<td>D 0.6538</td>
<td>31.7</td>
<td>36.7</td>
<td>6.7</td>
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<tr>
<td></td>
<td>M 0.6055</td>
<td>32.7</td>
<td>39.7</td>
<td>6.6</td>
</tr>
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<td>2000</td>
<td>J 0.5986</td>
<td>33.5</td>
<td>41.8</td>
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</tr>
<tr>
<td></td>
<td>S 0.5433</td>
<td>33.9</td>
<td>45.4</td>
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<td></td>
<td>D 0.5540</td>
<td>33.3</td>
<td>45.0</td>
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</tr>
<tr>
<td></td>
<td>M 0.4890</td>
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<td>2001</td>
<td>J 0.5075</td>
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<td>48.7</td>
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<tr>
<td></td>
<td>S 0.4923</td>
<td>34.0</td>
<td>49.8</td>
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</tr>
<tr>
<td></td>
<td>D 0.5106</td>
<td>32.6</td>
<td>47.0</td>
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<tr>
<td></td>
<td>M 0.5316</td>
<td>33.6</td>
<td>47.5</td>
<td>6.4</td>
</tr>
<tr>
<td>2002</td>
<td>J 0.5648</td>
<td>33.9</td>
<td>44.0</td>
<td>6.5</td>
</tr>
</tbody>
</table>

Source: RBA Statistical Tables

The impact of the Asian Crisis is shown by the fall in the index of commodity prices in US dollar terms. However, the exchange rate fell and the index of commodity prices in Australian dollars actually went up over the period under consideration. Specifically, CP fell by 20.4 per cent over the period June 1997
to June 1999 whereas CP($A) fell by only 8.8 per cent. Thereafter, the exchange rate depreciated further and CP($A) actually increased, although there was little change in CP. This increase was reflected in a significant reduction in the unemployment rate. This episode illustrates how a floating exchange rate insulates the economy from shocks arising overseas, making further government action unnecessary. This example also suggests that a floating exchange rate is particularly appropriate for an economy, such as Australia’s, which depends on commodity exports. Commodity prices move in wide cycles and it is desirable that the exchange rate move in a counter-cyclical fashion.

The same thing was happening in the first quarter of 2009. The dollar fell and this was stimulating the economy. Growth was unexpectedly high in the first quarter of 2009 because of the contributions of net exports. Then the Australian dollar increased sharply in value in a way that was not justified by increases in commodity prices. In the fourth quarter of 2009, growth was again unexpectedly strong. However, the contribution of government spending was almost exactly offset by the negative impact from net exports. An increase in business investment made the difference, but this increase was probably due to low interest rates and improving sentiment.

The effect of the movement in the exchange rate can be tracked by examining developments in the RBA Australian dollar index of commodity prices.

Table 2: Australian macroeconomic indicators during the Global Financial Crisis

<table>
<thead>
<tr>
<th></th>
<th>A$ per US$</th>
<th>Commodity Prices ($US)</th>
<th>Commodity Prices (A$)</th>
<th>Unemployment Rate</th>
</tr>
</thead>
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<tr>
<td>June 2008</td>
<td>0.9626</td>
<td>116.8</td>
<td>91.0</td>
<td>4.2</td>
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<tr>
<td>September 2008</td>
<td>0.7996</td>
<td>121.5</td>
<td>109.8</td>
<td>4.3</td>
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<tr>
<td>December 2008</td>
<td>0.6928</td>
<td>99.2</td>
<td>109.9</td>
<td>4.6</td>
</tr>
<tr>
<td>January 2009</td>
<td>0.6438</td>
<td>96.2</td>
<td>105.1</td>
<td>4.9</td>
</tr>
<tr>
<td>February 2009</td>
<td>0.6454</td>
<td>92.9</td>
<td>106.1</td>
<td>5.3</td>
</tr>
<tr>
<td>March 2009</td>
<td>0.6873</td>
<td>87.7</td>
<td>97.8</td>
<td>5.7</td>
</tr>
<tr>
<td>April 2009</td>
<td>0.7265</td>
<td>81.0</td>
<td>84.2</td>
<td>5.5</td>
</tr>
<tr>
<td>May 2009</td>
<td>0.7912</td>
<td>76.7</td>
<td>74.5</td>
<td>5.7</td>
</tr>
<tr>
<td>June 2009</td>
<td>0.8114</td>
<td>79.9</td>
<td>73.8</td>
<td>5.8</td>
</tr>
<tr>
<td>September 2009</td>
<td>0.8801</td>
<td>83.3</td>
<td>71.7</td>
<td>5.7</td>
</tr>
<tr>
<td>December 2009</td>
<td>0.8969</td>
<td>88.3</td>
<td>72.7</td>
<td>5.5</td>
</tr>
</tbody>
</table>

Source: RBA Statistical Tables

Over the period June 2008 to June 2009, CP fell by 31.6 per cent, but CP($A) fell by 18.9 per cent. For the remainder of 2009, CP($A) continued to fall although CP increased. Over the period covered by the table, CP fell by 24.4 per cent and CP($A) by 20.1 per cent. This was a result of the appreciation of the Australian dollar.
This sharp fall caused by the appreciation of the Australian dollar would have had a contractionary effect which offset the stimulatory effect of the fiscal stimulus. In addition, the 10-year bond rate increased from 4.22 per cent p.a. in December 2008 to 5.47 per cent p.a. in December 2009, which would also have had a contractionary effect. We obtained little benefit from the Australian fiscal stimulus. However, we did gain from one fiscal stimulus—the one in China. China, of course, has an exchange rate which is fixed in the short term.

Conclusion

The conclusion of this paper is that the fiscal stimulus was ineffective and, therefore, unnecessary. A similar conclusion was reached by Makin (2009) and Dixon and Rimmer (2009). It is also consistent with the accepted doctrine (at least outside Australia) that fiscal multipliers are close to zero in small open economies with a floating exchange rate (see Ilzetzki, Mendoza and Vegh 2009).

References


The Benefits (and Costs) of Foresight and Hindsight in Macro Policy Formulation

Nigel Stapledon

Abstract

This paper looks at the difficulties for fiscal and monetary policy posed by the inherent uncertainty of the economic outlook. It contrasts the excessive optimism of policymakers in the approach to the 1989–91 recession with the excessive pessimism of the outlook in Australia in 2008.

In the May 2009 Budget, it was stated that ‘the magnitude and speed of transmission of the global recession means that a recession in Australia has become inevitable’. In precise terms, GDP was forecast to contract for at least three quarters by a cumulative 1¼ per cent, thereby meeting the technical definition of recession. The unemployment rate was projected to rise from its lows of about 4.1 per cent (March quarter 2008), by about 4½ percentage points (ppts), to a peak of somewhere over 8½ per cent in 2010. And but for fiscal and monetary policy stimulus, the Government forecast that GDP would have contracted 4¼ per cent and the peak in unemployment would have been somewhere over 10 per cent: in short, a more severe recession than experienced in 1989–91 when GDP contracted 1.6 per cent and unemployment rose by 4 ppts from a low of 6.7 per cent (December quarter 1989) to a peak two years later of 10.8 per cent.

While it is probably unfair to judge these forecasts with hindsight, this is the only objective criterion we have. In the Treasury’s defence one may refer to similar forecasts from the consensus of private-sector forecasters (Gruen 2010). On the other hand, that is rather circuitous, given the propensity of private-sector forecasts to mimic the Treasury forecasts — most forecasters operate on the premise that being wrong is OK as long as you are in good company. What is critical here is not the forecast error, but the ‘certainty’ attached to it, a point to which I return later.

1 School of Economics, UNSW; nigel.stapledon@unsw.edu.au
2 Australian Government 2009a, Table 1: domestic economy forecasts.
3 Sources: ABS 5206.0 Table 2 for GDP and ABS 6202.0 Table 2 for seasonally adjusted unemployment rate. Estimates of unemployment rate are averages for the quarter.
Past recessions tend to be a guiding influence on thinking about causes and responses to subsequent recessions or downswings in the business cycle. As the most significant recession in post-1945 Australia, the 1989–91 recession cast a significant shadow over the 2008–09 policy response to the GFC-related downswing. Most of the attention appears to have been focused on the role of fiscal and monetary policy in the 1989–91 recession, with alleged policy failure said by some to have been a significant factor in the depth and duration of that recession.

It entirely reasonable that policy shaped in some way the depth and duration of that recession, but its role is probably overstated. As noted by Gruen and Stevens (2003: 53), the ‘distinguishing feature of the late 1980s boom and subsequent slump was the role of asset prices, accommodated by rapid credit expansion by newly liberated financial intermediaries.’ They cited Macfarlane (1989, 1990), who had contended that lax lending standards by banks, coupled with the interaction of tax and inflation (i.e. nominal interest tax deductibility and leveraging on asset-price inflation), helped explain the apparent imperviousness of investors (for a time at least) to high interest rates in the 1980s. The asset bubble in equities burst in 1987 but with minimal effect on the real economy (Simon 2003: 35).

It was the subsequent asset-price bubble in property, particularly in commercial property, which had a much more significant effect on the real economy. In the office property market in the period 1986–89, prices rose at 20–30 per cent per annum (Simon 2003: Figure 14). Crucially, the high returns led to an upswing in construction activity which, to judge against history, can be crudely measured in the high proportion of activity accounted for by construction activity (Figure 1 below and Simon 2003. When the bubble burst, Australia was left with surplus office space, which then took about a decade to work through and office building prices contracted about 60 per cent in real terms (Simon 2003: Figure 14). From the peak of activity (September quarter 1989) to the trough (September quarter 1993) the decline in non-residential construction expenditure was 42 per cent, taking the share of construction from 5.3 per cent to 2.6 per cent of overall activity, and this occurred over a period of four years (see Figure 1 below).

4 Simon (2003) Figure 14 has capital values in Sydney rising an average 26 per cent per annum in the period 1985–89. His Figure 13 indicates a similar story in Melbourne and Perth markets for office property. Simon’s source is Jones Lang Wooton, now Jones Lang LaSalle.
5 Simon (2003), Figure 14, shows the vacancy rate for Sydney, which had averaged about 2½ per cent in the period 1985–89, peaking at about 22 per cent in 1992–93. It took till 1997–98 for it to get down to just over 5 per cent.
6 ABS 5206.0 Table 2: Private non-residential construction expenditure measured in constant (chain volume measure) prices, seasonally adjusted series. Estimates exclude purchases of second-hand assets from the public sector. Estimates are for December quarter 2010 edition of ABS5206, downloaded 10 March 2011.
In the 1989–91 recession, the contraction in housing played a secondary role to that in commercial property. Capital-city median house prices experienced a sharp 59 per cent rise (30 per cent in real terms) in the three years to June quarter 1989. However, whereas commercial property prices declined 60 per cent in real terms, the median house price series for all capital cities did not fall in nominal terms, and fell only 8 per cent in real terms between their peak (in real terms) in March quarter 1989 and their trough in March quarter 1991, which does not rate this episode as a (price) bust. In activity terms, it was also mild. Given the sector’s vulnerability to interest rates and swings in the economy, the peak (September quarter 1989) to trough (September quarter 1991) decline in private-dwelling capital expenditure of 13 per cent was relatively mild. If the cycles in its share of GDP (as shown in Figure 1) are taken into account, it was one of the milder cycles.

Bodman and Crosby (2005) argued that the 1989–91 recession was the product of monetary policy which was targeting a reduction in inflation and this version of history has found its way into some economic texts. This downplays the role of the asset price boom, which was not unique to Australia and, with different

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7 Estimates for house prices for All Capital Cities. Real house prices derived by deflating by the implicit price deflator for Households Final Consumption Expenditure. House price data from ABS 6416.0 House Price Indexes: Eight Capital Cities, Table 1. Deflator from ABS 5206.0 Australian National Accounts: National Income, Expenditure and Product, Table 5.
monetary policy settings, led to different outcomes and in some instances even more serious recessions than that experienced in Australia (Macfarlane 1992). The Reserve Bank concedes that, with hindsight, monetary policy might have been managed marginally differently. While the Reserve Bank was conscious at the time of the need to capitalise on the opportunity presented by economic weakness to return inflation to low levels, it was not ignoring the role of monetary policy in moderating the economic cycle. Fraser (1992), for example, concedes that maybe policy was eased too much in 1987 in response to the share market crash, and perhaps could have been eased faster in 1990 and 1991. They make the point that, at the time, the major criticism was that the Reserve Bank was reducing interest rates too fast.

Turning to fiscal policy, Fraser (1992) observes the reluctance to use fiscal policy more vigorously for counter-cyclical purposes in both the upswing and downswing in late 1980s/early 1990s. With regard to the balance between fiscal and monetary policy, he argued that this put too much of the burden on monetary policy. Consistent with that, Henry (2010) notes that, when a second successive quarter of negative GDP growth had confirmed Australia was in technical recession in late 1990, the Treasury advice was simply to allow the automatic fiscal stabilisers to work. A policy of using additional discretionary stimulus was not recommended. Later in February 1992, by which time the economy was growing again, the Government did introduce a fiscal stimulus package (‘One Nation’) which Henry observed had its principal impact in the mid-1990s. The corporate knowledge of Henry and other Treasury officers of the mistakes made in the early 1990s influenced his advice (as Head of Treasury 2001–11) in designing the fiscal policy response in 2008–09 (Henry 2010).

