Income equivalence and a proposed resource rent charge

Michael Alexeev, Robert F. Conrad

A R T I C L E   I N F O

Article history:
Received 26 January 2015
Received in revised form 5 July 2017
Accepted 8 July 2017
Available online 18 July 2017

JEL classification:
Q38
H25

Keywords:
Natural resource rents
Natural resource taxation

A B S T R A C T

We demonstrate the equivalence of various income-based charges when perfect certainty prevails, as well as deviations from equivalence under uncertainty. Some of these equivalences are known but the derivations of others, such as cases for two types of free equity, are not. These equivalences lay the foundation for a proposed Accrued Rent Charge (ARC) as an alternative to Resource Rent Taxes (RRT), both as proposed and implemented. We argue that the ARC may be preferred to the RRT because the timing of returns to investors (owners of reproducible capital) and owners of natural assets coincide. That is, returns accrue to owners of natural assets earlier in time with the ARC relative to the RRT. In addition, we argue that, while both charges are inefficient when there is uncertainty, the ARC may be relatively more administratively and economically efficient. Finally, we use simulations to compare the ARC to the RRT and to standard income charges and discuss the results.

1. Introduction

Two objectives are served by this paper. First, we review a number of profit-based charges typically imposed on natural resource projects, and expand the number of charges that are equivalent relative to particular assumptions. This analysis is then used as the basis for a proposed “Accrued” Rent Charge (ARC) as an alternative to the Resource Rent Tax (RRT) and to other methods such as production sharing that are claimed to collect rent.1

How governments collect revenue from natural resource projects has been long debated.2 As well, mineral contracts between governments that own the resource base and producing entities have grown associated with natural resource extraction projects.

2 It is common to speak of taxation of rents, as in Garnaut and Clunies Ross (1983). We refrain from the use of this terminology, in part, because we believe the term has ambiguous meaning, particularly when the state owns the minerals in-situ. Some of the literature, such as Otto et al. (2006), contains distinctions between Ricardian and Hotelling rents (or user costs). Furthermore, studies such as Adelman (1990) and Tilton (2003) provide evidence supporting the view that user costs (or the scarcity value of natural resources) are either low or zero. These claims are based on evidence about the behavior of natural resource producers who behave as if there is no forgone value from increased current extraction. Recently, however, this view has been questioned, particularly by Conrad et al. (2017) who note that such behavior by the firm is simply the result of the resource producer having no claim to the residual value of either the reserves or the real property that holds the reserves. This is not the case for the resource owner, however, who faces a tradeoff between the reduced value of the property, even absent physical exhaustion of the reserves, and increased payments for the use of the resource, including the right to extract. From this perspective, there is no economic difference between natural resources from other scarce productive factors such as capital and labor, making a “royalty” equal to the marginal value of the factor payment; effectively the wage paid for the use of the natural resource.

3 Helpful reviews of the large body of literature on this subject include Lund (2015), Otto et al. (2006), and Daniel et al. (2010), among others.

4 See Conrad and Hool (1981) and the references cited therein for some of that literature. It should be noted that Conrad and Hool state that the distortionary effects of the royalty should be considered only after full costs, including the payment to the reserve owners, are included in the mining firm’s cost structure. Later summaries of distortionary effects of royalties include Otto et al. (2006) and Boadway and Koen (2010) in addition to the criticisms of Garnaut and Clunies Ross (1983).

either value or volume of extraction. The introduction of the Indonesian production sharing contract in the late 1970s and the RRT proposed by Garnaut and Clunies Ross (1983) that has been used in various forms since its inception (originally in Papua New Guinea and recently in Australian mining), are important markers for the change in both perception and application. The original Garnaut and Clunies Ross formulation was claimed to be based on risk aversion by producers and it appears that risk aversion on the part of citizens of a resource-endowed country was not considered. Economists now generally agree that the RRT is not neutral if for no other reason than the fact that the government does not engage in proportional risk sharing. The RRT and similar taxation approaches can be structured to be equivalent to a carried interest where there are incentives for the agent (the government in this case) to better align its objectives with those of the principal. By deferring compensation to later in the contract period and basing the compensation on some measure of surplus, the agent has an incentive to allow the principal to maximize the surplus. Economic rent is shared in a perfectly certain situation but there is asymmetric risk sharing because the agent’s lower bound for compensation is zero.

The lack of appropriate risk sharing has led to proposals to use a more traditional Brown tax that is equivalent to an income tax with perfect loss offsets. Another concern about the RRT is that the payments to the government in this case) to better align its objectives with those of the principal. By deferring compensation to later in the contract period and basing the compensation on some measure of surplus, the agent has an incentive to allow the principal to maximize the surplus. Economic rent is shared in a perfectly certain situation but there is asymmetric risk sharing because the agent’s lower bound for compensation is zero.

The government does not bear any of the downside risks with an RRT, where downside risks are defined as the part of the distribution of outcomes where the net present value of the project is non-positive. Under proportional risk sharing, risks would be borne in proportion to the share of gains (losses) between the government and the investor. See Lund (2009) for a review of this literature.

The price of capital goods is assumed to be constant across time for convenience. No uncertainty is what distinguishes the various instruments and so we then turn to risk sharing and our proposed Accrued Rent Charge (ARC). What is not invested by the special purpose entity is distributed, or otherwise accrued, to the shareholder. The left-hand side of Eq. (3) will be defined as free cash flow for our purposes. In addition, Rt – Ct is called the "return on a carried interest" in the mining industry.

2. Basic accounting identities

Define a special purpose entity (SPE) (for example, a mine) operated by one shareholder (for convenience) and financed with equity (for simplicity). The shareholder’s cash flow in any time period, t is:

\[ CF_{s,t} = -I_t + N_t + D_t \]  (1)

Where:

- \( CF_{s,t} \) = Cash flow to shareholder
- \( I_t \) = Investment in SPE
- \( N_t \) = Repayments of capital from SPE
- \( D_t \) = Dividends paid by the SPE

In this framework, cash flow for the SPE in any time period \( t \) is zero because it is a conduit for the investor and is defined as:

\[ CF_{s,pe} = R_t - C_t - p_k K_t + I_t - N_t - D_t = R_t - C_t - p_k K_t - CF_{s,t} = 0 \]  (2)

Where:

- \( CF_{s,pe} \) = Cash flow to SPE
- \( R_t \) = Revenue
- \( C_t \) = Operating cost
- \( K_t \) = Investment in capital goods during the period
- \( p_k \) = Price of capital goods

Note that by definition:

\[ R_t - C_t - p_k K_t = -I_t + N_t + D_t \]  (3)

What is not invested by the special purpose entity is distributed, or otherwise accrues, to the shareholder. The left-hand side of Eq. (3) will be defined as free cash flow for our purposes. In addition, \( R_t - C_t \)
دریافت فوری
متن کامل مقاله

امکان دانلود نسخه تمام متن مقالات انگلیسی
امکان دانلود نسخه ترجمه شده مقالات
پذیرش سفارش ترجمه تخصصی
امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
امکان دانلود رایگان ۲ صفحه اول هر مقاله
امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
دانلود فوری مقاله پس از پرداخت آنلاین
پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات