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Capital Gains Taxation and the Cost of Capital: Evidence from Unanticipated Cross-Border Transfers of Tax Bases

Harry Huizinga[1]
Johannes Voget[2]
Wolf Wagner[3]

[1] *Tilburg University, and CEPR;*
[2] *University of Mannheim, Oxford University Centre for Business Taxation,CentER Tilburg University;*
[3] *Tilburg University, Duisenberg School of Finance.*

1. Introduction

Shareholder-level capital gains taxation reduces the attractiveness of assets such as shares for which a large part of total investor returns comes in the form of capital gains. Thus, capital gains taxation potentially depresses share prices, and raises the cost of equity finance to firms. The measurement of the impact of capital gains taxation on the cost of capital, however, has proven difficult. This reflects that the capital gains tax is a rather complex tax. Capital gains are only taxed upon realization, and even then the capital gains tax base can be lowered by taking exemptions and deductions for realized losses. Individuals thus can reduce their capital gains tax liability by holding on to appreciated assets, or by realizing gains that are wholly or in part offset by losses. Ivković, Poterba, and Weisbenner (2005) provide evidence of trading by individual investors aiming to reduce the effective capital gains tax burden.

In this paper, we exploit international M&A data to estimate the impact of capital gains taxation on asset pricing and the cost of capital. A cash-financed cross-border takeover transfers the tax base associated with future capital gains from target shareholders to acquirer shareholders. These two groups of shareholders generally are subject to different capital gains tax regimes. This enables us to estimate the impact of a change in the capital gains tax rate triggered by the acquisiton on firm valuation. More specifically, the takeover price should reflect the capital gains tax burden to acquiring shareholders associated with expected capital gains subsequent to the takeover. The prices of new shares issued for the purpose of financing real investment should similarly reflect the future capital gains tax burden associated with holding these shares. Thus, our estimated discount of capital gains taxes in takeover prices informs about the pricing of new shares, and hence about the cost of equity capital.

The use of international M&A data for the estimation of the impact of capital gains taxation has several distinct advantages. First, while national tax

rates only change infrequently, international M&As create significant variation in capital gains tax regimes. Second, the change in applicable capital gains taxation triggered by an international takeover is generally unexpected, unlike capital gains tax changes at the national level. Third, an M&A only involves a single takeover target, and we can take the relevant capital gains tax regime to be exogenous to an individual M&A transaction. Fourth, our estimated effect of a newly applicable capital gains tax on the valuation of the takeover target does not reflect any general equilibrium effects on the return on savings or wages that potentially accompany a change of the capital gains tax rate at the national level. Thus, our estimation of the capitalization of future capital gains taxation in asset prices approaches the full burden of taxation. Finally, the acquirer shareholders do not have any accrued capital gains related to the target firm which they may want to shield from taxation. Therefore, the capitalization effect can be identified from variation in acquirer tax rates without any confounding lock-in effect.

For this project, we have constructed a unique data set on the capital gains regimes of OECD countries for the years 1985-2007. Capital gains tax rates are found to vary widely across holding periods, countries, and time. In 2007, the average short-term and long-term capital gains tax rates were 20.1 % and 12.6 % for the countries in our study. Our M&A sample covers 5349 deals. We estimate that a one percentage point increase in the acquirer country capital gains tax reduces the takeover price by 0.225%. Firms that issue new equity in the capital market to finance real investment can expect a comparable discounting of future shareholder capital gains taxation. Our discount estimate implies that the effective capital gains tax, after taking account of deductions, exemptions, and deferral options, is about 31% of the statutory capital gains tax. Given that the average statutory tax rate is 22.4% in our sample, this implies an average effective capital gains tax rate of about 7%. Taking into account historical capital gain yields for the MSCI World Index, this is equivalent to 5.3% of the pre-tax total shareholder

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return. This suggests that the impact of capital gains taxation on the cost of equity capital is substantial.

