

AGENDA

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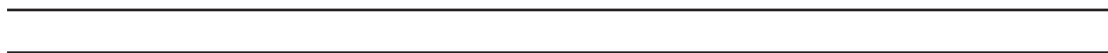
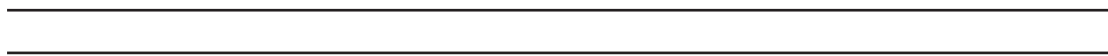
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ARGUMENT



Two Decades of Murray-Darling Water Management: A River of Funding, a Trickle of Achievement

Lisa Yu-Ting Lee and Tihomir Ancev¹

Abstract

The paper appraises the myriad of Murray-Darling Basin-related policies since the early 1990s. It contends that significant environmental improvements could have been achieved at substantially lower cost had decisive action been taken earlier. If the total expenditures in the last two decades had been put solely towards water entitlement buy-backs, an amount of water several times that necessary to significantly improve the health of the Basin would have been acquired.

Introduction

The majority of all water use in Australia is consumed in the Murray-Darling, with almost 90 per cent of the system's water diverted for extractive uses (CRCIF 2005). In recognition of inefficient water allocation among extractive and non-extractive uses,² numerous resource policies have been implemented since the signing of the 1992 Murray-Darling Basin Agreement and the 1994 Council of Australian Governments (COAG) Water Reform. It was envisaged that these agreements would provide a coordinated approach of the concerned jurisdictions to restore the Murray-Darling system to good environmental health. Correspondingly, this period saw substantial public funds injected into natural resource management, and the advent of market-based instruments (MBIs), including cap-and-trade schemes (for example, water trade) and pricing schemes (for example, cost recovery). This policy direction was in line with the abundance of literature that advocates MBIs as the conduit to cost effectiveness, and is becoming increasingly favoured over traditional regulatory controls (Bjornlund 2003).

If judged by the media coverage of water management policies and the amount of public investment poured into various programs and initiatives, the public might justifiably have a 'feel-good' perception that some progress has been made.

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² 'Extractive use' refers to water for human use, and 'non-extractive use' refers to water left in-river for environmental functioning.

However, evidence of tangible on-ground achievements in terms of actual environmental outcomes is sparse. There is limited empirical evidence of real improvements; in fact a 'report card' produced by the Cooperative Research Centre for Freshwater Ecology (2003) has shown a marked deterioration relative to 1994 conditions. The Living Murray Initiative and the government buy-back of water entitlements have received attention, particularly the recent purchase of properties such as Toorale for the purpose of procuring their water entitlements, which some have labelled a waste of money (Ferguson 2008). But the progress of other prominent, yet less-publicised, natural-resource management initiatives have been less assessed. The list of these programs includes, but is not limited to, the Environmental Works and Measures Program, the Basin Salinity Management Strategy, and the Australian Water Fund projects. Given the limited coverage and assessment of the various programs directed towards improved water management, it is difficult to discern the state of affairs in the Murray-Darling and to scrutinise successes and weaknesses in current policies.

The general perception is that progress in the Basin is somewhat disappointing, despite almost two decades of concerted management. This paper attempts to take stock of the achievements and progress of natural-resource policies in the Basin, and the reasons contributing to the lack thereof. This involves an overview of the evolution of public policy in water management in Australia, and an investigation into the range of government initiatives to clarify the relation between achievements and funding streams.

The overall conclusion is that, in spite of the numerous agreements and initiatives, corresponding achievements have been decidedly lacklustre due to poorly informed decisions and buck-passing between the states. There remain several weaknesses in institutional arrangements as water reform has evolved, underlying which is a significant information gap at the core of the frustrated progress. Notwithstanding information barriers, the most straightforward solution — to buy back entitlements — has also been resisted. It is the contention of the authors that, by having put off this difficult but seemingly necessary action, the social cost has become even greater than if the problem had been confronted sooner. Stronger action may have resolved water-resources issues at a fraction of the expense, had decisions been based on transparent, cost-benefit criteria unbiased by political motivations.

A Brief History of Water Management in the Murray-Darling Basin

The plight of the Murray-Darling is now a familiar story, and has been accompanied by a long string of water management policies to stem its degradation. The story also reflects the trend in favoured policy tools, from centralised regulatory directives towards reliance on market-based approaches,

generally classed as quantity or price instruments.³ Quantity instruments, often requiring a cap, have been used as an alternative to direct regulation, commonly in the framework of a market with tradeable property rights (Rolfe and Mallawaarachchi 2007). While there has been increased use of price instruments, there seems to be a tendency to shy away from direct water pricing. For example, cost recovery for water was only ever limited to operational costs, and does not capture environmental costs of extraction.⁴ So price instruments come commonly in the form of auction-style tenders, grants and rebates (Rolfe and Mallawaarachchi 2007). While subsidies have largely fallen out of favour, we appear to have come full circle, with the most recent policy, the National Plan for Water Security, embracing the use of direct subsidies to ‘modernise irrigation’.

Inter-governmental arrangements have evolved from the early 1900s, beginning with the signing of the River Murray Waters Agreement in 1915, which focused on resource sharing between the States. Various amendments to the Agreement made over the 70 years of its operation were only minor changes relating to the construction of dams and weirs. The need for balance between environmental and extractive demands came to light as Australia’s water economy moved into its mature phase, symbolised by the signing of the Murray-Darling Basin Agreement in 1992 (Quiggin 2001). The 1994 COAG Water Reform (Water Reform) marked the initial shift in natural-resource management towards market-based solutions, and was integral to the Federal Government’s National Competition Policy for competitive neutrality in key industries. The Cap was also introduced in 1995, alongside the water reform to enable transferable property rights for water.⁵ The water-reform process was tied in with National Competition Payments to motivate its implementation, although this financial incentive had varying degrees of success in promoting the full water-reform agenda. The Payments represented the first of a string of Federal funding towards environmental management in the years to follow. It can be regarded as a precursor to the weak correlation between government spending and outcome in natural-resource policies.

Problems contributing to stagnating progress since the 1994 Water Reform related to institutional factors in water-sharing arrangements, pertaining to the specification of property rights for extractive and non-extractive uses which compromised the security of water entitlements. In 2004, the National Water Initiative was introduced to overcome these sticking points, resulting in an

³ Market-based instruments use market-like processes, represented by a network of regulatory and incentive structures, which coordinate individual preferences and allow greater flexibility for participants to undertake mitigation actions suited to individual circumstances (Rolfe and Mallawaarachchi 2007).

⁴ One justification for this is that higher usage charges may erode market prices if environmental costs are fully accounted for (Grafton and Hussey 2007).

⁵ The Cap is a limit placed on the level of water diversions in the Basin, relative to 1994 baseline conditions.

agreed public–private cost-sharing arrangement if environmental flows were to be increased (Freebairn 2005). It was also agreed that priority would be given to the provision of water for the environment ahead of extractive use, representing a fundamental shift from the view that water management is designed to coordinate increased water use (Connell and Grafton 2008). Discussions on missing property rights over externalities associated with return flows also took place, in particular on the impact of increased water-use efficiency on downstream users; and the implications that water trade between hydrological systems has for water quantity and quality. Following from this was the introduction of ‘exchange rates’, in part to try and capture transmission gains or losses for interregional trading.⁶ This was in spite of there being significant knowledge gaps in understanding hydrological systems, which raises concern over the prudence of using those exchange rates. Another example where a rush for action overshadowed the need for robust information and evaluation is the Landcare program. Government failure in this instance led to excessive and poorly distributed public expenditure on small on-ground works (Pannell 2008).

Other prominent programs developed during this period include the Living Murray Initiative and Basin Salinity Management Strategy. The Living Murray began in 2002, aiming to deliver environmental improvements through the Water Recovery and Environmental Works and Measures Programs. The 2001 Basin Salinity Management Strategy focused on salinity-related problems in the Basin, and is linked to the National Action Plan for Salinity and Water Quality. The relevant governments also agreed to build salt-interception schemes under the Joint Works Program to achieve salinity reduction at Morgan, South Australia (which is at the mouth of the Basin). These initiatives represent substantial funding to deliver environmental improvements at target sites, with increasing reliance on market mechanisms, although still conspicuously avoiding direct buy-back. This shift away from ‘command-and-control’ policies reflects greater public acceptance of economic instruments in environmental management.

The most recent policy development was in January 2007, when the Federal Government announced the National Plan for Water Security — since renamed ‘Water for the Future’ by the succeeding government in 2008. The strategy of this Plan was in accordance with the objectives outlined in the National Water Initiative; specifically; to address over-allocation, to modernise irrigation, and to create a transparent water-management system. By this stage, market-based instruments have become fairly mainstream, with one-third of the funds to be

⁶ Exchange rates are a conversion rate for water traded between hydrological systems, since the security of the entitlement is not perfectly preserved because of transmission losses. For example, 1 unit upstream can be traded downstream at a conversion rate of 0.9. Some interstate trades also occur under a system of ‘tagging’, where water traded between states continues to be tagged according to its point of origin and continue to be managed the same way (Brennan 2007). However, this is so complex it appears only one trade has occurred under the tagging system (personal communication).

directed at buying back entitlements. Water information has also become a priority area, and for the first time irrigators are required to disclose water-use information to public institutions. This was done in parallel with efforts to improve basin-wide hydrological modelling.

The river of funding

A large number of programs and initiatives have been implemented to manage the Murray-Darling since 1992. These programs have been accompanied by a constant stream of government funding, as well as top-ups and other funding avenues. However, much like the situation with the river basin itself, while a lot went into these policies, little seems to have come out. In this section, details of high-profile Basin-related programs and investments are provided, with the aim to show that overall achievements do not reflect the generous funding. All along, the redistribution of extractive water towards ecological uses has remained a vexing point; the justification being, the cost of water reallocation should be justified by the environmental benefit it would generate. However, there is insufficient information to evaluate trade-offs between environmental benefits and economic losses (Grafton and Hussey 2007). For all the worry, expenditure on the agreements and initiatives has likely outstripped the cost of redistributing water towards environmental use. Earlier decisive action with a good science-based approach, removed from politics and workarounds, may have avoided the excesses.

A summary of relevant intergovernmental and Commonwealth programs, and their funding contributions, is provided in Table 1.

Water Reform and National Competition Policy

The development of water markets has been highly publicised, having been regarded as the ‘holy grail’ for water-allocation problems. While water markets have been established in most catchments, water trading has remained rather limited. In the past, trade has been confined to high-security licences in middle and lower reaches of the River Murray (Connell 2007). Even with the rules relaxed, trade in permanent water entitlements was less than 1 per cent of diversions in 2001–02, with less than 1% of all trade occurring inter-regionally (Heaney *et al.* 2004).⁷ In 2005–06, permanent trade remained below 1 per cent of the entitlements, and temporary trade under 10 per cent of annual allocations. Of the total temporary trade, 41GL (5 per cent) were sold interstate (MDBC 2007b). This is explained by the existence of several barriers to trade, including a 4 per cent limit on sales of entitlements outside of irrigation districts, and exit fees that will remain until 2016 (Connell and Grafton 2008). Taxation issues

⁷ Permanent water trade refers to permanently selling the ownership of the entitlement to another party, while temporary water trade refers to selling the right to use the seasonal water allocated to the entitlement, but retaining the ownership of the entitlement.

present further institutional constraint on permanent trading; temporary purchases are fully tax deductible in the year of purchase whereas permanent purchases can be subject to capital gains tax (Bjornlund 2003).

Table 1: Summary of government initiatives and funding arrangements

Programs for the Murray-Darling Basin	Funding (\$m)	Timeframe
National Competition Policy (inc. Water Reform)	3900	1997–2004
The Living Murray First Step (TLM)	500	2004–09
— Water Recovery	150	2003–11
— Environmental Works and Measures Program		
Commonwealth Supplementary Contribution to TLM	500	2006–11
National Water Initiative	2000	2004–10
— Australian Water Fund		
Water for the Future (formerly National Plan for Water Security)	12 900	2007–17
Joint Works Program (Basin Salinity Management Strategy)	60	2001–present
Natural Heritage Trust and National Action Plan	400/yr (tot. \approx 3000)	2001–08
Caring for our Country (Natural Heritage Trust 3)	2250	2008–11
Retiring properties in Queensland and NSW ¹	50	2008
TOTAL	25 310	
(without National Competition Policy)	(21 410)	

1: This new money was sourced to purchase Toorale Station.

Note: State-based arrangements are not included.

There have also been several unexpected consequences, including the fallout in increased water use as ‘sleepers’ and ‘dozer’ licences are activated in trade, stranded assets, and reduced return flows as irrigation efficiency increases. In addition, the push for greater water trading in the National Water Initiative has encountered problems of variability of supply and hydrology between catchments, resulting from gaps in biophysical and hydrological knowledge (Connell 2007). Furthermore, there is a general apprehension towards the water market, drawing from concerns pertaining to community decline, threat of foreign ownership, and a perceived loss of subsidies (Randall 1981). Concern over the impact on property values of selling entitlements and policy uncertainty over future allocations are other factors limiting permanent water trade (Bjornlund 2003). To circumvent the thin-market problem, and in an effort to discover efficient prices, there has been a move towards tenders for buying back entitlements. However, there remains resistance from rural communities to recent government purchases, even though there is evidence of growing support where the buy-back is perceived to generate justifiable benefits.

The Living Murray First Step

Part of the Living Murray agreement was the First Step program, developed in 2003, which identifies six ‘ecological assets’ in the Basin to be protected. The implementation of the First Step was endorsed as part of the 2004 National Water Initiative under the *Intergovernmental Agreement*, in which contracting

governments agreed to commit \$500 million over five years for the recovery of (on average) 500GL of water per year for the environment — known as ‘new environmental water’ or ‘new e-water’.⁸ This sum was allocated towards the Water Recovery program for a set of approved market-based variants of buy-backs and infrastructure projects.

Overall, water recovery lagged, and it was not until February 2008 that there were enough projects approved to potentially recover the full 500GL.⁹ April 2008 marked the historical first ‘water recovery’ event, with 133GL of environmental water entitlements secured in Victoria and South Australia. While the first water recovery is a significant milestone of the Living Murray, most projects are still under development; 367GL still need to be recovered at the rate of at least 1500 megalitres (ML) per day to achieve the full 500GL by mid 2009.¹⁰ Also, no physical environmental water will be released except in wet years (MDBC 2008). This has obvious implications for the sustainability of water sharing under the expected long-term climate change, in addition to the inconsistency with National Water Initiative commitments to prioritise ecological preservation over irrigation interests.

Complementing the Living Murray First Step, the Environmental Works and Measures Program was created in 2003, with a funding of \$150 million over eight-years for capital works and improvements in infrastructure targeting the six ecological assets, such as upgrading weirs and fish ways. No evaluations of the effectiveness of the program are yet available; however, a task force has been established for this purpose.

In addition to the First Step, there are also substantial efforts being made towards environmental water recovery at State level. For example, the NSW Government allocated \$13.4 million towards its Wetland Recovery Plan in 2005, a sum that was matched by the Commonwealth via the Australia Water Fund. The objective is to permanently recover water for ecologically significant wetlands through infrastructure projects and buying back entitlements, which so far has acquired 6.5GL in the Gwydir and Macquarie.¹¹ There is also the NSW Riverbank Fund introduced in 2006, which allocated \$105 million towards buying back water for environmental purposes. Other Riverbank projects were also supplemented with \$72 million from the Australian Water Fund. In July 2007, 15GL of environmental water was purchased for the Gwydir, Macquarie,

⁸ Water recovery refers to the process of recapturing water from other uses and directing it towards environmental purposes. In effect, the environment has entitlement over this water. The 500GL to be recovered is ‘new’ in the sense that the States will contribute new funds to recover this water, on top of pre-existing commitments.

⁹ 1GL = 1000ML; 1ML = 1 million litres, which is equivalent to the volume of water in an Olympic swimming pool.

¹⁰ From October 2008.

¹¹ The Wetland Recovery appears to be unrelated to the Living Murray, and could be considered ‘other new e-water’.

Lachlan and Murrumbidgee rivers in NSW. Riverbank's role has since expanded to include the Market Purchase Measure as part of The Living Murray Water Recovery, to buy back 125GL via a tendering process (NSWDECC 2008). However, it is unclear how much physical environmental flows will eventuate from these entitlements.

Commonwealth Supplementary Fund to the Living Murray

In 2006 a one-off supplementary funding of \$500 million was made to the Murray-Darling Basin Commission by the Commonwealth, as a top-up to the \$500 million for the First Step Agreement. The supplementary contribution is to be spent over five years from 2006. Of this, \$200 million was allocated for Water Recovery alone, bringing its total to \$700 million over five years. Of the remaining supplementary fund, \$100 million was flagged for infrastructure projects under the Environmental Works and Measures Program, totalling \$250 million. The rest of the supplementary funding was to hasten other programs, including the Basin Salinity Management Strategy, although it is uncertain how this was distributed (MDBMC 2006).

As mentioned, 133GL of water entitlements have been 'recovered' as at mid 2008. If the full 500GL is recovered, the average cost reduces to \$1,400/ML. Based on 2006 market prices, this is more than three times greater than permanent water rights of \$400/ML in the Murray Irrigation Limited (Quiggin 2006). Had the water-recovery funding been put entirely towards entitlement buy-back at this price, this would have resulted in a total of 1750GL of new e-water — three times greater than the *Intergovernmental Agreement* target of 500GL, and sufficient for moderate improvements in the health of the Murray-Darling.

The Cap

The implementation of the Cap has been delayed in three of the five contracting States; although most valleys are within long-term targets (MDBC 2007a). Each State is required to have water-sharing arrangements as part of its obligations under the National Water Initiative. For example, in New South Wales this takes the form of Water Sharing Plans, in which environmental flows beyond Cap provisos have apparently been stipulated (NSWDNR 2008). The Basin Plan has requirements for a new sustainable Cap to be set, incorporating the inter-linkages between surface and groundwater systems. However, how this new Cap will be reconciled with the existing commitments in current water-sharing plans is yet to be resolved (Connell and Grafton 2008).

