Risk and the Transfer Cost of a Tax Shelter

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PRÉCIS

En 1990, Glenn Jenkins proposa une mesure pour calculer l'efficacité des abris fiscaux, et estima l'efficacité des transferts d'abris fiscaux conçus pour les investissements dans l'immobilier canadien et dans les ressources naturelles. Il attribua les inefficacités considérables calculées pour ces abris fiscaux au risque et aux coûts qu'entraîne la vente de ces instruments. En prenant un modèle simple d'équilibre d'actifs financiers, et en analysant le changement dans la valeur actuelle d'un film hypothétique qui devient admissible comme abri fiscal, nous démontrons qu'en l'absence de frais de transaction au financement, le risque n'est pas une source d'inefficacité. Dans un monde où les frais de transaction n'existeraient pas, il importe peu si les demandes de déduction dans le cadre d'un abri fiscal sont combinées aux revenus provenant du projet et aux avantages fiscaux nouvellement créés, comme l'encourage la politique actuelle, étant donné qu'il est possible de défaire ces combinaisons sans encourir de frais dans le marché.

Les combinaisons sont importantes quand le financement comporte des frais de transaction. Dans ce cas l'investisseur typique qui recherche un abri fiscal accorde une grande importance aux crédits d'impôts, mais il n'est pas capable de vérifier et de contrôler efficacement le projet, et il ne peut pas transférer économiquement cette dernière responsabilité. L'obligation pour les amateurs de posséder et de contrôler des processus que seuls des professionnels de gestion sont capables de vérifier et d'exécuter, entraîne pour le producteur du film une externalité de coût.

Pour des activités avec des coûts de financement élevés comme la production de films, on peut réduire les frais du transfert des avantages de l'abri fiscal en créant une forme d'abri pour lequel les investisseurs n'ont pas à supporter le risque associé à la propriété. S'il est possible de concevoir un instrument simple et transparent qui sépare efficacement le transfert des avantages fiscaux et la propriété de manière à aussi protéger adéquatement les investisseurs contre les risques de fraude ou de procédés déloyaux, les producteurs de films et de programmes de télévision pourront bénéficier davantage que dans les circonstances actuelles et cela sans frais supplémentaires pour le gouvernement. Les producteurs seront

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dédommagés des pertes que leur cause l'actuelle asymétrie du système fiscal sans encourir d'augmentation connexe dans le coût du financement fourni par l'entremise des contrats et des institutions qui sont particuliers à cette industrie.

ABSTRACT

In 1990, Glenn Jenkins proposed a measure of the transfer efficiency of tax shelters, and estimated the efficiency of Canadian real estate and natural resource tax shelters. He attributed the substantial inefficiencies calculated for these tax shelters to risk and the transactions costs of selling the instruments. By analyzing within the framework of a simple capital asset pricing model the change in the present value of a hypothetical film that becomes eligible for a tax shelter, we demonstrate that risk in the absence of transactions costs in finance is not a source of inefficiency. In a world with no transactions costs, it does not matter if claims in the tax shelter instrument are combined ("bundled") with revenue from the project and the newly created tax benefits, as is encouraged by current policy, since any bundling can be undone without cost in the market.

Bundling does matter when transactions costs of finance exist. In that case, the typical tax shelter investor values the tax credits highly but is not able to monitor and control the project effectively, and cannot economically transfer the latter responsibility. A cost externality for the film producer arises from the requirement that amateurs own and monitor processes that can only be contained and nurtured by professional management.

For an activity with high costs of financing, like film production, a tax shelter's costs of transferring benefits can be reduced by designing the shelter instrument so that investors do not bear the risk of ownership. If a simple and transparent instrument that effectively separates the transfer of tax benefits from ownership can also be designed to protect adequately from abuse through fraud or sharp practices, film and television program producers will benefit more than they do under current arrangements at no extra cost to the government. Producers will be compensated for the damages done to them by the present asymmetry in the tax system without suffering a related increase in the cost of financing that is provided through the unique contracts and institutions of the industry.

INTRODUCTION

In 1990, Glenn Jenkins examined the efficiency of Canadian tax shelters as a transfer instrument in terms of the ratio E = PVTC/PCB, where PVTC is the present value of the taxes forgone by the government, and PCB is the present value to the beneficiaries of being able to transfer the tax loss.[1] The excess of E over 1 measures the tax shelter's inefficiency. Generally, any feature of the tax shelter that reduces the value of the tax credits to the targeted private parties generates an E greater than 1. For example, any

[1] Glenn P. Jenkins, "Tax Shelter Finance: How Efficient Is It?" (1990), vol. 38, no. 2 *Canadian Tax Journal* 270-85.

transaction cost of selling the instruments necessary to transfer the tax credits lowers PCB below PVTC. In this article, the influence of risk on E is assessed. A discussion of other factors that by themselves or in combination with risk affect transfer efficiency follows the analysis of risk.

Jenkins measured E for a sample of Canadian real estate and natural resource limited partnerships and reported values of E that were considerably in excess of 1.[2] On the basis of his measurements, he concluded that the tax shelters for these activities have "significant transactions and risk costs,"[3] and that they result in "a level of hidden costs that is unlikely to be tolerated in a system of open subsidization."[4]

Jenkins attributed the deviation of E from 1 to the transactions costs of creating and distributing the tax shelter instrument and the need to compensate for any differences in risk. In the calculations of E, the transactions costs of marketing the tax shelter instrument are explicitly registered.[5] The reported values of E seem very high relative to what one could reasonably attribute to the costs of creating and selling the tax shelter instruments. Thus a substantial amount of inefficiency must be accounted for by risk.

