MITIGATING SHAREHOLDER TAXATION IN SMALL OPEN ECONOMIES?*

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This article reconsiders the role of dividend taxation and its effect on the cost of capital for small firms. Using a simple portfolio model for small open economies, we show that an isolated increase in dividend taxes on large companies unambiguously decreases the required rate of return on small companies. A dividend tax increase for both large and small companies may moreover lead to the counter-intuitive result of decreasing the cost of capital for small firms. For different small open economies, we further provide statistics on the correlation between the return of large and small firms that drives the counter-intuitive result. (JEL: H24, H25)

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1. Introduction

Under a classical corporate tax system corporate profits are taxed twice: the first time at the company level by the corporate income tax and then the second time at the shareholder level when profits are paid as dividends. This double taxation of corporate source income is often seen as detrimental to real investment and as promoting excessive borrowing, by raising the costs of equity funds. Looking back, the Nordic countries, Finland, Norway and Sweden, have taken different policy stands on this issue. Following the major tax reforms in the beginning of the 1990's, Finland and Norway introduced imputation systems, which effectively exempted dividends in the hands of the shareholders from taxation. Sweden instead retained the so-called Annell-deduction, allowing companies – within certain limits – to deduct dividends on newly issued shares. Compared to the situation in Finland and Norway, mitigation of double taxation of corporate profits has been a controversial issue in Sweden. In 1994, the Annell-deduction was interrupted by the then non-socialist government and replaced by a new shareholder relief system which directly exempted dividends from tax at the shareholder level. This new regime was of brief duration, however, and as the Social Democrats returned to power in late 1994, a classical double taxation was soon adopted. This regime is still in effect.[1]

By the end of the last century, a large number of countries outside the Nordic scene had chosen to mitigate double taxation at the shareholder level through imputation systems or shareholder relief systems of various designs. Though this picture prevailed throughout the 1990's, the last decade has witnessed a clear reversal in policy. Imputation systems have been abandoned in favour of the classical system or shareholder relief systems which tax dividends from both domestic and international sources at preferential rates.[2] A likely impetus behind this policy change within the EU area was the ruling of the Court of Justice of the European Union in the so called *Manninen* case (C-319/02). The Court declared that by denying imputation credits to Finnish tax payers on foreign source dividends, the Finnish tax code hindered the free movement of capital within the Union. A modification of the imputation system was hence required. However, rather than extending imputation credits to dividends from abroad as a response to the Court ruling, the Finnish government chose to reintroduce double taxation from 2005, albeit at a preferential rate compared to the standard personal tax rate on capital income.[3] Still, outside the EU some countries such as Australia or New Zealand have full imputation systems.

Because of its membership in the European Economic Area, the EU Court ruling against the imputation system was a matter of concern also for Norway. When Norway abandoned its imputation system in 2006, however, the focus was rather on the mounting problems of taxing closely held corporations. Since the Norwegian imputation system exempted dividends from tax at the personal level, there was a strong incentive to report highly taxed earned income as leniently taxed income from capital. As the Norwegian income-splitting system failed to prevent such income shifting to an ever increasing extent, the chosen solution was to abandon the imputation system (see Alstadsæter and Fjærli, 2009). The new approach, which included the taxation on shares from both closely and widely held firms, was to exempt dividends corresponding to a normal rate of return and to levy a full tax – equal to the personal tax rate on income from capital – on any excess returns.

The economic consequences of dividend taxation have been the subject of a continuing debate among public finance researchers for a

[1] *Under the Swedish version of the dual income tax, the personal tax rate on income from capital, including the dividend tax rate, is lower than the tax on earned income.*

[2] *See Jacob and Jacob (2012) and Becker, Jacob and Jacob (2013) for a comprehensive account of recent global developments in shareholder taxation.*