Environmental flows derived from the Cap and investments outside of the *Intergovernmental Agreement* can be considered 'old e- water' or 'other new e-water'. Since 1999, combined old and other new e-water releases from NSW and Victoria total around 770GL, made up of one major release of 500GL in 2006, for the Barmah-Millewa site, and a series of smaller flow events (NSWDNR 2008).

Considering that 95 per cent of bulk water off-take occurs in NSW and Victoria (MDBC 2006), these releases account for almost all environmental flows to the Basin.¹² This averages 86GL/yr over the last nine years (less if the 500GL release in 2006 is excluded). Even in aggregate with the 133GL of new e-water, average environmental water provisions remain well below the 500GL/year target. This is unlikely to have preserved environmental sustainability as per the stated purpose of the Cap.

The impact of the Cap is more difficult to discern in unregulated systems.¹³ The available means of monitoring extractions often involve just one gauge at the upstream and downstream end of unregulated rivers, and penalties for over-extraction are based on the three-year average flow at the downstream gauge. The lack of monitoring capacity limits the extent to which the Cap and water-sharing arrangements can be enforced. For that matter, a general lack of water information has been a persistent issue underlying the inability to manage water effectively, which, until recently, has been recognised but ignored.

National Water Initiative — the Australian Water Fund

The Australian Water Fund was set up by the Prime Minister in December 2004 for implementing actions towards National Water Initiative objectives. A commitment of \$2 billion over five years was allocated among three programs under the umbrella of the Australian Water Fund: Water Smart Australia, Raising National Water Standards, and Australian Water Fund Communities. These programs were designed to ‘improve water-use efficiency’ via technological or infrastructural means, and through increasing capacity for water management.

Given the nature of Australian Water Fund projects, it is difficult to gauge environmental outcomes against which to measure progress; for example, projects which improve water accounting and develop water markets funded via Raising National Water Standards. Projects under Water Smart Australia and Community Water Grants, such as wetland management or water-recycling systems, may deliver more tangible environmental and water-efficiency improvements. While the projects appear to follow a vague mantra of ‘increasing water efficiency’, they may not meet the efficiency criterion. For example, rainwater tanks provide a ‘feel-good’ factor, but they do not represent an efficient solution to augmenting supply; households can be better off under scarcity pricing for water, which better coordinates demand and supply and removes the need for water restrictions (Grafton and Ward 2007). Without clear targets or reliable means to evaluate a project’s effectiveness, there is no reliable indicator of its success. This

¹² ‘Bulk water off-take’ refers to diversion from the river greater than 5GL/yr, which supplies a multitude of users via delivery channels (MDBC 2006).

¹³ ‘Unregulated’ catchments refer to river systems without an upstream head dam to ‘regulate’ downstream water releases.

undermines the capacity for future investment decisions, which can become an exercise in distributing funds rather than achieving desired outcomes.

Water for the Future (formerly National Plan for Water Security)

The National Plan for Water Security added a further \$10 billion to the mix, which increased to \$12.9 billion when the Plan was re-branded as Water for the Future in early 2008. At the March 2008 COAG meeting, a Memorandum of Understanding for the Murray-Darling Basin Reform was agreed to by all States, including Victoria which initially opposed the reform. This took \$1 billion in sweeteners to the Victorian government, which leaves \$1.9 billion as the net increase to Water for the Future.¹⁴ The ensuing Basin Plan has an important feature whereby a final decision-maker — a Commonwealth Minister — settles disputes between the States. This is envisaged to reduce the politicised nature of the Murray-Darling Basin Commission, which has overshadowed decision-making processes (Blackmore 2002; Scanlon 2006). The Water for the Future package has various novel — though sometimes conflicting — objectives.

Of the \$3 billion earmarked for the Addressing Over-Allocation component, \$50 million was offered in a first round of buy-backs from February–May 2008. The first round acquired 35GL of ‘other new e-water’, at an average cost of \$1400/ML; according to different sources only \$37 million had been spent to acquire 22GL, in which case the average cost is \$1700/ML (Wong 2008; Bardon 2008). It would appear that the value of entitlements has been inflated in the course of government buy-backs; the price is likely to increase as more substantial purchases are made (Connell and Grafton 2008).

The \$6 billion Modernising Irrigation component, largely in the form of subsidies for water-efficient irrigation technologies, can further increase the cost of water recovery as it is in direct conflict with the objective to retire inefficient irrigation areas. The financial assistance for water-efficient technologies allows less-efficient irrigators to remain in the industry, and to use the water savings to expand irrigated production (Ancev and Vervoort 2007). In this sense, the value of such properties becomes inflated and unnecessarily increases the cost of buy-backs.

The smaller, but significant, element of the plan is Improving Water Information, towards which \$480 million has been allocated. The Bureau of Meteorology has been given new powers to request water information from various parties to be used in a National Water Account. Under current arrangements, even where water metering is in place, water-extraction data is considered confidential and is not publicly disclosed (Hudson 2005, personal

¹⁴ The \$1 billion ‘sweetener’ is part of the old-money offered under the \$10 billion National Plan for Water Security (Milne 2008).

communication). The new arrangement would mean this information is relayed to the Bureau of Meteorology, allowing for better water management through transparent monitoring of water use on a national basis. For this purpose, \$620 million of the Modernising Irrigation component has also been allocated for water metering and telemetry rollout, administered by the Department of Environment, Water, Heritage and the Arts (Vertessy 2007).¹⁵ This brings the total investment in water data to over \$1 billion over the next 10 years, signalling the emphasis now given to accurate water information.

The Joint Works Program: The Basin Salinity Management Strategy

The Joint Works program began in 2001, and is a jointly funded program to build six major salt-interception schemes as part of the Basin Salinity Management Strategy. The program is estimated to cost \$60 million, with six jointly funded schemes towards keeping salinity below 800EC at Morgan.¹⁶ These new schemes are in addition to seven State-owned schemes predating 1988, and in aggregate are expected to contribute 61EC of the salinity target (MDBMC 2006). In other words, the cost to reduce salinity is at least \$1million/EC given the \$60 million investment. Despite being a pragmatic solution, salt-intervention technologies are expensive and treat only the symptom rather than the cause; that is, from non-point pollution that continues to introduce salt into the system. This is evidenced by recent experience with the Salinity and Drainage Strategy (now the Basin Salinity Management Strategy).

The Basin Salinity Management Strategy was developed in 2001, as the successor to the 1988 Salinity and Drainage Strategy. The Salinity and Drainage Strategy was a once-off agreement between the States and Commonwealth to finance activities to reduce salinity. This was initially deemed successful, as major investments made towards salt-interception schemes led to an immediate reduction in salinity throughout the 1990s. However, it soon became evident that further action was needed as salinity continued to rise, motivating the new Strategy in 2001 (Conner 2004).

The Strategy manages basin-wide salinity through end-of-valley targets and an overall downstream target at Morgan in South Australia. The States work to achieve these targets through in-valley actions, which are entered into a central Salinity Register managed by the Murray-Darling Basin Commission. The Register also captures legacy impact from previous activities and current salinity-reducing or -increasing activities, which are calculated in dollar terms using modelled cost-functions. The objective is to ensure there is net credit for each State and

¹⁵ 'Telemetry' refers to the remote measurement and reporting of information.

¹⁶ Electrical conductivity (EC) is a measure of concentrated salts in the water. A high reading indicates high salt content.

the Basin as a whole. Through these measures, in-valley actions are expected to offset 10EC points at Morgan, while salt-intervention schemes are expected to offset 61EC points. In 2005–06, these measures combined achieved the salinity target at Morgan (MDBMC 2006), although this success is still largely attributed to salt-interception schemes. A sustainable, long-term solution would be to change the pattern of land use to reduce the movement of salts. Targeted in-valley measures could potentially make a greater contribution; for example, Heaney *et al.* (2000) have shown that reforestation at sites with faster-responding, saline aquifers with porous soils can efficiently reduce salinity. Such long-term strategies will become feasible as greater hydrological information becomes available.

The main stumbling block for the Strategy (as is the case for water recovery) is the measurability of outcomes, with monitoring and evaluation identified as key areas for improvement. The reliability of entries in the Salinity Register is evaluated according to a standardised classification protocol, according to which most of the entries are of low reliability. This undermines the confidence in the progress of signatory States (MDBMC 2006). A contributing factor may be that each State uses its own hydrological models to estimate salinity impacts, each of which have strengths and weaknesses and are useful for different purposes. Following from this is a strong impetus for hydrological-economic models to be consolidated so that salinity impacts are modelled consistently, and thereby improve the transparency of investment decisions. There also remain significant information gaps in groundwater hydrological functioning. For example, IQQM models surface water and MODFLOW models groundwater, each with weak hydraulic interactions between surface and groundwater (Letcher and Jakeman 2002) — which is arguably a fundamental knowledge gap to understanding salinity. This has implications for the reliability of bioeconomic models which base cause-effect relationships on such hydrological models.

Other Related Programs

This subsection covers the following programs and activities: retiring properties in Queensland and NSW; the Natural Heritage Trust and National Action Plan for Salinity and Water Quality; and the National Competition Policy.

The considerable controversy over Federal government plans to retire properties that can provide flows to the Murray-Darling can be largely attributed to unease over the socio-economic impact of such purchases. In a recent move by the Federal government, \$50 million of new money has been flagged for the purpose of acquiring land with large water storages (ACF 2008). The first purchase was Toorale, which cost \$24 million split between the NSW and Federal government. The property held 14GL of entitlements. That is to say, it was bought at an average cost of \$1700/ML, equivalent to the cost in the first round of Addressing Over-allocation under Water for the Future. Toorale seems to

have attracted significant media attention because it was purchased in the midst of rural discontent over the buy-backs, and was particularly contentious because of Toorale's history and the potential for benefits to be offset by irrigation expansions in Queensland (Ferguson 2008). However, a similar purchase was made in August 2008 of the Pillicawarrina cotton property in the Macquarie Marshes, under a joint venture by the Commonwealth and NSW governments through Riverbank. The land was reportedly acquired for \$10 million with 7GL of entitlements (The Land 2008); at an average cost of \$1400/ML, this is similar to the cost of Toorale. Pillicawarrina was fully operational as a cotton farm, yet its purchase had widespread support from landholders, and did not attract the same media coverage as Toorale. The main issue at stake seems to be community disgruntlement over government decisions which were perceived as being questionable and not well justified in terms of the benefits they would deliver.

Other national programs include the Natural Heritage Trust and National Action Plan for Salinity and Water Quality, which funded environmental conservation activities delivered through Regional Natural Resource Management bodies. Joint funding to these programs has averaged \$400 million/yr since its inception in 2001. In the third phase of Natural Heritage Trust from 2008, a further \$2.25 billion over five years is committed towards States' natural-resource strategies operating under the guise of Caring for our Country (DAFF 2007). Another significant source of funding was the National Competition Policy. While not directly related to natural-resource management, tranche payments were tied into the water-reform process and totalled \$3.9 billion from 1997–2004 (NCC 2005).

The projects under Natural Heritage Trust and National Action Plan were largely small-scale, and unsuccessful in some instances. With some exceptions, most of the investments promoted practices that were not adoptable at the required scale, or were invested in the wrong places (Pannell 2008). In an audit report, it was noted that there was an absence of consistently validated data and insufficient information to indicate whether the programs were meeting expectations. The audit also highlighted the need to address the transparency and accountability of funds, and problems with the quality and measurability of targets directly linked to the paucity of scientific data (ANAO 2008). The issue of transparency and measurability of outcomes is a common theme throughout most natural-resources programs, compromising the cost effectiveness of on-ground actions.

In summary, public investment into natural-resource management totalled at least \$25 billion over the last 17 years, or \$21 billion excluding the National Competition Policy. In spite of the substantial expenditure, this has not produced the envisaged restoration of over-allocated river systems. Investment decisions appear to be without strong justification; the most cost-effective solution to

buy-back rights from irrigators has, until recently, largely been avoided (Quiggin 2008). There remains resistance from the rural community, who are unconvinced of the merits of government buy-back. Furthermore, the numerous initiatives will likely benefit from better-defined deliverables to rationalise the sums allocated and develop a way of quantifying results.

Transparency, Consistency and Courage

Overall, there has been some progress and some prudent, if somewhat ineffective, measures have been implemented. Government failure here has been in the familiar tradition of funds being hypothecated without due evaluation, perhaps as temporary fixes or on account of ulterior motives. A fundamental issue is the paucity of reliable scientific information against which to scrutinise decisions, blurring accountability and the cost-effectiveness of investments. Decisions backed by good science-based criteria and well defined trade-offs will improve transparency and help avoid politically-driven motivations (Connell and Grafton 2008). It will also justify difficult decisions that are needed to prevent environmental collapse in the Lower Murray.

Information on water use has been an area of neglect, but has gathered momentum in recent years, as reflected by the investment of \$1 billion towards improving water-data quality and metering technology. The National Water Account will be based on a comprehensive 'geofabric' — in collaboration between the Bureau of Meteorology, the CSIRO and Geosciences Australia — which will tie together all water information including hydrological flows, water use, climate, and so on (Vertessy 2007).¹⁷ The Bureau of Meteorology will also will build upon CSIRO work on the Murray-Darling Basin Sustainable Yields Assessment, commissioned in November 2006 and funded under the Australian Water Fund Raising National Water Standards Program (Vertessey 2008, personal communication). This involves building a 'supermodel' to estimate the current and future water availability, and the level of over-allocation, in all catchments within the Basin. A novel component of the model is that it makes use of existing State agency models (CSIRO 2007). This is an important move towards standardising the quality of hydrological information used in assessing land-use changes. It is logical that evaluations are based on a single, comprehensive basin-wide model which can capture whole-of-catchment effects and interdependencies consistently.

A useful extension may be to incorporate on-ground data to reflect tangible outcomes and environmental impacts. This will be possible as improved information of the system comes to hand, which should feed into overall water planning in order to maximise public benefits (Connell and Grafton 2008). For

¹⁷ Individual irrigators will be required to provide monthly extraction volumes; however, their identities will remain confidential.

example, the Integrated Monitoring of Environmental Flows program in NSW has been in place since 1997 to monitor the effect of environmental rules in regulated systems in the Barwon-Darling River. Integrating data from such empirical studies would help verify outcomes and provide an indicator of environmental improvement. Data from airborne electromagnetic surveying (AEM) could also be used to supplement knowledge of surface and groundwater connectivity across landscapes at high risk of salinity, and to inform strategic decisions such as reforestation.

A particular challenge to current institutional arrangements relates to water sharing between the jurisdictions. As a condition of the States agreeing to the Basin Plan, existing water-sharing plans will remain in effect until its expiry, even if sharing rules are incompatible with the sustainability principles of the National Water Initiative. This incongruence limits the capacity for effective environmental-water management across the jurisdictions, given that future shifts towards dryer climates will require that water-sharing plans be revised and be responsive to such environmental threats. Adequate revisions will likely inflict major political and economic pain on all parties (Connell and Grafton 2008). However, without the necessary changes it is likely future water security will be compromised, leading to even greater social costs.

Social Cost of Inaction

Water buy-back has long been advocated as the most efficient solution to the over-allocation problem in the Basin, but it has been left as the last resort in favour of other workarounds (Quiggin 2008). The lagging resolve meant that opportunities for acquiring low-value entitlements early on have been missed. During the current drought, prices for permanent licences have reached as high as \$2000/ML, which is a far cry from 2006 prices of \$400/ML. However, even at the likely long-term prices for permanent entitlements around \$1000/ML, \$500 million would suffice to recover 500GL — which could be achieved over five years at \$100 million/yr (Quiggin 2008). Even at the observed premium of \$1400–1700/ML in the current buy-back — indicating an endowment effect — \$850 million is enough to meet Living Murray obligations. This is but a fraction of the ‘Addressing Over-Allocation’ component of Water for the Future.

Suppose the total expenditure on natural-resource management, of \$21 billion, had been put towards buy-backs since 1992, price unadjusted. At \$1000/ML, at least 21 000GL could have been acquired permanently. Even at \$2000/ML — a significant mark-up compared to prices only just two years ago — at least 10 500GL could have been recovered. This is far beyond the recommended 4000 GL/year required for good improvements in the health of the Murray-Darling (WGCS 2008). This also suggests that only one-third to one-fifth of the total expenditure was required to achieve a high level of environmental improvement. Given the delay, and the urgency of the situation that has evolved in the Coorong

and Lower Lakes, it may now take up to \$8.9 billion to recover the 4000GL needed to secure the long-term health of the rivers (WGCS 2008).

Conclusions

Since the Murray-Darling Basin Agreement in 1992 a string of government initiatives have been implemented along with substantial public investment. For all the effort, there is considerable underachievement as a result of poorly informed investment decisions and persistent institutional weaknesses. The upshot of this is continued deterioration in the health of the Murray-Darling system. Furthermore, in spite of information and institutional barriers, earlier resolve to address water buy-backs could have achieved environmental improvements at substantially lower cost, even if action had been taken as recently as 2006.

Limiting further social costs will require that future investments and decisions are transparent, based on clearly-defined targets and criteria. Improved governance to manage environmental threats, such as climate change, can be achieved by amending water-sharing arrangements between jurisdictions to align with obligations to prioritise ecological health. Better markets and policies could be designed where externalities are captured comprehensively and accurately through improved hydrological knowledge. This will also allow greater transparency in investment decisions, devoid of political motivations.