But whereas a fair degree of certainty was attached to a recession in the period 2008–10, by contrast the recession of 1989–91 caught policymakers off-guard. Watson (2002) writes that in the period 1987–90, neither the Treasury nor the Reserve Bank picked the direction of the economy; either the boom that followed the share market crash of 1987 or the 1989–91 recession (Watson: 80). Edwards (1996: 394) argues that as the recession unfolded the Treasury was still assuring the Government that there would be a ‘soft landing’. More importantly, perhaps, the accounts by Watson and Edwards suggest that there was no consensus from the Treasury and Reserve Bank. If policymakers are required to be forward-looking, it helps if there is a clear consensus.

Fast forward to 2008. Were the pre-conditions there for a major recession? In the case of housing, prices had peaked in December quarter 2003, and then declined 3 per cent in the period to September quarter 2005 before rising to be 14 per
cent above their 2003 peak in June quarter 2008. The steady tightening in monetary policy in the period 2003–08 worked against the boost in demand for housing from the resources boom, including the related surge in net immigration. Housing activity was constrained in this period, with starts averaging close to 160,000 per annum in the five years to June quarter 2008, compared with National Housing Supply Council (2010) estimates of underlying demand of upwards of 174,000 in this period. This saw the vacancy rate decline from about 4 per cent in 2003 to below 2 per cent in mid-2008 and this evidence of supply shortage was reflected in rents accelerating from near zero growth to growth of 4.8 per cent in real terms in the year to June quarter 2008, and 5.6 per cent in the year to June quarter 2009. This was in sharp contrast to the significant oversupply in housing, for example, in the US.

But, if we look at non-residential construction as a share of economic activity (Figure 1), the high level at which it was operating looked scarier than it did in 1989, when it was one of the pointers indicating the risk of recession. The difference in 2008 for Australia — and also compared with the US — was that the cause of the construction boom was not an asset bubble but an externally driven resources boom. The external forces were the sustained and rapid growth in demand from, amongst others, China and India, coming after a long period in which, in the case of iron ore, prices had been declining in real terms and world output had stagnated. After declining about 50 per cent in real terms in the period 1980–2000, prices have approximately trebled since then, inducing a significant lift in investment. The resources boom is naturally going to be vulnerable to a sharp downturn in demand from China and/or excess investment in new capacity. The Treasury expected this threat to materialise, with the 2009 Budget forecasting a sharp 26 per cent contraction in private non-residential construction in 2009/10 which would equate to a peak-to-trough decline of more than 30 per cent and was expected to return to its pre-boom share of GDP (Figure 1). Learning from that previous experience, a major component of the fiscal package, the BER building program, was targeted at the construction sector to modify the expected sharp contraction in activity in that sector.

9 Estimates as for Footnote 7.
10 Figure 7.3 (p.132) in the National Housing Supply Council Report 2010 shows estimates of the gap between demand and supply in the period 2002–09.
11 Source for vacancy rates: Bloxham, Kent and Robson (2011) Figure 5, page 18.
12 In the period 1980–2000, the world output of iron ore rose just 4 per cent and US$ prices stagnated in nominal terms, implying an approximate 50 per cent decline in prices. Source: ABARES (2010) ACS 2010 Iron Steel Tables 289, 293. US$ prices deflated by Price Index for Personal Consumption Expenditure from US Bureau of Economic Analysis national Income and Product Accounts Table 1.1.4 downloaded 10 March 2011 from http://www.bea.gov/national/nipaweb/SelectTable.asp?Selected=N
13 Australian Government 2009a: 4. The comment refers to aggregate business investment returning to pre-commodity boom share of GDP but the forecasts in Table 1 indicate that the larger portion of this will occur via the 26 per cent contraction in non-dwelling construction investment. Refer Figure 1.
14 More specifically, it was targeted at commercial building as distinct from engineering construction (Australian Government 2009a: 25–7).
In the event, the GFC proved to be more of an Atlantic than a global recession, and the likes of China and India quickly returned to normal growth, albeit with the help of some sizeable fiscal stimulus (Gruen 2010). The signal for that return of demand was commodity prices — base metals are a good bellwether and prices contracted sharply, to be 59 per cent below their average for the peak year of 2007 when prices troughed in February 2009. By April they had lifted 17 per cent from that trough and by December by 73 per cent.\textsuperscript{15} Prices were still 30 per cent below the 2007 peak year but 20 per cent above the 10-year average. Moreover, the key is the message given by the direction of prices, which rose another 15 per cent during 2010.

Consequently, the forecast contraction in construction did not materialise, as miners observed the better news built into the prices and took their finger off the pause button on some projects. Indeed, in historical terms, the contraction in construction (Figure 1) looks extremely modest by contrast with the early 1980s recession, the 1989–1991 recession and the downturn in the early 2000s. Activity contracted just 11 per cent from its December quarter 2008 peak to December quarter 2009 and had recovered about half of that decline by late 2010.\textsuperscript{16} Moreover, this decline was more than made up by the increase in public-sector demand. The upshot was that, with activity in housing also rising, that aggregate activity in 2010 was 8 per cent above 2008 levels (see Table 1). The problem here is that in 2008 the construction sector was operating at or beyond capacity.

### Table 1: Real gross fixed-capital formation in construction ($bn)

<table>
<thead>
<tr>
<th></th>
<th>Private non-dwelling construction</th>
<th>Private dwelling construction</th>
<th>Total Private construction</th>
<th>Public construction</th>
<th>Total Private and Public</th>
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<tbody>
<tr>
<td>Mar-2008</td>
<td>20.5</td>
<td>18.2</td>
<td>38.7</td>
<td>8.3</td>
<td>47.1</td>
</tr>
<tr>
<td>Jun-2008</td>
<td>20.3</td>
<td>18.5</td>
<td>38.9</td>
<td>7.8</td>
<td>46.7</td>
</tr>
<tr>
<td>Sep-2008</td>
<td>21.7</td>
<td>18.5</td>
<td>40.2</td>
<td>8.5</td>
<td>48.7</td>
</tr>
<tr>
<td>Dec-2008</td>
<td>22.2</td>
<td>18.0</td>
<td>40.2</td>
<td>8.9</td>
<td>49.1</td>
</tr>
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<td>Mar-2009</td>
<td>21.5</td>
<td>17.6</td>
<td>39.1</td>
<td>9.3</td>
<td>48.4</td>
</tr>
<tr>
<td>Jun-2009</td>
<td>21.2</td>
<td>16.8</td>
<td>37.9</td>
<td>9.5</td>
<td>47.4</td>
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<td>Sep-2009</td>
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<td>17.8</td>
<td>37.5</td>
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<td>18.1</td>
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<td>10.9</td>
<td>48.7</td>
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<td>39.9</td>
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<td>39.2</td>
<td>12.6</td>
<td>51.8</td>
</tr>
</tbody>
</table>

Sources: ABS, 5206.0, Table 2: ‘Expenditure on GDP’, chain volume measure; ABS 8782.0, Table 1, ‘Construction Work Done’, chain volume measure

\textsuperscript{15} Reserve Bank of Australia Statistics Table G5: RBA Index of Commodity Prices.
\textsuperscript{16} ABS 5206.0 Table 2: Private non-residential construction expenditure measured in constant (chain volume measure) prices, seasonally adjusted series as per footnote.
What lessons are we draw from this? One of the standard issues with using fiscal and monetary policy to manage the business cycle is the difficulty in forecasting the state of play when the lagged impact of policy changes impacts on activity. In 1989–91, failure to forecast the recession (resulting from excessive optimism of a soft landing) led to delay in the policy response. A related dilemma here is that governments are naturally reluctant to ‘forecast recessions’ because of the risk that this will contribute to the recession, but this makes it difficult to obtain a mandate for policy action. In 2008–09, we had the rare situation where recession seemed so inevitable that no effort was really required to secure such a mandate. In the event, the pessimism prevailing at the time proved overdone.

While it took some time to sink in, the GFC turned out to be an Atlantic recession which had only a short-term effect on the high-growth economies and commodity prices. From an Australian perspective, the GFC turned out to be a brief interruption to the resources boom which has been the dominant influence on the economy since 2003. The real policy challenge is managing a boom as Australia ‘constructs’ a much larger resources sector: at some point, supply will catch demand, prices will come down, and the resource-driven construction boom will end. The timing is not predictable (Stevens 2011a) and, given the long lead times in resource projects, mining companies inherently have difficulty in matching supply and demand. The risk then is a recession as the economy adjusts.

For Australia the GFC did not turn out to be quite the policy challenge expected, which was good. The real challenge for the period ahead is that the resources boom will come to an end. The high share of resources devoted to construction will at some point in the medium term suffer something like the reversal predicted in the 2009 Budget and that will occur at the same time that a reversal in the terms of trade produces a cyclical decline in the fiscal balance. In the interim, the question is whether both fiscal and monetary policy will play their part in moderating the boom and so make managing the end of the boom less painful, or whether a disproportionate weight will fall on monetary policy.

References


Australian Government 2009a, Budget Statement 2: Economic Outlook, Commonwealth of Australia, Canberra.


Kankesu Jayanthakumaran¹ and Ying Liu

Abstract

This paper reviews structural changes in emissions of sulphur dioxide (SO2), nitrogen oxide (NOx), carbon monoxide (CO) and particulate matter (PM) in eight Australian states and territories over the period 1998–99 to 2007–08. A shift-share analysis decomposes the changes of an emission between these two periods into parts (a national-share component, an industry-mix component and a state-shift component) in order to account for the ecological competitiveness of the states and territories. The results suggest that the changes in state emissions have been substantial, and tend to reflect national, industry and regional policy changes.

Introduction²

In 2001 the Commonwealth government introduced a Mandatory Renewable Energy Target (MRET) to increase electricity generation from renewable energy sources by 9500 gigawatt-hours (GWH) in 2010. To comply with this target, the states introduced various schemes, such as the New South Wales Greenhouse Gas Abatement Scheme (NGAS) of 2003, the Victorian Renewable Energy Target (VRET), the Victorian Energy Efficiency Target (VEET) and the Queensland 13 per cent Gas Scheme (GEC).³ At the policy level, procedures are in place to align instruments and coordinate Commonwealth and state legislation, and to ensure that laws meet overall performance and avoid deviations from original targets. But Collins and Whitten (2007) (refer to the Parer Review (COAG 2002)) argue that the states’ attempts to tackle MRET have been generally poorly targeted, inconsistent, uncoordinated and costly. They further refer to the Garnaut report (Commonwealth of Australia 2008), arguing that the adoption of an emissions-trading scheme while keeping an MRET scheme in place may increase the overall

¹ University of Wollongong; kankesu@uow.edu.au.
² We do appreciate the comments of the editor, which have greatly improved the paper. Any remaining errors are ours.
³ See Department of Climate Change (2009) for the government initiative regarding climate change.
cost of climate-change response. The interplay between the states’ handling of multiple instruments is crucial to the overall environmental performance of the nation. Current priced-based instruments used to discourage emissions are complex in their design and implementation, including emissions charges, user charges, product charges, performance bonds, non-compliance fees, subsidies, pollution-discharge fees and deposit-refund schemes, as well as rights-based instruments such as tradable permits and offset schemes.

This paper examines the differences and changes in the levels of sulphur dioxide (SO$_2$), nitrogen oxide (NO$_x$), carbon monoxide (CO) and particulate matter (PM) of the eight Australian states and territories (hereafter ‘states’). The National Environment Protection Council (NEPC) provides national standards under the National Environment Protection Measures (Implementation) Act 1998 for air quality, and sets a consistent framework for the monitoring and reporting of SO$_2$ and NO$_x$ emissions, among others. In order to comply, states and territories introduced legislative and regulatory frameworks, such as the Protection of the Environment Operation Act 1997 (NSW), the Environment Protection Act 1994 (Queensland), the National Environment Protection Council Act 1996 (Western Australia), the Environment Protection Amendment Act 2005 (South Australia) and the Environment Protection Act 1997 (Australian Capital Territory) (Department of the Environment and Heritage 2006).

The aim of this paper is twofold: first, to identify the differences in the levels of SO$_2$, NO$_x$, CO and PM in Australian states over the period 1998–99 to 2007–08; and, second, to evaluate these differences using shift-share analysis.

**State emissions**

This section uses descriptive analysis to show how state productive structures can explain the gap in emissions between the states and Australia as a whole. The sample comprises eight Australian states and territories during the period 1998–99 to 2007–08. Emissions were converted from kilograms to tons and

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4 Ancev and Betz (2009) studied the load-based licensing system in NSW (introduced under the Protection of the Environment Operation Act 1997) to reduce nitrogen oxides (NO2) emissions, and conclude that the marginal fee rates were set too low in NSW to achieve a substantial reduction in NO2.

