The Resource Rent Tax: A Penalty on Risk-Taking

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and
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Foreword

Ross Parish

Many economic terms, such as 'cost' and 'profit', derive their primary meaning from accountancy, where they serve to give a meaningful account of the transactions of a business entity in some historical period. When these and similar terms are used by economists it is usually in a forward-looking sense, i.e., it is usually expected costs, expected profits, etc., that are meant. Expectations are subjective and uncertain; they may be vague and even at their most precise take the form of subjective probability distributions. When taxes or other government interventions affect business decisions, it is primarily through their effect on these subjective, insubstantial, magnitudes. Unfortunately, the subjective and uncertain nature of the data of business decisions is often forgotten or temporarily suppressed, and we argue as if they had the concreteness of their semantic counterparts from accountancy.

Probably nowhere is the element of uncertainty in investment decisions more apparent than in the mining industry. Hence it is important that it be borne in mind in discussions of the impact of economic policies on that industry. Professor Ball and Mr Bowers, the authors of this monograph, note that there is an unfortunate tendency to judge the effect of the proposed Resource Rent Tax (RRT) 'by calculating its effect on existing successful projects after the fact'. They argue that such projects 'do not provide a valid reference point for assessing the effect of an RRT on new investment decisions, where it will have its most serious effects'.

Ball and Bowers develop in this monograph the interesting insight that a resource rent tax, whereby the government takes a share of the profits of successful projects but does not share in the losses of unsuccessful ones, is equivalent to the appropriation by the government of a call option on a share of the profits of each mining project. They then draw on the theory of the valuation of call options in order to show how the expected value of the government's 'take' varies with the riskiness of the project. They conclude that this form of taxation, far from being a neutral tax on pure economic rents, as has sometimes been claimed, discriminates against riskier investments and is likely to bias the direction of investment in certain predictable ways.

The CIS is pleased to be able to contribute to the current debate on mineral taxation by bringing to a wider audience the results of Ball and Bowers' analysis, a fuller and more technical version of which is being published in an academic journal.

THE RESOURCE RENT TAX: A PENALTY ON RISK-TAKING

Ray Ball and John Bowers

I. INTRODUCTION

The Resource Rent Tax (RRT) is the Australian Government's latest scheme for extracting tax revenue from the natural resources industries. Besides the potentially lucrative advantage for the Government, support for the RRT comes from two sources. First, the particular academic economists who proposed the RRT (see papers by Garnaut and Clunies Ross, 1975 and 1979) have claimed that it is 'economically efficient' in that it does not distort resource allocation or interfere with the creation of wealth in the resources industries. Under this view, the RRT merely siphons off part of resources wealth to the Government, without inhibiting investment at all. The RRT is said by these economists to be 'neutral' with respect to private investment decisions. Second, there is a socio-political view that natural resources wealth is public rather than private, and that the RRT can in some sense allow both private risk-takers and the public to obtain 'fair' rewards from utilising this wealth.

We cannot agree with either of these claims. The RRT is a tax on successful risk-taking that will inhibit the process of risk-taking in the Australian resources industry, particularly in exploration investments but also in other phases of resources development and production.

The RRT will merely add one more wrinkle to the complex taxation apparatus in the resources industries. It is based not on sound economic principles, but on the attempt by governments to redistribute wealth according to their own political criteria. It promises to further socialise our corporate structure into the tidy but unadventurous group that the planning mentality appreciates. Far from being economically neutral, the RRT distorts against risk-taking behaviour, as part of an economic, political and social climate that does little to encourage and much to discourage entrepreneurship.

II. THE RESOURCE RENT TAX PROPOSAL

The notion of an RRT surfaced in the mid-1970s' received support from the then Prime Minister and endorsement by the then Labor Opposition, and has become a centrepiece of the present Australian Government's policy towards the resources industries. The Australian Government now intends to implement the RRT for crude oil in 1984-85, and for other resources soon after.

The Resource Rent Tax as it has been proposed has four features that are particularly important with respect to risk-taking.