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The new Basel Capital Accord: A major advance at a turbulent time

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Abstract

In January 2008, the Australian Prudential Regulation Authority introduced the second-generation capital requirement, Basel II, that substantially extended the 1988 Capital Accord of the Basel Committee on Banking Supervision. This paper explains the main features of Basel II; reviews concerns about the likely effects of the new capital requirement; and assesses the new capital requirement in the context of the global financial crisis.

Introduction

In January 2008, the Australian Prudential Regulation Authority (APRA) adopted the new Capital Accord (Basel II) that had been developed by the Basel Committee on Banking Supervision (BCBS).² Basel II is a much enhanced — meaning a more risk-sensitive and comprehensive — version of the capital requirement on banks, which is the principal regulatory tool of prudential supervision. The original Capital Accord (Basel I) had been adopted by the Reserve Bank of Australia (RBA) in 1988. It was meant to establish a minimum capital standard for internationally active banks. In Australia it has been applied to all authorised-depositing institutions (ADIs), except branches of foreign banks.

The development of the new Accord, which began in 1999, attracted considerable debate and criticism, and while its form and detailed provisions evolved in response to the debate, the introduced version (BCBS 2004b) has not met with universal approval. The main objectives of this paper are to explain the main features of the new Capital Accord as adopted by APRA and to assess criticism of the new capital requirement in the light of the global financial crisis (GFC) that was triggered by the US sub-prime loan crisis.

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² The committee was established in 1974, and comprises the central bank governors (and prudential regulators where they are separate organisations) of the G10 countries: Belgium, Canada, France, Germany, Italy, Luxemburg, the Netherlands, Spain, Sweden, Switzerland, the United Kingdom and the United States. It is serviced by the secretariat of the Bank for International Settlements.

The origin of the Capital Adequacy Requirement

The deregulation of financial systems during the 1970s and 1980s exposed their banks to a more competitive and riskier environment, that led to concerns about the stability of banks. These concerns motivated the establishment of the BCBS (in 1974) and its development of a new regime of prudential supervision that included a capital requirement. Capital provides a bank with a cushion to absorb losses and so provides it and the prudential regulator with an opportunity to resolve the risk the losses pose for the bank's depositors. Two years after it introduced its capital requirement (in 1986), the RBA modified the requirement in line with the BCBS's Capital Accord by basing the 8 per cent capital requirement on the *risk-weighted* value of a bank's assets rather than on the total value of its assets (see RBA 1988; 1989). The requirement is the ratio of a bank's capital (as defined) — the numerator — to its risk-adjusted assets as the denominator. This approach related (if crudely) the capital requirement to the risk-management aim of prudential supervision.

The risk-adjustment under the Capital Accord initially employed five *rule of thumb* credit-risk categories (subsequently reduced to four) into which a bank's assets were allocated. Low risk weights (zero and 20 per cent) were established for less-risky assets. Loans secured by residential mortgages were assigned a risk weight of 50 per cent, whereas all other loans were given a risk weight of 100 per cent. The denominator also included the credit-equivalent value of a bank's off-balance sheet exposures, such as its derivatives and standby credit facilities drawn down at the initiative of the bank's client, by including the resulting amounts in the respective asset risk categories according to the identity of the counterparty.

In July 1998 the RBA's responsibility for bank supervision and the state-based supervisory responsibilities for credit unions and building societies were transferred to APRA, which was established following a public enquiry into the functions of the financial system and its evolving nature. This organisation became the prudential supervisor of all ADIs in Australia (except branches of foreign-owned banks) and to which it continued to apply the requirements of the Basel Accord. Stability of Australia's financial system remained one of the responsibilities of the RBA. (RBA 2008b: 67–71)

The Structure of Basel II

The original Basel Accord's simplicity probably helped its introduction by national prudential regulators. But the insensitivity to variations in risk (both between and within risk categories) had the potential to *increase* the incentive for risk-taking behaviour. Hogan & Sharpe (1997a and 1997b) and Gup (2003: 74), for example, argue that attaching a risk weight of 100% to *all* commercial loans irrespective of counterparty allowed banks to pursue higher-risk (to achieve

higher return) lending since this requires no more capital than less-risky lending but has greater upside income potential. Basel II addressed this shortcoming by enabling the use of a much wider range of credit-risk weights, by providing for the use of different approaches to determining risk weights and by extending the capital requirement to cover all risks banks face.

Basel II has three *pillars*. The first deals with a bank's core capital requirement (Pillar 1); the second allows for supervisor discretion to adjust this requirement to allow for additional risk and particular circumstances (Pillar 2); and the third fosters market discipline (Pillar 3).

The main features of Basel II's pillars are introduced in turn.

Pillar 1: Capital requirements for core risks

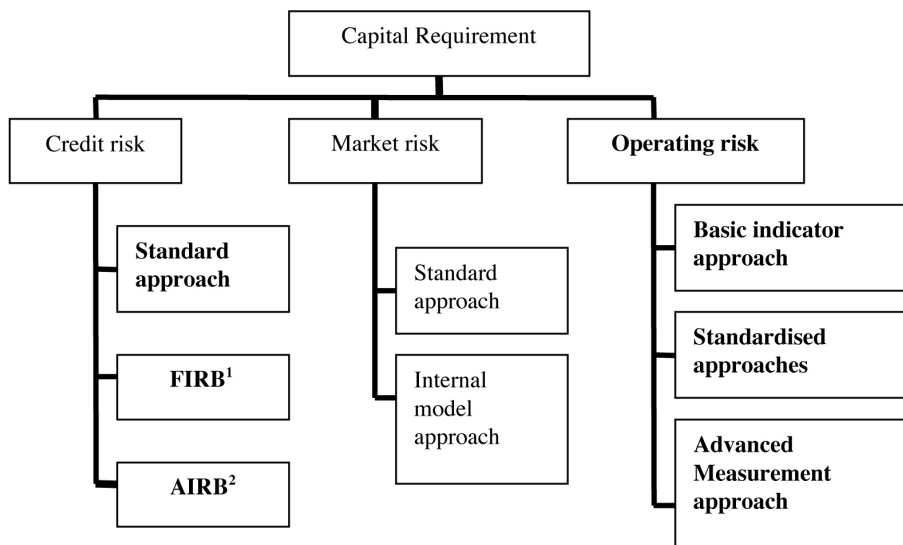
Pillar 1 refines the calculation of *regulatory capital* in three important ways. First, it uses a more *granular* approach to credit-risk weights; second, it provides banks (subject to the regulator's approval) with a choice of methods for calculating risk weights for certain types of risk; and third, it incorporates operating risk into the capital requirement. The anatomy of Pillar 1 is represented in Figure 1, which shows the Basel II innovations in bold type to distinguish them from those of Basel I. Note the introduction of three possible approaches to the calculation of the capital requirement for credit risk under Basel II; the *standardised* (externally set) risk weights and two approaches that rely on internal ratings (the *foundation internal ratings basis*, FIRB, and the *advanced internal ratings basis*, AIRB). Observe the introduction of a capital requirement for operating risk also provides for three approaches to the calculation of the capital requirement. An introduction to each innovation follows.

The calculation of the capital requirement for credit risk starts by dividing a bank's assets into five categories (corporate, sovereign, bank, retail and equity) within which there are sub-groups reflecting the different risk parameters for each asset type. The capital requirement for each represents an attempt to capture the average probability that a loan to each category of borrower would default, and the proportion of the loan that would be lost if default occurred.

Under the standardised approach, risk-weights are prescribed for each risk category, where the risk of each is rated by the borrower's *externally-determined* credit-rating agency such as Standard and Poor's (S&P). The value of the loans in each category is multiplied by the prescribed risk weight and the product is multiplied by 8 per cent to determine the minimum capital requirement. To illustrate, there are six credit-rating grades for corporate loans, where grade 1 covers loans rated AAA to AA– (on Standard and Poor's long-term scale), grade 2 covers A+ to A– and so on. The standard risk weights vary from 20 per cent to 150 per cent for these grades (APRA, APS 112 and APG 112). While this is the 'default' approach, which can be viewed as an extension of Basel I, it

represents a substantial advance. Basel I used just four risk weights, two of which (in Australia) covered the bulk of bank balance sheet assets. The standardised approach requires an improvement in risk-management systems to generate the data to satisfy Basel II's more granular risk categories. Most ADIs are using this approach, which is expected to generate, on average, a modest reduction in regulatory capital (Egan 2007).

Figure 1: Capital requirement under Basel I and Basel II



Notes: The new features (under Basel II) are shown in bold

¹ Foundation internal ratings based approach

² Advanced internal ratings based approach

Source: APRA 2004: 14.

The more radical innovation is the provision for banks to use either of two *internal* rating approaches subject to the regulator's (that is, APRA) approval. The foundation internal ratings-based approach (FIRB) uses internal estimates of the probability of loan defaults (PD) and feeds this into a more complex probability-based formula (that relies on the supervisor's estimates of the other risk components) to determine the risk weight to be used to calculate the amount of capital to be held against the loan. The advanced internal ratings-based approach (AIRB) uses internal estimates of *loss given default* (LGD) and the other risk components (effective maturity and the exposure at default) in a prescribed formula to determine the risk weight and hence the capital charge against a loan. These approaches derive from the internal risk assessments banks (including Australia's big banks) began undertaking in the 1990s and thus Basel II can be viewed as following industry practice.

Basel II does not change the two methods that can be used for assessing the capital requirement for market risk introduced in 1996. However, it introduced a capital requirement for *operational risk* exposures. Operational risk refers to the risk that losses may result from a lack of verification and control processes (such as the loss of 4.9 billion at Société Générale due to a trader's ability to circumvent operating systems that was revealed in January 2008). Three approaches for assessing operating risk are available; two that are relatively simple (the *basic indicator* and several *standardised approaches*) and the third *advanced measurement approach* (AMA) could be used by banks 'with advanced operational risk measuring and modelling capabilities'. Under the standardised approach, an ADI divides its activities into three categories — retail banking, commercial banking and all other activities, which have different capital requirements — and the sum of these requirements sets the ADI's operational risk-capital requirement. The capital requirement for retail and commercial banking is based on an ADI's gross outstanding loans and advances (as an indicator of its operating risk exposure) whereas for the third category the capital requirement is based on the ADI's gross income from these activities (APRA, APS114). To be accredited to use the advanced approach banks must have 'an operational risk management framework that is sufficiently robust to facilitate quantitative estimates of the ADI's ORRC (operational risk regulatory capital) that are sound, relevant and verifiable' in relation to the 'complexity of the ADI's business' (APRA, APS115: para. 21).

Three banks were accredited to use the advanced methods from January 2008 and a fourth (NAB) was given approval to use the foundation IRB approach. Three other banks have applied to move to an IRB approach during 2008 and are operating under Basel I in the meantime (RBA 2008a: 67). The advanced approaches are expected to reward banks with modest reductions in regulatory capital (for lower credit-risk exposures); although 10 per cent will be the maximum reduction in 2008 and 2009 (under Pillar 2 provisions) while the banks are demonstrating the performance of their risk-management models (Egan 2007).

Pillar 2: The Supervisory Review Process

Pillar 2 has two aspects. The first requires banks to assess their *overall* risk profile (in addition to the risks specified under Pillar 1) and to calculate any further capital that should be held against this additional risk. The additional risks potentially identified under Pillar 2 include credit concentration risk, liquidity risk, reputation and model risk. Consequently, Pillar 2 could be expected to add to the amount of capital held by banks (and offset the lower credit-risk capital requirement).

The second aspect of Pillar 2 is its inclusion of a 'supervisory review process'. This allows supervisors to evaluate each bank's overall risk profile and to mandate a higher prudential capital ratio where this is judged to be prudent (APRA, APS

110). APRA's decision to increase NAB's capital requirement following its foreign exchange losses (in January 2004) illustrates this process.

Pillar 3: Market Discipline

Pillar 3 requires disclosure of information regarding the calculation of bank capital positions and risk-management processes designed to strengthen the capacity of security markets to respond to changes in bank risk profiles. The idea is that banks which the market judges to have increased their risk profiles without adequate capital will have their securities sold down in debt and equity markets. The additional costs that this will impose on financing bank operations will provide an incentive for management to modify either the bank's risk profile or its capital base. This dimension of Basel II is thus designed to complement Pillars 1 and 2 by providing additional discipline on bank risk-taking behaviour.

APRA's prudential information disclosure requirements are most detailed for the Australian-owned ADIs that use the advanced risk-management approaches because of their use of internally-generated risk ratings. They are required to report quantitative risk-management information on a semi-annual basis and qualitative risk-management information on an annual basis, as well as reporting basic capital-adequacy information on a quarterly basis. The reporting requirements are less detailed for the ADIs that use the standard risk weights and for overseas-owned ADIs, assuming their home regulator's prudential information disclosure requirements are equivalent to APRA's (APRA June 2007 and APS330).

Securitisation

In this and the next sub-section Basel II's approach to securitisation (BCBS 2004b: 120–43) and credit risk mitigation (BCBS 2004b: 31–51) within Pillar 1 are introduced because of the role these processes played in the crisis triggered by the US sub-prime loan debacle (which is discussed in section 5). The process of moving assets (these principally have been housing loans) off the balance sheet via securitisation (a variation of the 'originate-to-distribute' model used by Australia's loan originators) has been an important feature of bank asset-liability management. In Australia it has been used especially by the regional banks.

The assets are securitised through the services of a special-purpose vehicle (SPV) established by a bank. The SPV arranges the issue of asset-backed securities (mortgage-backed securities, MBSs, where housing loans are involved) to investors and pays the bank for the loans with the proceeds. The bank avoids a capital requirement for the securitised assets provided the arrangement ensures it is no longer exposed to any risks associated with the assets, such as the risks that would arise if the originating bank agreed to any explicit credit enhancement of the securities or from implicit liquidity or solvency support for the SPV which

could result in the securitised assets being brought back onto the originator's balance sheet.

Credit-risk mitigation

An important dimension of Basel II is its treatment of credit-risk mitigation techniques such as the use of collateral, guarantees (by a third party) and other credit-risk reduction measures such as credit derivatives, which reduce the amount of loss in cases of default. Credit-default swaps (CDS) are the most extensively used credit derivative. They provide banks with the opportunity to buy protection against default events on one or more of its assets, which would reduce its credit risk. For example, a bank could purchase credit-risk protection on a specified set of loans or corporate securities held by the bank by issuing a CDS and paying a premium (this would be paid six monthly at the agreed rate) to the party that decides to accept the credit risk (such as a bond investment manager or another bank that wants to diversify its credit risks). The protection seller faces the obligation to compensate the protection buyer should pre-defined default events occur on the specified parcel of loans or securities. Should a default event occur the bank would receive a compensation payment and this lowers its loss given default, whereas should no default event occur the seller would receive the premium payments without having to compensate the bank.

Basel II explicitly recognises the role of banks' increasing use of instruments such as credit derivatives. Since these instruments reduce the risk of loss they reduce a bank's capital requirement. The reduction depends on the credit standing of the provider of the credit-risk mitigation instrument, such as the protection seller in the case of CDS. Thus the risk-weighted assets are adjusted using a risk weight appropriate to the risk class of the protection seller. For protection sold under the CDS, the same process is followed but the risk weight applied is that appropriate to the reference credit being protected.

Concerns debated during the development of Basel II

During the development of Basel II there was extensive debate internationally over the model's continued use of the 8 per cent capital ratio, the model's pro-cyclical effects, the effectiveness of market discipline and its impact on bank lending to small and medium-sized businesses. In Australia, concerns were expressed that Basel II would result in a lower capital requirement on the big banks than on the regional banks. These issues are considered below.

The amount of required capital

A primary concern was, and, is whether Basel II's capital requirement is adequate. In a structural sense this concern has two parts: should Basel II maintain the 8 per cent capital ratio and are the new risk weights in Pillar 1 (subject to any

action under Pillar 2) adequate? The historical record in developed economies over the last 30 years is that 90 per cent of failed institutions reported capital ratios at or near the regulatory minimum just prior to failure (BCBS 2004a). This raises the question of the requirement's adequacy, if the purpose of the capital requirement is to *prevent* bank insolvencies.

Gup (2004a) argued that the amount of regulatory capital implied by Basel II is too low for banks in the United States. Gup reasoned that the operational profile of US banks (in 2004) was much more risky than it was in 1988 on account of three sources of their altered risk profile: increased exposure of US banks to commercial property loans; an increased proportion of bank portfolios dedicated to sub-prime lending; and greater exposure to derivatives markets. Gup's concerns about bank's sub-prime assets and credit derivatives were well founded and imply that the risk weights attached to these loans and contracts were inadequate.

On the other hand, Altman, Bharath & Saunders (2002: 917–20) challenged the credit-risk weights for the standardised approach in an earlier version of the framework as well as the range of proposed risk categories for corporate loans. They found using the default experience of US corporate bonds over the period 1981–99 that the capital requirements on highly rated borrowers (A and BBB/BB classes) were *significantly higher* under the 2001 version of Basel II than is justified by the default experience of such high-grade bonds (that is, borrowers), while for more poorly rated borrowers (below BB) the risk weight was *about right*. These findings held also for the 1989–92 recession; but clearly the findings are not representative of the recent experience with securities backed by US sub-prime housing loans or with similarly rated corporate bonds.

APRA estimated that Basel II's introduction may marginally reduce the Australian banking system's required amount of capital and has advised that it will take a cautious approach toward reductions in regulatory capital during the initial years under Basel II (Egan 2007).

Australia's 20-year experience with the Capital Accord suggests the amount of regulatory capital has been adequate. Over this period there had been a recession in the early 1990s (accompanied significantly by a collapse in the commercial property market) when substantial losses were incurred at two large Australian banks (Westpac and ANZ). The capital held by these banks absorbed these losses and allowed them time to restore their capital ratios (Gizycki & Lowe 2000: 181–6). The results of the stress tests of the Australian financial system conducted by the IMF in early 2006 — that the banking system would cope (with reduced profits) under its macroeconomic shock scenarios — imply that the banking system was holding adequate capital in the tested scenarios (RBA 2006: 46).

