CANADIAN TAX JOURNAL / REVUE FISCALE CANADIENNE (2015) 63:2, 469-86

Policy Forum: Resource Rent Taxation—Experiences from Australia

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PRÉCIS

La propriété collective des ressources minérales de l'Australie et les redevances traditionnelles fondées sur la valeur ou le volume imposées par les gouvernements régionaux dans le système fédéral de l'Australie ont entraîné des propositions de remplacement de ces redevances traditionnelles par un mode de perception bien conçu fondé sur les bénéfices. Un tel remplacement permettrait une meilleure attribution des fonds d'investissement dans le secteur des ressources minérales de l'Australie, y compris de l'investissement dans des opérations marginales qui seraient peu lucratives en vertu des redevances traditionnelles, et la pleine récupération économique des minerais. Un gouvernement australien récent a proposé un impôt sur les excédents de trésorerie de conception audacieuse incorporant la compensation retardée de la totalité des pertes (supprimant le risque, inhérent aux impôts traditionnels sur le loyer des ressources, de perdre la valeur des déductions des dépenses), ainsi que des dispositions annulant l'effet des redevances traditionnelles des gouvernements régionaux. Dans ce cas, cette conception audacieuse n'a pas été mise en œuvre et une idée connexe est que la compensation de la totalité des pertes, considérée par certains comme une caractéristique de conception cruciale pour l'obtention des résultats escomptés est un gaspillage de fonds publics pour d'autres. Le remplacement des redevances traditionnelles exigera un modèle fiscal solide en plus de consultations méticuleuses et judicieuses.

ABSTRACT

Australia's community ownership of mineral resources and traditional value- or volume-based royalties imposed by regional governments in Australia's federal system set the scene for proposals to replace these traditional royalties with well-designed profit-based imposts. Such replacement offers better allocation of investment funds within Australia's mineral resources sector, including investment in marginal operations that would be unprofitable under traditional royalties, and full economic recovery of minerals. A recent Australian government proposed a cash flow tax of bold design incorporating delayed full loss offset (removing the risk, inherent in traditional resource rent taxes, of losing the value of expenditure deductions), as well as arrangements nullifying the effect of traditional regional government royalties. In the event, this bold design was not

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implemented, and one related insight is that full loss offset, viewed by one person as a crucial design feature for efficient outcomes, is a waste of taxpayer funds to another. Replacement of traditional royalties would require solid tax design coupled with meticulous and judicious consultation.

KEYWORDS: RESOURCES ■ RENTS ■ INVESTMENTS ■ NEUTRALITY ■ INCOME TAXATION ■ AUSTRALIA

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INTRODUCTION

Why is introducing resource rent taxation by government often considered problematic? After all, to tax above-normal profit, or economic rent, all that is needed is a cash flow tax (CFT). Negative cash flow would attract a government cash rebate of cash outflow multiplied by the CFT rate. Positive cash flow would require a payment to government of cash inflow multiplied by the CFT rate.

Thus, under a 50 percent CFT, $1,000 of cash outflow in year 1 from capital expenditure (no non-cash items involved here) attracts a $500 cash rebate. Net receipts in year 2 from the extraction of mineral resources (possibly petroleum) require a CFT payment of $600. (See table 1.)[1]

Investors assessing the prospective project in table 1 see it offering a 20 percent (internal rate of) return both before and after CFT. Where is the economic rent to be taxed? This depends on the potential investor. An investor using a 20 percent risk-weighted discount rate sees the project as a marginal prospect with zero net present value (NPV) both before tax (−$1,000 + $1,200/1.2) and after (with both −$1,000 and $1,200 being cut by 50 percent). For this investor, there is no economic rent and no tax on it: in discounted terms, the tax payment in year 2 matches the cash rebate in year 1.

In contrast, an investor using a 10 percent risk-weighted discount rate views the project as a profitable prospect. This investor puts the project's NPV and its economic rent—or the value of its mining lease just before the $1,000 of expenditure in year 1—at $90.91 (−$1,000 + $1,200/1.1) and sees half of that NPV paid out in tax (again with both −$1,000 and $1,200 being cut by 50 percent). Yet another investor using

1 The tables and figure in this article reflect material in Wayne Mayo, *Taxing Resource Rent: Concepts, Misconceptions and Practical Design* (Weston Creek, ACT: Kyscope, 2013).

TABLE 1 Two-Year Project, 50 Percent Cash Flow Tax

	Pre-tax	Tax	Post-tax
		dollars	
Year 1	−1,000	−500	−500
Year 2	1,200	600	600
NPV@20%	0	0	0
IRR	20%	20%	20%

IRR = internal rate of return.
NPV = net present value.

a 25 percent discount rate would view the project as unviable before tax, with negative $40 value and economic rent (−$1,000 + $1,200/1.25). Post-tax value would be negative $20 (again, pre-tax value being cut by 50 percent), with the upfront rebate viewed as exceeding the discounted year 2 tax payment (showing how the tax gives back to unprofitable outcomes while taking from profitable outcomes).

Thus, economic rent is in the eye of the investor, and CFT design accommodates that personal view of economic rent.

With CFT applied to just one sector in one country, NPVs of prospective ventures in that sector would be reduced in proportion to the CFT rate, affecting the ranking of projects in that sector relative to untaxed operations elsewhere in that country or in other countries. But profitable ventures in the sector would remain profitable, and, in contrast to the situation with imposts based on value or volume of production, marginal ventures should remain so after CFT.