(1) The RRT aims to tax what economists label a project's 'economic rent'. Briefly, the economic rent of a project is the difference between the return the project earns and the return that would be just sufficient to make it competitive. For example, an investment that returns 27 per cent in an area where 23 per cent is a competitive return for risk-bearing would be said to earn economic rent at the rate of +4 per cent. Other terms for 'competitive return' are 'normal profit rate' and 'cost of capital'. Other terms that closely describe the concept of economic rent are 'windfall profit' and 'excess return'.

Clearly, risk-taking corporations undertake their investments expecting to earn positive economic rents. That is, they believe that they can earn better returns by creating new investment than they can by simply parking their money on (say) the share market.

The intention of the RRT is to tax only a project's above-normal profits. This requires the taxing authority to calculate a 'normal' or competitive rate of return for each particular project or class of projects, based on the risk involved in it. This has become known as the 'threshold rate' since it determines the threshold return beyond which the RRT begins to be paid.

(2) **The Australian Government does not propose to underwrite projects that earn less than the threshold rate of return.** The Government's tax interest lies in only those projects that earn positive economic rents. Nor does it propose to allow companies to sell RRT tax losses (negative economic rents), which would have much the same effect as paying a tax refund on projects that earn less than the 'normal' profit. This fundamental asymmetry in the RRT's handling of economic rents means that the Australian Government's 'fair share' of the good outcomes does not extend to a 'fair share' of the risks.

(3) **The RRT is project-based.** This will have two effects: it will

require a whole new set of taxation rules to determine a project-by-project definition of taxable income; and it will prohibit the aggregation of winning and losing gambles into a single taxable entity, at which level the winners and losers would tend to cancel out. A resources company could have ten resources projects upon which it earns no **aggregate** economic rent, but still have to pay RRT on the most profitable five.

(4) **The RRT is applied to only a narrow subset of resources projects.** These include projects that use mechanical methods to recover resources in the form of minerals, liquids, gases, etc. that reside below the earth's surface. Activities that exploit natural resources in other ways are excluded from this special taxation. For example, we use natural endowments of land, upon which to construct commercial buildings, dwellings, recreational facilities, and roads; we use the air, to process exhaust wastes from automobiles, factories, workers' lungs, and all lungs for that matter; we use rivers, lakes, the sun, rainfall, and subterranean water: and we extract minerals from below the earth's surface by nonmechanical processes such as agriculture and grazing. The parallel between agriculture and so-called 'natural resources' is particularly close. What is the distinction between the narrow set of natural resources exploited by mining companies and the complete set of natural resources exploited by individuals and nonmining companies in a variety of ways? Perhaps the distinction is purely political, in that the wealth that resides in the resources projects now singled out for attention is more easily expropriated in the current political climate.

We use these features to show that the RRT is not a tax on economic rents, as claimed, but that it is a tax on successful risk-taking.

RRT versus other taxes

Before proceeding to our analysis, we wish to emphasise that we do not attempt to compare the RRT with the existing patchwork of taxes, for two reasons. First, a direct comparison would be extremely complicated and we do not believe it is feasible with current economic technology. Second, we believe that the RRT will not replace the existing regime, but will simply add to it. Our purpose is to show that the RRT's alleged superiority over other taxes is not as clear as its proposers and supporters have claimed.

III. THE RRT IS NOT WHAT IT CLAIMS TO BE

The existing taxation system in the resources industries is a patchwork of different taxes, levies, excise, royalties, excessive freight charges, and favouritism. Economic theory says that such a patchwork taxation regime will interfere with the natural economics of supply and demand and lead to decisions that are inferior to those that would be made in its absence.

The economists who have proposed the RRT claim that it 'can, in principle, be strictly neutral'. This is the conclusion of Garnaut and Clunies Ross at p. 201 of their 1979 paper (see Bibliography at the end). It is simply incorrect. In an academic paper forthcoming in the Australian Journal of Management, we show how the RRT will inhibit and distort investment activity in the resources industry. Our analysis, described below, shows that the RRT is not a tax on economic rent, as claimed by its proponents and by its very title.