5 While Commonwealth legislation may be in force, states may override it and act in accordance with state laws. States write complementary legislation to support Commonwealth laws. For example, in 1997 the Environment Protection Authority in NSW administered 16 pieces of environment-protection legislation and passed four more.

6 The above pollutants are researchable because, as indicated by Antweiler et al. (2001), they are characterised by: (1) being by-products of goods production, (2) having strong local effects, (3) being subject to regulations, (4) having abatement technologies and (5) having data available.
were reported as the origin of all sources from the NPI (1998–99 to 2007–08). Each state’s value-added product was obtained from the Australian Bureau of Statistics (ABS 2007–2008: catalogue no. 5220).

Table 1 indicates the share of total Australian emissions by states from 1998–99 to 2007–08. 7 Western Australia (WA) became the largest polluter, with the majority of its emissions (CO was approximately 43 per cent, NO\textsubscript{x} 34 per cent and PM 83 per cent) increasing substantially, while Queensland (QLD) became the second (NO\textsubscript{x} was approximately 24 per cent and PM 5 per cent) in 1998–99. New South Wales (NSW) emitted the highest proportion of SO\textsubscript{2}, at approximately 42 per cent. In 2007–08, QLD and WA showed the highest proportionate increase in SO\textsubscript{2} emissions, at approximately 33 per cent and 22 per cent respectively, while the Australian Capital Territory (ACT), Northern Territory (NT) and Tasmania (TAS) experienced modest declines.

Table 1: Emissions by Australian states (%), 1998–99 to 2007–08

<table>
<thead>
<tr>
<th>State</th>
<th>Share of total Australian emissions, 1998–99 (%)</th>
<th>Share of total Australian emissions, 2007–08 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSW</td>
<td>SO\textsubscript{2} 41.9, CO 18.8, NO\textsubscript{x} 18.4, PM 4.5</td>
<td>SO\textsubscript{2} 22.1, CO 26.7, NO\textsubscript{x} 22.5, PM 10.2</td>
</tr>
<tr>
<td>VIC</td>
<td>15.9, 14.7, 13.4, 2.5</td>
<td>16.4, 13.2, 17.1, 2.7</td>
</tr>
<tr>
<td>QLD</td>
<td>19.5, 13.4, 24.5, 5.5</td>
<td>32.8, 13.6, 24.3, 19.5</td>
</tr>
<tr>
<td>WA</td>
<td>14.3, 43.5, 33.7, 82.9</td>
<td>22.1, 37.4, 27.4, 63.5</td>
</tr>
<tr>
<td>SA</td>
<td>2.9, 4.8, 6.2, 1.3</td>
<td>5.5, 4.5, 5.3, 1.9</td>
</tr>
<tr>
<td>TAS</td>
<td>0.7, 2.6, 1.1, 1.1</td>
<td>0.5, 2.8, 1.1, 0.8</td>
</tr>
<tr>
<td>ACT</td>
<td>0.1, 0.8, 0.8, 0.1</td>
<td>0.1, 0.6, 0.5, 0.1</td>
</tr>
<tr>
<td>NT</td>
<td>4.7, 1.4, 1.9, 2.1</td>
<td>2.5, 1.2, 2.0, 1.3</td>
</tr>
<tr>
<td>AUS</td>
<td>100, 100, 100, 100</td>
<td>100, 100, 100, 100</td>
</tr>
</tbody>
</table>


Table 2 reports one of the indicators of changes in environmental efficiency as emissions per unit of value-added product. At the state level, these emissions (kg) per gross value-added product provide insights into the efficiency of the productive sectors — information useful for formulating actions to support environmental innovation. Table 2 indicates that emissions per unit of value-added product varied substantially across the states. The annual change of emissions per value-added product for WA was higher than the national average for SO\textsubscript{2}, CO, NO\textsubscript{x} and PM. The NT showed a lower share of national emissions per unit of value-added product, while having a higher annual average change.

7 The data for state-level emissions are available only from 1998–99 (for details, see NPI, 1998–99 to 2007–08).
of emissions per value-added product. The annual average change in emissions per unit of value-added product for WA, QLD and NT (SO$_2$, CO and NO$_x$) was higher than the Australian average.

Table 2: Emissions per unit of value-added product, by Australian states, 1998–99 to 2007–08

<table>
<thead>
<tr>
<th>State</th>
<th>Emissions per unit of value-added product in 2007–08 (kg)</th>
<th>Annual average change of emissions per unit of value-added product since 1998–99 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SO$_2$</td>
<td>CO</td>
</tr>
<tr>
<td>NSW</td>
<td>0.09</td>
<td>0.44</td>
</tr>
<tr>
<td>VIC</td>
<td>0.09</td>
<td>0.28</td>
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<tr>
<td>QLD</td>
<td>0.20</td>
<td>0.34</td>
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<td>WA</td>
<td>0.23</td>
<td>1.55</td>
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<tr>
<td>SA</td>
<td>0.11</td>
<td>0.35</td>
</tr>
<tr>
<td>TAS</td>
<td>0.04</td>
<td>0.72</td>
</tr>
<tr>
<td>ACT</td>
<td>0.00</td>
<td>0.09</td>
</tr>
<tr>
<td>NT</td>
<td>0.22</td>
<td>0.44</td>
</tr>
<tr>
<td>AUS</td>
<td>0.12</td>
<td>0.50</td>
</tr>
</tbody>
</table>


One possible explanation for these disparate changes in emissions is the substantial variations observed in increased economic activities in WA, QLD and SA. Exports from these states enjoyed the highest trend growth compared to the mean trend of the nation as a whole. These disparate growth rates resulted in significant changes in the states’ shares of exports and trade over the study period. For instance, WA increased its exports from 28.5 per cent to 30.7 per cent, while trade increased from 7.8 per cent to 9.7 per cent. Exports from QLD increased from 19.6 per cent to 20.7 per cent, while trade increased from 6.3 per cent to 8.1 per cent. Exports from the NT contracted, which reduced its share of exports.

The mean value-added growth of every sector of Australia was 6.5 per cent over the study period. QLD, NT and WA enjoyed an above-Australian annual average growth rate of 10.4 per cent, 9.1 per cent and 6.9 per cent respectively, while the other states recorded below the Australian average. The ACT experienced the lowest (positive) growth rate of 3.5 per cent. As expected, growth in value-added products in WA and QLD reflected as a positive performance in exports and trade, but a negative performance in emissions.
Environmental regulations have accelerated recently, in order to overcome pressure on the environment, but varying levels of response by federal and state governments are evident at both the policy level and in their implementation. Because the interplay of each state is crucial for the overall environmental performance, we may ask to what extent variations in state emissions are explained by differences in the initial-period national share, industry mix and regional shift. Such variations can effectively be reduced by internalising the externalities. Shift-share analysis captures differences over the initial period.

### Shift-share analysis

The shift-share approach is a method for analysing regional growth by comparing state growth with growth at the national level. While this method can be applied to a range of economic variables (such as employment and trade), the focus of this analysis is changes in emissions over time. Application of the shift-share method to environmental emissions is rare. A few studies have used emissions intensity (Van Rossum and Van de Grift 2009) and emissions levels (Stauvermann 2007) to measure shifts and shares. Emission intensity is obtained by using the ratio of emissions per value-added product to reflect environmental efficiency over time. We chose the level of emissions in terms of $\text{SO}_2$, $\text{NO}_x$, CO and PM in our analysis. Despite its limitations, this analysis provided an aggregate measure that captured trends in emissions and their distribution in terms of the national share, the industry mix and regional shift.

This section shows the aggregate change by selected industries in each state’s emissions over the study period divided into more meaningful components.
and articulated as a deviation from the national average. Shift-share analysis transposes the source of the change of a particular emission between two periods of time into three parts (the national-share component, an industry-mix component and a regional-shift component) in order to relate regional changes within the nation as a whole. This analysis was expected to capture the magnitude and direction of these three effects for each Australian state. We found that some were environmentally responsible, while others were underperformers relative to the nation as a whole. ‘Responsible’ states showed a negative net relative change, which indicated lower emissions. The contrary was also true. We transposed each negative and positive change into the national share, the industry mix and the regional shift, following the approach of Stauvermann (2007).

The overall change of emissions, the national share component, the industry component and the regional component can be derived by the manipulation of a series of identities. The national-share component will show how much of a state’s change in emissions can be attributed to the national average. The industry component will show how much of the change of emissions can be attributed to a state’s mix of industries. A lower negative value means that a state has specialised in the most efficient industries. A regional component shows changes in emissions as a result of the characteristics of a state. A lower negative value shows the extent to which a specific industry in a state leads in emissions reduction. The components are expected to capture Australian states’ ecological competitiveness and, more specifically, all individual industrial sectors’ competitiveness in reducing emissions. The negative value reflects environmental efficiency by reducing emissions compared to the previous period.

The emissions data were gleaned from the NPI emission reports (1998–99 to 2007–08). The sample comprised eight Australian states and territories from 1998–99 to 2007–08. Emissions were measured in kilograms, and were reported according to the origin of industries from the NPI emission report (1998–99 to 2007–08). The complete set of data for all eight states was only available for selected industries (such as ANZSIC codes 170, 213 and 261). The data for other ANZSIC codes (such as 114, 151, 181, 201, 202, 203, 211, 281, 118, 70, 80 and 840) were also available for selected states.

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8 These identities may be obtained by application to the authors.
9 Selected industries based on the data-available ANZSIC codes: 114 = fruit and vegetable processing; 151 = pulp, paper and converted paper-products manufacturing; 170 = petroleum and coal-product manufacturing; 181 = basic chemical manufacturing; 201 = glass and glass-products manufacturing; 202 = ceramic-products manufacturing; 211 = basic ferrous metal manufacturing; 213 = basic non-ferrous metal manufacturing; 261 = electricity generation; 281 = Water-supply, sewerage and drainage services; 118 = sugar and confectionery manufacturing; 70 = oil and gas extraction.
Results

Our analysis aimed to demonstrate the relative environmental performance of eight states and territories in relation to the nation as a whole. Due to lack of data, our analysis was restricted to selected industries (Tables 4–7). The overall change figures of -2800 tons and -2500 tons for NSW, the best-performing state in petroleum and coal-product manufacturing (ANZSIC 170) in terms of SO$_2$ and NO$_x$ emissions respectively, indicates that SO$_2$ and NO$_x$ emissions from NSW were, by the end of the period, 2800 tons and 2500 tons lower over the study period. However, this reduction was offset to some extent by the increase of emissions in electricity generation (ANZSIC 261). The electricity-generation sector figures in NSW show that the overall change in SO$_2$ and NO$_x$, at 40 000 tons and 20 000 tons respectively, were higher over the study period.

By disaggregating the net relative change of SO$_2$ and ANZSIC 261 into three components, we observed that the industry component was quantitatively the most important regarding relative changes to every state. An industry-mix component showed an increased level of emissions for all states, which tends to indicate that they do not specialise in generating electricity. Alternatively, for SO$_2$ (ANZSIC 261), the state-shift component reduced emissions in WA (-22,912 tons), NSW (-67 837 tons) and SA (-10,126 tons), while the national component reduced emissions in every state. The relatively poor overall change in SO$_2$ emissions by VIC (114 000 tons) and QLD (60 000 tons) in an industry (such as ANZSIC 261) was due to their relatively heavy reliance on electricity generation (industry component) and the regional shift, which subsequently expanded at a higher rate of emissions than the Australian average.

For SO$_2$ and ANZSIC 213, the overall change for QLD has been reduced considerably (-410 000 tons). The industry component was quantitatively the most important for reducing SO$_2$ for ANZSIC 213 in QLD (-191 498 tons), while the state component (-161 821 tons) and the national component (-56 682 tons) tend to show considerable reductions over time.  

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10 Approximately 40 out of Australia’s 200 foundries in Queensland produce 44 000 tonnes of castings annually, which is one-third of the national total. This industry has been subject to tight environmental regulations and standards since 1999. (Cleaner Production Manual for the Queensland Foundry Industry: http://www.ecoefficiency.com.au/Portals/56/factsheets/foundry/ecoindry_backgnd.pdf; accessed 18 January 2011).
Table 4: Shift-share table for SO₂ emissions for the period 1998–99 to 2007–08 (tons)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>170 — Petroleum and coal products</td>
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<td></td>
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</tr>
<tr>
<td>NSW</td>
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<td>-2800</td>
</tr>
<tr>
<td>VIC</td>
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<td>414</td>
<td>369</td>
<td>300</td>
</tr>
<tr>
<td>WA</td>
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<td>143</td>
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<td>2300</td>
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<td>SA</td>
<td>-37</td>
<td>31</td>
<td>-435</td>
<td>-440</td>
</tr>
<tr>
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<td></td>
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<td></td>
</tr>
<tr>
<td>NSW</td>
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<td>127 009</td>
<td>-67 837</td>
<td>40 000</td>
</tr>
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<td>VIC</td>
<td>-4668</td>
<td>30 924</td>
<td>87 744</td>
<td>114 000</td>
</tr>
<tr>
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<td>-8336</td>
<td>55 221</td>
<td>13 114</td>
<td>60 000</td>
</tr>
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<td>WA</td>
<td>-4251</td>
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<td>SA</td>
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<td>6627</td>
<td>-10 126</td>
<td>-4500</td>
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<td>-410 000</td>
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<td>102 045</td>
<td>40 000</td>
</tr>
<tr>
<td>SA</td>
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<td>-13 517</td>
<td>34 519</td>
<td>-4500</td>
</tr>
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<td>80 — Metal ore mining</td>
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<td>WA</td>
<td>-2334</td>
<td>4101</td>
<td>1233</td>
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<td>SA</td>
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<td>NSW</td>
<td>-77</td>
<td>3913</td>
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<tr>
<td>QLD</td>
<td>-150</td>
<td>7655</td>
<td>3695</td>
<td>11 200</td>
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<tr>
<td>211 — Basic ferrous metal</td>
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<tr>
<td>NSW</td>
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<td>3946</td>
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<tr>
<td>SA</td>
<td>-70</td>
<td>518</td>
<td>512</td>
<td>960</td>
</tr>
</tbody>
</table>

Note: See footnote 8 for the industries for which data were available.