Conceptually, CFT could apply before or after income tax, but practicalities point to application before income tax; in particular, difficulties may arise in allocating the right amount of taxable income of diverse organizations to their cash flows subject to CFT. Where CFT is applied before income tax, ideally income tax should be applied to cash flows after CFT (as in table 2), not to pre-CFT flows.

Table 2 shows income tax applied to post-CFT cash flows of our two-year project, which is being assessed and the value of which is set by investors using a 20 percent discount rate. As before, such investors view the project as marginal, with zero NPV both before and after 50 percent CFT. When income tax is applied to post-CFT cash flow, $30 of income tax is paid on taxable income of $100 in year 2 ($600 cash flow less the $500 reduction in value or, in practice, writeoff of $500 of year 1 post-CFT capital expenditure), resulting in cash flow of $570 in year 2 after all taxes. For these investors, the discount rate after income tax is reduced in proportion to their 30 percent income tax rate to 14 percent. Thus, NPV after all taxes is zero, the same as NPV before and after CFT, because both taxable income and the investors' discount rate are reduced in the same proportion (by the 30 percent income tax rate).

Such a tax-neutral result would not be achieved under a design that included the $500 CFT cash rebate in year 1 assessable income and in year 2 included $1,200 net receipts and allowed deductions for changes in pre-tax value (a $1,000 reduction in this case) and $600 CFT payment. While under such design the same $30 net amount

TABLE 2 Two-Year Project, 50 Percent Cash Flow Tax, 30 Percent Income Tax

	Pre-tax	CFT (50%)	Post-CFT	Value[a]	Taxable income[b]	Income tax (30%)	After all taxes
				dollars			
Year 1	−1,000	−500	−500	500	0	0	−500
Year 2	1,200	600	600	0	100	30	570
NPV[c]	0@20%	0@20%	0@20%				0@14%
IRR.	20%	20%	20%				14%

CFT = cash flow tax.
IRR = internal rate of return.
NPV = net present value.

[a] Value, after cash flow arising in the year, from discounting future post-CFT cash flow at 20% per annum. Value in year 1 matching the cash outflow in that year shows the marginal nature of the project at a 20% discount.

[b] Cash flow plus change in value. In year 1, $500 negative cash flow from capital expenditure is offset by the resulting $500 value. In year 2, the loss in value is $500 since the project has zero value when it ends.

[c] For an investor applying a 20% discount before 30% income tax, the discount rate after income tax becomes 14% (that is, the post-income tax comparative return of a comprehensively taxed financial asset with a pre-tax return of 20% reflecting the same risk as the two-year project). Should a 10% discount rate be used by investors to assess the project and set project value, year 1 post-CFT value would be $545.45, and in year 2 taxable income would be $54.55, income tax would be $16.37, and cash flow after all taxes would be $583.63. With income tax staying at zero in year 1, assuming that the difference between upfront value and required expenditure is not taxed, NPV after all taxes with discounting at 7% [10 × (1 − 0.3)%] would be $45.45, the same as post-CFT NPV.

of income tax would be paid, payment would be heavily front-loaded ($150 in year 1 and −$120 in year 2), resulting in post-tax NPV at 14 percent of −$18.40.

So, even after factoring in income tax treatment, why is a CFT on mineral resources problematic for government? The answer lies in the tax revenue and budgetary risks associated with a CFT. Here is a tax that, when established as a stable regime and when combined correctly with income taxation, should have little impact on investment decisions in a sector with potentially sizable economic rent driven by a limited supply of quality mineral deposits. Nevertheless, the tax-neutral properties of a CFT derive from its taking from profitable outcomes while also giving back to unprofitable outcomes. This means that government is relying on the commercial nous of investors to achieve net tax from profitable ventures that more than offsets net cash rebates paid out to failed operations. In addition, a CFT poses particular risks to budget planning from unexpected annual mismatches between cash rebates and tax receipts and unexpected changes in profitability from commodity price movements.

In contrast, traditional value- or volume-based royalties not only do not give back to unprofitable outcomes; they also offer the prospect of taking from unprofitable outcomes. Thus, traditional royalties interfere with investment decision making, even with the best intentions of a government that is prepared to adjust royalty

levels with changing circumstances. Nevertheless, traditional royalties are easy to collect and difficult to avoid, and are less sensitive to variations in profitability of mining operations than is a CFT.

Deeper understanding of why governments may balk at the introduction of a CFT may be aided by looking beneath the design of three variants of resource rent taxation either considered or introduced by the Australian government in recent years:

1. a petroleum resource rent tax (PRRT), effective from July 1, 1984, initially applying only to offshore petroleum projects;
2. a resource super profits tax (RSPT) proposed in May 2010 to apply to all mining and petroleum projects with provision for projects subject to the PRRT to transition to the RSPT, but ultimately not implemented; and
3. a minerals resource rent tax (MRRT), which applied from July 1, 2010 to coal and iron ore projects, together with an extension of the PRRT to onshore petroleum projects.

The MRRT was repealed in late 2014, leaving the extended PRRT in place.

Differences in the design of the PRRT, the RSPT, and the MRRT help to illustrate key issues that confront governments interested in considering the introduction of resource rent taxation.

EXISTING PROJECTS

First, there is the issue of existing projects.