Equity-financed cross-border takeovers, unlike cash deals, do not result in a transfer of the tax liability on future capital gains from target-firm to acquirer-firm shareholders. This induces acquiring firms to offer equity in exchange for target-firm shares when a cash deal leads to an increase in the taxation of future capital gains. In line with this, we find evidence that the likelihood of a cash offer declines with the difference between the acquirer and the target long-term capital gains tax rates.

Several papers have previously investigated the implications of capital gains taxation and capital income taxation more generally for asset values. Sialm (2009) finds an economically significant capitalization of the joint dividend and capital gains tax liability into a lower Tobin's q and price-earnings ratio for US data over the 1913-2006 period, relying on over-time variation in tax rates for identification. McGrattan and Prescott (2005) study the impact of corporate income taxation and shareholder taxation of dividends and capital gains on stock market valuations in the US and the UK over the 1960-2001 period. Using a calibrated growth model, they find that changes in tax policies can well explain secular changes in the valuation of corporate equity for these two countries.

Aiming to identify a capitalization effect of capital gains taxation on equity prices, Guenter and Willenborg (1999) examine the pricing behavior of new equities of small businesses that are subject to favorable capital gains taxation after a 1993 tax law change.[2] The authors find that firms that benefited from reduced capital gains taxation experienced a lower one-day return following their IPO. This provides evidence of higher equity prices for firms that are subject

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[2] Auerbach and Hassett (2006) study the capitalization effects of a cut in the US dividend tax from 35% to 15% following the Jobs and Growth Relief Act of 2003. We do not examine dividend taxation in this paper.

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to lower capital gains taxation. Dai, Maydew, Shackelford and Zhang (2008) find evidence of both capitalization and lock-in effects in share prices in the secondary market by considering equity pricing before and after the 1997 US capital gains tax rate cut. A capitalization effect is identified by showing that nondividend-paying stocks did relatively well before the implementation of the tax cut, while a lock-in effect is identified by showing that stocks with large past appreciation underperformed after the implementation.[3]

Several papers have focused on identifying a lock-in effect in stock prices. Among these, Jin (2006) shows that institutions serving tax-sensitive clients tend to sell less stocks with high accumulated capital gains, with measurable consequences for stock price responses to earnings surprises. Klein (1999, 2001, 2004) shows that the tendency of tax-sensitive investors to hold on to appreciated stocks can explain long-run stock return reversal. Using a sample of IPOs, Reese (1998) finds that stocks that appreciated prior to qualifying for long term tax status exhibit decreased returns after the qualification date (consistent with a lock-in effect), while stocks that depreciated prior to long-term qualification exhibit lower returns just prior to qualification – consistent with sellers locking in short-term losses.

Ayers, Lefanowicz and Robinson (2003) study the takeover premiums of mergers in the U.S. and find that they reflect tax burdens due to prior stock price appreciation. They show that the relationship between takeover premium and capital gains tax rate is weaker for stocks that are more heavily owned by tax exempt institutions. Due to a lack of shareholder data on the international level this empirical approach cannot be replicated here. However, we find that the financing choice of the deal reflects a lock-in effect. The likelihood of an equity

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[3] Lang and Shackelford (2000) find that stocks with high dividend yields did relatively badly in the week when Congress agreed the 1997 capital gains tax cut – which is evidence for a capitalization effect.

deal, in particular, increases in the potential capital gains tax liability due to increases in the target share price prior to the deal. On the other hand, a significant lock-in effect on the takeover premium – again identified by prior increases in the share price - cannot be shown.

Several papers have previously informed about effective levels of capital gains taxation, as opposed to statutory levels of taxation. Chay, Choi and Pontiff (2006) find that stock prices decline by less than the amount of capital gains distributions as evidence that distributed capital gains (which are subject to immediate taxation) are worth less than undistributed capital gains. In effect, the relative pricing of distributed and undistributed capital gains implicitly provides a relationship between the effective capital gains taxation of unrealized gains and an assumed immediate rate of taxation of realized gains for the marginal investor. Protopapadakis (1983) provides additional evidence on effective capital gains taxes for US investors over the 1960-1978 period. Looking at actual portfolio appreciations and capital gains tax liabilities, he finds that effective capital gains tax rates are only a fraction of statutory capital gains tax rates.

