QUANTIFYING BENEFIT ESTIMATES FOR PRUDENTIAL RULE MAKING

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Introduction

This paper outlines an experimental approach APRA is developing to quantify benefit estimates for our prudential rule making.

APRA's mission is to "establish and enforce prudential standards and practices designed to ensure that, under all reasonable circumstances, financial promises made by institutions we supervise are met within a stable, efficient and competitive financial system".

Put another way, APRA's main task is to reduce the incidence and severity of failures in prudentially regulated financial institutions, without unduly limiting the financial sector's competitiveness and innovation.[1] In undertaking this mission, we make prudential standards and other rules under relevant legislation. These rule changes are subject to the Australian Government regulatory oversight process, including the requirement for cost-benefit analysis where feasible.

Our mission is further guided by a Statement of Expectations from the Australian Treasurer,[2] and our response to this statement.[3]

Globally, few prudential regulators have been able to prepare quantified benefit analyses. Because APRA is unusual among prudential regulators in making quantitative estimates of failure probabilities, it is feasible for us to create quantified estimates of benefits associated with prudential rule making. It remains to be demonstrated, however, whether this estimation process produces a useful result.

About APRA

An economically stable and just society requires a dependable and sound financial system. Effective prudential supervision is an important tool for achieving such a system.

APRA does not aim for zero failures – that is why our mission contains the words 'under all reasonable circumstances'. Achieving a level of safety that results in zero failures is not wise or feasible. APRA strives to reach a regulatory equilibrium whereby the consequences of financial losses for our beneficiaries are minimised while, at the same time, not smothering the financial sector in risk aversion. Our mission requires us to consider our actions in the context of maintaining a competitive and efficient financial system.

Prudential regulation is able to improve market outcomes by averting or moderating failures that would otherwise occur in the absence of a prudential regulator. History has taught us that there is the possibility of material social damage arising from systemic financial failures caused by the failure of banks and

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[1] *Australian Prudential Regulation Authority Act 1998,* Section 8

[2] The Statement of Expectations from the Treasurer can be found at www.apra.gov.au/AboutAPRA/upload/Statement-of-Expectations-from-Treasurer-20-Feb-07.pdf

[3] APRA's Statement of Intent can be found at www.apra.gov.au/AboutAPRA/upload/Ltr-to-Treasurer-Statement-of-Intent.pdf

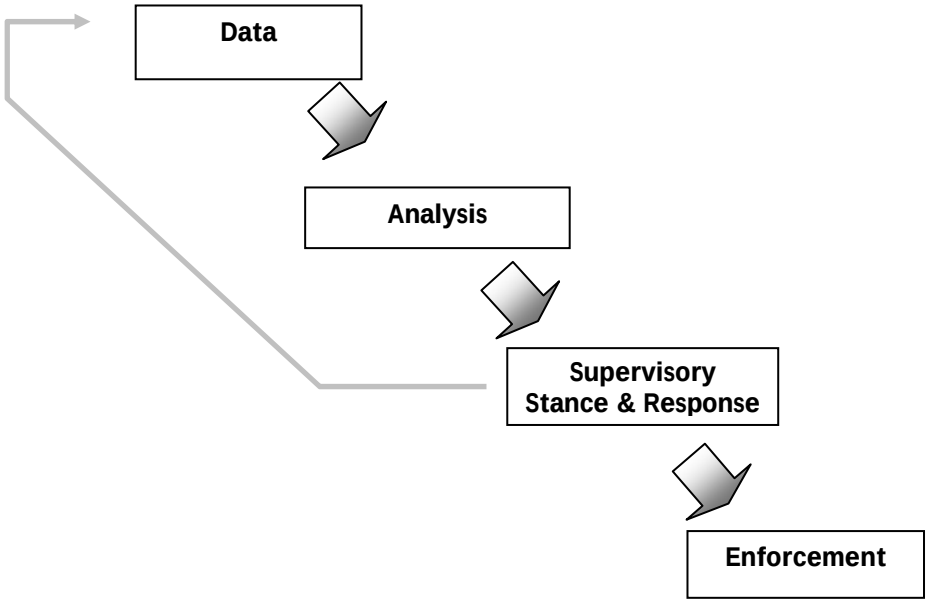
other institutions. One only has to look at the period from the 1890s to the 1930s in the developed world to see several unfortunate case studies, or the late 1990s in several Asian countries, for a more modern counterpart.