For example, consider the two-year project illustrated in table 1. If the project is undertaken *after* the introduction of a 50 percent CFT, post-tax outcomes are as shown in the table. If, however, the project's $1,000 year 1 expenditure is made just *before* the unexpected introduction of the tax, post-tax cash flows and profitability of the project look very different. In these circumstances (shown in table 3), the government is not sharing in the $1,000 of year 1 capital expenditure (by providing a 50 percent cash rebate) but is essentially just appropriating 50 percent of year 2 net receipts. This might look like the impact of an ad valorem royalty, and existing owners of the project might well continue on and produce the $1,200 of net receipts having sunk the upfront costs. Moreover, the government may wish the CFT to take from existing, as well as new, projects. Nevertheless, the project's owners no doubt would be less than happy at having a 50 percent capital levy suddenly imposed on them (with the value of the project instantly falling from $1,000 to $500 post-CFT). Moreover, the sovereign risk arising from a worry that such government action might be repeated in future could adversely affect future investment decisions.

If, however, the design of the unexpected CFT included a "starting base" year 1 allowance of $1,000 for this existing project, the project would once again attract a $500 cash rebate in year 1, compensating for the $500 capital levy. Project cash flows would again look like those in table 1. The owners of this project using a 20 percent discount rate to value the project (seen as marginal to them) would view

TABLE 3 Two-Year Project, 50 Percent Cash Flow Tax Starting in Year 2

	Pre-tax	Tax	Post-tax
		dollars	
Year 1	−1,000	0	−1,000
Year 2	1,200	600	600
NPV@20%	0	500	−500
IRR	20%		−40%

IRR = internal rate of return.
NPV = net present value.

the $1,000 starting base as matching both book value (expenditure undertaken) and market value. In contrast, if the owners were using a 10 percent discount rate to value the project, while the $1,000 starting base would still match year 1 book value, the associated $500 cash rebate would not match the $545.45 capital levy (the $1,090.91 upfront market value of the project to the owners cut in half). For these owners, a starting base of $1,090.91 would be required to compensate fully for the capital levy.

From government's point of view, allowing market value starting bases for existing projects turns them all into marginal projects from a tax revenue perspective. Differences in discount rates aside (since governments, in any case, often put a premium on getting budget impact in a particular year), the upfront value of expected net tax revenue from existing projects would be zero. Moreover, under pure CFT design, that zero expectation would be accompanied by potentially large upfront cash rebates for existing projects. And government would face the risk that future tax receipts may not justify the size of upfront rebates—particularly if market values were set during a boom period of high commodity prices. Practical difficulties would also be involved in setting market value for each existing project, a process potentially involving case-by-case negotiations.

In Australia, the initial PRRT design avoided these issues because, after preliminary consultation on the application of the tax to all petroleum mining onshore and offshore in Australia, the scope of the tax was narrowed to new offshore projects. Existing offshore projects, including Bass Strait and the fledgling North West Shelf, were excluded (though Bass Strait was later included in the PRRT net).

In contrast, the proposed RSPT was to apply to all existing and new mining and petroleum operations (except those already subject to the PRRT, which could elect into the RSPT). The starting base for existing projects was to be book value rather than market value, a feature that no doubt left some companies with existing operations somewhat disgruntled.

The MRRT, which superseded the RSPT and applied to new and existing iron ore and coal projects in Australia, provided for either market value or book value starting base with differing delayed writeoff provisions—pushing toward an effect similar to the original PRRT design that applied only to new projects. Market values likely reflected high commodity prices at the time. Similar starting base arrangements

apply to existing petroleum projects subject to extension of the PRRT, which accompanied the MRRT, to include new and existing onshore petroleum projects.

BUDGET MANAGEMENT RISK

The potential for large upfront CFT cash rebates for existing projects underlines the more general issue for government of a timing mismatch between immediate cash rebates and subsequent tax receipts under a CFT. This mismatch, posing difficulties for budget planning and risks for budget outcomes, is exacerbated by unexpected large projects, or mining booms with extended periods of large negative cash flows that are often difficult to predict. Beyond budget management, government faces the risk of providing cash rebates without being sure that future tax receipts will more than compensate for those payments.

In Australia, bold design of the RSPT accepted the risks around tax revenue security but sought to address budget management stress.

RSPT and Budget Management Risks

CFT design allows immediate writeoff of expenditures, so that negative cash flow translates into immediate CFT losses, and then provides immediate cash rebates equal to the tax rate multiplied by any unutilized losses—losses that cannot be written off against CFT profit (positive cash flow). In other words, immediate "full loss offset" is provided.

The RSPT sought to achieve financial equivalence to a pure CFT while addressing budget management stress by a design that incorporated depreciation of capital expenditure and loss carryforward. Capital expenditure was to be written off over a number of years (the number being subject to consultation) with an interest (uplift) rate to apply to both depreciated value and RSPT losses carried forward. Annual uplift would reduce RSPT payments or increase the size of losses carried forward, or both. Because uplifted unutilized losses ultimately (timing being subject to consultation) were to attract government-guaranteed cash rebates, the uplift rate was set at the long-term government bond rate (LTBR), incorporating systemic risk of government default and not any risk relating to project characteristics. Thus, the RSPT offered delayed full loss offset that was financially equivalent to immediate full loss offset under a pure CFT.

