4

Geared Equity Investments: A Case Study of Tax Arbitrage Down Under

by
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Abstract:

Geared Equity Investment (GEI) contracts are an over-the-counter financial derivative product offered by Macquarie Bank, Ltd. to individual investors in Australia and New Zealand as a managed-risk investment in local shares carrying significant tax shield benefits. Upon issuance, a geared equity contract has three stakeholders: (1) the investor; (2) the issuer; and (3) the national tax authority. We assess the value of these contracts to each stakeholder and their support for tax arbitrage. We find that the national tax authority provides a significant subsidy to GEI contracts via tax shield benefits. These benefits support investor tax arbitrage in certain cases and issuer tax arbitrage in all cases examined.

Keywords:

OPTION VALUATION; TAX ARBITRAGE; GEARED EQUITY INVESTMENTS.

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1. Introduction

'The power to tax involves the power to destroy' (Marshall 1819). By natural extension, the power to exempt from tax involves the power to create. Governments typically engage in policies to exempt from tax investment activities they wish to promote. For example, Australia and New Zealand use dividend 'franking' to reduce income tax paid by domestic residents on dividends received from domestic corporations, thereby encouraging investment in shares of local companies.[1] Australia and New Zealand also offer partial or complete tax exemption on long-term capital gains realised from direct shareholdings.[2] By contrast, gains on shares held indirectly in managed funds may be taxed before realisation through annual assessments, thereby encouraging direct shareholdings.[3,4]

This paper is a case study of an innovative financial derivative contract that facilitates tax arbitrage by individual investors in Australian and New Zealand. 'Geared Equity Investments' (GEI) are offered by Macquarie Bank, Ltd. of Australia to high-income individual investors with a tax residence in Australia or New Zealand. These contracts provide a 100% margin loan facility to purchase shares of selected Australian or New Zealand companies and an embedded put option to insure the investor against any loss on funds borrowed through the contract's loan facility. Major features of the investment and taxation environments of Australia and New Zealand supporting these contracts include: (i) steeply progressive marginal income tax rates; (ii) deductibility of investment interest expense from assessable income; (iii) favourable tax treatment of long-term capital gains; and (iv) absence of a legally mandated initial margin requirement on the purchase of common shares.

Previous research specifically focused on Macquarie's geared equity products appears limited to an article by Gray and Whaley (1999) that focuses on the value of a strike price reset feature attached to some geared equity contracts. The authors conclude that the reset feature was underpriced. Perhaps not coincidentally, the reset feature has been discontinued by Macquarie since dissemination of their interesting article.[5] Kat (2000) examines a similar product available to Dutch investors and concludes that the profit margin to the issuer is substantial. There is also an interesting stream of case study research on special products that identify and value embedded options in an Australian context. Significant contributions to this stream include Duncan and Easton (2000), Duncan and Easton (2002), Easton and Pinder (1998), Easton and Pinder (2000), and Pinder (1998).

We examine the generic (*sans* reset) geared equity investment (GEI) contract still actively promoted by Macquarie to investors who are tax residents of Australia

1. The word 'frank' derives from medieval Latin 'francus' meaning free, from a grant of political freedom in Gaul only to Franks. A 'franked' dividend carries an 'imputation credit' that rebates income tax paid on the dividend. Both Australia and New Zealand use franking (Boyle 1996; Cliffe & Marsden 1992; Wood 1997).
2. New Zealand currently has no capital gains tax and Australia exempts from tax half of any long-term capital gain (Australian Taxation Office 1999).
3. This is so even for personal retirement accounts, though concessional tax rates may apply.
4. Extensive tax information is available at the Australian and New Zealand tax authority websites, www.ato.gov.au and www.ird.govt.nz, respectively.
5. Information on geared equity investment products available from Macquarie may be found at their website (www.macquarie.com.au).

or New Zealand. The purpose of this paper is to assess the value of a GEI contract to each of its three stakeholders: (i) the individual investor; (ii) the issuer, Macquarie; and (iii) the national tax authorities of Australia and New Zealand, the Australian Tax Office (ATO) and the Inland Revenue Department (IRD), respectively. In particular, we examine the degree to which the GEI contract supports tax arbitrage by the investor and the issuer. Our conclusions have an obvious interest to those involved in the research and design of over-the-counter financial derivative products, as well as, of course, potential investors in geared equity contracts. Moreover, the discussion herein also has direct relevance to the tax authorities of Australia, New Zealand, and other countries where similar products might be available.