The RRT and economic rent

The logic of a true tax on economic rent is simple and appealing. The taxing authority simply expropriates a proportion (say 40 per cent) of the economic rent. This leaves the resources company with a positive proportion (say 60 per cent) of the rent. While the resources company no longer receives 100 per cent of the economic rent, a **true** resources rent tax never takes all the rent away and thus always leaves the resources company with an incentive to undertake the same set of investment projects as before. In other words, it does not interfere with investment decisions and therefore does not reduce aggregate economic rents. It merely redistributes the given rents from a given set of investment projects towards the taxing authority.

The Australian Government's RRT proposal is not a true tax on economic rent because of one important feature: it does not require the taxing authority to take its proportion of the economic rents **if they turn out to be negative.**

The effect of treating positive and negative rents differently can be illustrated by the hypothetical investment proposal described in the box opposite. This example reveals the most fundamental distortion caused by the proposed RRT: that it can actually cause viable projects to be rejected. This, of course, is a result that the RRT's proponents claim does not happen. In order to extend this

The **Proposed** RRT 'Kills' an Investment

Consider a project that requires a $100 investment and that has two equally likely outcomes: payments of $202 and $40, one year later. These outcomes are the project's revenues from sale of resources, less all operating (non-capital) costs. The risk of the project lies in the fact that, at the time of incurring the $100 outlay, the investor does not know whether the outcome will be $40 or $202.

In order to decide whether to make the investment, the investor first calculates the expected value (i.e., average) of the two outcomes as $121. Then the investor decides what rate of return is required for bearing this project's risk. This required return is called the 'cost of capital'. If 10 per cent is appropriate, then the expected value of the investment, $121, is 'discounted' for one year at 10 per cent, resulting in a 'present value' for the investment of $110. (The technique of discounting expected future amounts to obtain their present values is described in most finance textbooks.) Finally, the investor calculates the 'net present value' of, or the value created by, the hypothetical project. This is the present value of the expected future outcome from the project ($110), less the cost of creating it (the original $100 outlay), or +$10. Because the project is expected to create positive value, the risk-taker will go ahead and create it. The risk appears to be worth taking.

Consider now the effect of introducing a 50 per cent RRT. The RRT is levied upon a base defined as the revenue from sale of resources, less operating costs, capital outlays, and an allowance for a 'normal' return on capital (the 'threshold' rate). If the threshold rate is set equal to the cost of capital, then in the event of the favourable outcome occurring, the RRT payment for this hypothetical project is $46, calculated as 50 per cent of the economic rent of $92 ($202, less $100, less 10 per cent of $100). In this eventuality, the after-RRT outcome is $156. The RRT appears to be living up to its promise of leaving the risk-takers with a positive share of the economic rent.

However, in the event of the unfavourable $40 outcome occurring, the risk-taker bears 100 per cent of the negative economic rent of -$70, calculated as ($40, less $100, less 10 per cent of $100). The after-

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tax outcomes facing the investor are thus $156 and $40. Being equally likely, the outcomes now have an expected value of $98. Since the after-tax expected value is less than the cost of creating the project ($100), the value to the entrepreneur has been completely destroyed. The effective incidence of the 50 per cent RRT is in excess of 100 per cent; it has taken away all of the value originally created in the project. The risk now is not worth taking.

Consider one further scenario. Suppose investors could get tax relief for negative economic rents. In our example, suppose that the negative $70 RRT 'loss' were deductible against an RRT 'profit' from another project. At a 50 per cent RRT rate the tax saving would be $35, changing the pre-tax outcome to $75. The expected value of the two after-tax outcomes now would be $115.50. The expected value of the RRT would be $5.50, which has a present value of $5 under the simplifying assumption that the 10 per cent discount rate is still appropriate. This is exactly 50 per cent of the value created, leaving $5 for the project's owners. The effective incidence of the RRT now is 50 per cent, which is equal to the stated RRT rate. The risk would once again be worth taking.

This illustration shows that the asymmetric treatment of positive and negative economic rents is the fundamental reason that the RRT inhibits investment. Only with a complete RRT subsidy of investments that turn out to earn less than the 'threshold rate' will the RRT be a truly non-distortive tax.

analysis of the RRT's effects, we must turn to the theory of option valuation.