Table 4 presents a stylized illustration of the RSPT applied to our two-year project in table 1. The $1,000 year 1 expenditure is written off for RSPT purposes over the two years of the project. The tax rate is set at 50 percent (although the proposed RSPT was to apply at 40 percent). The written-down value (tax value) of capital expenditure and annual RSPT losses both attract an annual uplift at 5 percent LTBR. Consequently, instead of a $500 year 1 cash rebate followed by a $600 tax payment under the CFT in table 1, the project pays RSPT of $75 in year 2.

To better appreciate the operation of the RSPT and to properly assess project viability, the resulting post-RSPT cash flow of the project is split in the last two columns of table 4 between

TABLE 4 Two-Year Project, Stylized 50 Percent RSPT Design (CFT with Delayed Loss Offset)

	Pre-tax	RSPT writeoff	Tax value uplift[a]	Loss uplift[b]	RSPT[c]	Post-RSPT[d]	Post-CFT (risky)[e]	Cash flow (risk-free)[f]
					dollars			
Year 1	−1,000.00	500.00				−1,000.00	−500.00	−500.00
Year 2	1,200.00	500.00	25.00	525.00	75.00	1,125.00	600.00	525.00
NPV@20% . . .	0					−62.50	0	−62.50
NPV@5%	142.86					71.43	71.43	0
IRR.	20%					12.5%	20%	5%

CFT = cash flow tax.
IRR = internal rate of return.
LTBR = long-term government bond rate.
NPV = net present value.
RSPT = resource super profits tax.
[a] Prior-year written-down value × 5% LTBR.
[b] Prior-year tax loss ($500 in year 1) uplifted by 5% LTBR.
[c] 50% tax rate × $1,200 net receipts − $1,050 ($500 annual writeoff + $25 tax value uplift + $525 uplifted prior loss), which discounts back to year 1 to $1,000 (year 1 deduction under a pure CFT) with discounting at 5% LTBR, reflecting government guarantee of a cash rebate if necessary.
[d] Pre-tax cash flow minus RSPT payments.
[e] Cash flow if a pure 50% CFT is applied (50% × pre-tax cash flow).
[f] Post-RSPT minus post-CFT. An intermediated financial instrument offering a future government-guaranteed payment of the audited year 1 loss × the tax rate, uplifted annually at LTBR, could provide the project with a $500 year 1 payment.

- the project's risky cash flow (the same as in table 1) that would have resulted under a pure CFT (50 percent of annual pre-tax cash flow); and
- the remainder (the last column), an asset of the project that is "risk-free" (subject only to systemic government risk) and equivalent to an implicit loan to government of the shortfall in the upfront CFT cash rebate, with that shortfall guaranteed to be paid with interest by government via later reduced tax payments or cash rebates if necessary.

Through tax design, government has engineered the project's provision of a loan to it rather than issuing government bonds to pay for an upfront full loss offset.

The last column of table 4 (risk-free asset) shows that the cash flow deficiency relative to a CFT of $500 in year 1 is fully recovered via RSPT payments in year 2 that are lower by $525 ($75 versus $600 under a pure CFT). The project has to wait a year to recover the deficiency, but the wait is compensated for by interest at 5 percent LTBR. The 5 percent LTBR appropriately reflects government's standing behind the compensation should the project produce insufficient net receipts to absorb carried-forward and uplifted losses. At the extreme, in the event that this project produced no net receipts and closed down in year 2, the project would attract a cash rebate of $525 (a $1,050 RSPT loss multiplied by 50 percent), financially equivalent to a $500 cash rebate in year 1.

It would be misleading financially for investors to discount the cash flows of the risk-free asset in table 4 using a risk-weighted discount rate. Such faulty analysis, using a 20 percent discount rate applied to aggregate post-RSPT cash flows of the project, produces an NPV of −$62.50 (and an associated return of 12.5 percent), wrongly suggesting that the RSPT has turned the marginal project into an unviable one. The last column of table 4 shows that this −$62.50 NPV arises solely because the risk-free component of overall cash flow is discounted at 20 percent rather than a risk-free 5 percent. Discounting these risk-free flows correctly at 5 percent must result in zero NPV.

The RSPT design focused on achieving a tax-neutral impact on investment decisions. The design lent itself to simple explanation in the form of CFT outcomes like that in table 1 (with an accompanying explanation of some fully compensated delays). Nevertheless, as noted above, implementation of the RSPT was not pursued.

Sources and forms of opposition to the RSPT varied. While the mineral resources sector had expressed some sympathy toward profit-based imposts over those based on volume or value, its strong opposition may have resulted in part from surprise at the proposed 40 percent rate of tax and book value starting base. At the same time, some with prospective ventures complained that existing projects were to receive preferential treatment. People generally had trouble understanding how the RSPT worked (a problem that was perhaps exacerbated by the number of loose ends in the design that remained to be resolved and a paucity of clear hypothetical examples), and some considered it "a bit over-engineered." Many people erroneously saw the LTBR as a measure of when the tax kicked in, noting that they themselves could earn a similar return on their own regular savings. The potential for engineering by the financial sector of the implicit loans to government (the last column of table 4) into government-guaranteed financial instruments was portrayed by some as being an unworkable key design feature, rather than a potentially convenient side effect. Some pointed to what they saw as the destructive nature of the tax, a view that was typically based on faulty application of risk-weighted discount rates to aggregate post-RSPT cash flows as shown in table 4. Even though cash rebates are similar to consumption tax refunds, some questioned whether the government would actually honour its commitment to provide them. Moreover, the preparedness of the government to sign up to full loss offset was viewed by some, not as the path to tax-neutral design, but rather as an allocation of their taxes to failed mining operations undertaken by unreliable or risk-preferring operators.