The process of supervision

This paper discusses benefit estimates for rule making, but such benefits are inextricably linked with our broader information gathering, supervision, and enforcement activities. The benefits associated with a rule which is not monitored and in need enforced are at best zero; an un-enforced rule is often worse than useless.

APRA's supervision falls into four areas: information gathering, risk analysis, supervisory response, and where necessary, enforcement.

Figure 1: The process of supervision



APRA receives data from many sources, including:

- regular statistical returns. These are collected on a statutory basis and provide the essential background figures for APRA's risk analysis. About 80 per cent of the data items we collect are shared with other government agencies, including the Reserve Bank of Australia and the Australian Bureau of Statistics;[4]

- other regular returns. These include items such as auditor and actuarial reports, and regulated entity generated material such as reinsurance reports;

[4] Refer to APRA website (www.apra.gov.au) for more details.

- visit material. APRA conducts several hundred supervisory visits per year. These visits are typically preceded by extensive collection of relevant entity documents, then progress to on-site interviews and document reviews, and conclude with post-visit supplemental data requests; and

- finally, we receive a great deal of ad hoc information about regulated entities and their industries, including media coverage, equity and debt analysts reports, whistle-blowers, and the like.

Having gathered this mass of data, which is an ongoing task for APRA and for every supervisor, we must then convert the data into an analysis. Above all, we want to consider the probability that a given entity might fail, and where this probability is more than negligible, we want to know the sources of any risk of failure.

To facilitate the analysis, since 2002, APRA has used an internal risk assessment model called PAIRS.[5]

Using PAIRS and related internal supervisory guidance material, a supervisory analyst prepares a risk assessment on each regulated entity. This assessment comprises many expert judgment-driven ratings of the components of risk facing the regulated entity, the entity's ability to manage these risks and the entity's capital support to cover the risk position.

The PAIRS rating has two components – the overall risk of failure and the impact of that failure. Based on these joint ratings, APRA arrives at a supervisory stance that is appropriate for an individual entity. This stance ranges from 'normal', through 'oversight' to 'mandated improvement' and in the most serious cases 'restructure'. The likely supervisory response to each stance is signaled by the stance name. The great majority of entities are in either the Normal or Oversight stances. Entities in Mandated Improvement are often subject to enforcement action, where entities in Restructure are nearly invariably subject to this.

Probability and Impact Rating System (PAIRS)

The PAIRS framework is essentially a process for guiding an expert judgment procedure which leads, in APRA's case, to an estimate of the likelihood of failure. PAIRS also allows us to assess the impact that such a failure will have on the Australian financial system should it occur. Combining these two ratings processes for each institution, we arrive at a 'supervisory attention index'.

APRA is, to our knowledge, unique amongst prudential regulators in that our PAIRS framework allows us to estimate an explicit probability of failure for each entity we supervise. In doing this, PAIRS requires supervisors to assess the inherent risks, management and control and capital support elements of the entity.

The first step in determining the overall probability of failure is for us to assess an institution's inherent risk. All institutions supervised by APRA are exposed to risk; type and extent of the exposure, however, will vary in terms of the risk appetite of

[5] Information on PAIRS can be found on the APRA website http://www.apra.gov.au/PAIRS/home.cfm
Additional information can be found in Black J. 2004, *The Development of Risk Based regulation in Financial Services; Canada, the UK and Australia*. A Research Report. ESRC Centre for the Analysis of Risk and Regulation.

the institution and the risk profile of the products and services offered. Inherent risk is any uncertainty in relation to the business operations of an institution which has the potential to affect its financial position. Typically, inherent risk includes counterparty default risk, balance sheet and market risk, insurance risk, and liquidity risk. For each of these risks, supervisors use their expert judgement and enter a risk rating in PAIRS that can range from zero to four. These have been highlighted in figure 2. The more risk an institution takes on board, the higher the risk ratings will be.