Source: Computed from NPI (1998–99 to 2007–08)

For NOₓ (Table 4), WA showed reductions in emissions in electricity generation (-13 000 tons). In this regard, WA was the best-performing state relative to the national average. For NOₓ, VIC (53 000 tons), QLD (20 000 tons) and NSW (20 000 tons) were relatively lower environmental performers in electricity generation. For NOₓ and ANZSIC 261, we disaggregated the overall change into three components and observed that the national share and a state-shift component were quantitatively the most important for relative changes for all states. The state-shift component reduced emissions (negative lower value) in every state except VIC. An industry-mix component showed increased emissions for all states, which indicates that they do not specialise in generating electricity.
Table 5: Shift-share table for NOx emissions for the period 1998–99 to 2007–08 (tons)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
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<tbody>
<tr>
<td>170 Petroleum and coal products</td>
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<td></td>
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<tr>
<td>NSW</td>
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<tr>
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<td>-894</td>
<td>1832</td>
<td>1200</td>
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<tr>
<td>SA</td>
<td>157</td>
<td>-536</td>
<td>-461</td>
<td>-840</td>
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<tr>
<td>261 Electricity generation</td>
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<td></td>
</tr>
<tr>
<td>NSW</td>
<td>26 177</td>
<td>761</td>
<td>-6938</td>
<td>20 000</td>
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<td>VIC</td>
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<td>44 919</td>
<td>53 000</td>
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<tr>
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<td>203 Cement, lime, plaster and concrete products</td>
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Note: See footnote 8 for the industries for which data were available.

Source: Computed from NPI (1998–99 to 2007–08)
Table 6: Shift-share table for CO emissions from 1998–99 to 2007–08 (tons)

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>170 — Petroleum and coal products</td>
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<tr>
<td>VIC</td>
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<td>SA</td>
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<td>NT</td>
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<td>-100</td>
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<td>213 — Basic non-ferrous metal</td>
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<tr>
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<td>VIC</td>
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<td>SA</td>
<td>35 294</td>
<td>29 005</td>
<td>-65 299</td>
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<td>70 — Oil and gas extraction</td>
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<td>-143</td>
<td>-392</td>
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</table>

Note: See footnote 8 for the industries for which data were available.


The overall change figures of -36 000 tons, -26 000 tons and -1100 tons for NSW, SA and WA, respectively, made these the best-performing states in basic non-ferrous metals (ANZSIC 213) for CO emissions, which indicates that by the end of the period CO emissions were 36 000 tons, 26 000 tons and 1100 tons lower.

at the national level over the study period (Table 6). An industry component showed a reduced level of emissions for all states, which tends to indicate that they specialise in the basic non-ferrous metal industry. The relatively poor performance in CO emissions by QLD (57 000 tons) and VIC (8 000 tons) in an industry (such as ANZSIC 213) was due to their response to the national-share component and a state-shift component that subsequently expanded emissions at a higher rate than the national average. The relatively poor performance in emissions of NSW in the basic ferrous metal industry (ANZSIC 211) was mainly due to that state’s heavy reliance on national and industry components.

Table 7: Shift-share table for PM emissions for the period 1998–99 to 2007–08 (tons)

<table>
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<td>80 — Metal ore mining</td>
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</table>

Note: See footnote 8 for the industries for which data were available.
Source: Computed from NPI (1998–99 to 2007–08)

For CO, VIC increased emissions in electricity generation (33 000 tons) relative to the national average. By disaggregating the net relative change of CO (ANZSIC 261) into three components, we observed that the state-shift component was quantitatively the most important for the relative changes. On the other hand, a state-shift component effect for CO (ANZSIC 261) tends to show reduced emissions in every state other than VIC, while the national-share effect and industry-mix effects increased emissions in all states.
The overall change figures of -13 900 tons, -5700 tons and -1000 tons for WA, QLD and VIC, respectively, were the best environmental performers in electricity generation (ANZSIC 261) in terms of PM emissions, which indicates that by the end of the period PM emissions were 13 900 tons, 5700 tons and 1000 tons lower than the national average emissions over the study period (Table 7). The relatively poor performance for emissions of PM (ANZSIC 261) by NSW (1600 tons) and SA (210 tons) in an industry (such as ANZSIC 261) was due to their response to a national component that subsequently expanded emissions at a higher rate than the national average. An industry component showed a reduced level of emissions for all states, which tends to indicate that they specialise in the electricity-generation industry. The relatively poor performance in emissions by every state in an industry (such as metal ore mining — ANZSIC 80) was due to their heavy reliance on that industry and a national-share shift that subsequently expanded a higher rate of emissions than the national average. For ANZSIC 80, WA indicated an increased level of PM emissions (90 000 tons) relative to other states due to an increase in national (54 715 tons) and industry components (57 421 tons), while a reduction occurred in the state-shift component (-22 136 tons).

Conclusions

Substantial divergence in emissions (SO$_2$, CO, NO$_x$ and PM) and emission intensity (emissions per value-added product) among the states relative to the nation as a whole were evident over the study period. WA, QLD and the NT were identified as growing disproportionately in emissions, and therefore as being relatively lower environmentally efficient states. Measuring emissions per value-added product provides insights into the efficiency of the productive sectors and is useful for formulating actions to support future environmental policies. In this sense, WA, QLD and the NT need to bring their environmental efficiency into line with the other states.

Our findings on shift-share analysis indicate that the states diverged disproportionately from the national average in our selected emissions (SO$_2$, CO, NO$_x$ and PM) over the study period 1998–99 to 2007–08. On the basis of decomposition, we found that all three components — a national share, an industry mix and a state shift — strongly influenced the divergence from the national average. The extent of the influence varied across industries. For example, notable overall reductions in SO$_2$ emissions occurred in the basic non-ferrous metal industry in QLD — mainly as a result of both industry and state components. Thus, the main conclusion of this paper is that differences in
national share, industry mix and a state shift together explain the differences in our selected emissions over the study period. The information is useful for formulating actions to support environmental innovation.

We acknowledge the limitations of analysing (a) a selected, small number of industries (rather than entire industries) due to a lack of emissions data at the state level and (b) emissions rather than emissions per value-added product, due to a lack of the necessary data for the corresponding industries. However, the results from our sample industries unambiguously reveal that the changes in state emissions were substantial, and are, to some extent, due to state-specific characteristics that impact on state emissions. One possible explanation for this is that the market-based instruments used to tackle the problem were not appropriately directed, designed or implemented.

Myriad policy instruments have their consequences. Single quantitative instruments may minimise regional divergence of emissions and help the nation reach its intended goals, but the potential role of the above factors in explaining disparities in emissions is the subject of ongoing research. It is only suggestive at this stage.

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New Technologies in Higher Education: Lower Attendance and Worse Learning Outcomes?

Pedro Gomis-Porqueras, Jürgen Meinecke and José A. Rodrigues-Neto

Abstract

This paper explores the incentives offered to students and instructors by new technologies that grant access to online class materials. We examine the consequences for attendance and composition of live lectures and argue that new technologies reduce attendance, and very likely reduce it differentially.

Introduction

Teaching technologies in higher education are rapidly evolving; but new opportunities do not always improve welfare. Peltzman (1975) provides a prominent example. He analyses the effects of safety capabilities on car-accident mortality and finds that they had no effect on the highway death toll. Regulations had required car manufacturers to install seat belts for all occupants, an energy-absorbing steering column, penetration-resistant windshields, dual-braking systems, and padded instrument panels in all new cars. Peltzman concludes that effectively there has been an increase in the total number of accidents due to the induced change in drivers’ behaviour.

Economics can also offer useful insights into the behaviour response of students and lecturers to new classroom technologies. It can lay bare the channels through which availability of classroom technology affects attendance and learning outcomes. It can also help us understand if more technology is necessarily better for students, and it can help us avoid misguided policies.

During pre-literate times, most education was achieved through observation and imitation. Traditions, beliefs, values, practices, and local knowledge were

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passed orally from person to person for generations. This educational system forced students to be in direct contact with instructors. Moreover, the reviewing of information was limited to rote memorizing.  

The role of educators and students changed drastically after 3500 BC, as new technologies allowed writing systems to be used in the classroom. With written systems, students were not required to be in direct contact with the instructor and teaching materials could be more easily reviewed after the live class.

Today an ‘educational revolution’ is taking place thanks to the development of digital technologies. Students have greater flexibility through access to online class materials. Current technology is able to extend existing instructional activities, whether in face-to-face, fully online, or blended learning environments. While not intended as a complete replacement for in-class instruction, digital technologies adopted in the classroom offer three important benefits: an alternative when students miss class, an opportunity for content review, and content for online course development. These new technologies can have important consequences for students’ attendance, class composition, and academic outcomes.

Recently, Australian universities have invested in incorporating and improving web-based lecture technologies in the teaching environment. Such digital technologies allow lecturers to provide, inter alia, lecture slides, homework assignments, and practice tests on ‘web-based learning management systems’ such as Moodle or WebCT. The possibilities for online lecture content are evolving rapidly. For example, the majority of classrooms at the Australian National University (ANU) are now equipped with hardware and software that digitally audiotapes lectures and automatically publishes them online on course websites. This allows students to easily access the information conveyed in the lecture. In 2009, the ANU introduced mandatory digital audio recording for all lectures and all subjects.

To economists, any such mandatory policy raises a number of questions. Most importantly, is it likely to bring the best outcomes? How do students change their behaviour in response to the introduction of new teaching technologies? The same questions can be asked with regard to lecturers. Furthermore, how

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2 See Adeyemi and Adeyinka (2002) and Akinnaso (1998) for more on this issue.
3 In 2010 the university changed its audio recording policy and slightly relaxed the conditions for providing digital lecture content. Currently, the ANU Code of Practice for Teaching and Learning requires that teachers ‘provide flexible access to lecture content by one or more of the following: digital recording of lectures for the duration of the semester, appropriate notes for the duration of the semester, appropriate lecture slides for the duration of the semester. Recording, notes or slides are to be made available on the learning management system site for a course.’
do the objectives of university administrators affect student outcomes? Do all students benefit from new technology in the classroom? If not, what type of student benefits, and what type loses?

We will not provide answers to these questions here. Instead, our aim is to illustrate how policies that govern the availability of web-based lecture content — in many cases imposed in good faith and with good intentions — can lead to adverse outcomes. The naïve notion that ‘more online content is always better’ is misleading and can lead to bad policy. This is because not everyone benefits from the availability of web-based content — something that the recent policy debate has ignored. This paper deals explicitly with the different incentives that agents experience, and considers the impact on student attendance, lecture composition, and lecturer behaviour. We argue that new technologies reduce attendance, and very likely reduce it differentially for different types/groups of students.

Our paper complements the increasing economics literature on flexible learning. Benzing and Christ’s (1997) survey of 207 undergraduate economics instructors revealed that more were using interactive methods, class discussions, multimedia, and student participation in the mid-1990s than in the late 1980s. The authors concluded that educators have shown that more varied and active teaching yields better learning outcomes. In contrast, Guest (2005) provides a theoretical framework and survey evidence to determine the effect of flexible learning on students’ academic achievements. ⁴ He concludes that teaching methods that give students greater choice over their learning do not improve the academic achievements of all students. In particular, academically motivated students and females benefit from greater flexibility but the rest of the student population does not.

Economic theory has offered useful insights into the behaviour of students and lecturers. Prominent examples are that of Becker (1975, 1979, and 1982), Correa and Gruver (1987), and Guest (2001). Becker’s classic papers examine the optimal allocation of lecturer time to different teaching and research outputs and how these choices change because quality signals are not perfect. Correa and Gruver consider an environment where the student values academic achievement as well as time allocated to other activities. The instructor values the student’s academic outcome as well as time devoted to other activities. The efforts of the representative student are linked to the instructor’s efforts through academic achievement, which depends on the time allocated to the education process by both the student and the lecturer. As a result of the public-good nature of student achievement, insufficient time is invested into academic achievement. In

⁴ The term ‘flexible’ is generally applied to the current practice of university teaching and learning because it allows a range of options for the students to learn outside the classroom.
the same spirit, Guest proposes a non-cooperative game between the instructor and students to study the choice of teaching methods. The instructor’s optimal choice balances the greater time cost of more-active teaching methods against better learning outcomes. This choice critically depends on the instructor’s or the university’s utility function and the students alternative use of time.