Moreover, Australia's banks have maintained capital ratios well above the regulatory minimum. As a group, the Australian-owned banks have maintained a capital ratio of between 10 and 12 per cent and credit unions and building societies have maintained higher ratios since the introduction of Basel I, and these capital ratios increased in 2008 (RBA 2008b: 26). Such ratios reflect each bank's judgement of the amount of capital it should use in its financing. These judgements would depend on each bank's calculations of its *economic* capital requirement. Economic capital is the amount of capital a bank holds to protect its solvency from *unexpected* losses (and from inadequate provisions against *expected* losses). Its purpose is to ensure the bank is able to continue operating (that is, remain solvent) should it incur unexpected losses. Since banks have liabilities in addition to their deposits, a bank's economic capital is likely to exceed the regulatory requirement.

The evidence as at the end of 2008 (putting aside the Government's recent guarantee of bank liabilities) supports the conclusion that the capital requirement under Basel II as applied by APRA has been adequate given the approach of Australia's ADIs toward risk taking and risk management and APRA's approach to prudential supervision.

The Pro-cyclical Nature of the Basel II Capital Standard

An important criticism of Basel II is its *pro-cyclical* effects on economic activity that could amplify and prolong macroeconomic fluctuations. A substantial literature has analysed the cyclical nature of probabilities of default, exposure at time of default and losses given default and the consequences of capital requirements that are adjusted for these cyclical risk factors (such as Resti 2002; Kashyap & Stein 2004; Goodhart, Hofmann & Segoviano 2004; Illing & Paulin 2005; Altman *et al.* 2005). It is clear that regulatory capital under Basel II would increase during recessions and decrease during periods of strong economic growth. This view holds for each of the different methods for setting ratings even though, as Altman and Saunders (2001) argue, changes in corporate security ratings (by the major ratings agencies) tend to lag the changes in credit conditions.

The pro-cyclical criticism assumes that bank capital is varied according to movements in the minimum capital requirement. Banks in Australia have consistently held capital well above their required minimum and thus have always held a capital buffer. Consequently, proposals for Basel II's capital requirement to be set as an average risk across the cycle (Goodhart, Hofmann & Segoviano 2004: 599) and that regulators embed a counter-cyclical capital buffer in Pillar 2 during periods of economic growth that could be drawn upon during an economic downturn may not seriously distort banks' actual capital levels. Implementation of the latter proposal, though, would need to harmonise with

monetary policy and so require close cooperation (in Australia) between APRA and the RBA.

While actual capital ratios may be less pro-cyclical than regulatory capital, there is a good case for banks to hold a counter-cyclical capital buffer to improve their financial stability (that is, capacity to absorb lower earnings and even losses). Since the required return on equity falls as share prices increase (and vice versa), the capital buffer would be raised when the cost of equity capital is lower than if banks had to increase their capital when their share prices are depressed.

Market Discipline

The effectiveness of disclosure requirements and market discipline is the subject of a lengthy literature.

Bliss & Flannery (2001: 108–9) draw an important distinction between the roles of *monitoring* and *influence* in assessing the potential effectiveness for market discipline to enhance bank regulation. Information which is monitored, correctly understood and acted upon by investors, so that it leads to changes in the market prices of debt and equity, will result in effective bank discipline only if management responds to the changed market prices with modified risk-taking behaviour. They further point out monitoring behaviour has two pre-conditions. The first is that participants must have an incentive to monitor. Depositors covered by a perceived safety net are unlikely to have this incentive, while equity holders and holders of debt which ranks below deposits are more likely to have an incentive to monitor. The second is that the suppliers of funds must have the ability to accurately interpret disclosed information. The common answer is that most depositors are unlikely to have this ability while a greater proportion of equity and subordinated debt holders could be expected to have it, especially when they are institutional investors.

Flannery (1998) surveyed the evidence of *monitoring* and found that investors respond to and correctly interpret changes in bank conditions, that there is little evidence of irrational contagion and that on-site regulatory inspections contribute at least some information that markets use to discipline banks. Esho, Kofman, Kollo & Sharpe (2005) provide similar evidence that accounting risk measures for Australian banks are accurately reflected in the risk spread on bank subordinated debt over the return on Australian Government securities. However, Bliss & Flannery (2001: 141) found little evidence to support the *influence* dimension of market discipline and argued that it would be dangerous for regulators to rely on a market discipline mechanism in the absence of evidence that *supports* its existence. For this reason, commentators such as Gup (2004b: 82–4 and 86–8) and Kaufman (2004: 46) argue that Basel II's Pillar 3 provisions are likely to contribute little to effective bank supervision.

Calomiris & Powell (2001), however, suggest an alternative channel by which market discipline might enhance prudential supervision. They argue that the monitoring effect may impose discipline not on bank managers but on regulatory authorities, overcoming a problem of *regulatory forbearance* identified by Boot & Thakor (1993). They argue that regulators may delay taking corrective action when banks become financially distressed because of the high cost to taxpayers of closing a troubled institution and, instead, rely on the hope of bank recovery. The forbearance of APRA toward HIH in late 2000 and early 2001 prior to its \$5bn insolvency appears to be a case in point. The regulator delayed conducting a formal investigation into HIH's financial situation that should have been triggered by its failure to submit its quarterly financial statement for December 2000. The HIH case, though, illustrates that the *regulator* was not influenced by the market's discipline since HIH's share price fell sharply (from \$1 to \$0.20) in late 2000. Presumably APRA will not repeat this mistake and so the introduction of Pillar 3 should mean that the regulator will be *influenced* by market signals and so place pressure on ADI management to do likewise.

Impact on small-business lending

Under Basel II loans to small and medium-sized businesses (SMEs) can be treated as either retail loans or corporate loans. The former are pools of standardised smaller loans whereas the latter are customised larger loans. Under Basel II retail loans attract a lower capital charge (6 per cent); one reason for which is the view that such loans are less sensitive to systemic risk than corporate loans (Jacobson, Lindé and Roszbach 2005: 44). This view has attracted some debate but, irrespective of its validity, Altman and Sabato (2005) argue that (particularly in the US banking system) larger banks are more likely to be able to benefit from the lower charge. Berger (2006), though, concludes otherwise, arguing that the SME loan market is segmented and larger banks are unlikely to enter the segment dominated by smaller banks. Given the dominant role of Australia's large banks in the SME loan market it seems unlikely that the treatment of retail loans under Basel II will have much influence on small-business lending or on which banks dominate this segment of bank lending.

Basel II and competitive neutrality

Under Basel II credit and operating risk weights determined under the standard approach are likely to be higher than under the internal ratings approaches (McDonald & Eastwood 2000; Egan 2004: 4; Egan 2007; BCBS 2003: 4). This raised the concern that the smaller ADIs (the regionals, credit unions and building societies) would be placed at a competitive disadvantage to the larger banks by the different methods for calculating risk factors. Egan (2004: 7) disputed that requiring smaller banks to hold larger amounts of capital represents a distortion of competitive neutrality. Egan argued that small ADIs are inherently riskier

than larger banks since they have less-diversified loan portfolios and so face greater risk.

A related concern is the impact that Basel II might have on concentration in the banking industry. Given that the internal-ratings approaches under Basel II imply a lower regulatory capital requirement (than the standard approach) they represent an economy of scale that would encourage consolidation between banks. The merits of this potential impact would depend on the form of consolidation and whether the outcomes are anti-competitive. Mergers between regionals (such as between Bendigo and Adelaide banks) would be less likely to be anti-competitive than mergers with a big bank (such as between Westpac and St George and between the Commonwealth and BankWest). Where mergers enable the new organisation to adopt superior risk-measurement techniques this would be in the public interest. But fewer bigger banks intensifies the 'too big to fail' dilemma for APRA and ultimately for the community (through the cost of bail-outs, should they occur). A more concentrated banking industry may also increase contagion risk within the wholesale payment system.

Basel II and the global financial crisis

The GFC began to take hold in 2007. Its origins can be traced to a boom in US housing prices between 2002 and 2005 and the rapid growth of *sub-prime* housing loans following a doubling of the amount of prime loans between 2001 and 2003. Consequently, the crisis largely preceded the introduction of Basel II, which in Australia was at the start of 2008 whereas in the USA it was introduced over 2008 in parallel with the current requirements and applied only to the large internationally-active banks.

Sub-prime loans are those made to borrowers with a weak capacity to make their loan payments (compared with *prime* loans) and thus an increase in such lending represents a decline in lending standards. Sub-prime loans though were encouraged in the US as a way of democratising lending by providing loans to those who were not eligible for prime loans, including minorities. The loans' business model, though, was flawed because it depended on continuously rising prices for the mortgaged properties. The assumed capital gain served to compensate the lender for losses from loan delinquencies or encouraged delinquent borrowers to refinance with the lender at a higher interest rate.

The growth in lending for housing promoted an increase in the supply of housing that resulted in the stock of housing exceeding the demand. This led to a fall in housing prices that was exacerbated by the high (and rising) rate of mortgagee sales from the sub-prime loans. The crisis quickly spread to the securities markets because most of the sub-prime loans were securitised through asset-backed commercial paper (short-term securities that provided initial finance for the loans) and MBSs (long-term bonds that ultimately funded the loans). The

value of the highest-rated (AAA) of these securities (surprisingly, most MBSs based on sub-prime loans were rated AAA) halved between July 2007 and March 2008, which created a major credit crisis for two reasons. First, new issuers could not borrow because they could not afford the resulting higher interest rate and, second, investors only wanted to sell the securities; and so liquidity in both the primary and secondary markets for MBSs dried up.

The crisis spread to the related markets for *structured securities* such as collateralised-debt obligations (the collateral for which was sub-prime loans) and for credit-default swaps, drying up liquidity in these markets. A related feature of the credit crisis was the retreat by investors to US Treasury and other 'safe' bonds, driving down their yields and further widening the credit spreads between them and those for structured and similar securities. The crisis spread to the large US investment banks (they were not subject to prudential supervision) as well as commercial banks when it became clear that they held large amounts of these ('toxic') securities on their balance sheets and this contracted the flow of funds by banks (and even more disturbingly) between banks. The global nature of the affected financial markets and a surprising lack of information about banks' exposures (which spread fear) meant the credit crisis quickly became global in scope.

The BCBS, along with other pan-national agencies (Knight 2008), has analysed the causes of the threat the GFC poses for global financial stability and the Committee announced (in March 2008) it was developing four amendments to Basel II in response:

1. In relation to Pillar 1 it was examining the adequacy of the capital charge for structured securities given their highly correlated risk exposure (being backed by assets of the same type) which led to their sudden downgrading. The value-at-risk method of assessing the capital requirement for such securities during periods of low volatility did not adequately reflect their credit risk when volatility suddenly increased. Concern had been expressed when Basel II was being developed about the shortcomings of value-at-risk models in the context of financial system instability. (Goodhart, Hofmann and Segoviano 2004: 598)
2. The Committee was also developing a credit-default risk charge on assets held in banks' trading books. This is in recognition of the credit risk posed by structured credit products that do not have a liquid secondary market.
3. In relation to Pillar 2 the BCBS is proposing that regulators widen their stress tests of banks' risk-management systems to include contingent credit exposures such as those that arose when banks took back securitised (or collateralised) assets for reputation reasons.

4. The BCBS is also reviewing its disclosure requirements (under Pillar 3) in relation 'to securitisations, conduits and the sponsorship of off-balance sheet vehicles' (Wellink 2008; BCBS 2008b).

Prior to the crisis the BCBS had begun a review of liquidity-risk management and supervision, but given that market and funding illiquidity are core aspects of the credit crisis, the work was given greater priority. The intention is to strengthen its standards for liquidity-risk management and supervision, especially in relation to liquidity stress testing that includes off-balance sheet exposures and for funding capacity during periods of wholesale market funding illiquidity; as well as its reporting and disclosure standards relating to liquidity (BCBS 2008a). APRA has responded by intensifying its monitoring of bank liquidity and by strengthening its liquidity-management requirements on banks.

The GFC provides a real-life stress test of the stability of the financial system and the regulatory framework that is intended to promote the financial system's stability. Basel II forms a fundamental part of the prudential supervision of individual banks that serves to strengthen their individual stability through their capital buffer; but it does not aim to *ensure* financial system stability. Consequently, despite its recognised flaws, which the BCBS has moved to remedy, Basel II did not contribute to the emergence of the GFC. As noted above, the origins of the crisis pre-dated the introduction of Basel II in the USA. The same cannot be said about the anti-regulation political culture in the USA.

In the USA, sub-prime lenders included non-depository 'mono-line' lenders (referred to in Australia as 'loan originators') and large banks, as well as community banks, consumer finance companies and thrifts, many of whom along with investment banks arranged the issue of MBSs (Ashcraft and Schuermann 2008). As noted above, Basel II has been applied in the US only to their internationally active commercial banks. The widespread use of originate-to-distribute lending in the US has been referred to as a 'shadow banking system' that increasingly relied on a flawed originate-to-distribute model (Ashcraft and Schuermann 2008 detail the various flaws), which in the case of sub-prime loans was based on a business model that itself was seriously flawed (because of its reliance on ever-increasing housing values and its incentives for predatory lending and borrowing). It should be recalled that the process of *securitisation* that enabled the originate-to-distribute lending model was an acclaimed financial innovation that accessed investors' funds for housing loans and so placed competitive pressure on bank lending.

The question for the prudentially-regulated banks that decided to undertake either sub-prime lending or underwrite the issue of MBSs (or otherwise establish an exposure to structured securities) is why their capital requirement (their capital ratios exceeded those of Basel I) did not motivate them to act more prudently. The answer appears to be that the motivation provided by their

capital requirement to act prudently was outweighed by the pressure posed by competing institutions that were making profits from their appetite for risk taking; greed outweighed fear. The related question is: why did their prudential regulator tolerate their risk exposures? There is now a growing literature criticising the forbearance of financial and prudential supervision in the United States (Kane 2008; and Ashcraft and Schuermann, 2008). The role of ratings agencies and their supervision has also been criticised given the conflict of interest faced by the ratings agencies in assigning their AAA rating to securities based on sub-prime loans.

Fortunately, this debacle was not replicated in Australia. Sub-prime lending was largely confined to three smaller loan originators (Pepper, Bluestone and Liberty Financial) and Australia's banking system had very little exposure to the toxic securities (Debelle 2008: 43). Consequently the banks were not under competitive pressure to enter this segment of the loan market. The initial impact in Australia was in the inter-bank market, where the Australian banks became reluctant to lend to each other, preferring instead to increase their balances held with the RBA.

The main impact in Australia has been via the higher credit spreads in overseas financial markets, which had a relatively greater impact on non-bank lenders (the loan originators) because domestic and overseas MBSs markets had been their funding source. Deprived of funds, these lenders switched into mortgage brokerage, leaving the banks with an even larger share of the housing-loan market. The Government's guarantee of ADI liabilities has further strengthened the position of the large banks within the Australian financial system (RBA 2008b: 21–36).

APRA's review of credit standards for housing loans in 2006 (as well as the RBA's efforts to contain Australia's housing prices in 2002 and 2003) represented a stricter regulatory environment than occurred in the US. APRA's Chairman concluded a speech made in June 2007 with the following observations:

In repeating our concerns about credit standards, I am conscious that APRA might be perceived to be 'crying wolf' too often on housing lending. No one would welcome a continuation of Australia's economic strength and the recent resilience of most housing markets — from which ADIs have been major beneficiaries — more than the prudential regulator. Nonetheless, the risk currents in housing lending have been moving, slowly but inexorably, in one direction only and this demands careful management by our regulated lenders, and constant vigilance on APRA's part. (Laker 2007)

The comparison between the US and Australia's experience is instructive. Supervised banks in both systems employed similar levels of capital but many of the large US banks behaved less prudently than the large Australian banks

and the Australian financial regulators displayed much more vigilance than the US regulators.

Conclusions

Basel II represents a substantial improvement on Basel I because of its more extensive integration of the capital requirement within the prudential supervision framework through its greater risk-sensitivity and comprehensive coverage of banking risks. Shortcomings (particularly in the modelling of credit risk) revealed by the GFC are being addressed, which should ultimately strengthen Basel II.

Of the concerns debated during the development of Basel II the main outstanding issue is its pro-cyclical effect. It is unlikely to be evident during the current economic crisis because of the greater effects of the GFC; illiquidity of markets and the tightening of lending standards by banks. But Basel II should be modified to counter its pro-cyclical effect.

The main lesson of the GFC for Basel II is that bank capital is a necessary but not *sufficient* requirement for a bank's stability. Prudential regulators need to be vigilant because the intended influence of the capital requirement on banks' risk-taking behaviour can be outweighed when competing institutions profit from their greater risk appetite, especially when there is a too-ready acceptance of financial innovation.

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The Paradox of National Water Savings: A Critique of 'Water for the Future'

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Abstract

The Commonwealth's assumption of greater control over water policy has been justified on the grounds that a 'national approach' to the problems in the Murray-Darling Basin is required to resolve the ills of the Basin. This paper investigates the validity of this contention in the context of the Federal government's 'Water for the Future' manifesto. The paper argues that the current naïve understanding of 'water use efficiency' concepts is likely to stymie any purported basin-wide gains from a 'national approach' to water policy.

Introduction

The Howard government's *National Water Plan for Water Security* culminated in the Commonwealth Water Act in 2007.³ A key component of this approach is a focus on the formulation of water resource policy at the national level, or at least at the whole-of-basin level in the context of the Murray-Darling Basin. The justification for this approach is that a national body is best able to assess and deal with basin-wide problems and overcome the dilemmas arising from competition between differing state jurisdictions.