[3] *See Kari and Laitila (2010) and Ylä-Liedenpohja (2007) for a detailed discussion. Ylä-Liedenpohja claims that the EU Court decision was only the formal reason for abandoning the imputation system, other more important factors being a desire to promote competitiveness through more efficient tax instruments and concerns about income distribution effects of exempting dividends from tax.*

very long time. Much of this discussion has been concerned with whether the "new" or "old" view of dividend taxation best describes its effects.[4] Under the new view, the dividend tax has no impact on investment incentives, as the tax reduces the opportunity cost to the shareholders of an additional unit of profits retained for investment in the same proportion as it reduces future dividends. Under the old view, the firm is unable to cut dividends to finance new investment projects, and with new share issues as the marginal source of equity funds, the dividend tax falls also on marginal investment projects.[5]

Though this controversy is still unsettled as both models' assumptions do not universally hold, it may yet be of little relevance to the Nordic countries. In small open economies, stock market prices, and hence rate of return requirements on corporate equity (before personal taxes), are likely to be determined by international investors on world capital markets, rather than by domestic household investors. As implied by earlier research by Boadway and Bruce (1992), Devereux and Freeman (1995) and others, the level of domestic investment is then independent of the tax treatment afforded to domestic investors.

In the Nordic countries it is widely recognized that the openness of the economy limits the effectiveness of various policy instruments. Even proponents of mitigating corporate double taxation at the shareholder level admit that such tax breaks may have little impact on the cost of capital for large companies listed on national stock exchanges. Shareholder relief is rather motivated by its alleged importance to small companies which have limited access to international markets for raising new equity. Therefore, these firms rely on domestic savings to finance their investments in real assets. A segmentation of the market for equity finance is thus a key assumption of the proponents of shareholder relief.[6]

However, whether shareholder relief will promote real investment in small firms is not just a matter of financing opportunities on domestic or international markets but will also depend on the determinants of the investors' rate of return requirements. To what extent will the before-tax required rate of return on small companies depend on the rates of return earned on international markets for equity, and what is the role of the shareholder relief?

Apel and Södersten (1999) address these questions in a theoretical contribution. They set up a simple portfolio model, where the representative investor may hold three assets: risk free bonds, shares in small companies which are traded only domestically and shares in large internationally traded companies. A striking result of their analysis is that an increase in the personal tax on equity returns may have a negative effect on the rate of return requirement – and hence the cost of capital – of small companies. A sufficient condition for this counter-intuitive finding is that the beta (measuring the degree of covariance) between the returns on small company shares and large company shares is above unity – a condition that cannot be ruled out on theoretical grounds.

The purpose of this short article is to shed some additional light on the problem of mitigating corporate double taxation at the shareholder level by providing new evidence on the beta-factor for a number of small open economies. We update existing estimates of the correlation between returns of small and large firms in Scandinavian countries and exploit other data sources. Additionally, we provide estimates for four other OECD countries. As a background to this, we first present results from the Apel-Södersten model where we include different tax rates on the returns on small and large company shares. We extend the model by allowing the tax rate on small firms to be a fraction of the tax rate on large firms.

[4] *The new view of equity was developed by Auerbach (1979), Bradford (1981) and King (1977). For a survey of the debate, see Auerbach (2002) and Auerbach and Hassett (2002, 2005).*

[5] *Becker et al. (2013) show that payout taxes drive a wedge between internal and external equity. The taxation of dividends and share repurchases affects the allocation of investment and high tax rates lock-in capital in profitable firms.*

[6] *Cf. Interim Report of the Working Group for Developing the Finnish Tax System, p. 13 and NOU 2003:9, p. 23.*

Two conclusions stand out: (1) We find for all countries included in our estimates, that the beta-factor is positive. According to the theoretical model, this suggests that an *increase* in the tax on the returns to *large* company shares will unambiguously *decrease* the expected return on *small* company shares (cf. equation (8)). This effect is stronger the higher is beta. If beta exceeds unity, then a simultaneous *increase* in taxes on large and small firms will *reduce* the expected return on small companies (cf. equation (9)). The required beta for finding this counter-intuitive result is even below unity if the tax rate on small firms is a fraction of the tax rate on large firms (cf. equation (10)). (2) Our estimates of beta fall in the range 0.64 to 1.20, which indicates a substantial impact of the return on shares in internationally dominated large firms on the rate of return requirement for small company shares. A tentative policy conclusion based on our findings is that a tax reform which aims at promoting real investment in small companies in small open economies should combine a high tax on large company shares with a low tax on small company shares.[7]