New Technologies and Lecture Attendance

Coincident with the introduction of web-based lecture technologies, the way university students use their time has drastically changed. Babcock and Marks (2010) analyse data for US college students from 1961 to 2003 and find that students now work more, enjoy more leisure hours, and study less. In 1961, full-time students allocated 40 hours per week to studying; by 2003 they were investing only between 23 and 26 hours into academic pursuits. The authors remark that ‘For more recent cohorts, going to college full-time appears to have been, at best, a part-time job.’ In addition, more full-time enrolled students have some form of paid employment during the semester. Average work hours increased from about four per week in 1961 to between 9.5 and 11 per week in 2003.

At Australian universities, McInnis and Hartley 2002 find that students worked 14.7 hours in the most recent week they were employed. These employment and attendance patterns vary by discipline, emphasising the importance of student, course, and labour-market heterogeneity. For instance, McInnis and Hartley (2002) find that students in Arts/Humanities/Social Science and Education work an average of 15.3 hours per week, students in the Sciences work 14.4 hours on average per week, and students in Commerce/Business/Administration work 16.4 hours on average per week.

These results on students’ lecture attendance and labour supply suggest that absenteeism might be consistent with utility-maximizing behaviour. The issue becomes one of time allocation, as the students choose between competing academic and non-academic activities. These observations have been made previously in the literature; prominent examples are Schmidt (1983), Dolton, Marcenaro, and Navarro (2003), and Guest (2005).

The education literature offers some evidence on the effect of web-based lecture materials on lecture attendance. Massingham and Herrington (2006) report that one of the main reasons posited by students for not attending lectures is the

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5 The authors find that 38 per cent of respondents are working 16 hours or more and 18 per cent are working 21 hours or more per week. Respondents with 15 and fewer contact hours worked an average of 15.3 hours, but once course contact hours went over 15, paid work hours began to drop — to 14.7 hours for those with 16–20 course contact hours and to 13.2 hours for those with 21 contact hours or more per week.
availability of materials online. When asked why they did not attend lectures, 68.3 per cent of students surveyed at an Australian Group of Eight university reported that they could learn as effectively using digital audio recordings, as they could by attending the corresponding lecture in person (Gosper et al. 2008). Lecturers have also observed this trend: 55.1 per cent of academic staff reported that lecture attendance had decreased as a result of introducing digital audio recording of lectures.

These results support the view that classroom technology affects attendance adversely. We caution, however, that none of these findings have identified causal effects of new technology on attendance. They merely expose a correlation between availability of online lecture materials and attendance. If attendance numbers decrease because of the availability of web-based lecture materials, we do not understand perfectly the channels through which such an effect operates.

Economic theory can offer an additional structure to frame our thinking about these correlations. From the perspective of a student, how does the availability of online lecture material affect lecture attendance? On the one hand, material available online could be a complement in the learning process, over and above attending the live lecture. On the other hand, web-based materials could be substitutes for lecture attendance. To the extent that online materials are regarded as complements in the learning process, lecture attendance could increase. To the extent that they are substitutes, attendance could decrease with the introduction of new web-based technologies. Students will be affected differently depending on whether they regard online content as a complement or a substitute to live lectures.

Alternative policies on online lecture content offer different degrees of complementarity in producing knowledge for those attending live lectures and substitutability for non-attendants. For any given course, different web-based technologies will have distinct effects on attendance, depending on their relative degrees of complementarity and substitutability. Moreover, the degrees of substitutability and complementarity can vary significantly across courses and disciplines. For example, audio recording a mathematics lecture may not be very helpful for students who did not attend the lecture, but a good opportunity for those who did attend to clarify points that they missed (low degree of substitutability, moderate degree of complementarity). On the other hand, students may not consider it necessary to attend a history lecture if audio recordings are available (high degree of substitutability); at the same time, students that did attend may welcome the opportunity to listen to the

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6 Along these lines, see Correa and Gruver (1987) and Guest (2001).
7 Gomis Porqueras and Rodrigues-Neto (2010) present a game-theoretic model that exposes the different incentives for students and clarifies the dependency between lecture attendance and availability of classroom technology.
audio recordings to deepen their understanding of the material (high degree of complementarity). These examples also illustrate that degrees of substitutability and complementarity differ across students. In the case of the history lecture, audio recordings offer less complementarity for students who are not auditory learners and who prefer visual or kinaesthetic learning.

The actual attendance decision of a student also depends, of course, on her outside options. Every student faces an array of outside options such as work, leisure, or other lectures arising from time conflicts. A student will not attend lectures if her outside option is sufficiently attractive. Outside options, such as labour-market opportunities and social activities, are not typically under the control of the lecturer or the university. By restricting access to web-based materials, lecturers can increase the cost of missing class. If online materials are an efficient substitute and a poor complement to class, and the only objective of a lecturer is to maximize attendance, then the lecturer should offer as little online material as possible, within university rules.

Policies that govern the availability of online lecture content have significant consequences for the composition of students attending live lectures. Why should we care about class composition? If the content taught in a lecture is influenced by the students that are present, policies on web-based technologies may modify the content of courses. In particular, if the most skilled students are more likely to belong to the group of students with higher degrees of substitutability and better outside options, then these students may not go to classes that provide online access to lecture materials. Given that this group of students typically asks the majority of clarifying questions, their absence could reduce learning for the entire class. If group membership is correlated to other observable characteristics, such as gender, age, nationality, religion, or social status, then providing access to web-based materials will affect the presence of these distinct groups differently.

The empirical literature lends support to the theory outlined here. Students’ attendance decisions are highly heterogeneous and they affect class composition. The literature has identified various underlying determinants for absenteeism. For instance, Romer (1993) finds that absenteeism is lower for courses with a significant mathematical component, for core courses, and when the perceived quality of instruction is high. Cohn and Johnson (2006) find that factors that influence a student’s decision to attend class include the student’s race (non-whites are more likely to not attend class), Grade Point Average (higher GPA implies better attendance records), Scholastic Aptitude Test to enter university (higher SAT implies lower attendance), college experience (freshmen appear to attend more classes than juniors and seniors), and residence (state residents have better attendance records). These factors have important implications for the composition of lectures. Other determinants are students’ social activities.
For instance, Longhurst (1999) finds that 46 per cent of sampled students admitted missing classes for social, recreational, and leisure activities. Similarly, Marburger (2001) finds that absenteeism is significantly higher on Fridays.

**Attendance and Learning Outcomes**

The education literature has identified several benefits of attending live lectures. Student attendance is not only a good predictor of academic performance. Attendance is also a key component in the education experience as students learn to manage their differences, work in teams, share, and observe the experiences of other students. By observing the arguments of others, students develop and polish their critical thinking skills and study techniques. They are also motivated to study more, to become better and more participative professionals, and better citizens. Moreover, by sharing experiences, university students also establish friendships that last a lifetime and help them to construct valuable professional and social networks. Later in life, they may use these networks to create non-government organisations and cultural groups, to pursue spiritual and political activities, to enhance their culture, and enrich their lives.

The study of the consequences of introducing a new technology into the classroom and how it affects the incentives of students and lectures is comparatively new. There is, however, a substantial amount of research that explores how attendance affects student outcomes. Within the economic literature, Romer (1993) finds that the difference in performance between a student who attends regularly and one who attends sporadically is about a full letter grade. In the same spirit, Durden and Ellis (1995) find that absenteeism is strongly associated with poor academic performance. Similar results are found within the education literature. For instance, Rodgers (2001) and Rodgers and Rodgers (2003) find that attendance has a small, but statistically significant, effect on academic performance. In contrast, Bratti and Staffolani (2002) find evidence that once self-study time is controlled, the positive and significant effect of lecture attendance for some courses disappears.

To the extent that the use of classroom technologies may affect attendance, the effect on academic performance needs to be explored. In this spirit, Brotherton and Abowd (2004) focused on the digital audio recording of lectures and could not find any significant difference in exam grades based on availability of audio records. However, they postulate that students might achieve the same level of

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8 For more on students’ academic performance and attendance, we refer to Romer (1993) and Durden and Ellis (1995).

9 For more on networks and relationships, see Granovetter (1973) and Gersick et al. (2000) and the references therein.
performance with less work. Similarly, Traphagan (2005) finds that exam scores did not statistically differ when comparing the webcast and no-webcast sections of a course. On the other hand, Brown and Liedholm (2002) find that economics students instructed solely by video-streamed lecture through the internet perform worse in exams than students receiving real-time and live lectures. In contrast, Day and Foley (2006) find that the recorded section’s average grades on all assessments are higher than the live sections, in a course on human–computer interaction at Georgia Tech. Recently, Figlio et al. (2010) presented the first experimental evidence on the effects of live versus internet media instruction. Students in a large introductory microeconomics course at a major US research university were randomly assigned either to face-to-face lectures or to video-streamed lectures through the internet. Other than that, students in both groups had access to the same resources. The random assignment made it possible for Figlio et al. to compare the means of the test scores between the two groups, without controlling for characteristics. They find modest evidence that students who attended face-to-face lectures have higher average test scores. When stratifying the estimations along lines of ethnicity, gender, and ability (as proxied by university entrance exams), they find particularly strong effects for Hispanic students, male students, and lower-achieving students.

### Incentives for Students

Students might believe that they must benefit from the availability of additional resources. For example, some students at Harvard University strongly support recording lectures as a means to advance flexibility and accessibility. The student publication the *Harvard Crimson Staff* (2006), reported: ‘The real solution to poor attendance at lectures is simple: high quality, interactive, and engaging lectures. We should not deny students the fruits of new technology merely to force them into the classroom when that technology can substantially enhance their educations.’ In sharp contrast, the student publication of the University of California at Berkeley, *Daily Californian* (2006), writes: ‘Webcasts are a concession to student apathy. The broadcasts are essentially an admission of defeat by an academic institution, acknowledging that it is okay to skip class.’ These polarized views highlight how students evaluate the different trade-offs that emerge when online technologies are offered in the classroom.

Students have changing objectives when attending university. Before they start their university life, students have strong incentives to enter the most prestigious university possible. This is because they can use their university

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10 Students could access quizzes and past exams through the class website. There was also no difference in access to consultation times.
affiliation to signal their high quality to the labour market. But once admitted — assuming a high probability of completing a degree — students have an incentive to demand services that can lower the cost of their academic life as a student. The typical demand by student organizations is for all lecturers to provide web-based lecture materials. However, not all of the students’ short-run objectives and incentives are necessarily aligned to the best interests of students and society in the long-run. This is especially true in competitive job-market environments. These short-run and long-run considerations should be taken into account when designing policies that regulate the availability of online lecture content.

How New Technologies Alter the Incentives for Lecturers

In thinking about the incentives for lecturers, we follow Becker (1975, 1979, 1982). His classic papers on education develop a theoretical framework for analysing the behaviour of a university professor. Becker assumes that faculty time is a variable input to various academic outputs; that is, the production of research and teaching outputs. He finds that an increase in the pecuniary return of teaching will raise teaching quality, while exogenous changes in teaching and/or research technology may not. Becker’s papers emphasize the importance of correctly measuring academic outputs, such as the quality of teaching. Becker (1979) proposes student evaluations and standardized student-learning measures so that financial rewards could be tied to teaching performance. The incentives to increase productivity in teaching are then tightly linked with the quality of the measures used by the administration to capture the lecturer’s effort and quality.

Another important aspect that affects the instructor’s decision to allocate resources to teach is to have a sense of student heterogeneity. For expository purposes, let us simplify the student body and just consider two types of students: academic and non-academic. The academic student is likely to already have some prior knowledge, and is highly motivated to gain a deeper understanding of the subject. Typically, these students pursue higher degrees. On the other hand, non-academic students are mainly motivated by the desire to pass their courses and to obtain a certification that will allow them to find a job. The particular mixture in the class will affect the instructor’s choices regarding time allocation and teaching method.

Thus, it is crucial to analyse how technology might affect the production of research and teaching outputs when facing a heterogeneous student population. Not only is it important to decide whether to allow access to web-based lecture
materials, but it is also crucial to determine the type of digital technologies to use, because they induce different incentives for students to attend class. The lecturer cannot control the outside options of students. She can, however, choose, to a certain degree, the types of technology offered in her course. In practice, this is relevant because lecturers and universities have some control over the degree of substitutability and complementarity of different online materials. For instance, a lecturer can record lectures using mp3 formats that allow students to download lectures and listen to them when they want. On the other hand, the lecturer can provide recording materials that cannot be downloaded and have a time window during which students can access those materials. These different options change the relative degree of substitutability and complementarity of web-based materials, and thus the incentives to attend class change.