The option element of the RRT

In an uncertain world, investment decisions are made on the basis of the whole range of possible future outcomes, not a known outcome. Decisions are taken without knowing what their outcomes eventually will be. Thus, the risk-taking investor must in some way evaluate the possibility of losing as well as the possibility of winning. The effect of the RRT therefore cannot be assessed by referring only to the situation of the risk-taker who

has won: it must be assessed by referring to the situation before the investment decision is made. What is the effect of the RRT on investment decision-making?

To deal with this question, we do two things:

1. We switch to the language of economics that describes investment decisions with uncertain, multi-period outcomes. The concept of 'economic rent' cannot easily be used to describe a project that has variable returns over its life. For example, a project could return more than the 'threshold rate' in some periods and less than that rate in others. Further, the term 'economic rent' is not normally used to describe conditions in which future returns are uncertain. Hence, we use the term 'value' rather than 'rent'.

2. We observe that the RRT amounts to a call option, expropriated by the Australian Government, on the value created in resources projects. In this framework we use the techniques pioneered by the financial economists Black and Scholes to evaluate the effect of this call option.

Armed with more helpful language and a model that can explicitly allow for the RRT's asymmetrical treatment of positive and negative economic rents, we are able to show that the RRT does not tax **true** economic rent and that it is a distortive tax, contrary to claims.

The Black-Scholes option valuation model is appropriate for making this evaluation because the structure of RRT payments is strictly analogous to that of the payments upon a call option, the security that the model was originally designed to evaluate. A call option is a financial contract. Its owner has the option to buy shares in a specific corporation for a specific price (known as the exercise price) at a future point in time (the expiry date). The owner's gain from the contract will either be zero (if the shares are selling for less than the exercise price at the expiry date, in which case the option to buy will not be exercised), or be equal to the difference between the share price and the exercise price (if the difference is positive and the option is therefore exercised).

RRT payments to the Australian Government have a precisely analogous structure. The Government's gain from a project will either be zero (if the project's rate of return is less than the threshold rate), or it will be equal to a proportion of the difference between the rate of return and the threshold rate (if the difference is positive). The Australian Government thus proposes to expropriate a call option upon the value generated by individual resources projects: it will exercise its option to collect

the RRT if returns are above the threshold rate; it will 'let the option expire' if the returns turn out to be less than the threshold rate. If the threshold rate is set equal to the 'cost of capital', then the RRT can be stated as a call option upon the value created in each and every resources project that is subject to RRT.

The value of the Government's call option on value created in resources projects can be calculated by using the Black-Scholes model. The **effective** rate of taxation imposed by the RRT can then be stated as the ratio of the value of the Government's call option on the project's outcomes to the value created by the project (i.e., the net present value of the before-tax outcomes). This ratio is the **effective** tax rate that the investor faces at each phase of an investment decision: it is the percentage of value expropriated by the RRT.

In general, the effective rate of taxation imposed by the RRT will exceed the apparent or stated rate. Only when the known future outcome is absolutely guaranteed to be a return in excess of the threshold rate will the rates be identical. The effective tax rate under conditions of uncertainty always exceeds the stated RRT rate (the one that will be applied to favourable outcomes) because the RRT will not be applied in the case of unfavourable outcomes, which of course reduces the investor's determination of the value of the project.

There is nothing in the Black-Scholes model that restricts the value of a call option on the returns in excess of the threshold rate to be less than the net present value created by the project. That is, there is nothing to stop the RRT from attempting to expropriate more than 100 per cent of the value of the project, thus forcing the project to be abandoned.

Because the effective rate of RRT taxation upon value created can exceed 100 per cent, the RRT is not a tax on economic rent. Nor is it devoid of the distortive effects of other taxation regimes, as Section IV below shows in more detail.

The example of Woodside Petroleum Ltd

Woodside Petroleum Ltd provides a convenient illustration of the difference between effective and stated RRT rates. Treating the entire corporation as a single project (a reasonable approximation in Woodside's case) and using data from the Stock Exchanges and the Sydney Equity Options Market, we estimate that as at the beginning of August 1983, a stated RRT rate of 25

per cent, imposed in addition to existing taxes, would have expropriated 81 per cent of the wealth created in Woodside, leaving 19 per cent to its shareholders. This estimate is based upon the Black-Scholes model and is described in more detail in our A*ustralian Journal of Management* paper.