RSPT and Income Taxation

Proposed income tax treatment of the RSPT (applied before income tax with cash rebates assessable and RSPT payments deductible for income tax purposes) attracted little attention. Conceptually, however, the income tax treatment of implicit loans to government embedded in a CFT with delayed full loss offset determines whether the LTBR uplift should be applied at a before- or after-income-tax level.

Table 5 shows ideal income tax treatment of cash flows of our two-year project subject to CFT with delayed loss offset (matching that in table 4) applied before

income tax. Despite delayed full loss offset, the ideal income tax treatment of the risky component of project cash flows reflects that in table 2. In practice, this means that pre-tax capital expenditure would be reduced by the CFT rate (as if a pure CFT were operative) before applying income tax depreciation, and pre-tax net receipts would also be cut by that rate before being included in taxable income (similar to the situation with value-added consumption taxes). Thus, ideal income tax treatment sees the $1,000 year 1 capital expenditure cut by the 50 percent CFT rate and written off in year 2 against $1,200 of net receipts, also cut by 50 percent, to produce $100 of taxable income on which income tax of $30 is paid.

If income tax assessment stopped there and if $75 of RSPT (table 4) and $30 of income tax were simply taken from pre-tax cash flows to assess project viability, the project would appear unviable to an investor using a 20 percent pre-tax discount rate and facing a 30 percent income tax. That investor would compute an NPV after income tax of −$39.47, using a 14 percent discount rate, and a return of 9.5 percent (compared to the 14 percent return that the investor could earn after income tax from a financial asset with similar risk to that of the project).

But table 5 shows that this −$39.47 NPV comes entirely from the combination of inappropriate mixing of the risk-free asset (an implicit loan to government) with overall project cash flows and no income taxation being applied to that risk-free asset. The implicit loan alone has a pre-tax NPV of −$39.47 with discounting at 14 percent. Investors facing a 30 percent rate of income tax, however, would discount flows associated with implicit loans to government at 3.5 percent [$5 \times (1 - 0.3)\%$], not 14 percent. It is therefore necessary to subject the implicit loan to income tax (with consequent payment of $7.50 in income tax in year 2) in order for the loan's $500 upfront face value to be maintained after income tax with discounting at 3.5 percent. The loan then provides the same 3.5 percent return after income tax that the investor with a 30 percent income tax rate could make on 5 percent government bonds.

Splitting the project's cash flows into risky and risk-free components and subjecting the split flows separately to income tax as in table 5 results in the project's risky flows achieving a 14 percent return (remaining marginal) and the risk-free asset a 3.5 percent return.

Should the implicit loan not be subject to income tax, a tax-neutral outcome would require the uplift rate to be set at post-income-tax LTBR (raising complications regarding differing investor tax rates). Applying a 3.5 percent uplift rate, instead of 5 percent, to our two-year project would see $17.50 tax value uplift and $517.50 loss uplift in table 4, resulting in RSPT payments increasing to $82.50 (a $7.50 increase matching the loss in income tax from not taxing the risk-free asset) and putting year 2 post-RSPT flow at $1,117.50. While risky project flows would remain as in table 5 after income tax, the flow of the risk-free asset in year 2 after all taxes would be $517.50 ($1,117.50 − $600.00 from the computations in table 4). Thus, the risk-free asset viewed separately again has a post-tax return of 3.5 percent, consistent with what our investor with a 30 percent income tax rate can get from the government bond market.

TABLE 5 Ideal Income Tax Treatment of Two-Year Project Subject to CFT with Delayed Loss Offset

	Risky project: income taxation				Risk-free asset: income taxation				
	Risky cash flow	Income tax[a]	Post-tax[a]	Flow after all taxes	Risk-free asset	Writeoff[b]	Taxable income[c]	Income tax	Post-tax
					dollars				
Year 1	−500.00		−500.00	−1,000.00	−500.00				−500.00
Year 2	600.00	30.00	570.00	1,095.00	525.00	500.00	25.00	7.50	517.50
NPV@20%	0			−87.50	−62.50				
NPV			0@14%	−39.47@14%	−39.47@14%				0@3.5%
IRR	20%		14%	9.5%	5%				3.5%

CFT = cash flow tax.
IRR = internal rate of return.
NPV = net present value.
[a] From table 2.
[b] Capital component of implicit loan or its annual change in value.
[c] Income component of loan.

Such considerations—which apply equally to a CFT with delayed loss offset applied after, rather than before, income tax—put an even greater premium on taxpayers' clear understanding of the design of the tax. Investors would need some convincing that paying more CFT via a lower uplift rate was justified because no income tax would be applied on implicit loans to the government that the investors were not asked to provide. Moreover, arguments over the justification for applying income tax to implicit loans would inevitably be set against the reality that the lack of tax on implicit loans would not be the only feature of income tax treatment of mining operations at variance with tax neutrality. It is not hard to imagine cries that investors are not even allowed to earn the government bond rate before CFT kicks in.