We have explained above that different choices of web-based technologies will lead to different compositions of students attending lectures. Why should a lecturer care about class composition? Most universities subject their lecturers to regular teaching evaluations. It is commonly expected that lecturers will strive for ‘teaching excellence’ and, where this is not attained, to engage in activities that improve teaching quality (for example, by enrolling in teaching courses). In most cases, teaching quality is evaluated by the students at the end of the semester via paper-based or online teaching evaluations. Traditional paper-based evaluations require student attendance in a lecture. Therefore, if academic career concerns depend on teaching evaluations, the lecturer has an interest in influencing the composition of students in his class. Web-based materials give the lecturer a tool to do so.\footnote{For the Australian experience in teaching evaluations, we refer to Hirschberg (2007) and Davies et al. (2006).}

On the other hand, online-based evaluation methods have become more pervasive. These methods allow students to evaluate their lecturers within a certain time window at the end of the teaching term and do not require actual attendance at lectures. An investigation of the optimal blend of teaching technologies to maximize student-evaluation outcomes in this case, or in general, is beyond the scope of this paper. However, it is clear that lecturers face obvious strategic choices that they should exploit to their benefit if they are rational, within university policy constraints.
How New Technologies Alter the Incentives for Administrators

In these early stages of new online technologies, there has been confusion and disagreement between university administrators and lecturers over the use of new technologies. Some new web-based tools that are extremely efficient for marketing purposes may be less than ideal in the classroom, where the main goal is education. Some famous universities use modern technology as a marketing tool to attract the most intelligent students to their campuses. Once they are enrolled, these universities use blended-learning techniques to advance student education. Some of these tools are well tested throughout history. For instance, Harvard strongly encourages study groups in which students meet and discuss what they have learned in lectures. This approach requires no new technology. It is an old-fashioned, yet very successful, method of study that promotes participation and social interaction among students.\textsuperscript{12}

Moreover, providing easy access to education is very important in some universities and courses, but less so in others. When designing policies regarding classroom technology, university administrators should differentiate between courses that are purely web-based and those that require the students’ presence, as their student bases are quite different. This is because the nature and content of materials can be significantly different. For instance, institutions that specialize in distance learning deliver education to students who are not physically ‘on site’ and have to rely on online technologies. On the other hand, more traditional institutions — those requiring face-to-face interactions that offer more curriculum options — are less dependent on online technologies. In particular, traditional institutions offer subjects and courses that require students to be physically present to conduct, among other activities, laboratory experiments, group projects and presentations. These are key components of the educational experience for all students.

The optimal speeds, goals and designs of courses offered in these two types of institutions may be very different. Ideally, the web-based materials that live courses in traditional institutions provide tend to complement the materials covered in live lectures. In contrast, the types of materials used by distance-learning institutions provide online courses that are substitutes to live classes at traditional institutions. Thus, when implementing policies that regulate the availability of online lecture content, it is important to distinguish the nature of the institution at hand, as their student populations and objectives are quite different.

\textsuperscript{12} For the foundations and benefits of group performance, see the seminal works of Slavin (1980), McGrath (1984) or Johnson and Johnson (1994).
The objective of universities, as non-profit institutions, is to educate and nurture students, to create knowledge, and to provide service to the community. It is not to maximize the short-run income of students. As a result, institutions of higher learning protect their reputation and the quality of their education. It is crucial for institutions of higher learning to understand the consequences of introducing classroom technology for student learning outcomes.

Concluding Remarks

A priori, it seems that greater flexibility and more options would be beneficial, or at least neutral, to the learning processes; however, the net effect on students’ learning outcomes remains an open question. The availability of technology in the classroom will benefit some students while other students will be affected adversely. Further, the lecturer has some incentive to exploit technologies to his benefit. The net effect on students’ learning outcomes is likely to be different in distinct circumstances. A one-size-fits-all mandatory policy on web-based lecture content across campus is unlikely to be effective, and may hurt the reputation of leading academic institutions. It may also have a significant impact on class composition.

Finally, even when students have a utility-maximising response to new technologies, taxpayers are crucial stakeholders in providing the funds to enable universities to buy web-based learning management systems. Thus, university educational policies should ensure that taxpayers’ dollars are used wisely and efficiently, as there are alternative uses for these funds.13

References


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13 In response to the findings of the Bradley Review, the Australian government is supporting higher education and research with an additional $5.4 billion over four years and will commit additional resources over the next 10 years. This includes funding of $1.5 billion for teaching and learning.


Abstract

Professional team sports enjoy subsidies from government, as well as regulatory exemption from standards that apply to other sectors of the economy. The Australian sports economics literature has, however, focused on competitive balance, with few studies examining government policies. This paper examines government policies such as subsidies, mega-event bidding, salary caps and player draft systems. We argue that the peculiar nature of professional sports provides some justification for such distinctive government policies. However, there is need for greater transparency, better-directed funding, and genuine public debate on some of these policies to enable considered evaluation of their benefits and costs.

Introduction

The ‘peculiar’ nature of sporting activities makes them distinct from other types of industry and has led to extensive government intervention, either in providing subsidies or exempting sports businesses from labour, competition or other legislation. Economists might justify such intervention on the grounds of externalities, natural monopoly and competitive fairness. However, most of these justifications have been assumed rather than held to any level of real scrutiny. Moreover, in Australia such arguments have become dwarfed by emotional arguments based on ill-defined concepts such as ‘national pride’, ‘competitive balance’ and ‘fairness’. This has seen governments take an active role in funding sport and providing regulatory exemptions which are unique to this industry.
This paper raises four questions about Australian government policy towards sports. First, why spend public money on sports? Second, why subsidise bidding for sports mega-events and the hosting of sports events? Third, why subsidise professional team sports? Fourth, why provide regulatory exemptions which are unique to the sports industry?

Some major questions regarding government policy over sport

Q1. Why spend public money on sport?

In its 2003/04 budget, the Queensland government highlighted an outdoor facility at Deagon, eight multi-sports fields at Zillmere, and a baseball facility at Ormiston, but the combined cost of all such amateur sports projects was less than $1 million. At the same time, the government was providing most of the funding for the $280-million Suncorp Stadium and a new stadium on the Gold Coast costing $130 million, for which the main tenants are professional sporting teams.  

Funding sport has psychological appeal. Many people participate in sport and, in general, with a positive impact on their health and quality of life. The direct and indirect economic and social benefits of this are widely accepted: lower healthcare costs, reductions in productivity losses from illness, and the like. Notwithstanding arguments about health costs and absenteeism due to sporting injuries, participation in sports is likely to generate a net gain for society.

However, in Australia public funding for sports goes overwhelmingly to elite sports — in particular, professional sportspeople and non-professional Olympic level athletes. Such sports may yield a more emotional type of positive externality. Such phrases as ‘an important part of the national psyche’ are often deployed by those in the sector, the media and politicians. Indeed, there would be few sports fans who have not experienced a feeling of euphoria after their local or national team has pulled off a heroic victory against the odds. We will

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3 Figures from Wilson and Pomfret (2009).
4 For example, WHO (2011) points out that physical inactivity is the fourth-leading risk factor in global mortality. It identifies sport as one aspect of a more broad class of activities which yield beneficial health outcomes such as improved cardiovascular function, better control of cholesterol, improvements in glucose tolerance and hence protection against the onset of type-2 diabetes, and even anti-depressant effects. This leads to an interesting debate as to which activities lead to the greatest net gains. Waddington et al. (1997) identified that rhythmic, non-contact sports yield the greatest benefits; ‘elite contact sports’ had the lowest net gains due to costs of injury.
refer to it as the ‘warm-glow effect’. More recently, there have also been cases where corruption has been associated with outcomes in various sports. Illicit drug-taking pervades professional cycling, and there have been allegations of match-fixing in football and cricket. These types of scandals obviously temper warm-glow effects, but they are rarely incorporated into arguments justifying government spending.

A case is sometimes made that elite athletes provide role models for young Australians, encouraging them to participate as well as spectate. There is little evidence of this link, and it could be argued that schoolteachers have more influence than sports stars over teenagers’ decisions to participate in sports. While the positive psychological effects are embraced, potential negative effects stemming from the violence associated with some team sports, and the effects on family relationships caused by over-zealous or fanatical following of sport, are often overlooked by those calling for and providing funding.

Overall, it is clear that sport may generate both positive and negative externalities. The key is to design funding mechanisms which encourage the former rather than the latter. A key aspect of this is the nature and direction of sports funding; providing a public tennis court is more easily justified by a public health externality than building a sports stadium. Funding for elite sports may be justified by the warm-glow externality, but governments should be transparent about the cost of the glow.

Q2. Why subsidise sporting mega-events?

On 7 September 2006 a contested legal claim relating to the staging of the Le Mans event in Adelaide was settled and $1.87 million was written off in 2006–07.

A key target for sport funding is attracting and staging sporting mega-events. These events are one-off and winning them is probabilistic. If the bid is unsuccessful, there appears to be little public benefit, especially as the costs of bids are hidden and any value as a commitment signal seems dubious. For

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5 Of course, there is an obvious corollary to the warm-glow effect. If wins at elite level leave a warm glow, then losses may act in the opposite direction. For example, Columbian footballer Andres Escobar was murdered in 1994 and the crime is generally believed to have been perpetrated as a reprisal for his own-goal in the World Cup held in that year. There is speculation that the murder may also have been associated with gambling losses, which potentially illustrates another ‘bad’ associated with high-profile sports.

6 Two recent examples in cricket are the betting scandals which surrounded Hansie Cronje in 2000 and members of the Pakistan team in 2010. Numerous allegations of corruption in football can be found in Hill (2007).

7 The Australian leg of the then new Asia-Pacific Le Mans car racing series (held in Adelaide over New Year’s Eve 2000/1) was a commercial flop, and was not repeated, despite a nine-year contract. The state government’s funding for the race ran into the millions of dollars, and was heavily criticized in the 2007 Auditor General’s Report for the SA Tourism Commission (the quote is from page 15 of the Report).
successful bids, there is much evidence that projected social benefits turn out to be outweighed by social costs. Authors such as Baade (2006) and Coates (2010) have demonstrated that costs tend to be understated in a priori budgeting for mega-events. This may be viewed cynically as the result of parties with a desire to project benefits from a prospective event only commissioning reports which are incomplete and misleading. However, even where innocent errors are made in these types of economic impact studies, this may lead to a ‘winner’s curse’. Rival cities lodge bids which reflect the expected economic and social value of the event. If bidders are misled by overstated net benefits, the eventual winner may be the one whose expectations were most inflated — and hence the bidder most likely to make the biggest loss.\(^8\)

Advocates of bidding for sports mega-events play up positive externalities whose benefits are difficult to measure. Apart from the warm-glow effect, mega-events are claimed to bring in tourists, raise the profile of the host city or country and have legacy effects. All of these claims could be true, but mega-events may deter non-sports visitors and induce non-fans to leave town, and the legacy effects may be a debt overhang rather than usable facilities (Siegfried and Zimbalist 2006). In general, and as illustrated by the specific case of the Le Mans Adelaide event, ex-ante studies by consultants promise large net benefits while ex-post evaluation studies show net costs (Pomfret, Wilson and Lobmayr 2010).\(^9\) While no ex-post benefit/cost study has yet been conducted into the 2010 Commonwealth Games in Delhi, there is much anecdotal evidence to suggest that there were few gains to ordinary citizens. Indeed, the failure of many facilities to reach international standards and the much-reported collapse of a new pedestrian bridge to one of the main stadia were sources of national shame rather than eliciting the feelings of national pride which are so often presented as a tangible external benefit.

Even if a bid is unsuccessful, there are beneficiaries. For its 1992 bid to host the 1998 Commonwealth Games, Adelaide reportedly spent $600,000 to be the representative bidder from Australia and a further $4.1 million on the campaign, and had lined up a $25 million government subsidy for the event itself.\(^10\) Furthermore, the official figure of $4.1 million only included salaries,\(^8\) See Giesecke and Madden (2007) and Siegfried and Zimbalist (2006) on the systematic problems associated with many a priori economic impact statements. The ‘winner’s curse’ argument highlights the need for serious public scrutiny of benefits stated by politicians and sporting agencies before or during a bidding process. By way of example, Coates (2010) estimates that the total costs of staging the 2010 World Cup in South Africa were greater than US$5 billion. This is against projected costs of US$421 million.\(^9\) Some stark examples of exaggerated claims associated with mega-event studies are outlined in Matheson (2006), who cites examples of claims of 100,000 visitors predicted for a single game in Denver where the capacity of the stadium was 20,000, and claims that one in 30 visitors to New York travel solely for the US Open tennis. Such exaggerated claims, as well as other systematic errors in a priori estimates lead to over-inflated bids.\(^10\) Details of the stage-one bid taken from statements made from the Hon. J. K. G. Oswald MP, SA Parliamentary Debates, 1994-95, page 197. The A$25 million figure is not easily ascertainable from SA
administrative expenses, equipment, sundries, accommodation and service costs for the bidding office, and it seems likely that it excludes other consultancy fees (for example, to marketing and transport companies). Moreover, the velodrome constructed at the state government’s expense could be considered as another cost of making what turned out to be an unsuccessful bid. Ultimately, Kuala Lumpur emerged as the winner of the bidding race for the event.