It is not transparent why risk, as traditionally measured by economists, is a source of cost in this context. As Jenkins notes, our tax system discriminates against risky projects. An ideal tax shelter compensates for this distortion by providing, in states of the world when a project makes a loss, the same tax benefits from expenses as would have been claimed if the project had made a profit. The simplest way of organizing this transfer would be for the government to pay the developer the tax rate times the loss, when a loss is incurred. Such payments would add to the value of the development and help in financing it. If such payments were made, they would occur only in states of the world in which losses were realized. The evaluation of this "compensation" by the developer might be affected by risk considerations, but those do not represent a cost of transferring the benefit.

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[2] Jenkins, ibid., reported that E ranged from 2.40 to 2.56 for the real estate projects (at 280) and either between 1.2 and 5.2 or 1.57 and 5.80 for the resource developments with the ranges depending on the assumption of tax treatment at the time of disposal (at 284). In his abstract he concludes that under generous assumptions about the fall in the value of a typical real estate project "the Canadian government will lose about $2.50 in tax revenues for every $1.00 gained by the developer." For the resource projects, "the average cost to the government in lost revenues is between $1.83 and $2.68 per $1.00 of net benefit received by the resource company" (at 271).

[3] Ibid., at 285.

[4] Ibid., at 280.

[5] The term $PV(A_L)$ in Jenkins's equation 5 captures the "administrative and promotion costs that are associated with setting up a limited partnership," ibid., at 276. In the case of the real estate limited partnership, case A, for which figures are given in appendix A of Glenn P. Jenkins, "Tax Shelter Finance: How Efficient Is It?" in *Policy Options for the Treatment of Tax Losses in Canada* (Toronto: Clarkson Gordon Foundation, 1990), 7:1-42, at 7:32 and 7:34, the sale of limited partner units raises $16 million while issue costs are given as $810,000.

In practice, tax shelter relief is not granted by direct payment from the government when losses occur. Instead, tax benefits are transferred by the sale of limited partnership units or flowthrough shares to other taxpayers, who can integrate losses with income received from other sources. In these tax shelter investments, tax claims are bundled with an ownership stake in the project. Units sell at a price reflecting their risk.

Although Jenkins's article does not focus on how risk affects E, he comments briefly on the subject: "E may be greater than 1 if the investor requires a higher expected rate of return from the limited partnership investment than the normal cost of capital to the developer."[6] If no other factor were operating, could risk cause this difference? We demonstrate below that risk considerations could make the tax shelter units sell at a price implying a lower rate of interest than the cost of capital for the project. The converse is also possible. Which relationship will manifest itself depends on the relative risk characteristics of the project and the limited partnership investments. In neither case is the difference relevant to the transfer efficiency of the tax shelter; it reflects instead the risk characteristics of the benefit granted the developer.

In a world in which risk matters but investors face no transactions costs in buying or selling financial instruments, the bundling of ownership with the newly created tax benefits imposes no costs on the developer. This conclusion follows for the same reasons that led Modigliani and Miller[7] to conclude that the debt-equity ratio of a firm does not affect the overall cost of capital of the firm. Under the assumptions, what is originally bundled can be unbundled by the investor.

To demonstrate these points more rigorously, we examine the effect of risk on the transfer efficiency of a tax shelter instrument in the simplest economic model incorporating risk and no transactions costs, the capital asset pricing model (CAPM).[8] This model is typically taught in an MBA course on finance and is widely used in theoretical and applied financial analysis. It is the basis for the "betas" (β) reported by investment houses as a measure of risk for stocks. To illustrate, we examine the impact of a tax shelter on a specific project—a film—in a numerically specified CAPM world. We compare a situation without a tax shelter with one that has a shelter. We also compare the situation in which the newly created tax credits are sold separately with one in which ownership is bundled with the tax credits.

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[6] Jenkins, supra footnote 1, at 273. In this quote, "investor" refers to the person buying the tax shelter units (the limited partners or owners of flowthrough shares) and the "developer" is the project entrepreneur. The interpretation is echoed by the comment, ibid., at 279-80: "The amount by which E is greater than 1 indicates the degree to which the tax revenues lost have been spent on real resources to design and market the investment instruments and to which they have been used to pay a premium return on the limited partnerships to induce people to buy them."

[7] Franco Modigliani and Merton H. Miller, "The Cost of Capital, Corporation Finance, and the Theory of Investment" (June 1958), 48 *The American Economic Review* 261-97.

[8] Compare William F. Sharpe, "Capital Asset Prices: A Theory of Market Equilibrium Under Conditions of Risk" (September 1964), 19 *The Journal of Finance* 425-42.

The Modigliani-Miller point about debt-equity ratios, and our claim that bundling does not matter for the transfer efficiency of a tax shelter instrument, depend crucially on investors being able to readjust their portfolios at no cost. When there are transactions costs of financing, debt-equity ratios do matter for firms, and so does bundling for the efficiency of tax shelter instruments. Empirically, transactions costs are extremely important in finance. We conclude with a brief discussion of some related research on the film industry that illustrates how transactions costs and risk can combine to increase the cost of transferring income through a tax shelter that combines ownership of the tax credits and commercial income from the film (a bundled shelter).

RISK AND TAX SHELTERS IN A CAPM WORLD

We calculate the benefit of a tax shelter by comparing the present value of a film in a CAPM world before and after the introduction of a hypothetical unbundled tax shelter instrument and a bundled instrument. Although we describe the investment as one in film, the discussion in this section does not depend on any special features of the film industry, of which there are many.