2. The model

This section briefly reviews the results of the Apel-Södersten (1999) model. The model reflects a highly simplified tax system, where interest income is taxed at the rate τ_B, income from shares in large companies is taxed at the rate τ_L and income from small company shares is subject to the tax rate τ_S. We extend the model by adding a third risky asset, such as domestically owned housing capital (see Sørensen, 2005), and we let the tax on this asset, henceforth housing capital, be τ_H. As in Apel-Södersten, we assume an immediate full loss offset.[8] The risk-free interest rate R_B and the expected return on large company shares R_L are exogenously determined. The expected return on small company shares is R_S and on housing capital R_H. The representative domestic investor acquires q_S small company shares, q_L shares in large companies, and q_H shares in housing capital, at initial prices of P_{S0}, P_{L0}, and P_{H0}.[9] By solving the investor's portfolio problem our extension of the Apel-Södersten model then yields the expected pre-tax returns on shares in small (*S*) and large (*L*) firms and on housing capital (*H*)[10]

$$(1)\ R_S = R_B\left(\frac{1-\tau_B}{1-\tau_S}\right) + C[q_S\sigma_S^2(1-\tau_S) + q_L\sigma_{SL}(1-\tau_L) + q_H\sigma_{SH}(1-\tau_H)]/P_{S0},$$

$$(2)\ R_L = R_B\left(\frac{1-\tau_B}{1-\tau_L}\right) + C[q_L\sigma_L^2(1-\tau_L) + q_S\sigma_{LS}(1-\tau_S) + q_H\sigma_{LH}(1-\tau_H)]/P_{L0}$$

and

$$(3)\ R_H = R_B\left(\frac{1-\tau_B}{1-\tau_H}\right) + C[q_H\sigma_H^2(1-\tau_H) + q_S\sigma_{HS}(1-\tau_S) + q_L\sigma_{HL}(1-\tau_L)]/P_{H0}$$

[7] *The Swedish government has followed this path in 2006. The 30% dividend tax rate has been reduced to 20% for dividends for closely held corporations (limited to a predefined dividend allowance) and to 25% for dividends from unlisted widely held corporations. In Finland a tax exemption for small closely held firms was maintained as the dividend tax was reintroduced in 2005 for large listed firms.*

[8] *This assumption may not hold in actual tax systems as (1) there are either restrictions on offsetting losses across tax bases or as (2) losses may only be offset in later periods. Furthermore, loss aversion, i.e. the asymmetric valuation of gains and losses (see Kahneman and Tversky, 1979), strengthens the insurance properties of loss offsets. However, in the presence of loss aversion, a restriction of loss offsets, i.e. asymmetric tax treatment of gains and losses, can ensure a symmetric valuation of gains and losses after taxes (Fochmann and Jacob, 2011). Hence, our simplifying assumption of a symmetric tax system captures asymmetric taxation and loss aversion in actual tax systems at least to some extent.*

[9] *Note the definition* $R_i \equiv \frac{P_{i1} - P_{i0}}{P_{i0}}$, i=S, L, H *where* P_{i1} *is the expected end-of-period price.*

[10] *See Apel-Södersten (1999) for the derivation of the model, and their footnote 11, p. 87, for the case of differential taxation of small and large company shares. The extension to a third risky asset (e.g. housing capital) is straightforward and is available upon request from the present authors.*

where C (a constant) is a measure of the investor's risk tolerance, σ_i^2, i = *L,S,H*, is the variance of the end-of-period prices of the three risky assets and σ_{ij}, $i \neq j$ and *i,j,= L,S,H*, is the covariance between the end-of period prices. Hence, by solving the investor's portfolio problem we find that the expected before-personal-tax required return equals the before-tax return on risk-free bonds plus a risk premium, the size of which depends on the investor's risk tolerance, measured by *C*, multiplied by the amount of risk that the shares add to the investor's portfolio. This amount depends on both the own variance and on the covariances between the end-of-period prices.