An RRT rate of approximately one-third applied to Woodside would have expropriated all the value created in the corporation. As at that date, a one-third RRT rate, imposed in addition to existing taxes, would have made the investments created by Woodside seem unjustified in retrospect. That is, the effective RRT rate would have appeared to be at least 100 per cent. These estimates show that, in a risky environment where the possibility of negative economic rents must be taken into account, the RRT proposal can have a considerably greater effect upon investment activity than its stated rate implies.

IV. SPECIFIC DISTORTIONS CAUSED BY THE RRT

A fundamental result of option valuation theory is that the value of a call option increases with the risk or uncertainty of the outcome over which the option can be exercised. This result accords with intuition: when uncertainty is high it is more valuable to 'have one's options open'. Expressed slightly more formally, high uncertainty implies a possibility of both very favourable and very unfavourable outcomes — and the holder of a call option can elect to avoid all unfavourable outcomes and enjoy only the favourable ones. It is beneficial to face risk when one can avoid so-called 'downside' risk and therefore face only so-called 'upside' risk. Under these conditions, the more risk the better. Black and Scholes provided an important formal proof of this point in 1973, proving that the value of a call option increases with risk.

Because the RRT constitutes a call option on the value created in resources projects, and because the value of a call option increases with the risk of the payoffs over which the option is exercised, it follows that the value of the RRT levied upon projects increases with their risks. This result is illustrated in the box on page 10.

The higher the risk, the higher the effective RRT payment — this has serious implications for Australian resources industries. We choose eight examples of the distortions that this allegedly neutral tax would cause.

An Illustration of the Proposed RRT Penalising Risk-Taking

Consider two hypothetical investment possibilities, A and B. Both require an investment outlay of $100:

A has equal probabilities of returning $110 or $132 in one year, before tax. The normal rate of return (which is assumed to be the threshold rate set for the RRT) for this level of risk is 10 per cent.

B is a higher-risk investment. For B, the equally likely outcomes are $0 and $264. The normal threshold rate is 20 per cent.

Interpreting the normal return on investments as a rate that can be used to 'discount' the expected values of their cash flows to obtain their present values, the pre-tax net present values (NPVs) of A and B are equal at +$10. (For example, A's present value is the average of the two possible outcomes, $121, discounted at 10 per cent to equal $110. The NPV therefore is $10.)

Consider now the effect of an RRT. The introduction of a 50 per cent RRT would have a substantially greater impact upon B than upon A. The respective post-RRT outcomes then would be:

A: $110 and $121, with an expected value of $115.50. In the case of the successful outcome, the RRT is 50 per cent of ($132, less $100, less 10 per cent of $100), or $11; in the case of the $110 outcome, no RRT is payable. Therefore the expected value of the RRT is $5.50.

B: $0 and $192, with an expected value of $96. In the case of the successful outcome, the RRT is calculated as 50 per cent of ($264, less $100, less 20 per cent of $100) or $72. In the case of the $0 outcome, no RRT is payable. Therefore the expected value of the RRT is $36.

We cannot place an exact figure on the percentage of value expropriated by the RRT in these examples because the Black-Scholes model is not designed for cases where there are only two possible outcomes. But it is clear that the RRT would have a substantially greater effect on the higher-risk investment B. The

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expected value of the RRT collected from B is over six times the expected value from A, even though they generate exactly the same amount of economic value (or rent).

We note in passing that the RRT's discrimination against B has nothing to do with the establishment of the threshold rate, which has been raised to 20 per cent in B's case to allow for its higher risk. The discrimination occurs because the asymmetry in treatment of economic rents penalises B more, since B is exposed to more 'downside risk'.

1. Project Phases

Other things being equal, there is a clear 'seasoning' in the risk of a resources project as it moves from its exploration phase to evaluation, proving, development, production, and ultimately sale. At each phase, the level of uncertainty reflects not only that phase but the conditional risks of all following phases. For example, at the exploration phase there is uncertainty as to the success or failure of exploration and there also is the risk that, conditional upon successful exploration, the find will prove to be not of commercial quality. If the project continues past exploration, then the risks of that phase will have been weathered and subsequent phases will be correspondingly less risky. If the find is proven to be commercial, there still remains the risk attached to future production quantities, sales prices, interest rates, labour costs, etc. As the project 'seasons', some risks tend to be removed or reduced.