It is a feature of a CAPM equilibrium that the price of the instrument transferring the tax claims will be priced so that its β (the measure of risk) and its expected return lie in a linear relationship. For simplicity, we assume that the country imposing the tax shelter is a small country that is a price taker for securities of different risk characteristics. The prices and the "cost of risk" embodied in the slope of the relationship of risk to expected return are therefore unchanged by the introduction of the tax shelter.[9] The results are general, but to help readers who see interactions more clearly with a concrete situation, we provide a numeric example.

We make the following assumptions. There is a riskless asset with a rate of return of 1.6 percent or 0.016. The market security (GNP) has an expected rate of return of 0.03 and a variance of 0.00016. The risk of a security i, β_i, and its expected rate of return, R_i, conform to the relationship: $\beta_i = -1.158849 + 71.96162R_i$. Of the many securities available in this hypothetical economy, we concentrate on a film that is marginal before the tax shelter is introduced. The box office (BO) of the film is either a failure (F), a moderate success (MS), or a success (S). The world market basket returns 0.01 in depressed times (D), 0.03 in normal times (N), or 0.05 in boom times (B). The probability of failure, moderate success, and success for a film is {P(F), P(MS), P(S)} = {0.6, 0.3, 0.1}. The probability vector of the state of the market economy, P(GNP), is {P(D), P(N), P(B)}, which is assumed equal to {0.2, 0.6, 0.2}.

The probabilities of a level of success and a state of the market economy are derived by multiplication of the two probabilities, because the distributions are assumed to be independent. Despite the independence of success

[9] One justification for this assumption is that the country imposing the tax change participates in international security markets and is a price taker in those markets.

ratings for the film and the market return, film *income* (FI) and the state of the economy (GNP) are correlated because a moderate success (MS) and a success (S) provide more net revenue depending on the state of the economy. The income of the film is known if both the box office reception of the film and the state of the economy are known—that is, f: (BO, GNP) → (FI) (where f is a function that maps BO and GNP into film income, FI). More specifically, the vector of before-tax income payoffs in period one for a moderate success is {f(MS,*D*), f(MS,*N*), f(MS,*B*)} = {1,000, 1,200, 1,500}. For a success, the vector of before-tax income payoffs in period one is {f(S,*D*), f(S,*N*), f(S,*B*)} = {5,000, 5,500, 6,000}. A failure always generates zero income, so the vector of before-tax incomes across GNP outcomes is {f(F,*D*), f(F,*N*), f(F,*B*)} = {0, 0, 0}.

The cost of the film is 650 and is incurred in period zero. The capital cost allowance or depreciation for tax purposes is 100 percent. No income is received in period zero. A tax rate of 30 percent is payable on taxable income. Taxable income in period one is net income before taxes less the 650 (carried forward), or zero, whichever is greater.

No Tax Shelter

Without a tax shelter, the owner of the film realizes no tax benefit from the expenditure of 650 until period one and will not realize any benefit then, if the film fails commercially. Because of the probabilities assumed, the 650 spent in period zero is assumed not to generate any deductible tax benefit in period one 60 percent of the time. From all the information provided, the rate of return of this marginal film without a tax shelter can be calculated as 10.2 percent and its β as 6.2. Some of the assumptions and equilibrium results are summarized in table 1.

Unbundled Tax Shelter

We now introduce a tax shelter that allows tax credits from losses to be sold to those who can use them. Security prices are assumed not to change, so all assets are priced according to the assumed linear relationship between risk and return. The producer of the film described in table 1 realizes a benefit from two sources. He or she can benefit from selling the capital cost allowance (CCA) when the film fails. In addition, the tax benefits that are usable by the producer in period one and those that are not can both be sold for use in period zero. In our hypothetical world, how the realization of this benefit is packaged with elements of the original income stream does not matter. To the producer the tax benefits being sold are valued at 195 (30 percent of 650) in period zero, when a failure is realized in period one, and at the difference between 195 in period zero and the present value in period zero of 195 realized in period one, when either a moderate success or a success is recorded at the box office.

The tax benefits can be partitioned into the value of 195 received in all states in period zero, less the present value in period zero of 195 received in period one when either a success or a moderate success is recorded. Since the 195 tax benefit that the producer can use in period one, when

Table 1 Rate of Return in Period 1 of Film with No Tax Shelter (Cost in Period 0 Is 650)

Box office state	Before-tax income	Taxable income	After-tax income	Market bundle state	Probability of box office and market state
F	0	0	0	*D*	0.12
MS	1,000	350	895	*D*	0.06
S	5,000	4,350	3,695	*D*	0.02
F	0	0	0	*N*	0.36
MS	1,200	550	1,035	*N*	0.18
S	5,500	4,850	4,045	*N*	0.06
F	0	0	0	*B*	0.12
MS	1,500	850	1,245	*B*	0.06
S	5,800	5,150	4,255	*B*	0.02

Return on market basket	0.03
Return on film	0.102154
Variance of market return	0.00016
Beta of film	6.192308
Slope of assumed linear relationship explaining beta in terms of the security's return	71.96162

moderate success or a success occurs, is uncorrelated with the market payoffs (the β of the entitlements is zero), it is appropriate to discount the *expected* value of these usable tax credits received in period one of 78 (the probability of a success or moderate success of 0.4 times 195) at the riskless rate of return to obtain their value in period zero. This calculation gives a value of 76.76. The net increase in value of the film project as a result of the tax shelter is therefore 195 – 76.76, or 118.24.