Following Apel and Södersten, we treat the expected return on large company shares R_L, the number of small company shares q_S and the number of housing shares q_H as exogenous. As a result, the adjustment to a tax change, in the case of large firms, will take the form of a change in the number of shares q_L which the investor chooses to hold. We derive from (2)

$$(4)\quad q_L = \left\{P_{L0}\left[R_L - R_B\left(\frac{1-\tau_B}{1-\tau_L}\right)\right] - C[+q_S\sigma_{LS}(1-\tau_S) + q_H\sigma_{LH}(1-\tau_H)]\right\}/C((1-\tau_L)\sigma_L^2.$$

The intuitive answer given by the model is that the number of shares in large companies q_L is higher the higher is the expected return on large company shares. A high variance σ_L^2 for the return on large company shares and high (positive) covariances between the return on large company shares and returns on small company shares and housing capital, $\sigma_{Li}, i = S,H,$ has the opposite effect. In case the covariances are negative ($\sigma_{Li} < 0$), more investments in large company shares reduce risk. With a positive covariance, a hike in both tax rates τ_S and τ_H causes the investor to acquire more shares in large companies. With q_S and q_H exogenously given, we may conclude in this case that an increase in the small company tax and the tax on housing capital induces the investor to hold a larger number of risky assets ($q_L + q_S + q_H$) in his portfolio.

Using expression (4) to substitute for q_L in (1), we obtain the expected before-tax return on small company shares

$$(5)\quad R_S = R_B\left(\frac{1-\tau_B}{1-\tau_S}\right)\left[1 - \frac{P_{L0}}{P_{S0}}\frac{\sigma_{SL}}{\sigma_L^2}\left(\frac{1-\tau_S}{1-\tau_L}\right)\right] + R_L\frac{P_{L0}}{P_{S0}}\frac{\sigma_{SL}}{\sigma_L^2} + C(1-\tau_S)\frac{q_S\sigma_S^2}{P_{S0}}\left[1 - \left(\frac{\sigma_{SL}}{\sigma_S\sigma_L}\right)^2\right] + C(1-\tau_H)\frac{q_S\sigma_{HS}}{P_{S0}}\left[1 - \frac{\sigma_{HL}\sigma_{SL}}{\sigma_{HS}\sigma_L^2}\right].$$

It is straightforward to show that in (5)

$$\frac{P_{L0}}{P_{S0}}\frac{\sigma_{Sl}}{\sigma_L^2} = \frac{\mathrm{cov}(R_S, R_L)}{\mathrm{var}(R_L)} \equiv \beta,$$

which has an interesting interpretation as the beta between the returns on shares in small and large firms. Using this definition of beta and recognizing that $\sigma_{SL}/\sigma_S\sigma_L \equiv \rho$ is the coefficient of correlation between the returns, equation (5) simplifies to

$$(6)\quad R_S = R_B\left(\frac{1-\tau_B}{1-\tau_S}\right)\left[1 - \beta\left(\frac{1-\tau_S}{1-\tau_L}\right)\right] + R_L\beta + C(1-\tau_S)\frac{q_S\sigma_S^2}{P_{S0}}[1-(\rho_{SL})^2] + C(1-\tau_H)\frac{q_H\sigma_{HS}}{P_{S0}}\left[1 - \frac{\sigma_{HL}\sigma_{SL}}{\sigma_{HS}\sigma_L^2}\right].$$

where $\rho^2 \leq 1$, since $-1 \leq \rho \leq 1$.