In the bidding to host the 2018 and 2022 soccer World Cup competitions, Australia spent at least $75 million in public funds. Debates surrounding the use of these funds include accusations that a large portion of public spending was being spent on lobbying, including some items that might be considered as bribes. This brings into question two important aspects of bidding. The first is who stands to gain from both successful bids and the process of bidding itself. Certainly, lobbyists who act as a conduit between those with decision-making power over hosting rights and governments stand to gain. However, marketing firms, construction companies, and relevant sporting agencies are all potential beneficiaries.

The second issue is the integrity of the bidding process. For some time, there has been speculation surrounding the bidding for hosting rights of events such as the Olympic Games and the FIFA World Cup. Following evidence of bribery associated with Salt Lake City’s bid to host the 2002 Winter Olympics, 10 members of the International Olympic Committee were expelled and a further 10 were sanctioned. Although no legal crime may be involved, there is a sense that gifts offered to those voting on bids are excessive and non-transparent. This is obviously problematic where public funding is used.

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11 Cabinet approved the construction of a velodrome contingent on winning the right to be the Australian representative bidder for the 1998 games. While this facility has been used for other events, the Commonwealth Games bid is implicated as the motivation for its completion at a cost of $14.3 million. Data in this paragraph are from the South Australian Department of Recreation and Sport Annual Report 1989/90 through 1992/93.


13 If Australia had been successful in its bid to host the World Cup, eight out of the eleven stadia would have been either built (Blacktown, Perth and Canberra) or significantly upgraded (Gold Coast Stadium, Adelaide Oval, Newcastle, Sydney Football Stadium and Townsville Stadium); see Australian World Cup Bid website: www.australiabid.com.au; accessed 24 October 2010. The soccer World Cup bid became controversial because other two major football codes — the Australian Football League (AFL) and the National Rugby League (NRL) — worried that government funding was promoting their competitor, the Football Federation of Australia (FFA).

14 Adelaide’s 1992 bid for the 1998 Games was drawn into the Salt Lake corruption scandal controversy when Adelaide mayor Steve Condous claimed in 1999 that three countries’ representatives (from Pakistan, Sri Lanka and an unnamed African country) had asked for incentives such as sponsoring children to study at the University of Adelaide in return for votes. He reportedly refused to comply with their demands — see The Independent (London) 20 January 2009; http://www.independent.co.uk/sport/sports-politics-adelaide-refused-bribery-demands-1075143.html; accessed 25 May 2009.

15 See, for example, Jennings (2007). Bidding for the 2018 and 2022 soccer World Cups saw two of the 24-member FIFA executive suspended following bribery accusations, and a succession of accusations and
The bidding for sporting mega-events is plagued with issues that should lead governments to be very wary of investing public funds. The decision-making process of key international sporting bodies is non-transparent and, at worst, may be corrupt. There are question marks over how funds are used (bribes versus legitimate marketing) and who benefits from bidding and from ultimate success. In addition, empirical evidence almost overwhelmingly suggests that net benefits, if any, are small from hosting such events (Siegfried and Zimbalist 2006). Thus, this is an area where greater transparency and public debate is warranted.

Q3. Why subsidise professional team sports?

Geelong AFL club chief executive Brian Cook has warned the federal government it may suffer a backlash in one of its most marginal seats if it fails to match an opposition pledge to upgrade Skilled Stadium. The Liberals proposed a $36 million injection into the development plan … Mr. Cook welcomed the pledge, saying it would be a popular move among Geelong supporters [in the nearby marginal seat of Corangamite].

Professional team sports should be among the world’s most profitable industries. The main inputs are an enclosed stadium and two sets of players. Revenue comes from live spectators, concession stands, (increasingly) TV rights, and merchandising. Moreover, in professional team sports the top league (the AFL, NRL or the A League, for example) invariably enjoys monopoly power; fans want to see a single, undisputed national champion, and any challenges from new or breakaway leagues (as in Australian rugby league in the 1990s) are generally short-lived.

Most professional team sports run up accounting losses. Nevertheless, the major Australian leagues make large economic profits, which take the form of personal incomes far in excess of the recipient’s opportunity cost; for example, the top administrators and players in the AFL earn in excess of $800,000 per year, which is likely to be far more than they could earn in any alternative job and would be lower if league revenues (including government subsidies) were lower. Another feature of the peculiar economics of professional team sports is that few clubs actually go bankrupt, however poorly managed and despite counter-accusations of impropriety among bidding nations, while the final outcomes were widely condemned as not being in the best interests of the sport.

17 Australian ownership structures such as members’ clubs provide little incentive to earn accounting profits; the ‘owners/shareholders’ value on-field success rather than financial dividends. Even in the more capitalist setting of US professional sports, clubs make accounting losses, but rich owners benefit from the tax advantages of offsetting current losses against other income while making capital gains from rising franchise values (Fort 2006). On the international level, heads of monopolies such as the IOC or FIFA enjoy lavish lifestyles paid from the revenues of their ‘not-for-profit’ organisations.
accounting losses, and the most that happens is reorganization of a league’s structure, with existing players and administrators continuing to benefit from the revenue stream. This separation of rents from accounting profits is an aspect which tends to be underplayed in the policy debate.

Nevertheless, most public subsidies accrue directly to professional team sports. Stadia, a major cost item of professional teams, are most often provided by the public sector. This appears to be especially the case in Australia and the USA; Wilson and Pomfret (2009) identify spending of around $2 billion on stadium infrastructure by all levels of Australian government over the period 2000–10. The economics of such investment is unclear when the main beneficiaries from such expenditure are professional team sports. Positive externalities, as highlighted in the first section, are more likely to be attributed to ‘grass-roots’-type sports, which have a more direct effect on participation, and are not associated with negative aspects such as fanaticism or crowd violence. Under-provision is less likely in the professional team sports sector.

Contributions to stadium costs by the sporting bodies themselves tend to be very small. For example, a planned upgrade to Aurora Stadium in Launceston has attracted $35 million in government funding since 1998 and there are now calls for an extra $50–60 million. To date, the Hawthorn AFL club has played four or five games annually at the ground and has also received sponsorship support to the value of $16.4 million from the state government of Tasmania to do so. Each AFL game at the ground has been previously estimated to cost between $300–500,000, and since this does not include the capital costs of stadia these figures are understated.

So why would governments undertake such spending? The most obvious explanation is that sport is seen as a vote winner, as suggested by the example of the Geelong Skilled Stadium, instanced above. Indeed, in Australia there is a strong following for team sports, and there is some evidence to suggest that the upgrading of sporting stadia is popular among citizens. Or, at least, that is what politicians seem to believe. In the 2010 election in South Australia, the suitable model for a new stadium was a major election issue; the Liberal party argued for a new stadium to be built in the western parklands at a cost of around $800 million, while the incumbent Labor government announced a redevelopment.

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18 This represents funding of around $230 per household in Australia. Some of this was earmarked for future periods and did not proceed, such as the stadium planned for Perth. However, since that date, new proposals such as the Adelaide Oval upgrade ($535 million in most recent costings) and other upgrades, including Perth Stadium, were announced by government contingent on Australia winning its bid for the 2022 World Cup.

19 For Australian evidence, see Vamplew (1992).

20 Other matches are held irregularly between different AFL clubs, and a handful of A-League soccer games have been played at the stadium. See ‘Tas footing big bill for York Park Match’, ABC News, 10 June 2004; available at: http://www.abc.net.au/news/stories/2004/06/10/1128808.htm
of the Adelaide Oval at a cost of $435 million which, after the election, was revealed to be a misrepresentation. Neither party — and few commentators — raised the more general question of whether public funding was justified at all.

Muddying any measure of public sentiment are two factors. The first is that the spending is often non-transparent. For example, in the media report cited above with regard to the per-game costs of hosting AFL in Launceston, no confirmation could be obtained from government because of ‘confidential commercial agreements’. Second, as noted the public statements as to the economic benefits of these events appear to be overinflated. Hence, voters are not presented with transparent expenditure data or evidence that funding team sports generates large gains for the economy. This is consistent with an explanation based on single-issue voting; sports fans may vote for the candidate offering the best stadium irrespective of cost, while non-transparency hides the cost from those voters who are not interested in sports.

As with bidding for mega-events, some people benefit from spending on sports stadia irrespective of whether the social benefits are positive or not. Most obviously the teams using the subsidised facilities benefit, and are keen to overstate the benefits and understate their own ability to pay. However, it is difficult to imagine any major difference in AFL output if, say, TV revenues were spent on stadia and personnel received lower incomes.

Other possibly interested parties include the media. Local newspapers whose sales may be in large part driven by the sports pages and the success of local teams will support state or local government spending to favour local teams. This is apparent in Adelaide, where the single major newspaper in the state is a vocal supporter of any proposal for public spending on upgrading AAMI Stadium or the Oval, or, even better, building a new stadium. Inter-state competition fuels such lobbying, but the national benefit from upgrading all major cities’ stadia is unclear; if it benefits spectators and fans, then they — not the general taxpayer — should pay for the greater comfort.

21 See Hansard, Parliament of South Australia, 22 June 2010 (p. 507) for details of clarification made by the Treasurer relating to the higher costs for the Adelaide Oval upgrade which were known prior to the election.
22 In further support, there is apparent policy convergence between mainstream political parties on sports funding for stadia. Even where differences occur, such as those between the Labor party (upgrade of Adelaide Oval) and the Liberal party (new stadium) in South Australia, the arguments are emotive rather than economic. After losing the 2010 State election, the Liberal leader stated that while her party opposed the upgrade: ‘At the end of the day I’m not going to weep into my Weetbix in the morning. … It’s not something that I think is devastating personally to me if we end up with football at the Adelaide Oval.’ http://www.abc.net.au/news/stories/2011/03/02/3152774.htm; accessed 4 March 2011.
23 Some proponents of public spending invoke the equity consideration that many sports fans are from poorer economic groups and would be less able to participate in an important communal activity in the absence of public subsidies. The main feature of recent stadia upgrades, however, has been the provision of corporate boxes rather than improved access at low ticket prices.
The Peculiar Economics of Government Policy towards Sport

Q4. Why provide regulatory exemptions for sport?

The AFL has a Special Distribution Fund, the proceeds of which are distributed disproportionately between the clubs based inversely on profitability. This is funded by a uniform tax on match entry fees. In 2010, the AFL proposed a variation such that the tax will rise for some successful clubs and fall for others. The underlying principle is to maintain competitive and financial equality among the member clubs.24

The regulatory environment in which major sports operate is unique to the sector. In contrast to other sectors of the economy, sporting leagues prevent entry of new clubs, form cartels, engage in price-fixing, and impose restrictions on the labour market that are anti-competitive and would be illegal in other sectors.25 One much-discussed reason behind such exemptions is the ‘peculiar’ nature of professional team sports. In particular, unlike most industries, sporting teams rely on their rivals to produce output. Moreover, they require an overt set of rules which determine how one team will be crowned as the champion. The quality of output in terms of individual games and the league overall may be a function of the competitive balance that exists in the competition. Hence, a case may be made for exemption from competition policy both because of the structure of national competitions (AFL, NRL, A-League, etc) which entail cartel-like barriers to entry and the desirability of ensuring that affluent clubs do not dominate.26

In Australia, competitive balance has been the most-often cited reason for regulation exemptions, particularly those relating to labour markets. Nonetheless, there is some dispute about exactly what competitive balance entails. As noted by Sloane (1986), concepts such as uncertainty of each match, the number of teams still in contention to win the league, and the number of teams that win the league over many years might be equally considered as competitive balance.27 Moreover, the impact of competitive balance on actual attendance is still somewhat unclear. While some authors have found a strong positive correlation (Lenten 2009; Borland and Lye 1992), others have found

25 Academics would be unhappy with a job market draft for new PhD graduates where the poorest university had first pick.
26 The cartel-like structure of the league follows from a universal desire to know which team is the best in the country, and this cannot be satisfied if there are several parallel leagues whose teams never meet. That does not mean that the league should necessarily be a closed cartel of clubs, as in all of the major professional sports leagues in Australia (and North America). In European soccer, a system of promotion and relegation enables clubs to move in and out of the top league based on playing performance. There may be competition between codes, and this is particularly virulent in Australia where AFL, NRL and soccer all have strong followings, but few fans see the codes as close substitutes.
27 This debate continues in the literature. For a recent contribution, see Lenten 2009b.
less support (Donihue et al. 2007; Czarnitzki and Stadtmann 2002). The casual observation can also be made that in British football, for example, some of the largest attendances for many lower-ranked clubs in recent years occur as a result of meeting with vastly superior opposition. Hence, the chance of an upset, or the opportunity to see star players even if part of the opposing team, may draw crowds. Further, most of the topflight teams in the English Premier League charge higher entry prices for home games against the strongest teams in the competition, indicating strong demand for such games.