In this context, an unbundled tax shelter would give the investor tax credits of 195 now (period zero) and oblige him or her to transfer back to the project tax credits of 195 when the film is either a modest success or a success. This situation is depicted in table 2. The sale of this shelter would leave the project developer with the original prospects depicted in table 1 plus the 118.24 raised by selling the unbundled tax shelter. The cost of capital for the film would remain at its original value, and the developer of what now would be an inframarginal project would earn rents of 118.24.

Bundled Tax Shelter

We investigate bundling in two steps. First, we examine the situation when all the film's tax credits—the newly created tax credits plus those that were usable by the producer because the film was a success or a modest success—are separated and sold to tax shelter investors. The producer retains the rights to commercial revenues. This division is done to investigate what happens to the "cost of capital" of the film after the tax benefits are divested. Second, we assume that the limited partners buy both the film's commercial prospects and the tax rights. This is the case in which

Table 2 Rate of Return of Film with Unbundled Tax Shelter (Cost in Period 0 Is 650)

Box office state	Tax benefit, period 0	Tax benefit, period 1	Market bundle state	Probability of box office and market state
F	195		*D*	0.12
MS	195	–195	*D*	0.06
S	195	–195	*D*	0.02
F	195		*N*	0.36
MS	195	–195	*N*	0.18
S	195	–195	*N*	0.06
F	195		*B*	0.12
MS	195	–195	*B*	0.06
S	195	–195	*B*	0.02
Expected payments in period 1				78
Correlation of period 1 payments with market				0
Beta of period 1 payments				0
Value of period 1 payments in period 0				76.76
Net value of unbundled tax shelter, 195 – 76.76				118.24

ownership is bundled with tax benefits. We show that this bundling does not matter in a CAPM world.

To separate the tax benefits, we first assume that the limited partners sell their units (wind up the partnership) after tax benefits are realized but before revenues are received from its distribution.[10] Note that with no transactions costs no special provisions have to be included in the shelter instruments to liquidate the investment. Liquidation can occur through a market transaction at any time. For simplicity, ownership by the limited partnership is assumed to occur for only an economically insignificant time, the time required to establish a right to the tax credits. Also for simplicity, we assume that the original producer buys back the film.

The film tax shelter investor is assumed to pay 195 for claims immediately worth 195 to him or her. After repurchasing ownership, the producer reestablishes ownership over the before-tax revenues from the film described in the previous examples but can no longer deduct CCA from income when a moderate success or a success is realized. These tax credits, which were valuable to the producer under the no-tax-shelter regime, have been bundled with the newly created credits and transferred to the limited partners in the (now completed) tax shelter investment.

[10] We assume that no capital gains tax is levied on dissolution. This is not the case in Canada. Our intent in this section is to isolate the impact of risk in the absence of transactions costs.

Table 3 Evaluation of Film After Sale of Bundled Tax Shelter

Period 0	
Value of film after sale of tax benefits	573.24
Value of tax benefits	195.00
Total value	768.24
Total value less cost of film	118.24

Period 1

Box office state	Before-tax income	Taxable income	After-tax income	Market bundle state	Probability of box office and market state
F	0	0	0	*D*	0.12
MS	1,000	1,000	700	*D*	0.06
S	5,000	5,000	3,500	*D*	0.02
F	0	0	0	*N*	0.36
MS	1,200	1,200	840	*N*	0.18
S	5,500	5,500	3,850	*N*	0.06
F	0	0	0	*B*	0.12
MS	1,500	1,500	1,050	*B*	0.06
S	5,800	5,800	4,060	*B*	0.02

Return on market basket	0.03
Return on film after sale of tax benefits	0.11367
Variance of market return	0.00016
Beta of film after sale of tax benefits	7.021492
Slope of assumed linear relationship between beta and the security's rate of return	71.96162

Therefore, after the shelter is wound up, the value of the income stream is less than 650, the value of the film without a tax shelter, because all tax deductions have been sold. The market value of the income and attached probabilities, described in table 3, is 573.24. The film with its tax privileges alienated is worth less than before. In addition, the rate of return of the film with no tax credits is higher than that of the film that receives tax credits only when a success or moderate success is recorded. The rate of return of the film stripped of all tax benefits is 11.4 percent. The risk measure, β, of the film less tax benefits rises to over 7. This difference reflects the changes in the joint probability distribution of the film's net income and the market return, before and after tax stripping. A fall in the rate of return and risk could also occur.

In the situation depicted, the cost of capital of the portion of the film that remains after tax credits have been alienated has increased. This does not mean that the cost of financing the film in total has risen in comparison with the case in which only the net tax benefits were sold in the tax shelter instrument. This point can be most easily seen by assessing the net value of the tax credit to the producer. The producer receives 195 for selling all the tax-deductible expenses and is left with a prospect valued at 573.24. The total value is 768.24 for a film that costs 650. The producer of

the previously marginal film receives a "gift" of 118.24, as he or she did when the tax benefit was not bundled.

We conclude that, in a CAPM world, the cost of capital of the portion of the film that the producer keeps may change depending on whether the tax benefits are bundled or not, but this change does not constitute a cost of using the tax shelter to make the transfer. Some features of this case are summarized in table 3.

Bundling ownership in a CAPM world is not an effective constraint since the investor can rearrange entitlements and obligations at no transactions cost. If the tax shelter owner did not sell the commercial rights to the film but kept them, the investment would represent a net cash outlay of 573.24 (195 would also be paid for 195 worth of tax benefits, immediately realizable, but these offset) for the film's commercial prospects. The film, which was marginal without a tax shelter, now generates rents to its producer of 118.24.