Consequently, the Water Act (2007) legislates for the establishment of the Murray-Darling Basin Authority which, amongst its other obligations, has responsibility for 'ensur[ing] that Basin water resources are managed in an integrated and sustainable way' (Department of Environment, Heritage, Water and the Arts 2008). Gaining universal agreement for the Murray-Darling Basin Authority at the Council of Australian Governments (CoAG) meeting in July 2008 was proclaimed as one of the most significant accomplishments of CoAG.

The rationale for superordinate management of water resources in an interconnected basin resonates with many in the electorate. The extant degradation of the Murray-Darling Basin's riverine environment has been used to illustrate the urgent need for national intervention. For example, in the context

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³ In April 2008 the newly elected Federal Labor government signalled its intention to continue, in the essentials, the Howard government's approach to Australia's water resources.

of over-allocated water resources the Federal Minister for Climate Change and the Environment observed that 'like many areas of public policy involving multiple levels of government, water policy has been derailed by bickering and blame' (Wong 2008a: 2). Similarly, the Minister argued that Commonwealth action was required to ensure that the nation as a whole 'make[s] better use of our available water resources' (p.3). Hopefully, and perhaps naïvely, the Minister also contends that 'this means improved efficiency and productivity of water use, and better use of water markets to optimise the economic benefits that water brings'.

Notwithstanding the political appeal of national control of water resources in connected systems (such as the Murray-Darling Basin) and the mileage from proclaiming the benefits of water-use efficiency, the most recent episode of national intervention does not augur particularly well. A superficial understanding of core concepts such as 'irrigation efficiency' and the pervasive influence this can have over the allocation of funding, provide grounds for questioning the efficacy of the national control of water resources. Put simply, the benefits of a system-wide approach to decision-making are quickly eroded when the criteria upon which decisions are predicated are themselves seriously flawed.

Of particular concern in this context is the resolution by the Federal government to co-sponsor the modernisation of irrigation in Victoria to the tune of \$1 billion. We contend that this stands to significantly reduce the quantum and reliability of water supplied to those who extract water downstream of the Goulburn Valley, and also seems likely to weaken existing environmental claims in the River Murray. The assertion by some that national decision-making is a sufficient condition for achieving improved environmental outcomes in the Murray-Darling (see, for instance, ABC On-Line 2007) is thus both overly-optimistic and unhelpful.

The circumstances that have led to these events are traced in this paper. We argue that downstream states such as South Australia, which ironically has been amongst the most vociferous supporters for increased national intervention, will be a significant loser as a result of upstream 'renovation' of irrigation. We also aim to shed light on the flawed use of concepts such as 'water-use efficiency' particularly when it is portrayed as an environmental saviour and thus deserving of support from the public purse.

The paper comprises four parts. In the next section we briefly outline the political and policy background that gave rise to the decision by the Federal government to play a greater part in water policy. This is followed by a review of the various concepts of water-related efficiency. Importantly, this section illustrates the critical issue of scale when measuring and accounting for water use. The *Food Bowl Modernisation Project* (FMP) in northern Victoria and the

Federal government's decision to support this project with a \$1 billion injection from its own coffers are reviewed in the fourth section. The final section comprises some brief concluding remarks.

The Policy Context for Federal Intervention

Australia's water resources were unequivocally vested in the states when the constitutional reformists chose to reject the doctrine of riparianism⁴ in the late nineteenth century (Musgrave 2008: 35). This was ratified in the constitution itself by the inclusion of Section 100 which sought to constrain interference by the Commonwealth and limit national powers to 'abridge the rights of the State or of the residents therein to the reasonable use of waters of rivers from conservation or irrigation'. Given such a strong stance against Commonwealth intervention, this meant that agreement was required between those states that shared the water resources in the Murray-Darling Basin. Accord originally took the form of the River Murray Agreement of 1914 which has subsequently evolved into the Murray-Darling Basin Agreement. These arrangements leave Basin water management in the hands of representatives of each of the signatory states plus an agent of the Commonwealth. Notwithstanding that the Commonwealth intermittently played an influential role in several earlier water-policy decisions, such as the Snowy Mountains development, the Commonwealth's authority over water resources in the Murray-Darling remained largely in line with the intentions of the constitution until the mid 1990s.

Commencing with the CoAG Agreement on Water Resource Policy in February 1994 and the related Competition Principles Agreement of 1995, the Federal government has progressively sought to increase its influence over the water-policy agenda. For the first decade or so, this was accomplished primarily through the suasive influence of the Federal purse. The early CoAG reforms and the National Water Initiative (NWI) of 2004 were all premised on state jurisdictions complying with a national framework in order to be eligible for tranche payments from the Federal government. As an illustration of the rise of national and collective decision-making, almost half of the projects embodied in the 2004 NWI required national action or a heavily coordinated response from state jurisdictions (McKay 2008: 55). However, the primary mechanism for achieving this cooperation was the \$2 billion to be allocated by the National Water Commission as part of the Australian Water Fund.

These arrangements changed markedly in 2007 when the then Prime Minister announced his intentions to legislate a National Plan for Water Security. At the time, the Prime Minister expressed exasperation about the slow progress on reform and proclaimed that 'the tyranny of incrementalism and the lowest

⁴ Riparianism effectively allows landowners to exploit water that attends or adjoins their property on the proviso that such use does not unreasonably interfere with the existing rights of other landholders.

common denominator must end' (Howard 2007: 1). Similarly, Prime Minister Howard decreed that national intervention was required to solve the problems of the Murray-Darling Basin and argued that 'as long as integrated water systems are being managed piecemeal by governments with competing interests, the execution of even the best national agreements will remain challenging and contentious'. National decision-making was espoused as the solution to water management in the Basin.

To give effect to the *National Plan for Water Security* Prime Minister Howard sought the referral of state powers from Basin jurisdictions. In return the Commonwealth committed about \$10 billion over 10 years to address environmental degradation and over-allocation. The largest portion of the funding (\$6 billion) was to be allocated towards engineering solutions to enhance the 'efficiency' of irrigated agriculture. This 'modernisation' of irrigation was claimed to deliver 'water savings' which could then be used to underpin environmental sustainability.

The *National Plan for Water Security* was both hurriedly prepared and ambitious. Given the government's standing in the electorate at that time, the formulation of the *National Plan* was arguably more an act of political desperation than it was a response to concerns about deficiencies in water-resource management. As Watson (2007: 1) noted, the authors of *The Plan* were 'not claiming spurious accuracy for their major proposals. As subsequently emerged, the ten-point *Plan* to spend \$10 billion over ten years was prepared in haste, well away from the troublesome gaze of Treasury and Finance officials and the experienced eye of the Murray-Darling Basin Commission.'

Regardless of the financial inducements on offer, the Victorian government refused to sign up to the *National Plan for Water Security* and the then Federal government proposed the Water Bill 2007 without the complete referral of powers it had sought. The Explanatory Memorandum (p.2) that accompanied the Bill argued that Commonwealth control and decision-making would 'enable water resources in the Murray-Darling Basin to be managed in the national interest, optimising environmental, economic and social outcomes'. The Memorandum simultaneously signalled that this would be accomplished by four main funding targets: namely, 'modernising Australia's irrigation infrastructure; addressing over-allocation in the Murray-Darling Basin; reforming management of the Murray-Darling Basin; and new investments in water information'.

The Howard government was defeated and the Federal Labor government took power in November 2007. In April 2008 the Minister for Climate Change and Water released a broad outline of the new government's water policy in the form of *Water for the Future*. This document generally mirrors the former government's approach inasmuch as non-trivial public funds have been earmarked for the purpose of 'modernising irrigation' whilst a lesser but

significant emphasis has been placed on restoring balance by buying back water-access rights. In the context of 'modernising irrigation', the federal government specifically undertook to sponsor the renovation of irrigation infrastructure in Victoria to the tune of about \$1 billion, bringing the total commitment from State and Commonwealth governments to \$2 billion. Some commentators have viewed the generosity of the Federal government as a reward to the Victorian government for its resistance to earlier calls by the Howard government's request for referral of powers (see, for example, Milne 2008).

Federal support for 'modernising' Victoria's irrigation was subsequently ratified at the CoAG meeting in July 2008 when a further \$103 million was committed to assist with upgrading irrigation infrastructure in the north west of the state under the guise of the 'Sunraysia Modernisation Project'. New South Wales was also offered \$1.358 billion mostly for 'water saving' initiatives in irrigation, some of which were described as being 'at the conceptual planning stage' (CoAG 2008b). A total of \$610 million was offered to South Australia, mostly for projects that purportedly 'upgrade irrigation infrastructure', whilst Queensland is expected to receive \$510 million for water projects. In the case of Queensland, \$350 million is set aside for purchasing water entitlements from willing sellers but most of the remaining funding is to assist with the 'roll-out [of] community level irrigation planning and infrastructure investment' (CoAG 2008b). By the completion of the CoAG meeting in July, the Federal government had committed about \$4.3 billion to projects across the Basin, the majority focusing on water infrastructure projects. The espoused view of CoAG was that '[t]hese measures will reduce water loss and return water to the environment to help restore the sustainability of the resource and enable a long-term future for the communities of the Basin' (CoAG 2008b).

An important caveat was added to most of these funding initiatives; that projects would be 'subject to due diligence' (CoAG 2008b). Regrettably, this is not defined with precision but presumably it is likely to be politically difficult to reverse such commitments should the projects actually prove deficient.

Setting aside the financial and political dimensions to these decisions for the moment, there must now be serious concerns about the capacity of a national water Ministry to deliver efficacious outcomes at a basin-wide scale. Of particular concern is the continuing naïve support for the view that 'modernising irrigation' or investing in 'water-use efficiency' can generate substantial and fungible 'water savings' at a basin level. A brief review of these critical concepts is presented in the following section.

Efficiency and Water

In the context of irrigation, the common perception is that increasing efficiency in agriculture can provide a solution to the water crisis and result in 'wins' for

all players (Molle and Turrall 2004; Seckler *et al.* 2003). In contrast to the economist's conceptualisation of efficiency, irrigation efficiency is primarily an engineering concept concerned with the volume of water diverted and consumed (Cai *et al.* 2001). Engineering interventions in an attempt to 'save' water or to 'reduce losses' from an irrigation system are frequently said to improve 'water-use efficiency'. However, substantial confusion surrounds these concepts, despite the fact that they are often used interchangeably. Perry (2007: 373) argues that this confusion has frequently resulted in not only ineffective, but also undesirable, outcomes from technical interventions to 'improve' irrigation efficiency.

Perry (2007) traces the development and use of various conceptualisations of efficiency back to the original contribution by Israelson (1950) that came to be known as classical irrigation efficiency. Israelson defined irrigation efficiency as the ratio of the water consumed by crops of a farm or system to the water diverted. Despite later elaboration and development,⁵ Israelson's original definition, based ostensibly on the relationship between water used by the crop and the water diverted, remained the underlying basis for water accounting.

Importantly, the classical concept of irrigation efficiency ignored the potential for return flows and recycling. Later contributions to the debate emphasised the use of ratios or fractions to describe water use and to explicitly consider the impact of return flows (See, for example, Jensen 1993; Willardson 1994; Allen *et al.* 1996, 1997). According to these definitions, water diverted for irrigation could be divided into the consumed fraction, comprising beneficial consumption (intended purposes including environmental) and non-beneficial consumption (for example, weeds). The remainder was classified as the non-consumed fraction and this comprised two groups — recoverable flows and non-recoverable flows (Perry 2007: 372).

This approach highlights the fact that not all water purportedly 'lost' from a particular irrigation district in fact constitutes a loss to the hydrological system as a whole. For instance, take the case where an irrigation district in Victoria presently generates non-consumed flows that are then 'recovered' in the form of an environmental use in the River Murray or via extraction by a downstream or groundwater irrigator in South Australia. If actions are taken to reduce the non-consumed fraction in the irrigation district, the net impact of these activities must take into account the redistribution of water away from existing users (say the environmental use or the downstream irrigator). If the intent is to 'save'

⁵ Definitional refinements included attention to the concepts of consumptive beneficial use which comprises the quantity of water effectively used to control soil salinity (Jensen 1967) and distribution and application efficiency (Bos and Nugteren 1974; Bos and Nugteren 1982). 'Distribution efficiency' is the ratio of the volume of water delivered to the fields to the volume delivered to the distribution system. 'Application efficiency' is the ratio of the volume of water needed (and made available) to meet the evapotranspiration needs of crops compared to the volume of water delivered to the fields.

water, it is vital to know whether the 'losses' from the irrigation system are in fact losses at all. After all, when water is 'lost' from an irrigation district in Victoria it does not go to Mars. Similarly, in an international context, Sakthivadivel and Chawla (2002) expose the flawed reasoning that redirecting seepage losses to cities was seen as the best way to increase supply without impacting existing uses, but the 'losses' were found to be already tapped by other users.

The issue of scale of analysis assumes particular importance in this context and further developments in water accounting conceptualised the idea of water balance at the basin level (Molden and Sakthivadivel 1999; Perry 1999; Seckler *et al.* 2003). In an Australian context, Gyles (2003: 13) demonstrates the 'illusory' nature of water savings and argues that this derives from '...errors in logic and the inability or reluctance of the promoters to view water flows in a systems context'. Notwithstanding these developments, 'improvements' in irrigation efficiency continue to be calculated at farm or irrigation system level without regard for the overall impact on basin balances.

The importance of scale

At the global level in the long term, evaporation from water bodies and evapotranspiration from land and vegetation must equal precipitation. However, as soon as the frame of reference is spatially or temporally narrowed, flows across borders become of vital concern (Perry 2007). Similarly, Perry (2007) notes that only where river flows are sufficient to meet demands, can irrigation efficiency be examined in isolation (as is done in classical efficiency). Thus, given the intensified sectoral competition under conditions of severely limited supply, it becomes increasingly important to conceptualise water use at the basin level. From this perspective, distinctions must be made between consumptive uses which remove water from the current hydrological cycle and non-consumptive uses which return the water for potential reuse. Moreover, 'changing scale draws us from a mere question of cost-effectiveness of water-saving technology into a wider and thornier question of water allocation, rights to extract water and regulation of its use' (Molle and Turrall 2004: 10).

Adopting a 'basin-wide' perspective invokes the 'water-efficiency paradox' since when water is used, a substantial part of it is not 'used up' but is retained within the hydrological system (Seckler *et al.* 2003). It is therefore possible for each component part of a water system to exhibit low water-use efficiency but when viewed from the perspective of the system as a whole, it may be quite efficient. This paradox means that there are many instances of purported water 'savings' that when analysed further amount to no more than a redistribution. For example, Molden and Sakthivadivel (1999) illustrate the importance of the scale of analysis in estimations of classical efficiency, citing the example of Egyptian irrigation, which is approximately twice as efficient when measured

at a basin level compared to the field level. In simple terms, this arises because water that is 'lost' or 'leaks' from upstream users is frequently recaptured by downstream users.

Seckler, Molden and Sakthdivadivel (2003: 37) argue that the potential to 'save' water is overestimated as the application of a majority of the concepts of water-use efficiency '...systematically underestimate the extent of existing efficiency by a very large amount'. Viewed from this perspective, gains to be made have been much overestimated and purported savings merely result in some users being able to increase their usage whilst others downstream face reduced availability. Thus, these interventions result in spatial shifts or reallocation of water rather than 'savings' (Molle and Turrall 2004). The implication is that local interventions to 'save' water are likely to alter the flow regime and impact on other users. In the case of closed basins (defined by Molle and Turrall as those with a relatively small amount of uncommitted run-off leaving the basin) with major constraints of water scarcity, gains in local efficiency eventually amount to reallocation. Clearly, the modest flows making their way to the mouth of the Murray and the much-publicised excessive demands for water in the Basin places the Murray-Darling in this category.

The literature contains a number of examples that highlight the fallacy of water savings on a basin level (see, for example, Perry 2007; 2008). Molle and Miranzadeh's 2004 case study in Central Iran highlights the interconnectedness of water users in a closed basin. They conclude that micro level conservation through canal lining, did not eventuate in the expected water 'savings' but 'only led to having more water spread and depleted locally to the detriment of users downstream' (Molle and Miranzadeh 2004: 3). Until policy-makers understand that all water that 'leaks' from a channel does not automatically constitute a loss to the system as a whole then similar policy disappointments will occur in Australia. Estimates of the quantum of water to be realised by a particular 'water-saving initiative' are all-too-often exaggerated because the only water that can really be saved is that portion that enters a saline sink or evaporates and that which is consumed in non-beneficial consumption. Even in the case of the latter (say irrigation water consumed by weeds instead of crops), this water is seldom made available for other users since farmers invariably use the 'saved' water to expand production on site.

Molle and Turrall (2004) refer to the supposed 1998 'win-win' agreement between Southern California Metropolitan Water Authority and the Imperial Irrigation district. This agreement included the lining of canals and the transfer of usufructuary rights to Los Angeles equivalent to the amount 'saved' through this measure. The actual impact of this project, viewed from a basin-wide perspective, was the deterioration in the quality of the recharge to aquifers tapped by farmers on the other side of the border in Mexico (p.4). While the

impetus for this type of agreement may be understandable in the context of competing national jurisdictions, it is difficult to discern its logic in an Australian setting.

In short, the purported 'savings' that emanate from improved storage or conservation at one point in a basin necessarily diminish that available further downstream (Molle and Turrall 2004). Moreover, any analysis of water-use efficiency must take account of the particular context (location of diversions, and so on) lest the analysis become 'worse than meaningless [causing] wrong decisions to be made economically, hydrologically and ecologically' (Perry 2007: 369).

Food Bowl Modernisation and an Integrated National Approach?