The paper is sequenced as follows: We first provide an overview of the Macquarie geared equity investment contract and its tax shield benefits. Assumptions and a description of valuation methodology come next. We then analyse the valuation properties of the geared equity investment contract. The final section contains our summary and conclusion.

2. Overview of the Geared Equity Investment (GEI)

2.1 Basic Structure, Costs and Tax Benefits

The Macquarie geared equity investment (GEI) contract establishes a loan facility to purchase shares in selected Australian and New Zealand companies (Macquarie 2000). To facilitate exposition we assume a $100,000 contract size, where contract size specifies the amount of loan principal. At contract initiation, loan proceeds are used to purchase common shares of companies listed on the Australian Stock Exchange (ASX) or New Zealand Stock Exchange (NZSE).

The underlying shares for the GEI contract constitute collateral for a non-amortising loan. Loan interest is typically paid in constant monthly instalments, with loan rates of 17 or 15% for contracts maturing in 3 or 5 years, respectively. These incur monthly interest payments of $1,250 = $100,000 × 0.15 / 12 and $1,416.67 = $100,000 × 0.17 / 12, yielding effective loan rates of 18.39% = $(1+.17/12)^{12} - 1$ and 16.08% = $(1+0.15/12)^{12} - 1$, respectively.

New Zealand allows full deductibility of investment interest expense from other assessable income. Thus a $1,250 interest payment yields a tax rebate of $487.50 = $1,250 × 39%, assuming the highest marginal tax rate of 39% for income in excess of NZ$60,000. The effective after-tax loan rate then becomes 9.15% = 15% × ($1,250 – $487.50) / $1,250.

For contracts initiated in Australia after May 2001, the allowable interest deduction is based on the minimum of: (1) the unsecured personal loan rate; or (2) 80 (85)% of the current 3-year (5-year) GEI loan rate (2001 update to *Australian Taxation Office,* 2000). The average unsecured personal loan rate during 2001 was 12.73%, which is the lower of the aforementioned alternatives. Using the 12.73% value, a $1,250 interest payment yields a direct deduction of $1,060.83 = $100,000 × 12.73% / 12. The residual, that is, 2.27% = 15% – 12.73%, is deductible against future capital gains on other assets (2001 update to *Australian Taxation Office* 2000). We assume investors have unrealised capital gains sufficient to take advantage of this deduction during each tax year a GEI contract is outstanding.

This yields a total deduction of \$1,155.42 = \$100,000 × [12.73% / 12 +(15%–12.73%) × 0.5 / 12] from assessable income and a total tax rebate of \$543.05 = \$1,155.42 × 47%, assuming the highest marginal tax rate of 47% on income in excess of AU\$60,000 and the allowed 50% discount on long-term capital gains (*Australian Taxation Office* 1999a). The effective after-tax loan rate is then 8.48% = 15% × (\$1,250 – \$543.05) / \$1,250.

As the above calculations reveal, the interest expense deduction has somewhat more value to high-income Australian investors than to their Kiwi counterparts, a consequence of the higher maximum personal tax rate in Australia.

2.2 Contract Termination

At contract termination, an investor can repay loan principal with any combination of shares or cash. In particular when the value of underlying shares is less than the loan principal, an investor can repay the loan simply by turning over the shares to Macquarie. This capital protection guarantee shields the investor from a loss on borrowed funds. The cost of this guarantee is embedded in the interest payments for the loan.

2.3 Premature Contract Termination

The geared equity contract may be terminated any time before maturity at the option of the investor. The capital protection guarantee still applies, but early unwinding of the loan facility incurs significant penalties. Early termination fees for GEI contracts include:

- risk management fee of 5% of loan principal per year remaining until the original maturity specified in the contract; and
- one month's interest, except in the last 3 months of the contract.

For example, terminating a 15% contract with two years remaining until maturity would incur a penalty of \$11,250 = 2 × 5% × \$100,000 + 15%/12×\$100,000.