Figure 2: Example of a PAIRS rating schedule

Rating Schedule

Inherent Risk	Quality Assessment		Significance Weighting		Overall Rating	
	Peer Group Average	Entity	Peer Group Average	Entity(%)	Peer Group Average	Entity
COUNTERPARTY DEFAULT RISK	0.91	1	11	10		
BALANCE SHEET AND MARKET RISK	0.86	1	9	5		
INSURANCE RISK	1.35	1.5	44	40		
OPERATIONAL RISK	1.26	1.2	18	15		
LIQUIDITY RISK	0.67	0.5	3	2		
LEGAL AND REGULATORY RISK	0.97	1.2	4	8		
STRATEGIC RISK	1.27	1.3	6	15		
CONTAGION AND RELATED PARTY RISK	1.1	0.7	5	5		
Inherent Risk Total			100	100	1.23	1.33

Management & Control	Quality Assessment		Significance Weighting		Overall Rating	
	Peer Group Average	Entity	Peer Group Average	Entity(%)	Peer Group Average	Entity
BOARD OF (DIRECTORS OR TRUSTEES)	1.18	0.8	12	15		
SENIOR MANAGEMENT	1.11	0.7	16	20		
OPERATIONAL MANAGEMENT	1.17	0.9	15	15		
MIS/FINANCIAL CONTROL	1.28	1.2	20	10		
RISK MANAGEMENT	1.14	1.1	13	20		
COMPLIANCE	1.1	0.8	10	10		
INDEPENDENT REVIEW	0.95	1.1	14	10		
Management & Control Total			100	100	1.15	0.97
NET RISK					1.19	1.19

Capital Support	Quality Assessment		Significance Weighting		Overall Rating	
	Peer Group Average	Entity	Peer Group Average	Entity(%)	Peer Group Average	Entity
CURRENT COVERAGE/SURPLUS	0.95	1	50	50		
EARNINGS	1.2	1	25	25		
ACCESS TO ADDITIONAL CAPITAL	0.98	1.1	25	25		
Capital Support Total			100	100	1.04	1.03
OVERALL RISK OF FAILURE					1.15	1.14

The second category assessed under PAIRS relates to the management and control of the financial institution. Management and control is the process by which an institution identifies, measures, monitors and controls its inherent risks.

How well the inherent risks are managed will depend on the underlying governance, policies, practices, systems and controls established by the institution. When carrying out a PAIRS assessment on management and control, supervisors assess the board of directors; senior management; operational management; financial control; risk management; compliance; and the level of independent review. Ultimately, what APRA assesses is the adequacy of the risk-management systems and procedures that have been implemented by an institution to manage its inherent risks.

Taking all this into account, APRA can then determine the 'Net Risk of Failure' for a financial institution. This is an intermediate step and essentially is the residual risk remaining after taking into account the mitigating effects of management and control processes on the inherent risk of the financial institution.

The third component in the PAIRS framework examines the extent to which the financial resources of an institution are currently available, or may be made available, to enable the institution to absorb any unexpected losses while still continuing to operate.

A key output of the PAIRS assessment is the entity's 'Overall Risk of Failure' (ORF) and the Probability Index. The ORF is a summary measure and represents the likelihood that unexpected losses could exceed an institution's Capital Support resources. The ORF rating scores range from zero to four. A rating below one is deemed to be low risk. At the other end of the spectrum, a rating between three and four is extreme risk.

The Probability Index is a quantitative measure designed to estimate the likelihood that an institution could fail – akin to a probability of default. The relationship between the Overall Risk of Failure and the probability index is not a linear one and approximates the relationships found between the ratings of international debt rating agencies and their relative default expectations.

The APRA PAIRS approach borrowed heavily from predecessor models in place at our Canadian and UK counterparts; Black (2004) compares the three systems.[6] Unlike the predecessor systems, however, PAIRS produces a quantitative estimate of failure probability for our regulated entities.

Portfolio loss estimates

APRA aggregates its PAIRS estimates into an overall portfolio estimate for potential defaults. This estimate is simply a summation of the individual default probabilities multiplied by the asset (or more properly liability) sizes of our regulated entities.