We may now determine the impact of shareholder taxation on the expected return on small company shares. First, we assume an isolated change in the tax on small firms. From equation (6), we derive:

(7) $\frac{\partial R_S}{\partial \tau_S} = \frac{R_B(1-\tau_B)}{(1-\tau_S)^2} - C\frac{q_S\sigma_S^2}{P_{S0}}[1-(\rho_{SL})^2],$

This implies that the normal required return increases in the tax rate τ_S (first term of equation (7)) but decreases in the investors' risk premium (second term). As a result of this, the impact of a tax change on the expected return is ambiguous.

With an isolated change in the tax on the return to large companies, we get

(8) $$\frac{\partial R_S}{\partial \tau_L} = -\frac{R_B(1-\tau_B)}{(1-\tau_L)^2}\beta$$

and in case of a positive covariance between the returns – implying that $\beta > 0$ – the tax on eturns on large company shares will reduce the expected return on small company shares.

Next, we consider the case of a uniform tax on equity returns, $\tau_S = \tau_L \equiv \tau_E$. This is a realistic assumption for most economies where small and large firms face similar tax rates. From equation (6), we then derive

(9) $$\frac{\partial R_S}{\partial \tau_E} = \frac{R_B(1-\tau_B)}{(1-\tau_E)^2}(1-\beta) - C\frac{q_S\sigma_S^2}{P_{S0}}\left[1-(\rho_{SL})^2\right]$$

Again, the impact of the (uniform) tax on equity returns is ambiguous. However, since the last term of (9) is non-negative, a sufficient (but not necessary) condition for the tax to have a counter-intuitive negative impact on the expected return of small firms is that $\beta \geq 1$. That is, a tax increase *reduces* the cost of capital for small firms due to the high correlation between returns of large and small firms. Moreover, and as is apparent from a comparison between (9) and (7), the possibility for a tax increase to have a positive effect, i.e. to raise the required rate of return, is greater when any tax change is targeted on the returns to small company shares.

We next consider the case where the tax rate of small firms τ_S is lower than the tax rate of large firms τ_L. If we allow $\tau_S = \alpha \cdot \tau_L = \alpha \cdot \tau_E$ with $0 \leq \alpha \leq 1$, we can derive from equation (6):

(10) $$\frac{\partial R_S}{\partial \tau_E} = \frac{R_B(1-\tau_B)}{(1-\tau_E)^2}\left[\alpha\left(\frac{1-\tau_E}{1-\alpha\tau_E}\right) - \beta\right]. \\ -\alpha C\frac{q_S\sigma_S^2}{P_{S0}}[1-(\rho_{SL})^2].$$

If α is equal to 1, equation (10) is identical to equation (9). From equation (10), we can further see that the smaller is α, i.e. the larger is the tax rate differential between small and large firms, the smaller is the required beta-factor that results in a negative expression for $\partial R_S/\partial \tau_E$. Put differently, the beta-factor that results in the counter-intuitive result is lower if a country taxes small firms at lower rates than large firms. If α = 0, equation (10) coincides with equation (8). This means that if small firms are tax exempt, any increase in dividend taxes unambiguously decreases the required rate of return on small firms as long as $\beta > 0$.

Finally, as an extension of the original Apel-Södersten model we include additional assets: We find (from (4) and (5)) that the tax treatment of housing capital is of importance both to the portfolio composition of the representative shareholder and to the rate of return requirement on small company shares. However, it is also clear that the presence of a third (and additional) asset(s) neither mitigates nor reinforces the effects of a change in shareholder taxation on the cost of capital of small companies.[11]

3. Data and the empirical evidence

In this section we compute beta-values for eight OECD countries to illustrate the impact

[11] *Drawing on Apel-Södersten (1999), Sørensen (2005) also considers three risky assets in his analysis. However, Sørensen's focus is on the effects of taxation on the pattern of risk-taking and the cost of capital within the sector of domestically owned companies. Moreover, a conventional shareholder tax is compared to a tax on the equity premium as operated in Norway since 2006. Sørensen's definition of beta also differs from that of Apel-Södersten, and depends on the portfolio composition of the investor. Only in the limiting case, where the domestic assets carry a negligible weight, do the two definitions coincide. See our comments in section 3 below.*

of changes in shareholder taxation in different small open economies. We compare Denmark, Finland, Norway and Sweden with Ireland and Belgium as well as with South Korea and Australia. We follow the approach in Lindhe and Södersten (2012) and proxy the beta between returns of small and large companies by monthly returns between the stock market index for large companies and an index for small caps in the respective country. The beta is defined as $\beta = \text{cov}(R_L, R_S)/\text{var}(R_L)$ where R_L is the log return on the index for large stocks and R_S is the log return for the respective small cap index.