Despite these fees, an early unwinding of the contract might benefit the investor after a steep fall in share value. In this case, the investor may wish to cease making interest payments when the contract is deep out of the money and the value of the underlying shares has little chance of rising above the strike price of the contract, that is, the loan principal.

2.4 Margin Loan Issues

A geared equity investment contract is created with a 100% margin loan. *Ipso facto* no initial cash margin is stipulated and the capital protection guarantee obviates any maintenance margin. Such a contract could not exist in the United States as the U.S. Federal Reserve requires a minimum 50% initial cash margin on purchases of common stock. Furthermore, in the United States investment interest expense incurred by a margin loan is only deductible against investment income, greatly curtailing the benefit of the deduction (*Internal Revenue Service* 1999).

2.5 *New Zealand Approved Issuer Levy*

For a New Zealand tax resident, Macquarie Bank is an offshore lender. A New Zealand tax resident using an offshore loan facility is subject to a non-resident withholding tax on interest payments, which is 10% in the case of an Australian loan facility (*Inland Revenue Department* 1995). However, this levy is reduced by an Approved Issuer Levy Status, which is routinely granted upon application. This status allows interest paid to an approved offshore lender to be subject only to a levy of 2% of interest paid (*Inland Revenue Department* 2000).

3. Geared Equity Investment (GEI) Valuation Assumptions and Methodology

The Macquarie geared equity investment (GEI) contract links a common shares position to a loan facility and a capital protection guarantee. The value of the shares position is independent of the GEI contract. However, the GEI contract is a derivative security and its value, that is, the loan facility and capital protection guarantee, is a contingent claim dependent on the value of the underlying shares. We use the contingent claims valuation framework pioneered by Black and Scholes (1973) and Merton (1973) to value GEI contracts. Harrison and Pliska (1981) show that this is equivalent to valuation on a risk-neutral probability measure.

In the Black-Scholes-Merton contingent claims valuation framework, the value of a GEI contract is obtained as a solution to the following partial differential equation, subject to boundary conditions at contract termination:

$$\frac{\partial G_t}{\partial t} + \frac{1}{2}\frac{\partial^2 G_t}{\partial S_t^2}\sigma^2 S_t^2 - r\left(G_t - \Delta_t S_t\right) = 0$$

where: r, σ = riskless interest rate and share price volatility parameters;
G_t, S_t = time–t values of geared equity contract and underlying shares; and
$\Delta_t = \dfrac{\partial G_t}{\partial S_t}$ = hedge ratio between geared equity contract and underlying shares.

For a hypothetical GEI contract with termination allowed only at maturity, investor, issuer, and tax authority claim values at contract initiation ($t = 0$) are stated by equations (1), (2), and (3) immediately below:

$$\begin{aligned} \textit{Investor claim value} &= P\left(S_0, L, \sigma, T, r, y\right) + L - \frac{L}{\left(1 + r/12\right)^{12\times T}} \\ &\quad - \left(1 - \frac{1}{\left(1 + r/12\right)^{12\times T}}\right)\frac{\left(1-h\right)\times c \times L}{r} \end{aligned} \tag{1}$$

$$\begin{aligned} \textit{Issuer claim value} &= -\left(1 - t_c\right)\times P\left(S_0, L, \sigma, T, r, y\right) \\ &\quad + \left(1 - \frac{1}{\left(1 + r/12\right)^{12\times T}}\right)\frac{\left(c - r\right)\times L \times \left(1 - t_c\right)}{r} \end{aligned} \tag{2}$$

$$\text{Authority claim value} = -t_c \times P(S_0, L, \sigma, T, r, y) - \left(1 - \frac{1}{(1+r/12)^{12\times T}}\right) \frac{L}{r}\left(t_c \times (c-r) - h \times c\right) \quad (3)$$

where:

L = loan principal;
T = contract maturity;
S = value of underlying shares ($S_0 = L$);
y = dividend yield;
σ = share price volatility;
r = riskless interest rate;
$P(S, L, \sigma, T, r, y)$ = Black-Scholes put option value;

$$h = \left(1 - \frac{1}{(1+r/12)^{12}}\right) \frac{f \times t_p / (1+r/12)}{(1+r/12)^{12} - 1}$$

= fraction of loan interest refunded by tax authority, adjusted for time value of refund 3 months after end of each fiscal year;
f = fraction of loan interest that is tax deductible;
c = loan rate;
t_c = corporate tax rate; and
t_p = personal tax rate.