It is critical to note that the PAIRS default probability estimates are struck *prior to any consideration of APRA intervention effects*. That is, supervisors estimate failure via PAIRS without considering the likely positive effects of APRA intervention beyond our baseline monitoring. We monitor APRA's effect in several ways. Our main analytic tool is to consider transition matrices for entities in Mandated Improvement. Over the past several years more than 90 per cent of entities in Mandated Improvement have either exited the industry without loss, or have improved their ratings. We do not yet know how successful APRA will be at resolving Mandated Improvement entities in an economic downturn, but it is inevitable that our "cure rate" must fall when markets for financial assets are less receptive.

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[6] Black J. 2004, *The Development of Risk Based regulation in Financial Services; Canada, the UK and Australia*. A Research Report. ESRC Centre for the Analysis of Risk and Regulation.

The benefits of prudential rule making

Given APRA's mission, the main benefits associated with all our activities are reductions in the failure rate of regulated entities, and reductions in the rate of dollar loss associated with these failures.

The fundamental driver in our benefit model for prudential rule making is the idea that we can estimate the PAIRS changes likely to eventuate from any rule changes. The PAIRS changes will, in turn, flow through to the portfolio default estimates.

Our experimental model proceeds through several stages:

i) Estimating the change in PAIRS ratings for regulated entities, as a result of a rule change;

ii) Recalculating the portfolio default and loss estimates for the pro forma PAIRS ratings. This gives an annual benefit estimate for the rule change;

iii) Reducing the annual benefit estimate to take account of the fact that APRA's current rules and supervision are already effective (we hope!) at preventing most impending failures; and

iv) Converting the annual benefit estimate, a flow number, into a stock estimate of the net present value of the benefits.

In the remainder of this paper, we will further illustrate these steps. A worked example of our pro forma model is in attachment A.

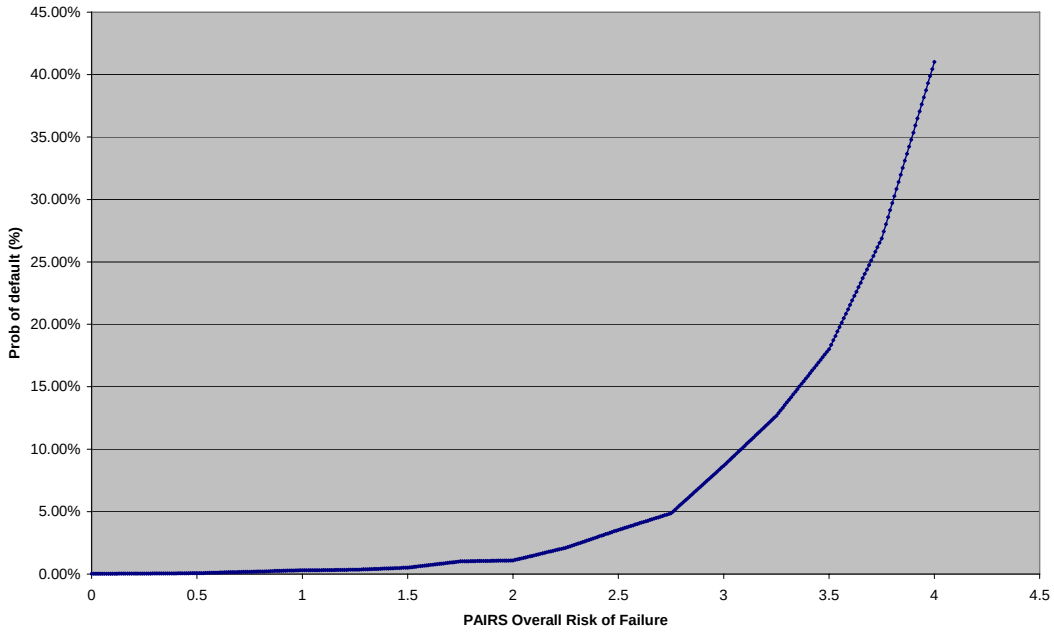
Developing the pro forma estimates for changes in failure rates

The foundation of the model is based on the relationship between the overall risk of failure and the probability of default. The overall risk of failure can be mapped from PAIRS to credit ratings agency results. Using historical statistics from credit ratings agencies and APRA's internally calculated overall risk of failure data, the probability of default within a given time frame can be estimated, as indicated in Table 1. Graph 1 illustrates the relationship between overall risk of failure and the probability of default for a given entity.