The definition of β follows directly our variable of interest in equation (6) of our model. The advantage of our definition is that it is independent from the portfolio weights in the model. Comparing returns on small firms to the market returns as in the traditional version of the capital asset pricing model (CAPM) requires knowledge about portfolio shares and would bias the estimates. We use monthly stock market data provided by Euronext, Korea Exchange, and Yahoo Finance. Table 2 in the Appendix summarizes the countries in our sample, stock market indices, and the sample period. An ideal dataset on small firms would consist of market prices of unquoted firms which are most likely to be domestically owned. However, market prices of unlisted firms are unobservable and we need a proxy for returns of small firms. We thus use data on small listed firms which are very likely to be domestically owned.

For our eight countries, we further collect aggregated data on foreign share ownership.[12] Data on gross domestic product is obtained from the World Development Indicators provided by the Worldbank. Table 1 presents the results for the beta-factors for the 2000–2010 and the 2008–2010 period[13], GDP in 2007, and the foreign ownership in equity in 2007. The GPD for 2007 of our selected countries ranges from USD 246 bn to USD 1,049 bn. This translates into a size of the economies in our sample of 1.75% (Finland) to 7.49% (Korea) relative to the GDP of the United States.

Table 1. Overview of country-specific beta-values – Returns from Stock Indices

Country	GDP 2007 (in USD bn)	As % of U.S. GDP	Foreign ownership 2007	β-factor (2000–2010)	β-factor (2008–2010)
Australia	857	5.97	29.0%	1.07	1.20
Belgium	458	3.34	19.3%	0.64	0.64
Denmark	311	2.26	30.2%	-	0.74
Finland	246	1.79	51.6%	-	0.90
Ireland	260	1.90	60.0%	0.71	0.92
Norway	388	2.83	40.8%	-	0.83
Korea	1,049	7.64	37.3%	0.76	0.95
Sweden	463	3.30	38.0%	-	0.77

Notes: Beta-values for Denmark, Finland, Norway, and Sweden are taken from Lindhe and Södersten (2012) and are based on monthly data for the 2007–2010 period. Foreign ownership in companies for Ireland is from 2004 and for Korea from 2006.

[12] *Foreign share ownership is defined as the percentage of listed firms' equity held by foreign investors. We obtain data from the Australian Bureau of Statistics, Danmarks Nationalbank (http://www.statbank.dk, 2012), Statistics Sweden, the Norwegian Registry of Securities, the Korean Stock Exchange, Finfacts Ireland, BelgoStat Online, the Finnish Foundation for Share Promotion, and the Deutsches Aktieninstitut's factbook.*

[13] *For Belgium we report beta-values for the 2005–2010 period.*

As all $\beta > 0$, our model predicts that a reform that only increases taxes on large companies will reduce the expected return on small company shares in all our countries. We can further observe beta factors greater than 1 for one country (Australia) in our sample. For the 2008–2010 period, the remaining six countries have beta-factors within a range of 0.64 (Belgium) and 0.95 (Korea).