Equation (2) represents a value-added measure of issuer claim value, composed by the difference between the values of outputs less inputs. This differs from a pure profit measure, which is impractical to compute since Macquarie's costs incurred administering GEI contracts are proprietary information, and so an exact profit margin is unavailable.

Since the geared equity contract has an early exercise feature, a general closed-form solution for claim value is unavailable. We compute numerical solutions using a standard binomial tree algorithm (Cox & Rubinstein 1985; Hull 1999; Stoll & Whaley 1993). Following this procedure, we account for all state-contingent cash flows and resulting tax effects during the life of the contract along with the stochastic put option payout upon termination of the contract. Three contingent claim values are computed, representing the claims of each of the contract's three stakeholders: the investor, the issuer, and the tax authority.

3.1 Tax Rates

We assume geared equity investors pay the highest marginal tax rates, which are 47% in Australia and 39% in New Zealand on assessable incomes over AU$60,000 and NZ$60,000, respectively.

New Zealand has no long-term capital gains tax. Australia allows a 50% discount from the personal tax rate on long-term capital gains (*Australian Taxation Office* 1999a). Of course, the Australian tax applies without distinction as to whether shares are held with or without a GEI contract. For Australian tax

residents, we assume a part of GEI loan interest is deductible against capital gains income as discussed in section 2.1.

The geared equity investment (GEI) contract generates income for the issuer, arising from loan interest and early unwinding fees, less the cost of the capital protection guarantee and the interest expense of acquiring loanable funds. We assume issuer income is subject to the representative 30% corporate tax rate in Australia.[6]

3.2 Calendar Dates

For simplicity, we specify contract initiation at the beginning of a fiscal year and share dividends paid at the end of each of four quarters spanning the fiscal year.[7] Investors receive tax refunds three months after the end of a fiscal year, while corporate tax cash flows are cleared on the run.

4. Geared Equity Investment (GEI) Stakeholder Values

In this section, we assess contingent claim values to each of the three stakeholders of a geared equity contract: investor; issuer; and tax authority. Calculations are based on $100,000 GEI contracts with maturities of 5 years and 3 years carrying loan rates of 15% and 17%, respectively. Separate calculations are provided for the cases of contracts sold to Australia and New Zealand tax residents. A contingent claim value of zero to the investor indicates a fairly priced contract under a risk-neutral probability measure. In this case, the normally expected negative claim value to the tax authority implies a positive claim value to the issuer because of the zero-sum character of these claims. Tax authority claim values are expected to be negative because of the subsidy provided by the tax deductibility of investment interest expense.

Through tabulated numerical examples, we examine how factors determining contingent claim values impact GEI contract values. The first factor examined is the price volatility of the underlying shares, followed by the optional early exercise feature. The third and fourth factors examined are the dividend yield of the underlying shares and the riskless interest rate in the economy.

4.1 Share Price Volatility

Option pricing theory holds that the price volatility of the underlying instrument is a major determinant of option value. Since the GEI contract's capital protection guarantee functions as a protective put option, the value of the guarantee to the investor (issuer) is positively (negatively) related to the price volatility of the underlying shares. Table 1 provides contingent claim values for the geared equity contract, including loan facility and capital protection guarantee, to the investor, issuer, and tax authority for various volatility levels ranging from 20 to 40%. These examples assume a 5% riskless interest rate, a 3% dividend yield, and a $100,000 contract size, with separate panels reporting contract values for 5-year and 3-year contracts.

6. The Australian corporate rate was cut from 34% to 30% in May 2001.
7. Fiscal years in both Australia and New Zealand begin on 1 April and end on 31 March.

Table 1
GEI Contingent Claim Values by Share Price Volatility

Contingent claim values for Geared Equity Investment (GEI) contracts issued in Australia and New Zealand reported separately for each of three stakeholders: (1) investor; (2) issuer; and (3) tax authority. Calculations assume a $100,000 contract size, 5% riskless interest rate, 3% dividend yield, 5-year and 3-year contracts with 15% and 17% loan rates, respectively, and indicated volatility levels.