Since the value of the Government's call option on the value created by investment decisions increases with risk, we conclude that the RRT has its greatest effect in the higher-risk project phases. In general, the RRT would tax value created in exploration at the highest effective rate. It would tax at the lowest effective rate value created in safer areas, such as investment in 'fine tuning' an on-going production facility to achieve higher production or lower costs. **The structure of the RRT discourages work on the next generation of resource projects relative to work on the present generation of projects.**

2. Choice of Commodities Produced

Different commodities involve different degrees of risk. The prices of some are more volatile than others on the world

commodity market. The uncertainties attached to exploration or to future production costs differ. **The RRT would distort overall investment toward commodities where future investment outcomes are more predictable.**

3. Choice of Areas

Different geographical areas have different geological features, resulting in different risks across areas. One onshore oil and gas basin might offer a greater certainty of outcome than another; offshore exploration and production are notoriously more risky than onshore. **The RRT would distort investment toward safer geographical areas.**

4. Choice of Technique

We understand that there are choices to be made about, for example, techniques for recovering liquids from a reservoir, where there are different risks involved. One technique might offer a higher level of total recovery from the reservoir, but at a higher degree of risk. **The RRT would distort operating as well as investment decisions, causing Australian resources companies to adopt less adventurous production methods.**

5. Choice of Sales Contracts

Resource companies must decide how much of their output to forward-sell under long-term supply contracts, and how much to sell on a day-to-day basis on the 'spot' markets. A long-term supply contract provides greater security of future cash flow, particularly if the contract has escalation or arbitration clauses that pass the risk of cost increases on to the buyer. The spot market is more risky. By passing risk on to the buyer, the producer reduces the effective incidence of the RRT. **An RRT would cause Australian companies to place an even greater emphasis upon long-term supply contracts with cost escalation clauses.**

6. Design of Projects

It is well known in the world of options that a portfolio of options on several investments is worth more than an option on a portfolio of those investments, because the outcomes of investments within the portfolio will tend to offset each other, thus reducing the level of risk of the portfolio. To the extent that design parameters will allow it, the RRT could cause companies to create larger 'projects' within which positive and negative

economic rents will tend to offset, thus reducing the impact of the RRT. In the resources industries the **RRT** will encourage companies to design a smaller number of larger projects.

7. Project Lives

The value of an option typically increases with the length of time it is open. Intuitively, 'more can happen' in the longer term, so that longer-term payoffs tend to be more uncertain. One of the effects of the **RRT** is therefore to discriminate against longer-term projects.

8. Marginal Projects

One of the curious implications of the RRT, with its asymmetric treatment of favourable and unfavourable payoffs, is that the highest effective tax rate falls upon the least valuable projects. This point is illustrated by comparing two hypothetical projects: a marginal project whose presently-unknown rate of return will be either 9 per cent or 11 per cent, depending upon future events; and a project that is sure to be profitable with possible returns of either 19 per cent or 21 per cent. Assume in both cases that the outcomes are equally likely to occur and that the threshold rate is set equal to the 'cost of capital' at 10 per cent. For the marginal project, the possibility of earning 11 per cent just compensates for the possibility of earning only 9 per cent — but an RRT at any positive rate levied upon the excess of 11 per cent over the threshold rate would remove that compensation completely and would stop the project. On the other hand, no RRT rate less than 100 per cent would stop the profitable project. At a given **RRT** rate, the effective incidence of the tax upon value is greatest in the most marginal projects — a perverse result for a tax aimed at 'windfall profits'.

We have simply chosen a few examples; people closer to the industry doubtless could produce many more illustrations of the general result that the RRT would inhibit risk-taking in an industry where risk is unusually high and risk-taking is crucial. We have also ignored administrative details of the RRT for simplicity and because they have not been finalised.

V. MISCONCEPTIONS

We realise that it is not easy to think naturally in terms of the 'call option' technology. But it is necessary in order to evaluate the impact of the proposed RRT. In this section we review some of

the more common misconceptions that seem to have arisen about the effect of an RRT, in the hope that the description will help expose the salient features of the 'call option' way of viewing the tax.