Table 1: Default probabilities

OVERALL RISK OF FAILURE	S&P Credit Rating	Moodys Credit Rating	S&P 3 Year Default rate	Moodys 3 Year Default rate	KMV 3 Year Default rate	PAIRS AVERAGE DEFAULT RATE
0.25	AAA	Aaa	0.03	0.000	0.06	0.03
0.50	AA+	Aa1	0.00	0.000	0.12	0.04
0.75	AA	Aa2	0.00	0.048	0.18	0.08
1.00	AA-	Aa3	0.23	0.078	0.27	0.19
1.17	A+	A1	0.26	0.241	0.42	0.31
1.33	A	A2	0.17	0.224	0.66	0.35
1.50	A-	A3	0.30	0.358	0.90	0.52
1.67	BBB+	Baa1	1.11	0.794	1.17	1.02
1.83	BBB	Baa2	0.91	0.883	1.49	1.10
2.00	BBB-	Baa3	2.11	1.680	2.53	2.11
2.25	BB+	Ba1	3.35	3.567	3.70	3.54
2.50	BB	Ba2	5.14	4.309	5.16	4.87
2.75	BB-	Ba3	8.14	10.151	7.74	8.68
3.00	B+	B1	12.85	14.360	10.83	12.68
3.33	B	B2	21.24	18.535	14.26	18.01
3.67	B-	B3	27.46	28.532	24.64	26.88
4.00	CCC	Caa	40.93	43.498	38.59	41.01

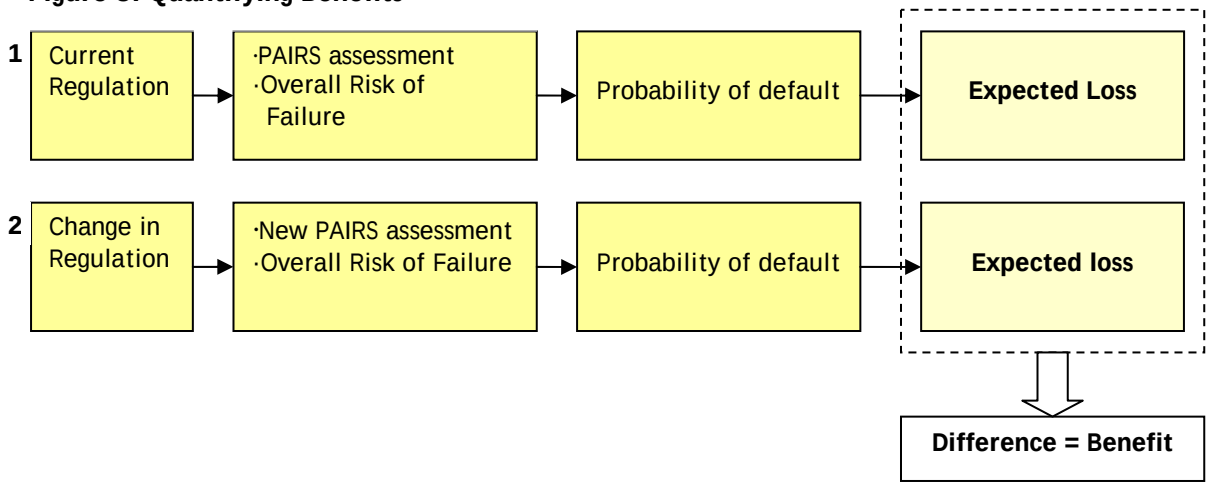
Graph 1: Relationship between Overall Risk of Failure and the Probability of Default



This use of ratings agency outcomes as a proxy for internal outcomes is similar to the approach taken by large banks in validating many of their internal ratings models in the Basel II accreditation process.

The benefit model enables APRA to calculate the monetary benefit of an incremental change in prudential policy by measuring the reduction in the expected loss for an industry as if the proposed prudential policy was complied with. Figure 3 outlines, conceptually, the methodology used in the model to quantify economic benefits for a single entity. The rule making benefit model aggregates this result across APRA's entire portfolio.