The remainder of this paper is organized as follows. Section 2 describes the capital gains taxation regimes of the countries in our sample. Section 3 discusses the capital gains tax consequences of cross-border takeovers and develops testable hypotheses. Section 4 presents the M&A data. Section 5 contains the empirical results. Section 6 discusses the implications of our results for the impact of capital gains taxation. Section 7 concludes.

2.   Capital gains taxation across countries

Our study includes 30 countries (all OECD countries for which merger data were available) and covers the period 1985-2007. For each country and each year, we have collected information on current and prospective capital gains tax rates. This distinction arises due to grandfathering and sunset provisions and

because tax changes are frequently announced in advance. This feature is valuable for our purpose as it facilitates the identification of the capitalization effect (which is determined by prospective tax rates – as opposed to the lock-in effect that is driven by current rates). Data sources are the Global Tax Surveys and the Tax News Service the International Bureau of Fiscal Documentation (2008a, 2008b).

The tax rates used in the empirical work apply to individuals and to cash transactions. Capital gains taxation is deferred in all countries of our sample if target shareholders receive equity instead of cash in exchange for their shares.[4] In some countries, capital gains tax rates depend on the size of the shareholding that is being sold, with substantial holdings taxed at a relatively high rate.[5] In our study we consider exchange-listed firms, for which individual shareholdings tend to be relatively small.[6] Therefore, we focus on the capital gains tax rates that apply to non-substantial holdings.

Table 1 provides information on prospective capital gains tax rates for the 30 countries in our sample as of 2007. Columns 1 and 2 provide the tax rates that apply to long-term and short-term capital gains, respectively. In column 1, we see that 12 countries apply a long-term capital gains tax rate of 20% or higher, while 14 countries exempt such capital gains. The average long-term capital gains tax rate is seen to be 12.6%.

Where long-term and short-term tax rates differ, the short-term rate tends to be higher. Austria, for instance, exempts long-term gains, but taxes short-term gains at the regular personal income tax rate, with a maximum rate of 50%. The UK and the US similarly tax long-term gains at 32% and 20%, respectively, while

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[4] For example, the EU Mergers and Acquisitions Directive, adopted in 1990 and amended in 2005, stipulates that capital gains taxation is deferred if a takeover is financed with a cash share of 10% or smaller. One exception is Australia prior to 1999 where capital gains were taxed irrespective of the form of payment.
[5] Depending on the country, substantial ownership is defined as 1% or more of the outstanding shares.
[6] Sometimes different capital gains taxation is applied to listed and non-listed firms. In these cases we take the rate on listed firms to be the applicable one.

short-term gains are taxed at 40% and 35%. The average short-term capital gains tax rate is seen to be 20.1%, considerably higher than the average long-term rate of 12.6%. Column 3 provides the threshold holding period for gains to qualify as long-term gains, if applicable. In most instances, this threshold is one year or less. The threshold exceeds one year in only four countries. These are Denmark with three years, France with eight years, Japan with two years, and the United Kingdom with six years.

Figures 1 and 2 show the development of prospective long-term and short-term capital gains taxation over the period 1985-2007, respectively. These figures provide trends of the average tax rates across countries, as well as for the UK and the US individually.[7] Figure 1 shows an upward trend in the average long-term capital gains tax rate from 9.5% in 1985 to 18.5% in 1995 before it gradually fell back to12.4% in 2007. The UK long-term rate, consistent with this, increased from 30% to 32% between 1985 and 2007, even though it stood at 40% for most of the nineties. The US long-term rate was equal to 20% at either end of this period, while it reached 28% in the nineties.[8] Figure 2 in turn shows that the average short-term rate declined from 30.0% in 1985 to 22.7% in 2007. The US followed the trend, with a short-term rate of 50% in 1985, and of 35% in 2007. The UK instead increased its short-term rate from 30% in 1985 to 40% in 2007. Together, these figures show a declining gap between the long-term and short-term rates over time.