Prospective risks versus known results

In many of our discussions of the RRT proposal with mining executives, academics, and political advisers, we have observed a tendency to judge the effect of the RRT by calculating its effect on existing successful projects after the fact. This is extremely misleading. Some of the more visible existing projects are almost guaranteed to produce returns in excess of the RRT threshold rate, regardless of forseeable variations in the world supply and demand for their products. Further, their exploration and evaluation have long since been completed and they have stable production costs. For these projects, there is little risk and thus little 'option element' of the RRT. They will almost inevitably pay RRT; the effective incidence of the tax will almost be its stated rate.

The success of these projects is the very reason for their visibility. For every successful project, there have been many losing gambles that are now invisible. There is a 'survivorship bias' in looking only at the successful, winning gambles. They do not provide a valid reference point for assessing the effect of an RRT on new investment decisions, where it will have its most serious effects.

The mistake in pointing to projects with essentially known results lies in ignoring the quantum difference between the risk levels of 'seasoned' projects and the risk levels of new investment. The 'acid test' of the proposed RRT is its effect on high-risk exploration and other risk-taking, not its effect on proven, viable projects.

Marginal projects

In a similar vein, misleading comments have been made about the effect of an RRT upon marginal projects. The Minister for Resources and Energy has stated in a letter to the *Australian Financial Review (6* September 1983, p 13):

> A rent tax has the unique advantage of imposing no tax on marginal production or marginal prospects.

We can only make sense of this comment if it is assumed that the future return from a marginal project is known in advance with perfect certainty. Under this assumption, a no-risk project that is sure to earn (say) 11 per cent as against a 10 per cent threshold rate would be marginal and would indeed pay very little RRT.

However, the decision to undertake a marginal project still involves a gamble — not a guaranteed marginal outcome. For example, if the project were seen as having uncertain outcomes of (say) 9 per cent or 11 per cent with equal probability, then the RRT would have a substantial effective incidence. It would turn the project from a marginal one into an unattractive one. Once risk and uncertainty are introduced, the analysis presented in the previous section comes into play: the RRT would have its **greatest** impact upon marginal projects.

Risk-taking pervades the resources industries

In response to protests from the resources industries, the Australian Government has indicated the likelihood of a partial offset of exploration expenditure against assessable income for RRT purposes. This is a partial recognition of the effect on exploration of the RRT's asymmetric treatment of economic rents.

We have two points to make here. First, only a complete system of tax refunds for negative-rent projects would eliminate the risk-inhibiting effect of the proposed RRT (see below). Second, it is a misconception that exploration is the only risk-taking activity that would be suppressed by the RRT.

Risk-taking occurs at all points in the resource industry. While exploration investments obviously tend to be the most risky, even a fully-producing project faces risks arising from sources such as variation in price, unexpected production difficulties or costs, industrial action, and uncertain production volumes. The RRT would inhibit risk-taking at all phases in a project's life.

Loss offset systems

The only offset system that would stop the RRT from inhibiting risk-taking would be one in which the Australian Government paid an RRT tax refund on all projects earning negative economic rents. The next best system would be one in which all losses for

RRT purposes were fully saleable and deductible by the purchaser against RRT profits, immediately and in full. The least neutral offset system would allow RRT losses to be carried forward against possible future RRT profits. Only the full RRT refund system would eliminate the different treatment of RRT gains and losses, thus eliminating the 'call option' bias of the tax.

Fiddling with threshold rates

The RRT's bias against risk-taking cannot easily be corrected by adjusting threshold rates. The issue we raise is the asymmetric treatment of RRT gains and losses. Our analysis does not depend upon errors in setting the threshold rate — in fact, it assumes that threshold rates are correctly set at the required rate for risk-bearing. This point can be seen in the illustration on page 10 above.

The Australian Government is essentially expropriating a call option on the value created in resource projects. The only way to 'fiddle' the threshold rate to compensate for the resulting distortions would be to engage in some impossibly sophisticated Black-Scholes mathematics. We are unaware of the Australian Government having access to this technology. The easier solution would be to implement an RRT refund system for negative economic rents or, alternatively, to make RRT losses fully saleable and deductible against profits.