On the basis of the preceding discussion it would appear that there is some merit in taking a national approach when water resources are shared across competing jurisdictions. For example, without a national approach, a full appreciation of the downstream impacts of investments in 'water-use efficiency' in one upstream jurisdiction may not emerge. Regrettably, there is no evidence that this broader, integrated view has arisen from national intervention in Australian water policy. To illustrate this problem we use this section to describe and analyse the *Food Bowl Modernisation Project* (FBMP), which recently won the support of the Commonwealth government. Similar arguments may well apply to other projects of this genre although the absence of data on many, particularly those that are 'currently at the conceptual planning stage' (CoAG 2008b) makes scrutiny problematic.

The euphemistically named FBMP forms only one component of the Victorian Government's ambitious water policies assembled under the *Our Water Our Future* framework in 2007. This framework also comprises the construction of a 150GL desalination plant in the Wonthaggi region, expansion of the Victorian water grid by establishing additional pipelines between major centres, increased capital expenditure on water-recycling projects and additional support for water-recycling programs.

The FBMP has six key elements.

First, manual structures for managing the supply of water via channels are to be replaced with automatic channel-control technologies.

Second, some sections of the open-channel network are to be replaced with pipes and/or remodelled.

Third, Dethridge wheels (which measure water use) are to be replaced with more accurate metering devices.⁶

Fourth, changes to water charging to reflect the additional investment base are foreshadowed.⁷

Fifth, some farm system adjustments, such as a reduction in the number of off-takes,⁸ are anticipated as part of the project.

And sixth, a sequence of consultations and communication to adjust to different service demands are predicted (DSE 2008).

The FBMP reportedly aims to 'save' 225GL of water per year by improving distribution efficiency with the resulting 'savings' to be shared equally — one-third being allocated to irrigators, one-third being exported to Melbourne via the Sugarloaf pipeline, and another third assigned to environmental uses.⁹

In total, the *Our Water Our Future* initiatives are estimated to cost \$4.9 billion, with 90 per cent of the cost being borne by water consumers via increased charges (Victorian Auditor-General 2008: 19). Like the Howard government's *National Plan*, the Victorian initiatives were hurriedly assembled over a six-month period, largely in response to the unprecedented low inflows in 2006. Whilst the Victorian Auditor-General concedes that 'the speed of the response' may account for some of the deficiencies in planning, he nevertheless observed that 'for some of the key projects the rigour was inadequate' (p.v). In the case of the FBMP, the Auditor General specifically noted that 'the upgrade costs (reported in the plan) represent the lowest level of rigour and were, at the time, based on a preliminary study by a stakeholder group (the Food Bowl Alliance)' (p.31). Importantly in the context of 'water savings', the Auditor-General also sourced earlier work used to develop the business case for the FBMP and found that in these earlier documents 'the estimated water losses were more refined and **lower** than those published in the food bowl steering committee's final report in November 2007' (p.35; original emphasis).

In order to shed additional light on the magnitude of this problem it is worth considering some of the earlier work undertaken on water-use efficiency in this

⁶ It is a moot point whether replacing devices that inaccurately measure water will actually reduce water use.

⁷ It is not at all clear to the authors how the G-MW charges will be adjusted to account for infrastructure that is substantially gifted to irrigators by other taxpayers.

⁸ Each farm might have several points at which it draws water from the irrigation network. These are referred to as off-takes.

⁹ A gegalitre is the equivalent of a billion litres of water but the metrics of water frequently prove vexing for the uninitiated. Politicians often resort to 'Olympic swimming pools' or 'Sydney Harbour' as the metric for the convenience of voters. In the interests of providing a more meaningful comparison we offer the following: a household tap left running full for an hour will usually use 1000 litres of water (that is, a kilolitre or 1 cubic metre); the Victorian government is supporting a program to reduce Melburnians' water consumption to 155 litres per person per day, or about 226 kilolitres for an average four-person household per year; in 2007 Melbourne's annual water consumption was about 370 gegalitres.

setting. Of particular interest is a pre-feasibility assessment undertaken by Marsden Jacob on behalf of the Murray-Darling Basin Commission in 2006. This work was undertaken primarily to assess the quantum of water that might be 'recovered' from the Shepparton Irrigation Area (SIA). The project had three main goals: to reduce irrigation outfalls through channel automation; to improve the detection of losses in the channel system; and to undertake investments in seepage and leakage reduction. The SIA is only one of six districts covered by the FBMP but the empirical approach and findings are instructive on several grounds.

To estimate the quantum of water that might be 'saved' by this project Marsden Jacob and Associates (2006) categorise the various forms of distribution losses within the irrigation network. In the context of the proposed automated channel technologies that forms a core part of the FBMP, the greatest potential for 'savings' is attributed to the water 'lost' through channel outfalls. A channel outfall is the mechanism by which excess water and return flows pass from the irrigation network to the surrounds. In some instances, this will be a structure that links to a river or, in other cases, water might pass to a swamp, creek or depression.¹⁰ Marsden Jacob and Associates (2006: ESiii) concede that 'the destination or final use of this return flow is unknown but could conceivably include extractions by diverters in the Goulburn and Broken system or discharge into the River Murray where it becomes part of the tributary contribution to Victoria's share of the River Murray water resource. Notwithstanding this caveat and numerous instances where data were unavailable or embodied significant measurement error (see, for instance Marsden Jacob and Associates 2006: 16; 21) the study arbitrarily assumed that differing percentages of the water that entered outfall drains constituted return flows. These range from an assumed 10 per cent return flow for four large drains to 100 per cent return flow where the outfall was directly to a river. An accompanying assumption was that 50 per cent of all outfalls came about as a result of rainfall rejection flows. These flows arise when irrigators close their receiving infrastructure because of heavy rainfall during an irrigation event. Put differently, this study assumed that a significant portion of the water rejected by farmers had no other use, including maintaining in-stream flows. Whilst it is encouraging that the study at least acknowledged the existence of return flows, there is considerable conjecture about the actual volume of water involved, its present uses and possible end destination. In addition, whilst the FBMP forecasts a change in distribution efficiency from 70 per cent to 85 per cent, Marsden Jacob and Associates (2006) offer a more cautious

¹⁰ For those less familiar with irrigation it might seem odd that water would 'return' via an outfall from an irrigation network. However, irrigation is not a precise science and the water drawn off by farmers cannot always be judged accurately (say in the instance where a farmer has ordered water but rainfall forces them to 'reject' the flow for fear of waterlogging). The key issue of concern here is what happens to those flows thereafter.

outcome suggesting a change from 70 to 80 per cent as being plausible. The upshot of the work by Marsden Jacob and Associates is that there is considerable conjecture about where the water purportedly 'lost' from the Goulburn Valley is presently going. Moreover, redistributing this water under the guise of irrigation efficiency runs the risk of depriving existing users with low-ranking claims, including environmental beneficiaries.

There are two key issues here. First, water is invariably fugitive and measuring it with precision is costly and difficult. This is not unique to Australia and, as we noted in the earlier section, there are numerous projects around the world where the purported 'water savings' turned out to be much less than the original estimates used to justify the project. Second, the scale of analysis and the incentive to focus on local water use invariably leaves downstream users worse off. Without a clear view of the quantum of return flows before embarking on a 'modernisation project' it will always be difficult to assess the actual detriment to downstream users/uses. Moreover, once the project is completed it will be costly and difficult to redistribute the resource in its original configuration. This is further complicated in the context of the FBMP since one-third of the water 'saved' is purportedly to be used for environmental benefit. Since there is uncertainty about the quantum of water presently accruing to 'the environment' under the status quo, it will not be possible to test whether the 75GL assigned for 'the environment' represents an increase or decrease in environmental amenity.

Notwithstanding these uncertainties, inconsistencies and potentially flawed logic, the Federal government announced its support for the FBMP in March 2008, following the twenty-first meeting of the CoAG. In reaching this decision, the Commonwealth 'agreed in principle to fund 90 per cent of the project costs, up to \$1 billion of the Stage Two Food Bowl Project in Victoria, subject to a due diligence assessment and delivery of half the gains in additional flows to the Murray River' (CoAG 2008a: 7). The Commonwealth also signalled to other states that it intended to continue down the path of 'modernising irrigation' and funding additional 'water saving' projects. The largesse of the Commonwealth at the July meeting of CoAG gave effect to this commitment.

Regrettably, the mythology that attends 'water-use efficiency' projects seems likely to be perpetuated. Even within the academic profession there are signs that the fiscal suasion of the Federal government can override water distribution logic. In June 2008, the Federal government announced \$8.6 million of funding to two universities that have long and distinguished histories in hydrology. The project reportedly aims to 'find ways to make better use of the water we have, creating benefits for both farmers and the environment' and to 'provide farmers with practical ways to make the most of available irrigation water supplies — including rainfall and recycled water — through better planning, technology

and predictive tools' (Wong 2008b: 1). Unfortunately, there is no indication that the project will assess the impact of these measures at a wider and more appropriate scale.

On a more cynical note, the political allure of the water-use efficiency chimera shows no signs of weakening. By definition, water politics is hard work and orchestrating the genuine redistribution of a tightly held resource in favour of broader environmental interests was always going to be viewed by the polity as a zero-sum game, at best. Convincing the electorate that more water can be 'created' in order to satisfy environmental interests whilst maintaining the existing distribution of rents remains far more politically palatable, even if this approach results in long-run negative outcomes.

Concluding Remarks

The lack of precision that has attended a project of the magnitude of the FBMP and the willingness to use public monies to fund elaborate engineering projects to 'put water to better use' is reminiscent of an earlier era of water policy in Australia (see, for instance, Watson 2007). During this earlier phase, water resources were viewed as a resource to be harnessed in order to foster growth — firstly at the state level and then, incidentally, at the national level.

Many policy analysts were buoyed by the CoAG reforms which signalled a move to a more rational allocation of water resources and greater concern for the underlying requirements to maintain ecosystem health. There was also evidence of a more integrated consideration of resource management as manifested in the Murray-Darling Basin CAP, for example. Nevertheless, state governments, arguably in an effort to do the best for their constituents, had generally resisted calls for national control of water resources, unless coupled with substantial financial incentives. Decision-making at the state level also encourages excessive investment in local water-saving projects since this maintains the resource, and the benefits that accompany that resource, in a given jurisdiction. This approach was seen as counterproductive and resulting in narrowly defined decision criteria that often privileged particular water users in particular states over basin-wide benefits.

Against this backdrop the expanded role of the Commonwealth in water-resource policy in the last two years was heralded by many as a way of accelerating reform and dealing with inter-state rivalries. After all, a national government should be able to consider issues at a basin scale and establish policies that support optimisation of the resource at that level.

Regrettably, the most recent forays of the national government fall well short of this mark. Moreover, the present enthusiasm for 'modernising irrigation' stands to replicate and even exacerbate earlier mistakes. Arguably, these decisions are also illustrative of a gross misunderstanding of the rudimentary theories

necessary for making sound policy at a basin scale. As Perry (2007: 368) observes 'poor theory can lead to ineffective and even counterproductive actions. Many of the problems of water today are due to the implementation of false, erroneous or misapplied concepts of efficiency in water resource policy and management.' Regrettably, it would appear that national governments drawn into the politically appealing but flawed logic of water-use efficiency are just as capable of presiding over the degradation of the Murray-Darling Basin as are the states.

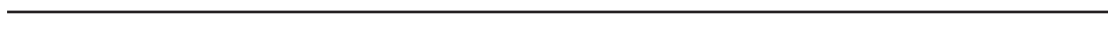
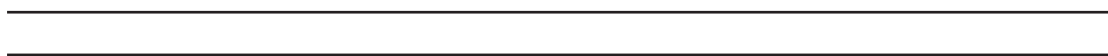
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RETROSPECT



Peter Karmel: A Tribute

Geoff Harcourt¹

In November 2008 Bob Wallace and I visited Peter Karmel at his Canberra home. We had our photo taken, by Joan Harcourt, holding a copy of *Economic Activity* (1967), that had been written by the three of us, and which had just been reissued by Cambridge University Press. It was my first book and Peter's third.² We had a very happy hour and a half. Sadly, it was the last time we were to see our much-admired and highly valued friend and colleague, who subsequently passed away at the age of 86 on 30 December 2008.

When I came to Adelaide in March 1958 to my first lecturing post, Peter was the still very young Professor of Economics at Adelaide (aged 28 when appointed in 1950). I had heard him as an undergraduate give the G. L. Wood Memorial Lecture, and he had interviewed me in early 1958 for the Adelaide post while I was doing a PhD at Cambridge. It was at Adelaide that I came to know him well before, to our great collective chagrin, he went to Flinders as its first Vice-Chancellor in 1962. When he called us into the tearoom to tell us the news, we all moaned about *our* lot at losing *him*. It was almost only as an afterthought that Frank Jarrett congratulated him on his new post!

Peter was a wonderful head. He was democratic and approachable; he also created the fiction that each one of us was his most trusted confidant so that when decisions were taken, they were almost always approved of because he had found out what the dogs were barking beforehand. He created an atmosphere of exciting intellectual teamwork, with all of us joining in, often in the tearoom, in discussions of economic and other issues, which fed into the creation of our and his papers. It was an extraordinarily happy and productive period with Peter, Eric Russell, Ron Hirst, Frank Jarrett, Russell Mathews, John Grant, Bob Wallace, Keith Hancock, Hugh Hudson, Donald Whitehead, Maureen Brunt, John Dillon, Alan Powell, Allan Barton — I could go on, but you get the picture: a youthful and outstanding department.

Rightly, Peter is greatly admired for his splendid work as a university administrator, for his contributions to higher and secondary education, for his roles in all manner of major government reports, and for his input into the arts, not least being the remarkable collection of paintings and sculptures that he and Lena built up at their Canberra home. But he was also an absolutely first-class

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² His two previous books were *The Structure of the Australian Economy* (1963), co-authored with Maureen Brunt, and *Applied Statistics for Economists* (1957). As Allan Barton noted in his splendid Eulogy at Peter's funeral, *Applied Statistics for Economics*, was 'an instant success', and adopted as 'the' textbook for many years.

economist with a capacity for work at an intensity for the whole day which most of us could not sustain for even two hours, if at all. His PhD at Cambridge, predicting population growth by looking at *male* fertility, was highly original and extremely technical; it resulted in a number of papers in brownie-point journals. I read his dissertation when I was in Cambridge in the 1950s, but I would be kidding if I said I could do anything other than admire it. So I shall write about his economics papers which I think I understand more.

Peter and Bob Wallace published a seminal article, entitled 'Credit creation in a multi-bank system', in the first ever issue of *Australian Economic Papers* in September 1962. It concerned the fallacy of analysing the banking system by using a representative bank as opposed to a population of interacting banks. Their work — or rather, the issue — was not taken up again until a couple of years ago, by the authors of a paper in the *Cambridge Journal of Economics*, who had to be referred to Bob and Peter's paper. Bob and Peter were decades ahead of the pack in exposing the fallacy of using single representative agent models in macroeconomic analysis. Through a number of carefully worked out cases, going from the simplest to complex ones, they illustrated how misleading the traditional method of examining the effects of changes in the conditions under which banks worked could be. They analysed whether convergence on a new equilibrium position or fluctuations around it would result, using both analytical and simulation approaches to get a 'feel' on the problems. Their exposition exhibits deep economic intuition allied with technical analysis which gives the reader confidence that the authors are completely on top of what they are doing.

Peter collaborated with Adelaide mathematicians B. C. Rennie and George Sved when he took issue in the *Economic Record* (Karmel 1959a) with John Pitchford and Alf Hagger, who had published a note in the *Economic Journal* in 1958 on the possibility of multiple rates of return on investment projects when some of the expected cash flows were negative. Peter showed 'that, if a project is terminable at any stage during its [expected] lifetime and provided that the scrap value is always non-negative, the marginal efficiency of the truncated project expected to have the highest marginal efficiency will be a unique value' (p.430). Negative cash flows were shown to produce multiple values 'only in very special circumstances'. The paper is marked by crystal-clear exposition, helpful diagrams and supporting algebraic proofs, including an addendum criticising Sam Soper's further note on the same issue in the March 1959 *Economic Journal*. In Adelaide we always thought that Roy Harrod, then editor of the *Economic Journal*, erred in rejecting Peter's definitive critique of Pitchford, Hagger, and Soper.

Perhaps above all, Peter was a major player in the formulation of wages/incomes policy for Australia, even if, as I believe, Eric Russell and Wilfred Salter made the deepest contributions here. In his most substantial article on

these issues — his Presidential Address to Section G, A.N.Z.A.A.S. in 1959 — he acknowledges ‘great indebtedness’ to Eric’s *Statement of Evidence* to the Arbitration Commission in the Basic Wage Case. There Eric argued that average *real* wages should be tied to ‘effective productivity’ — national productivity adjusted for the terms of trade.³ Peter’s address, published as ‘Some reflections on inflation, productivity and growth’ (Karmel 1959b), contained a comprehensive analysis of the interrelationships between the three. Peter was especially keen to get away from the then Australian practice of regarding growth of the economy as ‘a residual objective’. He wanted it placed on the same footing as full employment (without much inflation), and an equitable distribution of income, including systematic provision of public infrastructure. The Address is a model of clarity and sustained, joined-up arguments, with the formal analysis presented in footnotes. Peter belonged to the generation that was brought up on the ‘Trinity’ of *The General Theory*, *Value and Capital* and *The Foundations* and he followed Hicks’s example of persuasive prose in the text⁴ and the mathematics in footnotes or appendices. Peter’s wide reading is evident in his discussion of, for example, growth, where the contributions of Frank Ramsey and Roy Harrod clearly underlie his analysis.⁵

Peter took a pragmatic view on how ‘close’ to full employment we should aim to be. He was sceptical of Paish’s view that some slack was necessary in order to allow resource allocation to do its thing through the relative price mechanism, because Peter had a real sense of the need for buoyant ‘animal spirits’ to sustain private investment at levels which would lead to the productivity gains from the embodiment of new ideas in the capital stock through investment.