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[7] The average numbers are computed only for countries for which capital gains tax information is available over the entire 1985-2007 period and hence differ somewhat from Table 1.

[8] The maximum US tax rate on capital gains was 15% for capital assets sold after 6 May 2003 and before 1 January 2009. The reduced 15% tax rate on qualified dividends and long term capital gains introduced on 6 May 2003, and previously scheduled to expire after 2008, was extended through 2010 as part of the Tax Reconciliation Act signed into law by President George W. Bush on May 17, 2006. This was extended through 2012 by President Barack Obama on December 17, 2010.

3. Capitalization effect and M&A outcomes

In this section, we formulate testable hypotheses on how anticipated taxation of prospective capital gains affects the premium in an M&A as well as its financing choice.

Consider a firm from country i that takes over a firm from country j (the deal is domestic if $i = j$, and cross-border if $i \neq j$). Let p be the price of the target firm if there were no capital gains taxation. This price simply reflects the present discounted value of future dividends. Capital gains taxation of future capital gains reduces investors' valuation of the firm, resulting in the associated expected capital gains tax liability to be (partly or wholly) capitalized in the current market price. We take this capitalization to be proportional to the long-term capital gains tax rate t_j in the target country. The market price of the target firm prior to the merger can then be written as $p - \sigma t_j$, where σ measures the degree to which future capital gains taxation reduces the current market price. The parameter σ will depend on various factors, such as the value attached to the deferral of capital gains taxation until realization or the possibility to offset gains on one asset with losses on another. The reservation price of the seller in the transaction, p_j^{Seller}, equals the market price so that

$$p_j^{Seller} = p - \sigma t_j \tag{1}$$

In a cash-financed deal, the buyer will acquire the full income stream of the target. The reservation price of the buyer hence similarly reflects a capitalization effect, which now however depends on the capital gains tax rate of the acquirer country, t_i. In addition, this reservation price mirrors any synergy gain from the merger, denoted g. We can hence write the buyer's reservation price, p_j^{Buyer}, as

$$p_j^{Buyer} = p + g - \sigma t_i \tag{2}$$

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Note that the difference between the reservation prices of the buyer and seller equals the after-tax gain created by the merger, $g - \sigma(t_i - t_j)$. Let α be the share of this gain that can be realized by selling target shareholders (for instance, reflecting Nash bargaining between buying and selling shareholders). The takeover price in a cash deal, p_{ij}^{Cash}, then becomes:

$$p_{ij}^{Cash} = p + \alpha g - \alpha\sigma(t_i - t_j) - \sigma t_j \tag{3}$$

From this we can derive the takeover premium, m_{ij}^{Cash}, as the difference between the transaction price and the market price:

$$m_{ij}^{Cash} = \alpha g - \alpha\sigma(t_i - t_j) \tag{4}$$

In equity-financed mergers, firm j's previous shareholders remain shareholders of the combined firm. Hence, there is no transfer of ownership to residents of country i that would lead to a change in the capitalization effect. In this instance, there are no capital tax implications and equation (4) collapses to

$$m_{ij}^{Equity} = \alpha g \tag{5}$$

From these relationships, we can derive the following three hypotheses. First, the takeover premium in cash transactions is negatively related to the acquirer-target tax difference, $t_i - t_j$. Second, this tax difference has no impact on the premium in equity-financed mergers. Third, when $t_i - t_j$ is high, the gains from cash-mergers are low and we should hence see equity-finance more often.

In deriving expression (4), we have assumed that there is no lock-in effect associated with capital gains taxation of prior gains on stock prices and on the merger premium. Importantly, a lock-in effect on the merger premium, if present, depends only on capital gains taxation in the target country as these taxes are paid by target shareholders. Hence, the capitalization effect can still be identified. In the empirical work below, we will also test for a lock-in effect in the

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determination of the deal premium and the choice of financing. For this we include in our regressions capital gains tax liabilities that may be triggered for target shareholders by the deal .