The CAPM world is the simplest model for examining the impact of risk on E. In CAPM, the risk of a security depends not on its own variance but on its correlation with the market rate of return. Because there are no transactions costs, an investor who is putting *X* dollars into films will take a small position in a large number of films rather than place *X* in one film. This diversification reduces the variance of the return on films to a negligible amount. In contrast, the covariance effect is not reduced by the diversification. If the economy is in depression, the return on each film owned is affected and the investor's return on *X* is equivalently affected whether one or many films are owned. As long as there are no transactions costs, diversification is costless and the covariance with characteristics of the economy that are not affected by diversification remains an important determinant of risk premium in more complicated settings than CAPM.[11] Current practice in cost-benefit analysis also treats the correlation with market factors as important.[12]

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[11] For example, Robert Wilson shows that a main component in the "risk charge" for an investment financed through the capital market is due not to the risk of the project in isolation but, rather, to its correlation with other projects and with other sources of national income. See Robert Wilson, "Risk Measurement of Public Projects," in *Discounting for Time and Risk in Energy Policy* (Baltimore: Johns Hopkins University Press, 1982), 205-49, at 205. That risk is not a component of transfer cost in the absence of transactions costs would also hold in theoretical generalizations of the CAPM model such as the consumption-beta model; compare Douglas T. Breeden, "An Intertemporal Asset Pricing Model with Stochastic Consumption and Investment Opportunities" (September 1979), 7 *Journal of Financial Economics* 265-96. In current empirical work, more factors than the market rate of return are introduced to "explain" risk premiums. For example, in their investigation of the difference in risk between New York Stock Exchange (NYSE) and National Association of Security Dealers (NASD) stocks, Fama et al. use three risk factors—a market factor, a factor related to size, and book-to-market equity. See Eugene F. Fama, Kenneth R. French, David G. Boothe, and Rex Sinquefield, *Differences in the Risks and Returns of NYSE and NASD Stocks* (Chicago: Center for Research in Security Prices, 1992), 362.

[12] In a joint session of the Association of Environmental and Resource Economists and the American Economic Association organized by Randolph Lyon of the US General Ac-

(The footnote is continued on the next page.)

TRANSACTIONS COSTS OF FINANCE AND THE TRANSFER COSTS OF A TAX SHELTER

The transactions costs of creating and marketing a tax shelter instrument obviously affect the efficiency by which it transfers income. Not as obviously, the transactions costs of finance in general affect this efficiency. These transactions costs make expensive the adjustment of an investor's portfolio to mitigate the risk impact of a new investment. For some securities, the wedge between the marginal evaluations of buyers and sellers is similar for all potential traders. The market for such a security is diminished by the spread, but entry conditions permit broad participation. For many other securities, differential information and endowments divide potential traders into groups with markedly different costs of trading. In this case, the issuing of loans is restricted to a few informed institutions or financiers, and any trading of the instruments occurs only within a small set of traders. The overall financial market is an overlay of broad markets in which traders generally face the same transactions costs, such as the government bond market, and balkanized markets for other securities in which most traders do not participate because of their transacting disadvantage in comparison with insiders.

When there are high costs of laying off a portion of a position, when investments are "lumpy," and when each one may require personal monitoring, an investor's diversification possibilities are limited. In that case, the variability of the asset's return as compared with its covariance with GNP becomes more significant to the investor. Within the bounds set by the transactions costs, intertemporal marginal rates of substitution vary from individual to individual in equilibrium. Consequently, there is a range of relevant rates of return and risk premiums for each type of asset. In such a world, the calculation of the transfer efficiency measure, E, is fraught with difficulties. In discounting, not only does the researcher have to choose among government interest rates and private interest rates of different maturity, or weighted averages of these—an issue that has generated much debate—but also there is no single rate in any category.

The numerator of E, the present value of forgone tax benefits to the government, should be discounted at the relevant rate to the government. For a government of a small country that must borrow internationally to replace the forgone funds, the international borrowing rate is appropriate.[13] Similarly, the denominator, the present value of the same tax benefits

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[12] Continued . . .
counting Office to bring "the profession to the cutting edge of theory and practice," Robert Hartman of the US Congressional Budget Office advocated that a 2 percent real rate of discount be used, subject to an adjustment depending on the sign of the correlation of the asset with GNP. See Robert W. Hartman, "One Thousand Points of Light Seeking a Number: A Case Study of CBO's Search for a Discount Rate Policy" (March 1990), 18 *Journal of Environmental Economics and Management* S-3 to S-7, at S-5. The quotation in the first sentence is from Charles W. Howe, "Introduction: The Social Discount Rate," ibid., S-1 to S-2, at S-1.

[13] Spreads will be sufficiently low for the government that they can probably be safely ignored.

plus any other causally related effects on the wealth of the private parties affected by the tax shelter, should be discounted at the appropriate rate for the private parties. For each of these parties, the correct rate may lie anywhere between the issue price and the buying price for the security. The correct discount rate for the private parties depends on the situation of the individual.

For a public offering, the tax shelter investor is a price taker, and the present value of the units is the buying price. As time passes, the evaluation of the units by each holder can differ within the bounds set by the buy-sell price, if a secondary market exists, and more widely, if a secondary market does not exist. Fortunately we can assume that these patterns of subsequent evaluation changes are anticipated and inform the original buying price. Where the problem does surface in calculating E is in assessing the end-of-period value of the tax shelter investment.