Contracts Issued In:		Australia		New Zealand		
Volatility	Investor	Issuer	Tax Authority	Investor	Issuer	Tax Authority
%	$	$	$	$	$	$
Panel A: 5-year Contracts with 15% Financing Rate						
20	–4,833	21,310	–16,477	–8,369	20,174	–11,805
25	–1,246	18,404	–17,158	–4,763	17,516	–12,753
30	2,304	15,710	–18,013	–1,197	14,926	–13,730
35	5,889	13,012	–18,901	2,450	12,146	–14,596
40	9,368	10,508	–19,877	6,021	9,424	–15,445
Panel B: 3-year Contracts with 17% Financing Rate						
20	–3,465	13,582	–10,117	–4,934	13,185	–8,251
25	–370	11,456	–11,085	–1,913	11,170	–9,257
30	2,667	9,399	–12,066	1,141	9,004	–10,145
35	5,719	7,156	–12,875	4,210	6,786	–10,996
40	8,675	5,062	–13,737	7,159	4,630	–11,789

As shown in table 1, investor (issuer) claim values rise (fall) with increasing volatility. For an Australian investor with a 5-year contract and 15% loan rate, claim value rises from a negative –$4,833 at 20% volatility to a positive $9,368 at 40% volatility. Corresponding claim values for a New Zealand investor are lower, from –$8,369 at 20% volatility to $6,021 at 40% volatility. In the case of 3-year contracts with a 17% loan rate, claim value rises from a negative –$3,465 at 20% volatility to a positive $8,675 at 40% volatility for an Australian investor, and from –$4,934 at 20% volatility to $7,159 at 40% volatility for a New Zealand investor. These examples illustrate what is true generally: geared equity contracts have more value to Australian tax residents than to their Kiwi counterparts. This is due to the higher maximum marginal tax rate in Australia than in New Zealand, that is, 47% versus 39%.

4.1.1 Investor Tax Arbitrage In the Black-Scholes-Merton contingent claims framework, positive investor claim values reported in table 1 represent opportunities for investor tax arbitrage. In practice, implementing investor tax arbitrage may prove nettlesome. Advertised 15% and 17% loan rates for 5-year and 3-year contracts, respectively, are indicative and do not represent standing quotes. Macquarie sets actual loan rates according to prevailing market conditions. Nevertheless, the option to enter a GEI contract lies with investors, who have

access to a range of alternative financial products and ultimately determine prevailing market conditions for these products.

A useful source of information to assist investors in evaluating geared equity investment contracts is the Australian market for exchange-traded options. Almost all company shares accepted by Macquarie as a basis for GEI contracts have options traded on the Australian Stock Exchange (ASX). Investors can easily compare implied volatilities of exchange-traded options with share volatilities required for successful tax arbitrage as a decision criterion for entering a GEI contract. Gray and Whaley (1999) measure option implied volatilities for various company shares available as a basis for geared equity contracts. They report an average implied volatility of 28.89%. Taking their volatility value of 28.89% as typical for shares underlying geared equity investments, and referring to table 1, then plausible tax arbitrage opportunities appear common for Australian investors but less accessible by New Zealand investors.

4.1.2 Tax Authority Subsidies The allowed deductibility of investment interest expense from assessable income provides a subsidy from the tax authority for the creation of geared equity investment (GEI) contracts. Tax authority claim values reported in table 1 indicate that the magnitudes of these subsidies can be substantial. For example at a volatility level of 30%, indicated claim values to the Australian tax authority are –$18,013 and –$12,066 for 5-year and 3-year contracts, respectively. For the New Zealand tax authority, corresponding claim values are –$13,730 and –$10,145, respectively. Side-by-side comparisons with corresponding investor and issuer claim values indicate that these subsidies are not always evenly split between the investor and the issuer. For 5-year contracts, the larger part of the tax authority subsidy typically passes through to the issuer. This pattern is repeated with 3-year contracts, except in the case of a 40% volatility for which the investor receives most of the subsidy.

4.1.3 Issuer Tax Arbitrage The generally large, positive issuer claim values reported in table 1 suggest substantial opportunities exist for the issuer to undertake tax arbitrage by underwriting geared equity investment (GEI) contracts. For example with an underlying share price volatility of 30%, issuer claim values are $15,710 and $9,399 for 5-year and 3-year contracts, respectively, for GEI contracts sold to Australian tax residents. Corresponding issuer claim values are $14,926 and $9,004, respectively, for contracts sold to New Zealand tax residents. Furthermore, issuer claim values remain substantial across all volatility values shown, indicating that the issuer does not require precise volatility forecasts to be confident of underwriting *ex ante* profitable contracts.