Figure 3: Quantifying Benefits



A Fit and Proper example

In developing the benefit model, we have used APRA's recent changes to 'Fit and Proper' requirements for boards, senior executives, and other responsible persons as a test bed for the concept. 'Fit and Proper' rules have a substantial effect on PAIRS management and control elements, but no effect on inherent risk or capital support elements.

Taking these changes into account, our internal expert judgments were that the new 'Fit and Proper' rules would produce the PAIRS adjustments outlined in Table 2.

Table 2: Adjustments to the PAIRS quality assessments as a result of 'Fit and Proper' rules

PAIRS Criteria Quality Assessment	very Low 0.00<X<=0.50	Low 0.50<X<=1.00	low Medium 1.00<X<=1.50	high Medium 1.50<X<=2.00	High 2.00<X<=3.00	Extreme 3.00<X<=4.00
	REDUCTION IN ASSESSMENT					
COUNTERPARTY DEFAULT RISK QA BALANCE SHEET AND MARKET RISK QA INSURANCE RISK QA OPERATIONAL RISK QA LIQUIDITY RISK QA LEGAL AND REGULATORY RISK QA STRATEGIC RISK QA CONTAGION AND RELATED PARTY RISK QA						
BOARD OF (DIRECTORS OR TRUSTEES) QA	0.025	0.05	0.15	0.4	0.7	1.25
SENIOR MANAGEMENT QA	0.025	0.05	0.15	0.4	0.7	1.25
OPERATIONAL MANAGEMENT QA	0.025	0.05	0.15	0.35	0.45	0.5
MIS/FINANCIAL CONTROL QA RISK MANAGEMENT QA COMPLIANCE QA INDEPENDENT REVIEW QA	0.025	0.05	0.15	0.35	0.45	0.5
CURRENT COVERAGE/SURPLUS QA EARNINGS QA ACCESS TO ADDITIONAL CAPITAL QA						

It is evident from Table 2 that APRA considers the effect of rule changes to be minor on low risk PAIRS elements (i.e. the entity wasn't going to fail anyway) but more significant for riskier elements.

Calculating the portfolio default effect

At any given point, APRA knows the current portfolio default estimate, and by substituting in the pro forma PAIRS adjustments it is straightforward to calculate the amendments to this default estimate. In the 'Fit and Proper' example, the pro forma PAIRS changes result in a reduction in default estimates from $1.650 billion to $1.607 billion per annum.[7] This is a relatively large reduction, and reflects the historical reality that board and management quality is the essential element separating survivors from failures in adverse economic conditions.

Having developed an annual benefit estimate, the remainder of the model converts the annual estimate into a risk adjusted net present value.

Moving from defaults to losses

When a supervised entity fails, normally there is some recovery to beneficiaries on the defaulted assets. Long term ratings agency data suggests that unsecured recoveries in the order of 50 per cent of the defaulted amount are appropriate, and we have adopted this ratio in converting the estimate of the defaulted asset amount to the actual loss amount.

Reducing the benefit to reflect APRA cure rate

APRA seldom applies one rule or one supervisory method to a troubled regulated entity. This means we have a number of ways to remediate or "cure" a problem. Our track record in recent years on over 150 Mandated Improvement and Restructure entities suggests that our current tools are sufficient to cure most problems.

For our benefit modelling, however, how do we convert "we already cure most problems" to "with better rules we will cure more problems"? Arithmetically, the answer is that we reduce the benefit associated with any specific rule change by the assumed longer term cure rate, before that rule change. As an interim measure, APRA has selected a 50 per cent cure rate; this number will be refined over time, particularly once we have experience in managing troubled entities through a recession.