Peter was a wonderful teacher: clear, enthusiastic and able to put over large amounts of material which, nevertheless, all but the weakest students could absorb and understand. I took over his first-year course in ‘Outlay’, when he was appointed to Flinders and he lent me his very full lecture notes. They were the inspiration for our co-authored book with Bob Wallace, *Economic Activity*. When I was in Cambridge in 1963–66, I taught the first-year macro course from its proof sheets. One of my listeners was Mervyn King, now Governor of the Bank of England. I am delighted to report that three times in public (to my knowledge) Mervyn has paid tribute to its contents and presentation, saying in effect that it formed the basis of his understanding of macro economics.

Peter was a great economist and public citizen, a humane liberal thinker who always wanted to apply economics to improving the lot of his fellow Australians,

³ The relevant pages are 353–4 and 366 (n.19).

⁴ Eric used to say that Hicks wrote so well he made the confusions clear.

⁵ On the specific issue of wages/incomes policy, he had not yet come to Eric’s (and Salter’s) view that money wages should be adjusted for both overall productivity and prices, though Peter does make a reference to the classic 1957 Russell–Meade paper in the *Economic Record* on how the Australian economy works, which was the foundation of Eric’s views.

especially those who were not as gifted as him, nor as fortunate in their opportunities. He had an earthy sense of humour, innumerable friends and no real enemies (though Bob Menzies treated him very badly over the Vernon Report).

Most of all, Peter was a tremendous, devoted family man. He and Lena had six children and 16 grandchildren. The family was the centre of his being, and he and Lena formed the most wonderful team. Peter described Lena as 'the rock upon which the family has been built'. The Karmels also gave superb Faculty parties, and were kind, supportive yet really down-to-earth friends, always calling things as they were. It has been an enormous privilege to have known them.

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Helen Suzman: The Hour Brings Forth the Woman

John Nieuwenhuysen¹

In the annals of parliamentarianism in the English-speaking world, Helen Suzman may have been the best there ever was.

The Times

Helen Suzman, who died in January this year, aged 91, was a courageous, fearless and persistent critic of South Africa's apartheid regime. Her brilliant and biting attacks were based on thorough research and analysis, and driven by her passion for human rights and justice. As a Member of Parliament for 36 years, from 1953–89, she laid bare the discrimination, brutality and ineptitude of apartheid. Helen's speeches were a light to the world, an inspiration to many of her fellow South Africans, and a thorn in the flank of the ruling Afrikaner Nationalist Party.

Born Helen Gavronsky in 1917, she was the daughter of financially successful Lithuanian Jewish migrants who came to South Africa at the turn of the century. But her early days in Johannesburg did not presage subsequent worldwide renown. After matriculating aged 16, she attended the University of Witwatersrand as a commerce student and found life 'carefree and enjoyable'. She dropped out of university, aged 19, in 1937, and married Dr Mosie Suzman, returning in 1939, after the birth of their first child, to complete her degree. In this, she obtained distinctions in Economic History and (African) Law and Administration.

Helen's war years were spent with the Supplies Board, which tracked down war profiteers, a job she found 'boring but essential'. In 1945, at the invitation of the illustrious Professor Herbert Frankel, Helen was appointed tutor and subsequently lecturer in Economic History at the University of the Witwatersrand. In her 1993 memoirs, *In No Uncertain Terms*, she observed: 'Those years of teaching the economic history of South Africa were to prove enormously useful to me when I became an MP, for they provided a solid background on which to base my speeches and develop my skills in researching source material.' (p.12)

It was also during the eight years at the University that Helen joined the Institute of Race Relations and gained a detailed knowledge of the discrimination

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against non-whites, especially in the labour market and in civil liberties. She observes in her memoirs that 'before and during the Second World War, I was much more concerned about the defeat of Nazism than about the disabilities of Black South Africans. Thus I was a late starter in the field of race relations, but once I got going, I became entirely preoccupied with it.' (p.13)

After being elected to Parliament in 1953 as a member of the United Party, Suzman with nine of her colleagues formed the Progressive Party in 1959. In the 1961 election, she was the only one of the 10 to survive. Helen was thus for the 13 years from 1961–74 the only Progressive in the House. Her loneliness was accentuated for six of these years during which she was the only woman among 165 male, largely very chauvinistic, MPs. As Stanley Uys noted, Helen's complete fearlessness showed as she was 'confronted ... by some of the most menacing and odious politicians of any parliament ever.'²

It is hard, I suspect, for those accustomed to a democratic society with a free press and the rule of law to envisage the stifling and confining effect of a controlling, police-state regime, such as apartheid, on its citizens. The special edge of this for white opponents of apartheid like Helen was to be dubbed a traitor and subjected to maligning treatment, including hate mail and abusive phone calls (in response to which Helen would vigorously blow a police whistle down the line).

Ironically, onslaught on Helen's views came not only from Government ranks in Parliament (who shouted 'go back to Israel/Moscow') and other apartheid supporters, but also from some in the freedom struggle, who accused her of supping with the devil and of racism. I personally witnessed young students in Melbourne chanting 'racist, racist' at Helen when she addressed a meeting here in the 1970s. (Characteristically she refused to be silenced.)

How did such divided responses to Helen Suzman arise? Liberation movement critics alleged that she condoned apartheid by participating in the white Parliament; and they were incensed when (with British PM, Margaret Thatcher) Helen opposed economic sanctions against South Africa.

It is hard to judge the merits of the sanctions debate. But there is no doubt that Helen's parliamentary role made a remarkable contribution in publicising the evils of apartheid. Her powerful evidence-based oratory and cross-questioning spread the knowledge of how rotten was the state of apartheid South Africa. Despite being in a minority of one, Helen's invective against apartheid's leaders could hit marks with unforgettable force. She once told the Minister of Justice that he should visit his constituency 'heavily disguised as a human being', and referred to the head of State Security as 'South Africa's very own Heinrich Himmler'. She dismissed the government as 'narrow-minded, prejudiced bullies'.

² *The Guardian*, 9 January 2009.

In addition to her exceptional forensic skills in the House, Helen was a tireless grassroots operator who sought personally to help as many people as possible, particularly the vulnerable and voteless. She would take up individual cases with the administration, and was able as an MP to regularly visit those in the resistance struggle who had been imprisoned. Helen developed in this way a strong and lasting friendship with Nelson Mandela and many of his colleagues, including Mosiuoa Lekota, the leader of the recent ANC breakaway Party, Congress of the People (COPE). As to whether this made a difference to the lives of the freedom fighters, Professor David Welsh's tribute to Helen recounts an episode when, with her, in 1989, he visited Zambia to meet ANC people: 'A young militant accosted her, saying that serving as an MP legitimised an unjust system. Helen ... turned to Steve Tshwete, a former Robben Islander, and subsequently a Cabinet Minister, and asked him whether she had made a difference. Tshwete simply put his arms around Helen and hugged her.'³

However, Helen was fiercely independent, and did not resile from criticising the ANC when she felt that there were excesses in the liberation struggle or, after freedom, in ANC-controlled government policy. This meant unpopularity for her in some circles, both in the way in which ANC leaders disparaged the role of the Progressives in the anti-apartheid struggle, and in their resentment of her policy criticisms once they gained power.

Helen's Herculean public labours did not, however, prevent her from enjoying life to the full. She was a gregarious, warm, fun-loving person, strongly attached to family and a wide circle of friends, and possessed of a great sense of humour. (David Welsh tells of an occasion over lunch with Helen and foreign diplomats in the South African Parliament dining room when, served a dubious looking fruit juice, she raised her glass to the light and said: 'Cloudy today, Doctor.')

My own limited contact with Helen Suzman leaves a memory of a kind, caring, inspiring and generous person. Prior to her visit to Australia in the 1970s, Helen had met my father in Pretoria and offered to contact me in Melbourne. Despite a busy schedule, she did so and, on her return, wrote a lovely letter to my Dad, summing up my condition precisely in Afrikaans: '*Ek dink hy verlang na sy vaderland*' — I think he longs for his fatherland, which was exactly so.

In 1994, after the first free elections in South Africa, I heard that Helen was to visit Australia. As Director of the Bureau of Immigration, Multicultural and Population Research, I invited her to address a meeting in Melbourne and she accepted. Held at Mietta's wonderful premises, and filled to the rafters, Helen was greeted as the hero she was. Sir Zelman Cowen, a former Governor General, chaired the occasion, and Sam Lipski, then editor of the *Jewish News*, and Dr Jay Sadhai of the South African Cultural Association, spoke eloquently in

³ *Cape Times*, 10 January 2009.

welcome. Helen's own speech lasted 50 minutes, and was brilliantly delivered, without a note. She held the audience in the palm of her hand, and along with the new South African anthem, *Nkosi Sikelela Afrika*, it sent tingles down the spine.

There is an old saying that the hour brings forth the person. In South Africa's hard road to democracy, several great people rose to the occasion, including four Nobel Prize Winners — Luthuli, Mandela, Tutu and de Klerk. Helen Suzman was twice (unsuccessfully) nominated for the Nobel Prize, so obviously at least some close to the throne believed she deserved one. Nonetheless, she received a remarkable list of honours, including Dame of the British Empire (though under Britain's quaint rules, non-British citizens are not able by custom to use the title, as in 'Dame Helen Suzman'). Even more impressive were the 26 prestigious honorary university doctorates which she was awarded. The bravery and isolation of her struggle in the South African Parliament and society against apartheid deserved these accolades.

Helen Suzman was an inspirational leader who believed that right must be done, and laboured tenaciously with all her heart and soul to try and make it so.

REVIEWS

Bruce Chapman (ed.), *Government Managing Risk: Income Contingent Loans for Social and Economic Progress*

(Routledge, London, 2006)

Chris Jones¹

Motivated by a desire to increase the participation rates in higher education of individuals from disadvantaged backgrounds, the Whitlam Government significantly increased subsidies to education. But the ensuing burdens this placed on the government budget led to supply restrictions that limited growth in student numbers without significant changes in the socio-economic composition. As these subsidies are largely regressive in nature, with most of the benefits flowing to recipients by way of higher future earnings, the Higher Education Contribution Scheme (HECS) was introduced in Australia in 1989. This was not only a politically clever way of increasing the small upfront fees that had been reintroduced in 1983 as the Higher Education Administration Charge (HEAC), but also salved the concern that higher fees would create problems for potential students from low-income groups who could not borrow against their human capital. The HECS gives students access to 'income-contingent loans' — ICLs — that are repaid only when their taxable income rises above a threshold reflecting average income.

Government Managing Risk: Income Contingent Loans for Social and Economic Progress examines the costs and benefits ICLs made by the public sector. It looks at ways of using them to collect revenue from beneficiaries of government spending, and to manage risk. Most of the chapters are written by Bruce Chapman, who advised the Wran Committee that recommended HECS in 1988.

Part I looks at using ICLs in higher education and provides a summary of the HECS in Australia. After a brief overview in Chapter 1, efficiency and equity concerns are examined in Chapter 2 as a basis for considering higher education funding. In particular, the case is put for charging fees. There is a detailed summary of the arguments for and against ICLs in Chapter 3, where income and consumption profiles for students with HECS debts are compared under (government-guaranteed) bank loans and ICLs. It is argued that ICLs generate

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insurance and consumption smoothing benefits not provided by bank loans. In particular, people who default on repaying their debt are not forced into bankruptcy under ICLs. Two types of ICLs are considered: those with 'risk pooling' (where the default risk is spread across other borrowers under the scheme), and those with 'risk sharing' (where the default risk is transferred to taxpayers), as well as graduate taxes and human-capital contracts as other ways to fund education spending.

In my view, the main advantage of HECS, which uses risk-spreading ICLs, is that it corrects the regressive redistribution from subsidies to higher education. By doing so, it generates revenue that can be used to expand the supply of higher education places. It is unfortunate that under the current arrangements students have limited ability to affect the nature of the service provided to them by public universities, but that is not really the fault of the HECS. Instead, it is more to do with the way governments in Australia attempt to create pseudo-markets where outcomes meet social and political objectives which would not be realised by private-market outcomes (even with partial subsidies). In this regard, there are circumstances where some of the externalities, which are used to justify government intervention in the first place, may be negative. Poor incentives under public provision can lead to bad education outcomes which are difficult for individuals to avoid.

Other policy applications for ICLs are examined in Part II. There is examined a proposal to collect drought-relief payments (Chapter 7) and criminal reparations (Chapters 8 and 9), the provision of finance to economically disadvantaged regions (Chapter 10) and loans to low-income households (Chapter 11). In most of these applications, borrowers have some form of collateral, which is not true for loans made for higher education fees, and that significantly weakens the case for governments using ICLs. It would be better not to make expenditures which are going to be collected from agents who can access finance in private markets. Thus, any social benefits from using ICLs in these circumstances must come from their ability to provide risk benefits that cannot be obtained from trading in private markets.

It is argued throughout the book that there are two critical advantages of risk-sharing ICLs — consumption smoothing and protection against default. By allowing individuals to repay loans when their incomes rise above a prescribed threshold they can smooth consumption over their lifecycle. And as noted above, those without high-enough taxable incomes to repay their loans are not forced into bankruptcy which adversely affects their credit rating and capacity to borrow in the future. But in my view, this aspect of risk-sharing ICLs is their greatest weakness. Chapter 4 cites Quiggin (2003), who argues that there are welfare gains from income-contingent repayment schemes relative to the alternative of upfront fees (yielding the same revenue in present-value terms)

due to a reduction in consumption risk. But when making this claim no allowance is made for the possibility that individuals can smooth consumption over time by trading in private markets.² In effect, it is assumed (at least implicitly) that there is no opportunity for them to diversify consumption risk when they pay upfront fees. Clearly, that overstates the potential welfare gains. Firstly, is the risk diversifiable across risky activities or is it market risk which cannot be diversified and must therefore be borne by someone in the economy?³ If it is diversifiable risk, why do markets not provide insurance? Are there prohibitive trading costs or moral hazard and adverse selection problems? If so, they should be included in the welfare analysis. Alternatively, if there is market risk, the ICLs transfer it to taxpayers who incur welfare losses when the HECS is not adjusted properly to provide them with compensation. These losses should be taken into account, and a proper assessment of the welfare gains needs to explicitly model the types of risk and what opportunities there are in private markets to diversify and spread them.

The present moment is, indeed, an opportune time to raise the concerns aired above. The current financial problems which are now spilling over into real economies had their origins in the home-mortgage markets where governments have provided (often implicitly through their actions) lender-of-last-resort facilities which transfer market risk to taxpayers. These problems were exacerbated in the United States by the Community Investment Act (1973) and the subsequent Acts to establish Freddie Mac and Fannie May, which encouraged significant lending to low-income groups without the capacity to repay under commercially viable terms. Many government policies have been justified by the risk benefits they provide — for example, commodity price-stabilisation schemes and macroeconomic stabilisation policies — but they frequently ignore the market risk transferred to taxpayers. When no risk premium is paid by the beneficiaries they ‘over invest’ in risky activities.

In higher education there is concern that students face uncertainty about completing their studies, the prospects of getting employment in their field of study, and the wages they can expect to receive. But why should this risk be shifted to taxpayers or, for that matter, spread to other students under risk-pooling ICLs? It is unlikely that public-sector employees have better information or face the appropriate incentives to assess this risk than do private

² Newbery and Stiglitz (1981) do the same thing when they measure the welfare effects of commodity price-stabilisation schemes. They argue private markets do not provide insurance due to moral hazard and adverse selection problems, but they do not consider whether these schemes are effective when the government also faces the same problems. Dixit (1987; 1989) shows how price stabilisation schemes are largely ineffective once moral hazard and adverse selection are included in the welfare analysis.

³ Diversifiable risk can be eliminated by pooling it across agents, whereas market risk cannot be diversified in this way. When insurance trades at actuarially fair prices (in the absence of trading costs), diversifiable risk can be eliminated at no expected cost to consumers. In contrast, market risk attracts a premium to compensate those who bear it for the variance it imparts to their consumption.

lenders. A quote from Bruce Johnstone on page 23 argues that private lenders will require a creditworthy cosignatory or a credit-worthiness test of the borrower based on academic credentials or demonstrated employment prospects. They do this because they have no collateral when lending against returns to human capital. But the argument that this demands government intervention to absorb the risk does not immediately follow without considering the costs and benefits of the other options. Later in Chapter 3 consideration is given to the idea that repayments of ICLs made by private lenders could be collected by the government through the tax system. At least private lenders are likely to have better incentives and are better situated to properly assess the risk of individual students, and would be able to include the appropriate premium in their loans.

There is evidence in the book that the HECS has not much changed the socio-economic composition of the students, and that most of the additional enrolments have arisen from expansion in higher education places. Thus, it is the rationing of places at public-sector universities that is restricting the growth in borrowing and, as a consequence, the amount of risk being shifted onto taxpayers. But if risk-spreading ICLs are extended to other activities where collateral exists, and where demand and supply is less regulated, agents are encouraged to 'over-invest' in these activities with outcomes similar to those being experienced at the present time in the financial sector .

Since the main justification for using ICLs is based on risk benefits, I believe the analysis of the economic effects of the changes in risk bearing needs to be expanded considerably in the book. However, as well as providing a very useful summary of the HECS in Australia, it gives readers a great deal to think about: for example, the subtle changes in incentives under ICLs that can have unintended consequences.

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Timothy Kehoe & Edward Prescott (eds), *Great Depressions of the Twentieth Century*

(Federal Reserve Bank of Minneapolis, 2007)

Declan Trott¹

What makes a Great Depression? Worldwide mass unemployment and shrinking output, as in the 1930s? Or secular deflation, as in the late nineteenth century?

In this collection, none of these conditions — unemployment, deflation, absolute falls in output or worldwide contagion — is necessary. A Great Depression is simply a 20 per cent fall in output per capita, relative to a 2 per cent p.a. trend, in any single country. Thus it includes recent periods in Latin America, Japan, Switzerland, New Zealand, and Finland, as well as America and Europe in the 1930s, even if they do not all meet the strict criteria for ‘greatness’.