4.2 Early Exercise Values

Substantial penalties for premature contract termination suggest that early exercise would rarely be optimal. Surprisingly, however, the possibility of early exercise adds significant value to a GEI contract for both Australian and New Zealand investors. Table 2 provides GEI claim values to the investor, issuer, and tax authority for various volatility levels from 20 to 40%. American (European) exercise style corresponds to contracts that (do not) allow early contract

termination. The American (early exercise) premium is the difference in claim values between contracts with American and European exercise styles.

Table 2

GEI Contingent Claim Values by Exercise Style

Contingent claim values for Geared Equity Investment (GEI) contracts issued in Australia and New Zealand reported by exercise style. American (European) exercise style corresponds to contracts that (do not) allow early termination. Calculations assume a $100,000 contract size, 5% riskless interest rate, 3% dividend yield, 5-year and 3-year contracts with 15% and 17% loan rates, respectively, and indicated volatility levels.

Contracts Issued In:	Australia			New Zealand		
Volatility	American	European	American Premium	American	European	American Premium
%	$	$	$	$	$	$
Panel A: 5-year Contracts with 15% Financing Rate						
20	–4,833	–5,528	695	–8,369	–9,692	1,323
25	–1,246	–2,143	897	–4,763	–6,308	1,545
30	2,304	1,330	974	–1,197	–2,834	1,637
35	5,889	4,775	1,114	2,450	611	1,839
40	9,368	8,133	1,235	6,021	3,969	2,052
Panel B: 3-year Contracts with 17% Financing Rate						
20	–3,465	–4,840	1,375	–4,934	–6,742	1,808
25	–370	–1,804	1,434	–1,913	–3,706	1,793
30	2,667	1,186	1,481	1,114	–716	1,830
35	5,719	4,131	1,588	4,210	2,229	1,981
40	8,675	7,031	1,644	7,159	5,129	2,030

Table 2 reveals that potential early termination for a GEI contract can add significant value. For Australian investors, early exercise premiums range from $695 to $1,235 for 5-year contracts and from $1,375 to $1,644 for 3-year contracts. For New Zealand investors, these premiums range from $1,323 to $2,052 for 5-year contracts and from $1,808 to $2,030 for 3-year contracts. These early exercise premiums constitute a significant part of investor claim values, indicating that a geared equity investment contract may not conform to a simple buy-and-hold strategy. To capture full contract value, GEI contract investors will need to monitor share prices to insure timely exercise.

4.3 Dividend Yield

Option pricing theory asserts that a higher dividend payout raises the value of a put option on the underlying shares. Since a GEI contract's capital protection guarantee is effectively a put option, a higher dividend yield is expected to increase GEI claim value to the investor and lower claim value to the issuer. Table 3 presents GEI contract claim values to the investor, issuer, and tax authority for dividend yields between zero and 10%.

Claim values reported in table 3 reveal significant increases in investor claim values and decreases in issuer claim values as dividend yields rise. For 5-year contracts sold to Australian tax residents, investor claim values rise from –$1,146 at a zero dividend yield to $12,659 at a 10% dividend yield, while corresponding issuer claim values fall from $17,651 to $9,727. For 5-year contracts sold to New Zealand tax residents, investor claim values rise from –$4,504 at a zero dividend yield to $8,849 at a 10% dividend yield and issuer claim values fall from $16,771 to $8,908.

Table 3

GEI Contingent Claim Values by Dividend Yield

Contingent claim values for Geared Equity Investment (GEI) contracts issued in Australia and New Zealand reported separately for each of three stakeholders: (1) investor; (2) issuer; and (3) tax authority. Calculations assume a $100,000 contract size, 5% riskless interest rate, 30% volatility, 5-year and 3-year contracts with 15% and 17% loan rates, respectively, and indicated dividend yields.