Creating a net present value

Cost-benefit analyses typically compare the net present value of the costs to the net present value of the benefits. Therefore we must convert our annual benefit calculation into a net present value. The challenges associated with this process are well known and we will not repeat them here. We do note, however, the following points:

i) the loss reduction benefits associated with rule changes are tied to dollar amounts, and the dollars under APRA prudential supervision have grown and are likely to continue growing quite strongly. This means that we cannot take a perpetuity on the current annual benefit, but must project some growth in the benefit; and

[7] These estimates are based on partial 2005 PAIRS data and are provided for illustrative purposes only.

ii) the appropriate discount rate is likely to be close or identical to the risk free rate. This arises from the observation that depositors, insurance claimants, and superannuation fund members are by definition risk averse, and have a very high expectation of payment.

APRA has not devoted a great deal of effort to advancing the state of the art on converting an annual and growing benefit to an NPV. We have instead simply assumed a ten-year benefit stream with a terminal value, and applied the ten-year government bond rate for discount purposes.

Social value of avoided losses

In addition to the direct costs of asset defaults, regulated entity failures produce substantial social losses. A bank failure, for example, may damage the payments system and remove lending (and job creation) capacity from the economy. Insurance failures can have flow-on effects to the real economy, for example, by reducing the availability of required third party liability insurance. Superannuation failures increase the general tax burden through increased pension payments, and more importantly, reduce confidence in Australia's post retirement savings arrangements.

APRA has discovered no persuasive way to quantify these extra social costs, and therefore we do not gross up the calculated benefits. We are mindful, however, that such benefits are likely to exist.

Sensible assumption ranges

The above work has been presented on the basis of APRA's central estimates on cause and effect. In practice, we acknowledge that these estimates fall within ranges, and when using the model for actual policy analysis we intend not only to use central estimates on the major assumptions, but to apply reasonable ranges as well. This is particularly the case for mapping the PAIRS changes associated with any rule change, and for the conversion factors from an annual to a net present value benefit.

Shortcomings and open issues

It will be evident from the above description that APRA's model for quantifying rule making benefits relies upon a number of linked assumptions. The major assumptions are, in rough order:

i) our supervisors can make expert and reasonably accurate judgments through PAIRS;

ii) we can map PAIRS failure estimates to quantitative failure rates, via realised loss data from the major ratings agencies;

iii) we can reasonably estimate the likely change in PAIRS ratings flowing from a rule change; and

iv) we can convert the annual benefits from the above steps into a net present value.

We do not assert that we have found perfect answers to the above issues, but we believe that we are within sight of acceptable answers. Matching the above list:

i) APRA possesses significant information and analytic advantages when assessing regulated entity risks. Among other things, we have considerable information flows, we have a strong organisational focus and expertise in risk assessment and response, and perhaps, most importantly, we have the context and perspective which comes with overseeing the whole of the Australian regulated sector. We are confident that on at least an ordinal basis, our PAIRS approach is working well;

ii) mapping PAIRS to external ratings default rates is admittedly an inexact science, but it is state of the art for the majority of private sector risk modelling work;

iii) if we are reasonably confident in the first instance that APRA's supervisors can estimate risk in PAIRS, we are at least as confident that our most senior and experienced experts can estimate first difference effects in PAIRS arising from any rule changes; and

iv) we are no more or less confident than other analysts in generating NPV rules, though we note that the range of error on our discount rate is probably lower than in some other applications.

All this adds up to the conclusion that, as long as we apply a reasonable range to the critical assumptions in the benefit model, we can develop a reasonable range of quantitative estimates of rule making benefits.

Next steps

Our work to date has been on creating the theoretical basis for a quantitative benefit model for prudential rule making. APRA will now need to consider how we convert this into a production model which will help us assess the APRA prudential rule set. In order to do this we are likely to engage external consultants to review our theoretical and arithmetic approach. As an example, the draft model uses the current PAIRS universe to calculate benefits. The current PAIRS portfolio of regulated entities, however, is based upon sixteen good years in the economy. Should we calculate rule making benefits after a recession, the PAIRS universe would start from a higher risk position, and therefore we would likely see more benefit in tighter rules. This implies that we need to convert the benefit model from a point in time reliance upon PAIRS, to a "through the cycle" calculation. There is some irony in this issue, as we are requiring Australia's major banks to perform exactly this calculation as part of their Basel II accreditation.[8] It would be fair to say that this is a difficult task, and it will be a challenge for APRA to improve upon the bank performance in this area.