The more difficult aspect of calculating the denominator is assessing the impact on the other private party, the producer. It turns out that the details of the producer's cost of capital do not matter if the tax shelter just transfers tax benefits but, as we discuss in the next section, are indirectly important when the tax credits are bundled with commercial ownership of the film.

Difficulties in choosing the right discount rate to calculate the components of E become academic if the benefits are not spread out over time, although the indirect effect of bundling ownership on the value of the shelter does not. The choice of interest rate is less significant for a tax shelter in which the ownership of claims is concentrated in a period of one or so years. In some important cases, the tax shelter instrument may be designed so as to limit the period of ownership. For example, it is common for a Canadian film tax shelter to terminate the unit holder's ownership by an option to sell limited partnership units back to the producer, or a distribution company, at a specified future time.[14]

TRANSACTIONS COSTS, A TAX-BENEFITS-ONLY SHELTER, AND TRANSFER EFFICIENCY

With financial transactions costs, the bundling of tax benefits with ownership of the commercial revenues from the property does have an impact. We begin by considering a tax shelter that transfers only tax credits and not claims to the commercial income. In this case, the denominator of E is the net increase in the present value to the producer of the shelter and the

[14] The inclusion of a put has become common in the last decade. The agreement is structured to make it unattractive not to exercise the put through the inclusion of a followup right, which typically requires the unit holder to sell if a certain proportion of holders have sold. The tax authorities do not allow the put to be at a fixed price; it must be at a fair market price. There is no market, so the prospectus typically mentions that the closing price will be either a target price or a price determined by an outside adjudicator, if that is lower than the target. Our understanding is that most puts are exercised at the target price. For more detail see Keith Acheson and Christopher J. Maule, "Transactions Costs and the Design of a Tax Shelter" (mimeograph, August 6, 1993) and the references cited therein.

present value of any economic rents earned by the tax shelter investor. For the moment, we assume that the benefits are all realized in one period. Since a set of tax credits, which can readily be assessed by buyers, is being sold, we assume price-taking behaviour. Suppose the demand price for the shelter by taxpayers in equilibrium is $y = y_n + y_p$, where the evaluation of the newly created tax credits is y_n, and the evaluation of tax credits that the producer could have used in the absence of a tax shelter is y_p. The producer receives a net gain of y_n per unit. The supply of units by producers depends on their ability to use the tax credits against other income and on the production costs of their film. If all buyers of tax shelter units have a demand price for each of the units they purchase of y_n, they earn no rents. The denominator of E is therefore y_n, the gain of the producer, which is independent of the cost of capital of his or her film.[15]

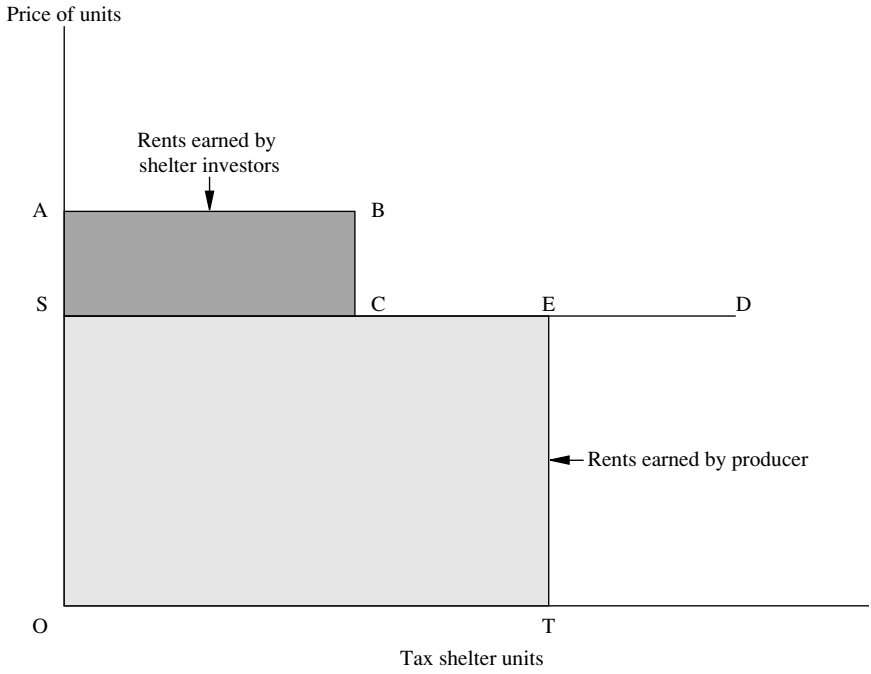
Now consider the case in which the tax shelter investors do not have the same value for each unit purchased. With a good, like apples, inframarginal units are indistinguishable from the marginal ones, as far as the value inclusive of producer rents embodied in them—that is, the seller forgoes the same amount, the price, if any of the apples sold are withdrawn from sale. This is not the case with tax credits. In figure 1, the demand curve for tax credits has two linear parts. The first, AB, reflects the value of tax credits to the highest tax bracket taxpayers; the second, CD, reflects the value of the credits to the second-highest tax bracket. There are OT tax shelter units available, and the equilibrium price is OS. The producer receives OTES. The high-bracket taxpayers receive net rents equal to the area ABCS. The government forgoes tax income equal to OTES plus ABCS. The inframarginal tax shelter units cost it more than the marginal tax shelter units.