TAX REVENUE RISK

A pure CFT does not involve implicit loans to government. A CFT with delayed, but guaranteed, full loss offset invokes an implicit loan to government, ideally with an interest (uplift) rate reflecting the systemic risk of government default and the income tax treatment of the loan.

What happens to this framework in circumstances where government's concern about budget-planning risks shifts to concern about potential revenue risk, and that concern results in government not backing immediate or delayed full loss offset? Traditionally, in these circumstances (as in the case of a pure CFT), immediate writeoff of all expenditures is allowed for resource rent taxation purposes (so that negative annual cash flow matches the tax base), and (as in the case of a CFT with delayed full loss offset) an interest rate applies to tax losses carried forward. But (in contrast to a CFT with delayed full loss offset) investors face the real possibility that losses uplifted and carried forward will be lost in the event of insufficient net receipts to absorb them.

An implicit loan to government is still involved, but with the open-ended risk that the loan will never be repaid. Against such possibility, attempting to isolate cash flows of such risky implicit loans and to apply income tax to those flows would not be practicable. The focus of design shifts to the level of the uplift, or "threshold," rate to apply to losses being carried forward. Such design might be regarded as a traditional resource rent tax (RRT) and is the design underpinning the Australian government's PRRT and MRRT (where the only specific income tax provision applied is to allow income tax deductions for RRT payments).

Overarching CFT concepts make it clear that the level of the threshold rate may be viewed as a general measure of the risk of not achieving the equivalent of full loss offset under the CFT—or, more simply, the risk of losing the value of available RRT deductions. Selection of the threshold rate has, however, often been linked more to the level of project risk typical of the industry or sector subject to RRT than to the risk of losing RRT deductions. Certainly, where RRT is applied to individual ring-fenced projects, the payback of implicit loans can be heavily dependent on the characteristics of individual projects, particularly marginal ones. The risk of losing RRT deductions is also likely to decline in concert with project risk as the development of the project progresses. But, even under tight project-based design, with

some highly profitable projects it may be clear from the outset that there is little or no chance of unutilized RRT losses.

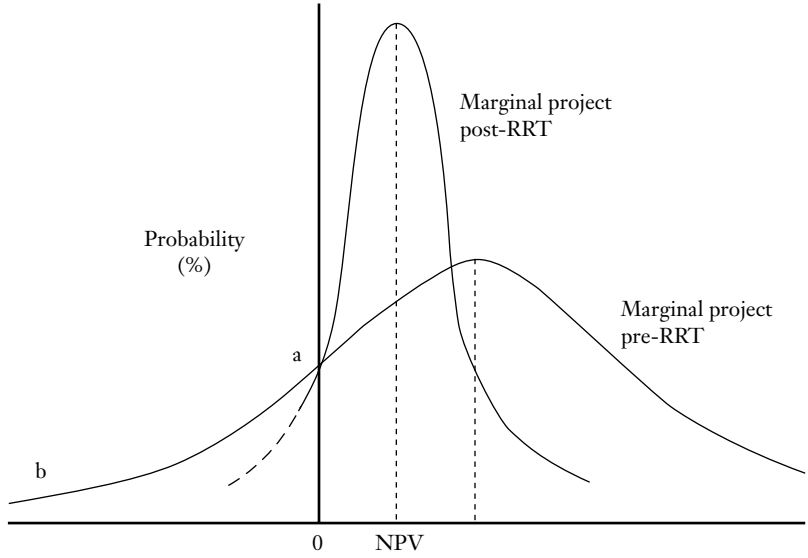
The risk of unutilized RRT losses faced by individual projects and the unique project risk faced by those projects are two very different things.

Figure 1 indicates the nature and extent of this difference. It shows the spread of possible NPV outcomes of a marginal stand-alone project subject to RRT. Instead of a risk-weighted discount rate measuring a single project NPV, the NPV of each possible outcome of the project (like the one outcome for our two-year project in table 1) is determined using a risk-free discount rate to avoid double-counting for risk. Before RRT, the potential investor judging the investment in figure 1 as marginal sees positive expected NPV just balancing the spread of possible outcomes, with that spread including a significant percentage of NPV outcomes below zero NPV.

If the pre-RRT NPV schedule in figure 1 were shifted to the right so that there were no NPV outcomes below zero, project risk (the spread of possible project outcomes) would remain unchanged. Despite unchanged project risk, there would then be zero risk of losing RRT deductions regardless of the NPV outcome (the RRT threshold set at a risk-free rate then appropriately reflecting the fact that RRT deductions will always be absorbed before the project's end). Post-RRT outcomes of the project would be equivalent to those under a CFT, in discounted terms. The dichotomy between project risk and the risk of losing RRT deductions is further underscored by the fact that RRT design may reduce the risk of losing deductions while project risk remains unchanged—for example, by applying RRT on a taxpayer or company basis and thereby allowing RRT losses from one project to be offset against RRT profits from other projects of the same taxpayer or company.