All of these episodes are subjected to a growth-certain accounting framework: per-capita growth is decomposed into changes in hours worked, the capital-output ratio, and a residual (TFP).² The residuals are then used in simulations with a dynamic general equilibrium model. These simulations can usually reproduce a fair share of the observed variation in output, although hours worked often recover more slowly than the model predicts. Based on these results, the editors make the extremely strong claim that ‘government policies that affect TFP and hours per working-age person are the crucial determinants of the great depressions of the twentieth century’ (p.15).

This claim is unproven, and highly dubious. It is true that in most countries the residual plays the largest role, followed by hours, and capital is insignificant. This might, however, be an artefact of the methodology rather than the data. Tracking output per capita and capital relative to output would tend to maximise the measured residual, and minimise the role of capital. A standard Solow

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² The familiar Solovian growth accounting states

$$gY = gA + sL.gL + sK.gK \text{ (g indicates growth rate, s factor share)}$$

The present authors add two more identities

$$gL = gh + gN \text{ and } gK = gk + gY \text{ (h = hours, N = persons, k = capital per unit of output)}$$

and through substitution obtain

$$gy = gA/sL + gh + sK.gk/sL \text{ (y = output per person)}$$

This is what they use.

decomposition using total output, capital and labour could have given very different results.

Even if the decomposition used here is preferable, it is a giant leap from accounting to policy. The interpretation of the residual as TFP is controversial even in long-run growth theory. It would take a brave man indeed to attribute short-run fluctuations in TFP to particular policies. And indeed, most of the contributors are more restrained than the editors. There are ritual nods to deregulated finance, competition, and trade, but most are content to leave TFP as a mystery. I certainly would not like to explain in those terms why the New Deal-ridden US saw TFP return to trend while Canada, with no significant policy changes, did not. Or why lack of fiscal discipline in Argentina should be sufficient to produce a collapse in productivity, except through some nominal channel.

Equally, on the labour side, it seems rather unfair to blame high German wages on government policy in a period when wages were actually being reduced by decree. Let alone 'Once ... wages were again market-determined, the German economy recovered as theory predicts.' Market determined? In *Nazi Germany*?! With wages set by the government-controlled Labour Front, and workers legally unable to change jobs without the consent of their employer?

Not all of the speculation is so unreasonable. It is perfectly plausible that British welfare policy retarded labour mobility in response to negative shocks in coal and textiles, or that Chile's superior bankruptcy law and freer access to finance helped it grow faster than Mexico. Yet it remains, for the most part, speculation. The growth accounting and simulations prove little. Indeed, some of the most interesting results come from other methods: the brief analyses of the role (or lack thereof) of banking in the US and Japan are an example. This is one of the few times when alternative explanations are considered explicitly, which is curious, given that the book's own website proclaims that it 'challenges the Keynesian theory of depressions'.

Overall, *Great Depressions* represents an unconvincing attempt to take real business-cycle theory to the extreme. While I would not say that it contains nothing of value, it does not establish either the specific claims of the editors, or the more general case that growth theory is useful in understanding depressions. Put another way, it does not prove that collapsing the distinction between depressions and growth accelerations/decelerations, as is implied by the use of a common growth trend, is a good idea.

In a way, this is a relief. After decades of research into economic growth, there is consensus of a kind: growth is caused by TFP, but we don't really know what drives it. If we were to believe this volume, depressions are also (largely) about TFP. Such an extension of the field of our ignorance would be, no pun intended, greatly depressing.

Infrastructure Australia, *A Report to the Council of Australian Governments*

Henry Ergas¹

At the outset of this publication we are told that Infrastructure Australia² is determined to 'drive' the development of 'nationally significant infrastructure' (p.6). To this end, it will consider funding infrastructure according to criteria which will be variously 'national and balanced', based on a 'national perspective to complement state and territory ambitions', reliant on a 'triple bottom line' that seeks the 'efficient use of existing infrastructure and resources' while 'optimising the role of both the public and private sector'. All this will be done by using methodologies that are 'robust' and by a commitment to 'one economy, one set of rules', creating a 'seamless national economy'.

The repeated use of catchphrases of this type creates an obvious contrast between this report and its distinguished overseas predecessors, such as the UK White Paper of 1967 on *Nationalised Industries* (Cmnd. 3437), its 1978 successor *The Nationalised Industries* (Cmnd. 7131), Simon Nora's classic 1967 report on infrastructure pricing, and Marcel Boiteux's 2001 report on the choice of transport investments. But those are works of substance. In Infrastructure Australia's report, the substance is ably hidden.

This is a pity because the report does make some sensible points. It stresses the importance of cost-benefit analysis, of assessing costs on a lifecycle basis and of good governance and proper allocation of risks. However, these elements of common sense are then undermined by diagnosis and prescription that are often superficial and, at times, plainly inaccurate.

Diagnosis is scant, especially in view of the sums at stake. Consider the bold statement that 'rail freight needs significant investment' (p.37). On what evidence is that assertion based? It is true that rail freight's share of the transport task on the East Coast has declined in recent years. But it is hardly apparent that that decline is inefficient. Moreover, even were it efficient for rail to transport a higher share of freight, one would want to know why the required investment has not materialised. Is not the cause an industry structure that impedes efficiency, including poor governance of rail assets by State governments and

¹ Concept Economics, HenryErgas@concepteconomics.com.au. I am grateful to the Editor, William Coleman, for helpful comments.

² Infrastructure Australia was created by the Infrastructure Australia Act of 2008, with the task of 'providing advice to the Minister, Commonwealth, State, Territory and local governments, investors in infrastructure and owners of infrastructure on matters relating to infrastructure'. It is presently chaired by Sir Rod Eddington.

the separation of track ownership from freight operation, rather than any shortage of funding *per se*? Insofar as this is true, little purpose would be served by merely increasing expenditure — as shown by the UK experience under Blair (when vast sums were wasted on a deeply flawed rail-industry structure).

Assessment, though of varying quality, is sometimes even flimsier. For example, the report notes that ‘public transport is not administered and managed in Australian cities as well as in many cities overseas’ (p. 45). This is doubtless true and the admission is welcome, but it is not equally true of all Australian cities; and without going a bit further, it is impossible to draw any meaningful policy inferences. Sydney is, as usual, the basket case; with extensive feather-bedding, restrictive work practices, third-rate management, even worse political leadership, and pervasive and institutionalised corruption. Perth has done somewhat better. Before throwing more money at public transport, taxpayers are entitled to demand much-needed changes in governance. Whether such changes will be required, prior to any funds being given, is unclear.

As for the prescription, it is often disturbing. We are told early on that cost-benefit analysis is ‘not the whole story’ (p. 10). Important issues such as how time and risk should be analysed are not discussed at all. Rather, project advocates are told to ‘demonstrate a project’s strategic fit’ (p.77) and that Infrastructure Australia will ‘consider the rating of strategic fit supplied in the project submissions and moderate the ratings to ensure comparability between projects’ (p.67). How this ‘moderating’ will be done is not explained, other than by saying that in the project-selection phase, Infrastructure Australia will ‘integrate the profiling and appraisal assessments with other data and information. This enables the national productivity impact of individual initiatives to be compared’ (p.67). What ‘the national productivity impact’ means is a matter that readers are left to work out for themselves.

There is a lengthy discussion of the infrastructure requirements of remote Aboriginal communities, but it does not question whether those communities are viable. Rather, the goal appears to be that of achieving some level of ‘parity’ between these communities and others. Here, any form of cost-benefit assessment seems to be suspended (or if it isn’t, the utility benefits of recipients are being given unusual, though hidden, weights). But why not, with equal warrant, take as given the whole pattern of white rural settlement (much of it far older than many Aboriginal outstations), with the obviously absurd results that would entail? As for the greater weight apparently placed on the welfare of Aboriginal Australians in remote areas relative to that of other Australians, even a committed Rawlsian would likely find the implied redistribution difficult to support, especially if it perpetuates communities in which disadvantage is chronic and unavoidable.

The statement that ‘the benefits of a fast and accessible national broadband network to Australia’s international competitiveness are almost impossible to overstate’ (p.64) is no less perplexing. Presumably, if a national broadband network is worth building that is because there is a positive value to Australian users, net of the costs, of upgrading from the existing network. There is no sensible reason why this amount would be ‘almost impossible to overstate’. Infrastructure Australia, instead of adding to the hyperbole, should subject such claims to careful assessment.

Nor is one comforted by the thought that an evaluation criterion will be whether a project has ‘a particularly strong impact on aggregate demand or sensitivity to the economic cycle consistent with the Commonwealth’s macro-economic responsibilities’ (p.74). If resources are under-employed, this should perhaps be reflected in the opportunity cost used in project appraisal; but other than that, why would infrastructure be used for pump-priming, relative to the other instruments available to the Commonwealth? And even if it was to be so used, why would this not be captured through a conventional cost-benefit analysis, rather than be an appraisal factor in its own right? In contrast, how the approach proposed in the document could be justified, or even quite what it means, is left unexplained.

All of this suggests a lack of clear thought; a lack for which checklists of alleged ‘goods’ — such as promoting exports, achieving environmental sustainability and so on — are no substitute.

This is not to say the report is entirely tosh, but it suffers greatly from being neither fish nor fowl: it lacks the frankness, clarity and rigour one would expect from an expert report. At the same time, it lacks the care in drafting, the appreciation of the subtleties, and the honest acknowledgement of political constraints that one hopes for in a departmental statement. The impression is of a document drafted by a committee of mixed quality, with the attempt to do ‘the right thing’ (through references to efficiency and cost-benefit analysis) frequently overridden by a ragbag of currently fashionable concerns.

The result is a kebab in which sensible statements are interlaced with incomprehensible managerialist jargon, weasel words and, at times, garbled economics, the whole being so open-ended as to give the decision-maker what amounts to untrammelled discretion. If that was the purpose, it has been achieved.

It would have been better if Infrastructure Australia had:

1. set out a coherent framework for cost-benefit appraisal, including by specifying a reference approach to the discount rate (including the marginal social cost of funds), the treatment of risk, and provision for ‘optimism bias’;

2. specified instances where shadow prices can be used, and defined the approach to be adopted to determine those shadow prices;

3. identified areas (if any) where distributional weights may be used, and for those areas specified the methodology to be adopted;

4. specified processes for testing data, input assumptions and results so as to ensure robustness;

5. where projects are to be funded through PPPs, defined standards for acceptable risk allocation and for determining a maximum allowed rate of return to private investors, especially when exclusive rights are being allocated;

6. defined 'best practice' regulatory and governance requirements, and indicated that funding would not be available to entities, including State and Territory governments, that did not meet those requirements; and

7. lastly, but importantly, specified disclosure requirements, including those bearing on Infrastructure Australia itself, so that taxpayers could have some confidence that public moneys were being used wisely.

Finally, even by unexacting current standards, there seems to be little justification for subjecting the reader to sentences such as: 'For example, given the increasing internationalisation of the Australian economy over recent decades factors which impact on our national competitiveness such as poor infrastructure provision is increasingly an area of national importance' (p.74).

This utterance displays an irrational aversion to the comma, and reckless disregard for English grammar; it cries out for careful editing, something which a fund endowed with billions of taxpayer dollars might be thought to afford. It is not unfair for taxpayers to hold the drafters of official documents to standards of clarity of expression that should be taken for granted in any of our secondary schools. Without adherence to those standards, it is the quality of thought that inevitably suffers.

Susanne Warning, *The Economic Analysis of Universities: Strategic Groups and Positioning*

(Edward Elgar Publishing, 2007)

María Racionero¹

The higher education sector is becoming increasingly competitive. In *The Economic Analysis of Universities: Strategic Groups and Positioning*, Susanne Warning raises many interesting questions about the implications of such competition on research and teaching quality. Unfortunately, she does not provide, in my view, many convincing answers.

The book focuses mainly on publicly funded universities and uses German public universities as a case study. The analysis is based on two different theoretical approaches — the strategic-groups model from management theory, and the product-differentiation model from industrial organization — which are tested using data from the German higher education sector.

In Chapter 2, Warning describes the German higher education sector. She provides information on the institutional background, particularly regarding teaching, research, financing and staff numbers in German universities.

She deploys three types of research indicators: the number of publications, the amount of research grants and the number of ‘habilitations’, which is a formal qualification to teach in a tenured position rather specific to scientific universities in Germany. Concerning the evaluation of publications, she gathers evidence on Citation Indexes from the Institute for Scientific Information (ISI). Even though such an exercise can give a very rough picture of research quality, it has been argued by several papers on rankings of journals and departments (see, for instance, Kalaitzidakis *et al.* 2003 and Lumbrano *et al.* 2003) that Citation Indexes by themselves are rather imperfect measures of research quality. I think that some discussion or acknowledgement of this would have been pertinent, as the author cites them in a later section when she examines German higher education in the international context and notes that, according to Kalaitzidakis *et al.* 2003, only one German institution ranks among the top 50 economics institutions. In this section she also uses data from *Education at a Glance* (OECD

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2003) that I think could have been updated by the time the book was published in 2007.

In Chapter 3, Warning includes a survey of the theoretical and empirical contributions in the literature on positioning, focusing on the two main functions of universities: teaching and research. She claims that the theoretical literature has correctly identified the basic trade-off universities face between teaching and research but argues that it has failed to explain the strategic positioning of universities, particularly concerning research. In her view, empirical research based on Data Envelopment Analysis (DEA) suggests that heterogeneity in research is significant and greater than that in teaching, contradicting theoretical studies that have identified heterogeneity in teaching but have largely ignored heterogeneity in research.

In Chapters 4 and 5, Warning develops two theoretical approaches to explain the positioning of German universities, paying particular attention to the specific characteristics of a publicly funded university system. In Chapter 4, she applies the concept of strategic groups, common in the business literature, to universities. She considers teaching and research as the two main strategic variables affecting performance and industry structure, and derives the following testable hypothesis: that heterogeneity is greater in research than in teaching (H1) and that the impact of teaching quality and of research quality is greater for the group of high-ranked universities than for the group of low-ranked universities (H2a, H2b). Although the concept of strategic groups offers an explanation of how strategic variables affect university performance, it does not explain how universities position themselves in teaching and research quality in equilibrium. Warning then develops a complementary two-dimensional differentiation model, familiar in the industrial organization literature, to fill this gap in Chapter 5. This model is a variant of Vandenbosch and Weinberg (1995) in which universities receive a fixed amount per student from the State and provide support to students to attract them. The model concentrates on teaching and research as separate tasks. A demand effect pulls universities together in one dimension and a strategic effect forces them apart in the other dimension. The result is that they choose minimum differentiation in one dimension (teaching) and maximum differentiation in the other dimension (research). The reason why maximum differentiation takes place in research is, in her view, linked to the fact that investments in research are more specific than in teaching, which makes changing positions in research quality more difficult. From this model the author derives additional testable hypotheses: that universities attach greater weights to teaching than to research (H3), and that the probability of being a high-ranked university depends more on research quality than on teaching quality (H4).

Warning then tests the theoretical hypothesis, using both non-parametric and parametric empirical methods, in Chapters 6 and 7. She employs Data

Envelopment Analysis (DEA)² to evaluate the performance of universities in Chapter 6. She argues that DEA provides the most appropriate measure in environments with multiple inputs and outputs and unavailable or nonexistent market prices (for outputs, inputs or both), which is the case of a university sector that is largely publicly financed. She claims that the results obtained lend support to the hypothesis that heterogeneity is greater in research than in teaching (H1) and suggest the existence of significant differences in overall performance across institutions (H2a, H2b). In subsection 6.4.2 the author finds that all universities put a high weight on teaching while only some do so on research, with larger average weights for teaching overall (H3). The efficiency scores are then used in an econometric analysis that aims to explain these performance differences in Chapter 7. In section 7.3 she presents several probit regressions that aim to evaluate the influence of research quality and teaching quality on the predicted probability of being in the high- or low-performance groups. The results obtained suggest that high research quality has a positive effect on the probability that a university is in the high-performance group (H4).

In my view, however, the time span of the data used — from 1997 to 2000 — is rather too short for the kind of issues that are investigated — in particular, positioning in research and teaching — and I have doubts about the appropriateness of the interpretations of many results.

It is clear that Warning has read thoroughly and drawn from a very diverse set of sources, which is highly commendable. I find the idea of establishing a bridge between different disciplines quite interesting. I am left, however, with the impression that the attempt is not completely successful. Some of the author's original contributions would have greatly benefited from a proper refereeing process if she had attempted to publish them in peer-reviewed journals rather than in a book. I truly believe that some of her ideas deserved more and that a peer-reviewed refereeing process would have contributed to improve the content and polish the form.

The prose is certainly quite poor throughout the book, excepting, perhaps, in the concluding chapter. This makes reading and understanding the arguments exposed a challenging task. I do not blame the author herself for this deficiency: I am not a native English speaker, and fully understand the difficulties involved. However, I do fault the editors for not doing their job properly. Despite the author's acknowledgements to three anonymous referees in the Preface, it seems

² Data Envelopment Analysis (DEA) is a non-parametric method for the estimation of production frontiers. It is used to measure the productive efficiency of decision-making units (or DMUs), where a DMU is a distinct unit within an organisation that has flexibility with respect to its decisions, but not necessarily complete freedom over these decisions. University departments are one example. DEA is based on linear programming techniques and is capable of measuring the efficiency of multiple DMUs when the production process presents a structure of multiple inputs and outputs with no need to explicitly specify a mathematical form for the production function.

as if nobody read the manuscript before it went to press. If this had been done I imagine that the many grammatical mistakes and typos present in the text would not have gone uncorrected. In its present state I cannot recommend its purchase.

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