VI. ECONOMICS OR POLITICS?

The academic appeal of the RRT is based in large part upon its promise of a simple formula that would apply across all resources projects,-and upon its superiority relative to the existing patchwork collection of taxes, levies, excessive freight charges and the like — a collection that it is said to replace. In this section we ask the questions:

a) Would the RRT be a single formula applied consistently across resource projects?

b) Would the RRT replace or would it merely add to the range of methods by which the States and the Australian Government now expropriate resources wealth? and

c) Where are the economic rents supposed to come from?

In answering these questions, we must keep in mind the fact that the RRT will be implemented by a political process, not a market process.

Simple and consistent?

For each and every resources project subject to RRT, the taxing authority will need to establish:

- a definition of the project (for example, does it include adjacent areas where returns have proven to be less than the threshold rate?);
- the RRT tax rate;
- the 'threshold' rate beyond which the RRT becomes payable;
- allowable charges;
  allowable contractual arrangements (for example, the owner of a resources project could contract to a 'services' company for the provision of labour and materials, the compensation being related to the success of the project. The effect of this is to sell some of the project risk to the service company and reduce the present value of the RRT impost upon the resource company);
- accounting methods; and
- allocation of corporate overheads (including failed exploration expenditure) to projects.

These factors are certainly not simple. Nor, we believe, will they be applied consistently. In time, the political process is sure to discover that threshold rates, project definitions, accounting methods and the like are negotiable. It is inconceivable that RRT parameters will remain constant in the face of political pressures over time.

Why would an ideal solution in economics be produced by a political process? In general, one would expect that it would not: the political process responds to votes cast in a ballot box, not necessarily to economic rationality. In our view, the RRT introduces a number of new ways of juggling companies' and projects' tax imposts and, as a result, makes it easier for the political process to achieve the type of equilibrium it seeks.

Replacement or new tax?

If the RRT were introduced, would all the existing taxes, royalties, etc., go away? For example, would the Queensland Government accept a periodic audit of its freight charges by the Australian Government to determine whether they constitute an indirect means of taxing resource wealth? At what price would the States sell their autonomy and sovereignty?

We are unsure of the answers to these questions. However, the questions do raise our suspicions that the implementation and the effect of the RRT would be shaped by political rather than economic criteria. If this turned out to be the case, then the RRT would merely add one more dimension to the distortions created by taxation methods in the resources industries.

Where do the rents come from?

We conclude by raising a question that strikes at the heart of the supposed 'resource rent' tax: why would one expect the resources industries to systematically earn positive economic rents?

A positive economic rent implies a greater return than could be expected in a competitive situation. But surely the resources industries are competitive, especially when their markets are international. In order to earn positive rents, an industry or investment must have some special competitive advantage, for example, a lower tax rate or a subsidy of one sort or another. What special feature of the Australian resource scene implies positive rents?

One possible source of rent is that Australian natural resources might possess competitive advantages such as location, grade and ease of recovery. But remember that we are assessing the impact of the RRT on new investment. Most of these natural advantages are not new. Even if their value is assumed to be intrinsic (and not the property of the people who discover the resources and make them available), they will have been exploited in the earliest developments, leaving new investors with the less attractive opportunities. We therefore are inclined to discount the issue of natural advantage.

Another source of possible rent is governmental restrictions on the industry. Barriers to entry and non-competitive systems of bidding for exploration licences are examples. In our view, it is inefficient for the Australian Government to premise an RRT

upon artificial rents of its own making. It would be better to remove any barriers to entry that may exist in the resource industry.

Another possible source of positive rent could be increased profits arising from the removal of other resource taxes. However, we have already stated our view that the RRT is likely to add to, not replace, existing resources imposts.

We see no evidence that the Australian resources industries are not competitive. Therefore if the RRT were a true resources rent tax, with the Government subsidising negative economic rents as well as taxing positive rents, then there would be on average zero revenue collected from the tax. The RRT proposal is not such a tax. It will collect revenue because it taxes risk-taking, not economic rent, in a high risk industry.

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