Return now to unchanged figure 1, which, more realistically, has the left tail of its pre-RRT schedule going below zero NPV. In these circumstances, RRT imposes an asymmetrical effect on the project's NPV probability distribution. The asymmetry arises because while profitable outcomes attract CFT-equivalent treatment, unprofitable outcomes do not. At the extreme of unprofitable outcomes, when no positive annual positive cash flow is ever realized, no loss offset at all is provided. Such a situation would arise where no net receipts at all in year 2 resulted from the $1,000 expenditure outlay in year 1 of our two-year project. Thus, negative post-RRT NPVs, instead of following the dashed schedule in the figure (which would be the case under a CFT), approximate the "a" to "b" part of the pre-RRT schedule where NPV is unchanged by RRT—where no RRT is paid and no recompense given for unutilized RRT losses. No amount of extra annual uplift applied to those losses will provide any direct compensation for the unutilized losses (but extra uplift would have an impact on the upside). Relative to the investment neutrality of CFT design, distortions imposed by the lack of full loss offset under RRT design cannot be simply and neatly offset by imposing a generally applicable loading above LTBR on the threshold rate applying to losses carried forward—including a loading based on supposedly typical project risk and associated risk-adjusted discount rates. Against the illustration in figure 1, an RRT threshold rate above LTBR may be viewed as an attempt at a second-best offset to probability distributions skewed by the RRT.

FIGURE 1 NPV Probability Distribution for a Marginal Project Pre- and Post-RRT



NPV = net present value.
RRT = resource rent tax.

Both the PRRT and the MRRT incorporate additive (rather than multiplicative) loadings above LTBR. The project-based PRRT started out with a general threshold rate of LTBR plus 15 percentage points (ignoring the implications of future reductions in LTBR at a time when the bond rate was around 15 percent). Dated exploration expenditure attracted a threshold rate of LTBR plus a gross domestic product deflator (and from 1990, exploration expenditure losses could be transferred to other projects). PRRT losses created by a project's eligible closing-down expenses attract a refund of the project's prior PRRT payments equal to 40 percent of the losses (the PRRT rate), thus removing the risk of losing the value of available deductions for closing-down expenditure (a provision announced without any associated change to previously announced PRRT threshold rate).

The threshold rate for MRRT was set at LTBR plus 7 percentage points (when LTBR was about 6 percent). MRRT losses (other than starting base losses) from one project of a taxpayer could be transferred to MRRT profits of other same-commodity projects of the taxpayer (subject to a common ownership test).

An imposed uniform loading on LTBR for the RRT threshold rate inevitably influences investment decision making in various ways. A high threshold rate, for example, provides encouragement for gold-plated expenditure and delayed production to extend loss carryforward artificially. From July 1990, the PRRT's 15 percentage point threshold rate loading above LTBR was reduced to 5 percentage points for general project expenditure.

The potential for distortions can be exacerbated by the positioning of RRT taxing point along the sequence of extraction through to sale. Expenditures to bring product to taxing point are included in the RRT net, and product is priced at taxing point for RRT purposes.

Where taxing point is upstream in the production sequence from the point at which product can first be priced, mechanisms are required to reconstruct product price from pricing point back to taxing point. Such mechanisms may include the application of a specified return to capital downstream of taxing point to pricing point, and perhaps also upstream of taxing point. Administrative and compliance complexities aside, investment distortion possibilities are expanded by differences between the risk of losing RRT deductions, the RRT threshold rate, and the specified return to capital. PRRT design avoids these added complexities by seeking to align taxing point and pricing point. In contrast, MRRT design had taxing point focused around run-of-mine stockpile, which could often be upstream of the first point of commercial pricing of product.

REGIONAL GOVERNMENT ROYALTIES

For countries like Australia with a federal structure and where mineral resources are assumed to be owned by the community, royalties imposed by regional jurisdictions are a significant issue. Typically, royalties imposed on the extraction of mineral resources by Australia's regional jurisdictions (states and territories) are based on volume or value (ad valorem) of production. Such traditional royalties apply regardless of the profitability of particular operations.

Case-by-case negotiations and adjustments of royalty levels for changing circumstances may occur. Nevertheless, beyond sovereign risk effects of such ongoing government involvement, investment distortions are inevitable. Similarly to a traditional RRT, royalties that are based on value or volume take from the upside without giving back to the downside. Moreover, absent sensitive case-by-case adjustment, royalties offer the prospect of also taking from the downside. To illustrate project assessment using risk-weighted discounting, in table 6 a 10 percent ad valorem royalty is applied by a regional government in a country to the annual net receipts of our two-year project.

For the investor using a 20 percent risk-weighted discount rate, the royalty makes the project, marginal before the royalty, unviable with an NPV of −$100. That negative impact of the royalty flows through to the investor's post-income-tax assessment of the project (even if royalties are deductible for income tax purposes).

If now the central government of the country imposes a pure CFT on the same project but ignores the royalties entirely, the assessment by the investor (now the meat in the sandwich between two levels of government) will, by chance, stay at −$100. While the −$1,000 year 1 expenditure is reduced to −$500, year 2 net receipts after royalties and CFT become $480, which discounts to $400 in year 1. Not a great deal would change if, more realistically, royalties were allowed as a deduction for CFT purposes, just like other costs of operation. With a 50 percent CFT, the investor would compute a post-royalty cut in NPV by 50 percent (both post-royalty

TABLE 6 Ad Valorem Royalty of 10 Percent on Net Receipts[a]

	Pre-tax	Royalty	Post-royalty
		dollars	
Year 1	−1,000		−1,000
Year 2	1,200	120	1,080
NPV@20%	0		−100
IRR	20%		8%

IRR = internal rate of return.
NPV = net present value.
[a] Net receipts are gross receipts less operating costs. Ad valorem royalties are often based on gross receipts.