4.   The deal data

The M&A data are taken from the Thomson Financial SDC database. This database provides pricing information and other deal characteristics as well as some accounting information of the merging firms. Additional accounting data are obtained from Compustat North America and Compustat Global, while additional stock price data are retrieved from CRSP and Datastream. Our final data set consists of 5349 mergers and acquisitions from OECD countries between 1985 and 2007. Of these, 1,109 are international and 4,240 are domestic.

Table 2 provides summary information on the transactions, broken down by target nation and by acquirer nation. The bid premium is calculated as the bid price relative to the market price of the target four weeks prior to the bid announcement, adjusted for the overall market price movement in the target country during the intervening four weeks. The overall mean takeover premium, as seen in the table, is 37%. The table also reports that 66% of the transactions are cash-financed, and hence potentially are subject to immediate capital gains taxation.[9]

5.   Empirical results

This section presents evidence on the impact of acquirer-country and target-country capital gains taxation on the takeover premium and on the choice of payment for takeovers.

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[9] Cash and hybrid cash-equity transactions form a single category as the deferral of capital gains taxation is in many cases only possible if the cash share does not exceed 10%.

5.1. The takeover premium

To test the first two hypotheses of section 3, we relate the takeover premium to the acquirer-target tax difference, $t_j - t_i$. For the construction of this variable we use prospective rates for an investment horizon of five years.

Before turning to regression analysis, we report the results of a simple means test where we compare the mean values of the premium for cash-financed transactions across two subsamples consisting of observations of the tax rate difference below and above its median. In Table 4, we see that the mean value of the premium is 43.9% for low values of the acquirer-target tax difference, and 36.2% for high values of the tax difference. This is consistent with the first hypothesis, stating that acquirer firms in countries with relatively high capital gains taxes pay relatively low premiums. The difference of the two mean values is statistically different from zero at the 1% level.

Next, we present regressions that relate the takeover premium to the acquirer-target tax difference and to a range of control variables (see the Appendix for variable definitions and data sources; see Table 3 for summary statistics). The regressions include target-country, acquirer-country and year fixed effects, and errors are clustered at the target country level. Outliers in the dependent variable are removed by excluding the top and bottom 5% of the sample.

Regression 1 of Table 5 relates the premium to the tax difference for cash transactions. The tax difference obtains a coefficient of -0.225 that is significant at the 1% level. Thus, acquirers in countries with a higher capital gains tax rate tend to pay lower premiums, consistent with a capitalization of capital gains taxes into equity prices.

Among the control variables, targets with larger market values command significantly lower premiums. Highly leveraged targets instead receive

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significantly higher premiums, perhaps because this indicates borrowing constraints that can be removed by the merger. Acquirers further offer significantly higher prices for targets with high book-to-market values, as such targets may be undervalued. Significantly higher premiums are also paid for targets with a high return on equity, possibly because a high return on equity forebodes high synergy gains of the takeover. The percentage of acquirer ownership in the target prior to the takeover, or the toehold, is significantly and negatively related to merger premiums. This may reflect higher bidder bargaining power. As expected, competed bids and hostile takeovers lead to significantly higher premiums, while bids made in the form of a tender offer also are significantly higher, in line with the results in Schwert (1996).

In regression 2 we include a measure of capital gains tax burdens arising from past gains in the target (to be paid by target shareholders), to control for a possible lock-in effect on the merger premium. A challenge in constructing such a capital gains tax liability is that we do not know for how long target shareholders have held their shares prior to the takeover. We hence choose as our tax liability measure the maximum tax liability that can apply for any share purchase in the five years prior to the merger. In constructing this maximum tax liability, we take into account that different capital gains tax rates apply to gains achieved over different holding periods. We choose the maximum tax liability – rather than a tax liability for a specific holding period – as target shareholders with higher tax liabilities are likely to be the marginal shareholders that decide whether or not a takeover offer is accepted. In regression 2, this maximum tax liability measure, which is the product of the associated tax base and target rate,[10] is seen to obtain