OTES corresponds to y_n, but there is also a private gain on inframarginal tax shelter unit purchases of g_{ts} (the area ABCS). The government forgoes $y_n + g_{ts}$, which is the same as the total gain of private parties, so E is equal to 1. Despite the fact that there is no excess of E over 1, the effectiveness of the tax shelter in countering the asymmetry of the tax system and encouraging investment is affected because only the proportion $y_n/(y_n + g_{ts})$ accrues to producers.

If the benefits are realized over more than one period, differences in the discount rates can affect the calculation of E. The stochastic income stream forgone by the government is identical, except for sign, to that received by the tax shelter investor. The government's discount rate would be chosen in the established manner. Suppose that there are no rents earned by the tax shelter investors. The equilibrium price for the newly created tax credits, y_n, incorporates the discount rates of the tax shelter investors. If the discount rate for the government is lower than for the private parties, y_n is less than the evaluation of the government, and E will exceed 1.

[15] Once a tax shelter regime is in place, the producer may change production decisions because of the ability to realize tax benefits when losses occur.

Figure 1 Benefits to Tax Shelter Investors and to Producer of Tax Shelter Costing Government OSABCET



The excess of the private rate over the government rate reflects the cost of private versus public diversification. What private investors are able to achieve in the teflon world of CAPM, the government can come closer than private parties to achieving through the sheer size of its portfolio, when there are financial transactions costs. Generally, we are wary of the argument that the government should undertake an activity, rather than a private concern, because it can borrow more cheaply. Other issues, such as efficiency, flexibility of management, and ability to identify more valuable investments, also must be considered in discussions of privatization or nationalization. However, in this case intermediation is the only relevant issue. The producer would benefit more from selling the shelter units directly to the government than from selling them to private taxpayers.[16]

[16] Under the tax shelter arrangement, the present value of the government's sacrifice is the product of E and y_n. If it pays $E \cdot y_n$ to the producer directly, the private parties receive a benefit of $E \cdot y_n$ rather than y_n at the same sacrifice to the government. This, of course, amounts to the government's paying directly for tax losses—a feasible but apparently unattractive option politically.

TRANSACTIONS COSTS, A BUNDLED TAX SHELTER, AND TRANSFER EFFICIENCY

Bundling tax credits with effective ownership of the film during its commercial exploitation can have a significant effect on transfer efficiency when there are high transactions costs of finance. We present a more detailed account of this effect for the film tax shelter in a companion paper.[17] The core of the argument suffices for our purposes here. In film production, finance is typically provided by insiders to the industry—distributors,[18] broadcasters, pay movie channels,[19] and key personnel who delay remuneration—through a system of contracts designed to mitigate the difficulty of monitoring whether best efforts are being provided by all parties. The hazards of contracting in film production and distribution are pervasive, because the producer, the key personnel, and the distributor are vulnerable to opportunism by each other.

When a tax shelter bundles ownership with tax credits, the incentives for the producer to make as good a film as before and to monitor distribution contract obligations are reduced by the sharing of ownership with outsiders, who lack the information to protect themselves contractually and are deterred from taking the relatively ineffective monitoring measures available to them by legal constraints on limited partners. We predict that, anticipating a reduction in the quality of the film as a result of the dilution of measures normally adopted to control production costs and quality, distributors pay less for rights, and key personnel demand more lucrative recoupment positions to postpone wages. Distributors are also likely to insist on a lower advance and to place more reliance on sharing to counteract the weakening of incentive effects caused by the tax shelter bundling. These effects are also anticipated by the tax shelter investors and reflected in the price of the bundled tax shelter unit.

How is E affected by the bundling with transactions costs? To examine this, we consider the case in which the film is sold to a limited partnership with no provision for reversing ownership in the future. To focus on the issue of the organizational externality, we assume that the tax shelter buyers receive no rents. The producer is under contract to deliver the described film to the limited partnership within budget and at a stated date. Consider the denominator of E. The tax shelter investors pay their demand price, y', which is equal to the value of the tax credits, $y_p + y_n$, plus the value of the bundled claims on the net revenues from the film, y^*. Because of the bundling, the producer cannot make the film and sell the

[17] Acheson and Maule, supra footnote 14.

[18] A distribution contract typically provides an advance and a formula for participating in a specified measure of box-office success. The advance is repayable against the participation, but if the film is unsuccessful and does not generate enough income to recoup the advance, the distributor forfeits it.

[19] A conventional broadcaster or a cable network pays a licence fee that can be discounted and may take an equity position. The licence fee may be a lump sum or have a flat payment plus bonuses for achieving specified viewing measures.

commercial prospects to insiders, who, because they have the information to contract and monitor more effectively, have a higher demand price of y^{**}. The net gain to the producer from taking advantage of the bundled tax shelter is $y' = y_p + y_n + y^*$ less the revenue forgone from not selling the bundled part to insiders for y^{**} and not claiming the tax credits available without tax shelter status, y_p. The numerator of E is the government's present value of y_n. The denominator of E, the benefit to the private parties, is equal to $y_n - (y^{**} - y^*)$. In our other paper we call the term in brackets, representing the forced sale of the commercial rights to owners who cannot realize the most value from them, an organizational externality. The producer will find the tax shelter attractive as long as there is a net pecuniary benefit—that is, as long as the present value of $y_n - (y^{**} - y^*)$ is positive. When the negative organizational externality is close in value to the value of the new tax credits, very high values of E can be generated.[20]

CONCLUSION

In this article, we argue that risk in isolation, as traditionally analyzed by economists, does not affect the transfer efficiency of a tax shelter. With transactions costs of finance, an unbundled shelter can incur a transfer cost resulting from the higher interest rates faced by individual taxpayers as compared with the government.[21] This inefficiency could be avoided if the government made direct payments to the film producer. For a film tax shelter that is in effect "unbundled" by the inclusion of a put before commercial exploitation begins, the tax investors' commitment is for a short period of time. The organizational-externality source of transfer inefficiency would not be significant in this case.