−$1,000 and $1,080 being cut by 50 percent), but the project would still be unviable at NPV of −$50.

In Australia, the design of the original PRRT did not have to grapple with the treatment of regional government royalties because such royalties did not apply to the offshore petroleum projects subject to PRRT.

The RSPT, with its proposed broad coverage of onshore and offshore mineral resources, incorporated a bold design that compensated mineral resource operations directly for their royalty payments to regional governments. Thus, in table 6, the regional government would still receive $120 of royalty payments, but the Australian government would fully compensate the project. For existing projects subject to RSPT, this meant that starting bases built around the aim of market value would have logically been less by an amount equal to the upfront value of the expected stream of future royalties at the time of the RSPT announcement—perhaps providing some justification for the use of book value rather than market value in the announced RSPT design.

With projects fully compensated for royalty payments, project viability would be unaffected by distortive value- or volume-based royalties. The RSPT was to achieve this compensation via credit for royalties against RSPT payments, with immediate cash refunds for excess annual credits. The royalties would have had nil net effect for income tax purposes with royalty payments being deductible and their matching compensation being assessable for income tax purposes. Royalty credits were to be limited to royalty increases scheduled at the time of the RSPT announcement plus "appropriate" indexation factors (to avoid revenue siphoning by regional government). Nevertheless, regional governments would still have been able to increase royalties beyond such levels unilaterally, with a negative impact on mineral resource operations.

In contrast, Australia's MRRT, which incorporated an operative 22.5 percent tax rate, required excess credits to be carried forward to be offset against future MRRT payments. (Excess royalty payments attracted uplift at the MRRT threshold rate via conversion of royalty credits into deduction equivalents by multiplying the credits by 100/22.5.) At the extreme, however, there may be no RRT payable at all. Then,

because there were no refunds for excess credits, the full distortive effects of royalties would again be revealed. To illustrate, if RRT with a 20 percent threshold rate applied to the project in table 6, no RRT would be payable, and project cash flow after paying royalties and RRT would be as shown in the table. Moreover, MRRT crediting arrangements applied regardless of the extent to which regional governments later increased royalties.

A low tax rate for a central government's resource rent taxation coupled with RRT-style carryforward of excess credits (as with the alternative of deductions for royalties) can result in domination by regional government royalties and their distortive effects, leaving resource rent taxation and its associated extra tax revenue to perform a topping-up role.

FUTURE POLICY DIRECTION

The design of resource rent taxation by government can follow that of a pure CFT, a CFT with delayed full loss offset, or a traditional RRT. The design could also be a mixture of these, such as a pure CFT applying at the exploration and proving-up stages; a traditional RRT during the development and production stages with a low threshold rate, given the low risk of losing the value of deductions; and a pure CFT at the closing-down stage. A key aim is to achieve a design that is more efficient (less distortive of investment and production decisions) than volume- or value-based royalties. Design that is seen to be stable over the long term is an important part of that.

Take a country like Australia, with community ownership of mineral resources, a federal system, and traditional royalties imposed by regional governments in that federation. Should conditions for the achievement of desirable design from an economic perspective come together, out of the large range of possible ways to design resource rent taxation imposed by central government, one design ticks a number of boxes in terms of efficiency improvement and the chance of being implemented. That design is a pure CFT applied by central government wherever traditional regional government royalties currently apply, with the CFT rate being set at a level expected to deliver tax revenue similar to the revenue from existing royalties. Existing royalties would be abolished through negotiations between the two levels of government resulting in regional government being compensated directly by revenue transfer from central government. Since expected overall tax revenue from existing projects would be unchanged, there would be no starting bases needed for existing projects. In addition, no implicit loans to government would be involved, with the associated complexities regarding income tax treatment of such loans. Greater focus on forecasting budgetary effects from industry investment surveys would seek to minimize risks around budget planning.

Intergovernment negotiations would ideally include agreement for all exploration permits to be allocated via cash bidding (reflecting expected economic rent), removing the encouragement given to excessive expenditure from work program bidding. Net tax revenue beyond cash bids received from future developments would depend on upside in profitability not expected at exploration time. Government would be seen to be facing both downside and upside risks to CFT revenue and

passively relying on the commercial nous of industry players to come out ahead. The possibility of limited future tax revenue beyond cash bids highlights the need for simplicity of compliance and administration, which a pure CFT offers (particularly if applied on a company rather than a project basis).

The ranking of profitable prospects would likely be little changed (with NPV under the CFT matching that of royalties). But, crucially, better allocation of investment funds would be expected, including into marginal operations unprofitable under royalties, as well as more finely tuned recovery of minerals around the end of projects' lives.

A pure CFT substituting for royalties lends itself to simple explanation through, say, the use by government of simple examples such as tables 1 and 2—expanded as necessary to realistic mineral resource projects. Inevitably, however, there are risks with respect to the acceptability of design and the stability of design over the long term. Ironically, one design risk based on Australia's experience with the RSPT is the concern that taxpayers generally may have with immediate cash rebates provided for unutilized negative cash flow. A crucial design feature for the achievement of efficiency to one person is a waste of taxpayer funds to another. A risk to design stability is the likely pressure that would arise for increased CFT rate in the event of unexpected boom conditions in the mineral resource sector accompanied by high commodity prices and increasing profitability.