As a robustness test, we obtain monthly stock price data from the 2012 edition of WorldScope. We use the same countries as in Table 1 and compute beta-factors based on firm data. This enables us to present more long-term estimates for the Nordic countries. We use stock price data on all listed corporations headquartered in the same country.[14] For example, we include Nokia only in the country where it is headquartered, i.e. Finland. We sort firms according to their year-end market capitalization and compute beta-factors for the period 2000-2010. We use two different definitions for small firms. First, we use the bottom 30% of the market capitalization distribution.[15] Second, we use the 4th decile of the market capitalization distribution. As a proxy for large firms, we use the top decile as well as the top 20 firms according to year-end market capitalization. Table 2 presents the number of observations per country (*Obs*) over the 2000–2010 period, the ratio of market capitalization of small firms to large firms (top decile), and the resulting beta-factors. We use equally weighted portfolios in each group to compute the average portfolio return. This method includes more corporations than the approach in Table 1 but has the disadvantage that turnover of shares of small firms on stock markets can be very small.

Table 2 Overview of country-specific beta-values – Returns from Firm Data

Country	Obs	Relative Firm Size (1)	β - factor Bottom 30% to Top Decile (2)	β - factor Bottom 30% to Top 20 (3)	Relative Firm Size (4)	β - factor 4th Decile to Top Decile (5)	β - factor 4th Decile to Top 20 (6)
Australia	148,014	0.10%	0.77	0.74	0.26%	0.91	0.91
Belgium	18,125	0.22%	0.55	0.60	0.67%	0.64	0.68
Denmark	25,789	0.27%	0.52	0.52	0.68%	0.61	0.61
Finland	17,266	0.19%	0.56	0.61	0.52%	0.65	0.71
Ireland	7,951	0.21%	0.51	0.54	0.60%	0.66	0.66
Korea	160,229	0.40%	0.71	0.67	0.78%	0.76	0.72
Norway	23,115	0.33%	0.59	0.59	0.84%	0.75	0.76
Sweden	47,241	0.09%	0.65	0.59	0.30%	0.86	0.78

Notes: The number of observations represents the number of monthly share price information for each country. Relative Firm Size is the average market capitalization of corporation in the Bottom 30% relative to the market capitalization of firms in the top decile (column 1). In column 4, we compare the 4th decile with the top decile. In column 2 (3), we report the beta-factor for small firms, defined firms in the bottom 30% of the market capitalization distribution, and large firms, defined as firms in the top decile (top 20). In columns 5 and 6, we use the average return of corporations in the 4th decile as return on small firms.

[14] *We use stock returns adjusted for stock splits, dividends, and share repurchases. We use monthly stock price information and include new listings, delisted firms as well as suspended listings to avoid a survivorship bias.*

[15] *We sort corporations in each country and year separately.*

We find that the average market capitalization of our small firms is less than 1% of the average market capitalization of largest firms. This makes us confident that we compare small with very large corporations in each country. In line with the results in Table 1, all beta factors are larger than zero and vary between 0.61 and 0.91. Beta-factors are, for example, close to unity for Australia. They can exceed or can be very close to unity for medium sized firms (e.g., 0.83 in Ireland and Sweden or 1.03 in Australia for the 6th decile, not reported in Table 2). This is relevant as our model assumptions also hold for medium sized firms.[16]

With the help of Tables 1 and 2, we are able to predict how an increase in dividend tax on both, small and large, corporations in small open economies, such as Australia, Finland or Ireland, will affect the required rate of return on small company equity. Finland and Ireland, in particular, are characterized by a significant share of foreign ownership. More specifically, we observe this predominantly among the largest companies, such as Nokia in the case of Finland. In Ireland, more than 75% of the building material group CRH, which accounts for about one fifth of the Irish Stock Exchange market capitalization, is held by foreign shareholders.[17]

Both Finland and Ireland have certain characteristics in common. The beta-values predict a similar impact on the cost of capital following a dividend tax increase on large as well as small companies. With a beta value close to unity for the last years, a dividend tax increase can reduce the required rate of return on smaller, domestically owned companies in both countries. The likelihood of this effect is higher in the Finnish case where small firms are taxed at lower rates than large firms. The same phenomenon prevails in Australia, where the beta-factor is close to unity when corporate data is used. When indices data is used the beta-factor exceeds unity. Our model suggests that Finland, Ireland and Australia could reduce the required rate of return by simultaneously increasing taxes on large and small companies.