Sporting leagues, to some extent, must behave like cartels. Rules relating to how competition will occur and how the champion will be decided need to be established collectively, for example. However, the power of leagues over their participating clubs is not just confined to the determination of rules for competition. Most leagues engage in some form of revenue distribution, which may be done for financial reasons, as in the case of the proposed AFL tax above, or on the grounds of competitive balance. In the case of the AFL Equalisation levy, highly taxed clubs are those with higher average attendances. Arguably, these clubs should be able to capture the spoils of their success and reinvest to their own benefit. While no team can exist without rivals, it is unclear as to how much equity there needs to be in the system. Further, clubs which might get into financial trouble could well be those which are not economically viable in not having a sufficient fan base, etc. We do not see such an explicit profit-sharing arrangement in other industries.

Given that off- and on-field performance are not mutually exclusive, the arguments for and against such policies become blurred. Adding to that are objectives the league has itself which may or may not suit all member clubs. An example is the preferential draft system in the AFL and the implications for clubs finishing low on the ladder; over the forthcoming period with new clubs entering the competition, their preferential draft picks come at the expense of the clubs who would normally receive them. Hence, governing sports bodies carry with them authoritative power that has the capacity to seriously compromise the fortunes of any individual club and, being outside the legal system, disadvantaged clubs are denied the redress that companies in other industries could seek.

Labour-market regulations are perhaps the most controversial issue in Australian team sports. The AFL, NRL and FFA all employ forms of price-fixing by way of salary caps and/or player draft systems. For example, in the AFL, a player draft exists which effectively permits the lower-ranked clubs to have first

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28 Donihue et al. (2007) find that home-team form is a significant positive determinant but that the quality of opposition is not a significant for crowd attendances at Major League Baseball spring games. Czarnitzki and Stadtmann (2002) find uncertainty not to be a significant determinant of crowd attendance in top-division German football.
pick of all new entrant players and those out of contract. While some trade is permitted outside of the draft between clubs, it is effectively relegated to a barter system over player switches and draft-pick trading. The rationale is to try and ensure that there is some form of competitive balance. Indeed, under this system, only three teams out of 16 have not contested the AFL Grand Final since 1997. However, this again relates to the concept of how competitive balance is measured. Assuming the draft and other equalisation procedures (gate equalisation and salary cap) have been largely a cause for such a result, it might be questioned whether in the long run fans will look favourably on what could be argued to be contrived outcomes in the sport. Indeed, there is no evidence to suggest that when a few teams dominate, the popularity of team sports declines; evidence from European soccer leagues suggests otherwise.29

Two components of these regulations are worth examining in more detail. The first is the player draft. There are few industries in which employees are effectively drafted by firms. While some government allocation of labour, such as teachers, has traditionally taken place, in particular to more remote locations, Australian sporting leagues stand out in regard to forced labour mobility. There is evidence to suggest that these types of draft rules may create perverse incentives to lose, with lower teams deliberately throwing games to ensure a higher draft pick in the following year (Taylor and Trogdon 2002). Perhaps more important, however, are the restraints placed on the freedom of individual players. Players arguably have as much right to choose their location of employment as any other worker in Australia.

The second is the policy of a salary cap. Capping total wages in the sector, which like any price cap is necessarily done below equilibrium, represents a transfer of wealth from players to owners or those with other vested interests. Moreover, enforcement of such regulation is difficult, as illustrated by the length of time over which Melbourne Storm breached the NRL salary gap before being punished.30 What is unclear is whether salary caps achieve all that is claimed for them. While ensuring that all clubs have a wage bill which is approximately equal, long-term market signals to players may be distorted, and there have been several recent cases of players moving from one football code to another.31

29 In the English Premier League, which commenced in 1992, all of the titles except one have been shared between three clubs (Arsenal, Chelsea and Manchester United). During this period, over 40 teams have competed in the competition. Attendances and TV audiences are on the rise rather than in decline. Similarly, the dominance of Spain’s La Liga by Real Madrid and Barcelona has not dented its popularity.
30 Melbourne Storm was stripped of two premierships for salary-cap breaches, fined, ordered to return prize money and prohibited from earning competitive points in the 2010 season. For those two years, the league now effectively has no champion.
31 Where prices paid by consumers directly (ticket entry and merchandise) or indirectly (TV rights) convey information relating to the economic value of the activity, to not pay players according to their marginal product sends distorted signals which may affect choices over which sport to play, just as public subsidies for individual venues may do. One example of shifting loyalty is the signing by AFL expansion team Western
Moreover, it might well be argued that teams that are successful in attendance terms deserve to reinvest the rewards of their success just as firms in other industries do. There is no doubt that the peculiar nature of professional team sports justifies nuanced application of competition policy and other legislation. At the same time, the distribution of the large rents involved in team sports turns on the interaction between the regulatory environment and market forces. In Australia, competitive balance has provided a basis for pervasive distortion in this industry, particularly in labour markets. The exact economic effects of rules such as player drafts and salary caps have been under-researched in Australia and there has been little public debate. Path dependence explains many regulations applying to team sports, and hence it may be time to re-examine their motivation and effects. The blurring of the sporting ethos and business practice, routinely displayed in much of the media, exacerbates the difficulty of applying a sensible regulatory regime to professional team sports and other sporting activities that have become big business.  

Conclusions

Sport is a high-profile activity in Australia. Government policies are often justified by the health benefits from participation, but the reality of public spending is that it goes overwhelmingly to elite sports. Governments at all levels finance bids to bring mega- (and sometimes not so mega-) sporting events to Australia or to their city or state, and they justify such expenditure by the economic benefits from hosting such events. Governments also spend large sums in support of professional team sports, most obviously in subsidising the stadia which are the main non-labour expenses of these businesses. Finally, the professional sports industry is permitted to engage in anti-competitive practices which would be illegal in other sectors of the economy and which deny basic freedoms for the production-line employees. All of these government policies towards sport are potentially flawed and the amounts spent are substantial, but they are implemented with minimal public debate. Although some public

Sydney of former NRL player Israel Folau. In a recent article, the head of the South Australian Institute of Sport argued that many AFL footballers were likely to also be ‘exceptionally good athletes in a range of Olympic sports’ (The Advertiser ‘SA Weekend’, 2 October, 2010: 12.  

An example of emotive semantics is that sellers of second-hand tickets to sporting events are called ‘scalpers’ and vilified more than used-car salesmen or real-estate agents. Analysis of public policy is also obstructed by lack of transparency in government statements and accounts, which make it difficult to assess issues such as tax treatment or bankruptcy in the context of commercial sports. Ironically, governments justify lack of transparency on the grounds of commercial confidence (presumably because they are dealing with entities that can be individually identified), while not acknowledging that sport has become big business characterized by monopoly power.
policies may be justified by the peculiar economics of commercial sporting events, the extent of government intervention demands greater transparency and accountability than is currently observed in Australia.

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RETROSPECT
Quiet Alf

Graeme Wells

Alf Hagger, the economist most singly responsible for the advent of the post-war ‘quantitative revolution’ in Australian economics, has died in Hobart at the age of 88.

Alf was born in the Melbourne suburb of Preston in 1922, the only son of his namesake, a proprietor of a cardboard-box factory. While the home of the family of four was in Preston, the Haggers had strong links to the inner-city suburb of Fitzroy and even stronger links to the sporting clubs that bore that name, the Fitzroy Cricket and Football Clubs. Alf worked his way up through church cricket to play for Fitzroy; later, he loyally stuck with the Lions football team when they merged with the Brisbane Bears.

Leaving Melbourne High School at the end of 1938, he went on to the University of Melbourne to study Commerce in the shadows of war between 1939 and 1942. He served in the University Rifles, along with economist Peter Karmel (who was the cook). Later, despite his wish to serve in the Navy, Alf was ‘drafted’ to work in the Department of Manpower and National Service. He served with distinction and, at the end of the war, the best and brightest of those recruited into the Public Service were given the opportunity to take up permanent careers. Alf was one of those selected. He joined the Commonwealth Bureau of Census and Statistics, then under the direction of Roland Wilson. A year or so later he was seconded, presumably by Wilson, to work with Sir Douglas Copland, the first Vice Chancellor of the Australian National University.

Some years later, when recommending him for promotion at the University of Tasmania, the professors referred to Alf’s ‘amazing capacity for work requiring sustained concentration’. Most likely, his secondment at the ANU made more use of this capacity than his abilities as an economist. In any event, Copland was influential in securing for Alf a scholarship to the London School of Economics.

His time in London was well spent — while at the LSE he met Rona, with whom he was to have two children, Michael and Stephanie. Under Ralph Turvey’s supervision, he completed his doctorate in 1952, writing a thesis entitled ‘An Analysis of Some Recently Developed Methods of Forecasting Aggregate Spending’. Importantly for his later research and teaching, he was at the LSE

1 University of Tasmania; Graeme.Wells@utas.edu.au. I gratefully acknowledge assistance from and discussions with Don Challen, William Coleman, John Grant, Nic Groenewold and Michael Hagger.
when important advances were being made in mathematical economics and econometrics (later generations of Alf’s students recall being directed to R. G. D. Allen’s *Mathematical Economics* when help was required).

On graduating, he was almost immediately recruited by Gerald Firth as part of the post-war re-staffing of the Faculty of Economics at the University of Tasmania.

The University he joined was in a sorry state. After years of dissatisfaction regarding working conditions and academic governance, a Royal Commission had been established in 1955 to make a comprehensive inquiry into the University, with particular emphasis on the relationship between the academics and the Council of the University. A year later, the Council dismissed the Professor of Philosophy, Sydney Orr, for improper conduct (he was accused of seducing one of his students). The Orr affair was to divide the small university community long after Orr’s death in 1966.

Alf did not allow himself to be distracted. He quickly made his mark at the University of Tasmania, and in Australian economics, by his quantitative approach to economic research. Many of his publications in the 1950s use mathematical tools to correct or clarify propositions which, at the time, were being loosely made using verbal arguments. His later colleague Professor John Grant recalls that in his first year at the University Alf established the first course given in Australia in econometrics, based on the then new books by Klein, Tinbergen and Tintner — later, with Don Challen as co-author, Alf was to produce a series of well-received texts and monographs on the use of econometric modelling for policy.

During the 1960s his attention turned from investigations of Keynesian national-income analyses towards a study of inflation, and an important theme running through his macroeconomics research was its emphasis on labour markets and the measurement of excess demand. Alf’s later move to regional economics coincided with his growing involvement with the Centre for Regional Economic Analysis and continued for the most part his interest in labour markets. One of his early contributions examined the way in which industry contributions to regional employment could be measured, an issue with which CREA had to grapple early in its existence. Subsequent work broadened to an analysis of unemployment, both at the national level and for regions. His most recent research in regional economics involved theoretical and simulation models with maximising regional governments.

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2 On one account 'Staff were poorly paid and poorly regarded, with non-academic members of council deriding academic work, contemptuous of research and uninterested in questions of salaries and conditions' (Pybus 1993: 47)
As the only member of the Department of Economics with a PhD, and one of the few who published regularly, Dr Hagger was held in awe by his students. His patience and skill as a supervisor and mentor resulted in productive collaborations with his former students, most notably Don Challen and Nic Groenewold. He was by no means an entertainer. As Nic remembers:

I remember being a little disappointed – average height, not at all distinguished-looking. When he spoke, it was the same: a normal Australian accent, not an imposing voice, not an authoritative lecture style. His teaching method was quiet and methodical. He told me later that he has always been of the view that it is more important to teach a modest amount thoroughly than to attempt to cover all the fashionable topics superficially. I have often thought of him when I have been critical of the more recent university practice of relying on ‘student evaluation of teaching’. He is the prime example of a lecturer who was first-rate but would have fared very badly in today’s popularity contests which are ‘student evaluations’. There was no flair, no entertainment, no jokes (or none that I understood) but if at the end of the lecture you didn’t understand, it was because you hadn’t paid attention.

Alf was elected to the Academy of Social Sciences in Australia in 1981, and retired from the then Department in 1982. Few would have anticipated that he was only halfway through his productive career — in the following three decades he produced eight books, more than 20 journal articles, and more than 30 CREA publications.

The Centre for Regional Economics was the first research centre outside the physical sciences within the University of Tasmania. Its funding model relied on grants from the State Government and, for a short time, from the Commonwealth Government, together with income from consultancies and other fee-for-service work. Alf Hagger was a crucial part of the effort involved in the creation of CREA, the establishment of its operating model and winning the grants and work fundamental to its survival and growth. Most importantly, he was one of the mainstays of the intellectual effort over a period of 20 years, on which CREA’s reputation rested and without which CREA could not have survived and prospered the way it did. CREA made a major mark in regional economics and, together with John Madden, the credit for that goes to Alf.

Alf, with some co-authors, wrote a number of books on the role of economists in Australia. *Exasperating Calculators* defends economic analysis and economic advice against ill-informed and misleading criticisms. In *Giblin’s Platoon* and *Torliev Hytten* he explores the role of a group of influential economists from the 1920s to the 1950s, all with a Tasmanian connection. He was working on the biography of another Tasmanian, Arthur Smithies, when he died.
Alf believed that the work of economists — rigorous and quantitative analysis — is crucial for policy. This ideal drove his research and teaching. So, while he never became enmeshed in the policy-making process, his heroes were those who were able to make significant contributions both to economic analysis and to the implementation of soundly based policy.

**Selected Publications of Alf Hagger**

**Books**


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