Contracts Issued In:	Australia			New Zealand		
Yields	Investor	Issuer	Tax Authority	Investor	Issuer	Tax Authority
%	$	$	$	$	$	$
Panel A: 5-year Contracts with 15% Financing Rate						
0	–1,146	17,651	–16,506	–4,504	16,771	–12,267
2	1,172	16,369	–17,540	–2,287	15,584	–13,297
4	3,631	15,099	–18,730	–137	14,047	–14,184
6	6,418	13,607	–20,024	2,766	12,699	–15,466
8	9,530	11,715	–21,244	5,810	10,662	–16,471
10	12,659	9,727	–22,386	8,849	8,908	–17,758
Panel B: 3-year Contracts with 17% Financing Rate						
0	116	10,688	–10,805	–1,335	10,379	–9,044
2	1,796	9,863	–11,659	328	9,334	–9,663
4	3,569	8,744	–12,313	2,044	8,375	–10,418
6	5,490	7,720	–13,210	3,886	7,433	–11,319
8	7,802	6,347	–14,149	6,170	5,991	–12,161
10	10,046	4,945	–14,992	8,366	4,653	–13,019

4.4 Riskless Interest Rate

Option pricing theory further asserts that a higher interest rate decreases the value of a put option on the underlying shares. Since the GEI contract's capital protection guarantee is *de facto* a protective put option, we might expect investor (issuer) contract value to decrease (increase) with a higher interest rate. However, for a given loan rate a higher interest rate decreases the present value of interest payments for the GEI loan, thereby exerting an upward (downward) influence on investor (issuer) claim value.

Table 4 provides claim values to the investor, issuer, and tax authorities for riskless interest rates between 2% and 10%. In table 4, we observe that a higher interest rate consistently yields a higher claim value to the investor and a lower claim value to the issuer. This indicates that a varying interest rate has a greater effect on the present value of loan interest payments than on the value of the capital protection guarantee.

Table 4

GEI Contingent Claim Values by Riskless Interest Rate

Contingent claim values for Geared Equity Investment (GEI) contracts issued in Australia and New Zealand reported separately for each of three stakeholders: (1) investor; (2) issuer; and (3) tax authority. Calculations assume a $100,000 contract size, 3% dividend yield, 30% volatility, 5-year and 3-year contracts with 15% and 17% loan rates, respectively, and indicated riskless interest rates.

Contracts Issued In:	Australia			New Zealand		
Rates	Investor	Issuer	Tax Authority	Investor	Issuer	Tax Authority
%	$	$	$	$	$	$
Panel A: 5-year Contracts with 15% Financing Rate						
2	–3,933	20,052	–16,119	–7,136	18,276	–11,141
4	79	17,539	–17,618	–3,138	16,072	–12,934
6	4,560	13,851	–18,411	1,044	13,245	–14,289
8	9,111	10,113	–19,224	5,720	9,519	–15,239
10	13,735	6,148	–19,883	10,379	5,875	–16,254
Panel B: 3-year Contracts with 17% Financing Rate						
2	–867	11,417	–10,550	–2,207	10,654	–8,447
4	1,453	10,039	–11,492	–82	9,784	–9,702
6	3,749	8,691	–12,440	2,162	8,417	–10,578
8	6,454	6,632	–13,086	4,924	6,268	–11,192
10	9,301	4,227	–13,529	7,713	4,175	–11,888

5. Summary and Conclusion

This paper investigates Geared Equity Investment (GEI) contracts, offered by Macquarie Bank, Ltd. to high-income individual investors in Australia and New Zealand. Each contract provides a 100% margin loan to purchase shares of an Australian or New Zealand company. Major contract features making them attractive to investors are a significant tax shield benefit via the deductibility of investment interest expense from assessable income, and a capital protection guarantee to insure against a loss on borrowed funds. Upon issuance, each GEI contract has three stakeholders: (1) the individual investor buying the contract; (2) the issuer; and (3) the national tax authority.

We use the contingent claims methodology pioneered by Black and Scholes (1973) and Merton (1973) to obtain contract claim values to each stakeholder. We

find that the national tax authorities provide significant subsidies to GEI contracts via tax shield benefits from investment interest expenses. These benefits support investor tax arbitrage under realistic assumptions, particularly for tax residents of Australia. In almost all cases considered, tax arbitrage by the issuer absorbs the greater share of tax authority subsidies.

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