Summing up

The benefit model is still at the developmental stage, but we consider this model to have significant potential value in the rule making process. It will allow us to undertake a comprehensive and sound cost-benefit analysis prior to the implementation of any regulatory changes. We emphasise that the model will not be applied as the definitive answer to APRA rule making decisions; it is meant to be an important, but not conclusive, input into such decisions.

[8] See *Prudential Standard APS 113 Capital Adequacy: Internal Ratings-based Approach to Credit Risk*.

The following example outlines the process by which the model values changes in expected default and quantifies economic benefits. The 'Fit and Proper' example has been used to demonstrate this point. Table 3 illustrates an (imaginary in this instance) entity whose initial scores for the quality assessments produce an Overall Risk of Failure[9] of 1.32. Using the mapping process described above, the Overall Risk of Failure is converted to a probability of default and then multiplied by the total assets of the entity to calculate the annual expected default. In this case the annual expected default for the entity, before considering any changes to the prudential requirements, is $2,000,000.

Table 3: Changes to expected default as a result of tighter Fit and Proper rules

PAIRS Quality Assessment (QA) Criteria	QA score before policy change	Reduction in Assessment	QA score after policy change
Inherent Risk			
Counterparty default risk	0.9		0.9
Balance sheet and market risk	1.2		1.2
Insurance risk	0.0		0.0
Operational risk	1.7		1.7
Liquidity risk	0.5		0.5
Legal & regulatory risk	1.1		1.1
Strategic risk	1.3		1.3
Contagion & related party risk	1.2		1.2
Management & Control			
Board of (directors or trustees)	1.2	**0.15**	**1.05**
Senior management	1.5	**0.15**	**1.35**
Operational management	1.5	**0.15**	**1.35**
MIS/Financial control	1.5		1.5
Risk management	1.7		1.7
Compliance	1.7		1.7
Independent review	1.5	**0.15**	**1.35**
Capital Support			
Current coverage /surplus	0.8		0.8
Earnings	0.6		0.6
Access to additional capital	0.4		0.4

Overall Risk of Failure	**1.320**	**1.291**
Probability of default	**0.40%**	**0.38%**
Total Assets of entity	$500,000,000	$500,000,000
Expected Default	**$2,000,000**	**$1,900,000**

Total Economic Benefit	**$100,000.00**

As a result of strengthening APRA's 'Fit and Proper' standards the quality assessments of the entity will change. The extent of the change will depend on the original score for each quality assessment. Within the input page, shown in Table 4,

[9] The mathematics used to calculate the Overall Risk of Failure has not been included in this paper.

the quality assessment inputs are separated out according to their current value - whether they are very low; low; low medium; high medium; high; or extreme.

Table 4: Adjustments to the PAIRS quality assessments as a result of new 'Fit and Proper' rules

PAIRS Criteria Quality Assessment	very Low 0.00<X<=0.50	Low 0.50<X<=1.00	low Medium 1.00<X<=1.50	high Medium 1.50<X<=2.00	High 2.00<X<=3.00	Extreme 3.00<X<=4.00
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OPERATIONAL MANAGEMENT QA	0.025	0.05	0.15	0.35	0.45	0.5
MIS/FINANCIAL CONTROL QA RISK MANAGEMENT QA COMPLIANCE QA INDEPENDENT REVIEW QA	0.025	0.05	0.15	0.35	0.45	0.5
CURRENT COVERAGE/SURPLUS QA EARNINGS QA ACCESS TO ADDITIONAL CAPITAL QA						

The model incorporates these inputs by reducing each quality assessment for the entity as appropriate; taking into account that extreme risk values will be reduced by a greater amount than low risk values. This process is illustrated in column three and four in Table 3.

Incorporating the changes to the quality assessments, the Overall Risk of Failure and the expected default are then recalculated for the entity. The annual expected default for the entity, taking into account APRA's tighter 'Fit and Proper' standards, will be reduced to $1,900,000. The difference between the original and final expected default, in this case $100,000, equates to the annual economic benefit. Summing this across all the APRA supervised entities in the industry provides us with the total annual economic benefit across the APRA portfolio. This benefit is then transformed into a perpetuity function to ultimately obtain the total net present value of economic benefits.

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