However, there are major differences in shareholder taxation between Finland, Ireland, and Australia. Ireland has a classical shareholder tax system. Australia is one of the few remaining countries with a full imputation system as it was implemented in Finland until 2004. With the current state of tax law in Ireland and top marginal tax rates on dividends of 41%, an increase in shareholder taxes seems to be very unlikely. Should the Irish tax authority instead decide to reduce shareholder taxes in an attempt to stimulate domestic investments, the required rate of return on small companies might actually increase since the beta-value is close to unity. In contrast, in the case of Australia, it is more likely that the full imputation system is suspended and any form of classical shareholder taxation is installed. At first glance, one might expect a trade-off from implementing a classical tax system and increasing payout taxes: On the one hand, introducing classical shareholder taxation would put an end to the earlier discrimination of foreign investors who are not entitled to imputation credits.[18] On the other hand, the tax increase for domestic shareholders may be seen to increase the cost of capital for small companies. However, this trade-off may not exist for Australia. According to our model for small open economies, higher payout taxes reduce the cost of capital for smaller companies when the beta between small, domestically owned and large, internationally dominated companies is above unity.

4. Conclusion

This article shows that mitigating payout taxes in small open economies can have ambiguous effects on the cost of capital of small, domestically owned firms. The precise effects crucially depend on the "beta" factor, measuring the correlation between returns of domestically owned small firms and the return of large internationally traded firms. When beta is positive, an increase in the tax on the return to large companies, leaving the tax on small

[16] *For example, firms in 7th percentile of the market capitalization distribution have on average a market capitalization of less than 3% of the market capitalization of corporations in the top decile.*
[17] *Cf. CRH Annual Report 2009, p. 121.*
[18] *See Footnote 2.*

company returns unchanged, will unambiguously reduce the cost of capital of small companies. This is similar to the Finnish case, where a tax exemption for small closely held firms was maintained, parallel to the reintroduction of the dividend tax for large firms

Moreover, the Finnish economy is one example where a tax increase for both, small and large firms, could lead to the counter-intuitive effect of lower cost of capital for small firms. According to our model, the likelihood of this effect is higher as small firms are taxed at lower rates than large firms.

Though our results and policy conclusions conform well to economic intuition, the limitations of the theoretical and empirical analysis should still be born in mind. There are well-known objections to the mean-variance approach which we rely upon, e.g. with a limited success in explaining differences in rates of return across companies.[19] We have also (see footnote 6 above) pointed to the asymmetric treatment of gains and losses in real world tax systems, and to the lack of information on the market values of unquoted firms that makes measurement of the beta-factors difficult.

Appendix

Table A1. Description of stock market indices

Country/Index	Description	Time period
Australia		
ASX 20	20 largest companies by market capitalization	04/ 2000–05/2010
ASX Small Ordinaries Index	300 largest firms excluding firms in the ASX 100 (100 largest firms)	04/ 2000–05/2010
Belgium		
BEL 20	20 largest companies traded at the Brussels Stock Exchange	03/2005–05/2010
BEL Small Index	The BEL Small index consists of stocks not included in the BEL20 index. Market capitalization is between the level of the BEL 20 index multiplied by EUR 5,000 and the level of the BEL 20 index multiplied by EUR 50,000.	03/2005–05/2010
Ireland		
ISEQ 20	20 companies with the highest trading volume and market capitalization	05/2000–05/2010
ISEQ Small	The index consists of companies not included in the ISEQ 20. Further, the market capitalization must be below a certain threshold (e.g € 400 million in 1999).	05/2000–05/2010
Korea		
KOSPI 50	50 largest companies by market capitalization	01/2000–05/2010
KOSPI SmallCap	The KOSPI SmallCap consists of all listed companies smaller than the 300th company by market capitalization.	01/2000–05/2010

Sources: *www.ise.ie*, *www.euronext.com*, *www.asx.com.au*, and *eng.krx.co.kr*.

[19] *See Sørensen (2005) for a further discussion.*

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