Transactions costs of finance often arise because of prohibitive costs of direct and indirect measurement of effort or the validity of information. Indirect measurement depends on a direct causal relationship between the variable of interest and a variable that can be measured directly. For example, if output were measurable and were a known function of effort, effort could be inferred from output. Indirect measurement also becomes less precise as the effect of luck or nature on the measurable variable becomes greater, for example if output is a function of effort plus a random term. If output depends on effort and luck, an inference problem arises as to the degree to which hard work or luck contributes to a given level of output. As measurement becomes less precise, it becomes more important to devise institutional and contractual mechanisms that provide incentives for divulging correct information or providing appropriate effort. Both in private and public activities, a number of such mechanisms have been developed and tested over time. They do not perfectly correct, but do

[20] The discount rate issues for calculating the private gains from the shelter are similar to the unbundled case and therefore are not explored.

[21] From the discussion in Jenkins, supra footnote 1, at 271, we believe that this effect is what he was alluding to and called risk. However, in his calculations the same interest rate was used in the numerator and the denominator so some other factor must account for the high measured values of E.

ameliorate, the effects of the transactions costs. If there are significant financial transactions costs in an activity, a bundled tax shelter structure can impose an organizational externality by making those contractual and institutional mechanisms less effective.

It appears that the costs of raising finance influence which industries receive relief from the asymmetry of the tax system. We suspect that financial transactions costs are high for research and development, natural resource exploration, and real estate development. From other research that we have undertaken, we know that they are high for audio-visual productions. The expansion of these activities is penalized both because of the difficulties of measurement and because of the interaction of their riskiness with the asymmetric tax system. The argument developed in this article suggests that for activities in which transactions costs in production and distribution limit finance to insiders, tax shelters can be made more effective by restricting the claims of outsiders solely to tax benefits. By this approach the government will avoid an unintended, but nevertheless costly, interference with the contractual and institutional mechanisms developed within the industry to ameliorate the costs of providing finance.

The case for limiting tax shelter instruments to the transfer of tax credits and not requiring "ownership" of the activity is strengthened by other considerations. One concern with tax shelters is that they transfer tax benefits to the wealthy and therefore are regressive. There is no dispute that the most highly valued users of tax credits are individuals who pay higher tax rates. However, these tax benefits are not given to these individuals. They have to acquire them. We expect that the more that the tax shelter instrument is limited to transferring tax credits, and the less it involves ownership of a difficult-to-monitor commercial asset, the wider will be the bidding for the instruments and the lower the rents earned by buyers on inframarginal units.[22]

Transparency and simplicity can be effectively augmented by other measures to further reduce the rents earned by the tax shelter investor as compared with the producer. For the purposes of assessing effectiveness in countering tax system asymmetry, we suggest that E could be usefully modified by weighting the private gains, with the producer's gain receiving a dominant weight. Given this view, it would be desirable to make a design change that would decrease both the rents earned by higher bracket tax payers and the cost to the government. One possibility would be to make the value of tax credits be a specified amount rather than depend on the tax bracket of the claimant. If the tax value of the claims were specified to be the second highest tax bracket rate times the eligible expenditures, the demand for tax shelter units in figure 1 would become SCD. No rents would be made by the tax shelter investors. The same amount of benefit would be transferred to producers at a lower cost to the taxpayer. Making

[22] If the marginal buyer is in the second from the highest tax bracket, the inframarginal buyers who are in the top bracket will earn rents. E will not be affected if these rents are included in the denominator, but measuring these rents will be difficult.

such a change and simplifying tax shelter structures would raise more money per dollar of tax money sacrificed for activities discriminated against by the present tax system and would reduce any negative impact on the distribution of income.

An important caveat to the recommendation to simplify is that the creation of a transparent instrument for transferring tax benefits would be open to abuse. The same difficulties of measurement that restrict the flow of finance to an activity may also make tax monitoring ineffective. The belief that society is being "ripped off" contributes significantly to a general antipathy toward extending or opening up new tax shelters. It has also contributed to convoluted mechanisms for realizing tax benefits and uncertainty over what the tax authorities would or would not accept. Before abandoning tax relief for industries affected by the asymmetries of the present tax system, we recommend addressing simplification, avoiding external organizational effects, and attacking the fraud issue directly. For example, for the film industry the authorities could abandon their concern for risk taking and "ownership" by tax shelter investors and support the development of an instrument that would transfer tax credits as simply as possible.

Both the desirability of unbundling and the incidence of fraud depend on transactions costs in finance and monitoring. We have said more on the issue of fraud and its impact on the design of a tax shelter in a related paper.[23] However, we consider our comments and ideas on the impact of fraud to be much more speculative than the arguments we have made about the importance of transactions costs and risk on the impact of a tax shelter. The determination of how fraud should be taken into account in designing a tax shelter requires a prior determination of how it should affect the design of the system as a whole. That prior question raises deep issues concerning statistical discrimination among groups, directly and through proxies, that we, as authors, have not reconciled in our own minds. Our conclusion must therefore be qualified. If, after a consideration of the fraud issue, a tax shelter for films and television production is deemed desirable, we recommend a transparent instrument that transfers tax benefits and interferes as little as possible with the idiosyncratic financing mechanisms developed in the industry.

[23] For a more complete discussion, see Acheson and Maule, supra footnote 14.