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[10] Formally, the tax liability at a horizon of n years is the product of the current target tax rate assuming a holding period of n years times the tax basis, which is the share price appreciation of the target in the n-years prior to the merger, excluding the four weeks before the merger (in the case of a depreciation, the basis is set to zero). The maximum liability is then obtained by taking maximum value of these liabilities over all years up to five years.

an insignificant coefficient. The separately included tax base and target rate variables also obtain insignificant coefficients. The coefficient on the acquirer-target tax difference variable is robust to the inclusion of these lock-in variables: the coefficient is now -0.234 and it is significant at the 5% level.

The insignificance of the lock-in effect remains if we consider various alternative specifications. In particular, we vary the horizon over which we compute maximum tax burdens to one and three years. Furthermore, we consider alternative specifications of the tax base such as using the lowest share price or the average share price over the preceding five year period in conjunction with the five year capital gains tax rate. In all cases, the lock-in effect remains insignificant. The insignificance of the lock-in term may capture heterogeneity among target investors that makes it difficult to correctly proxy the tax base and tax rate applicable to the marginal shareholder. An alternative interpretation is that lock-in considerations are already reflected in the pre-merger stock price and hence do not affect the premium.

Apart from taxation, the institutional environment in acquirer and target countries may affect merger outcomes, and in particular the takeover premium. Regression 3 includes proxies for acquirer and target country differences in indices of institutional quality. In particular, we consider an index for capital controls (with a higher value denoting less stringent capital controls), an index for the quality of the legal system (with a higher value denoting higher legal system quality), and an index of shareholder protection (with a higher value denoting better shareholder protection). All three institutional difference variables are estimated to be insignificant. This may reflect that there is little time variation in the included institutional indices in a regression that controls for target and acquirer country fixed effects. The capitalization effect remains significant at the 1% level.

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While the previous regressions are based on the sample of cash-transactions, regression 4 considers the sample of equity transactions. In Section 3, capital gains taxation is hypothesized not to affect the premium in equity-financed transactions.[11] The tax difference variable indeed loses its significance for equity swap transactions. This finding is important as it suggests that the significance of the international tax difference in the cash-finance regressions does not capture the effects of some omitted variable.

While in regressions 1-4 we have excluded outliers of the premium variable, these are included in regression 5. This increases the number of observations by 314. The coefficient for the tax difference variable is now estimated to be more negative at -0.324, and it remains significant at the 1%-level.

Regressions 1 to 4 are potentially subject to a sample selection problem if some unobserved effect has an influence on the choice of financing as well as on the size of the premium. This could result in biased estimates if the tax variable captures such a correlation. To address this issue, we estimate a Heckman model, where in the first step the acquiring firm chooses between cash and equity finance, and in the second step it determines the premium for the cash transactions. In both steps, the included control variables are as in regression 1. Regression 6 reports the results of the second-stage Heckman regression. The capitalization coefficient is now smaller in absolute value (-0.192), and significant at the 5% level.

The capitalization effect is robust to further checks. First, we vary the assumed holding period of investors from five years to three years and to one year. The coefficient for the three-year period (significant at the 1%-level) is -0.228 and close to the estimate for the five year period. The coefficient for the one-year period (significant at the 5%-level) is -0.187 and smaller in (absolute)

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[11] Capital gains tax effects should also be less important when institutional ownership is high. However, the necessary ownership data is not available for an international sample.

magnitude. This is to be expected since the average holding period of target shareholders who are marginal in deciding on a merger deal is likely to be longer than one year, and hence (higher) short-term taxes will be capitalized to a lesser extent, leading to a lower coefficient. The effect is also robust to excluding firms that have negative book values or a ROE of less than -100% (presumably, firms in distress). The sample is reduced by 99 when these firms are dropped; the coefficient for the capitalization effect is -0.210 (significant at the 1% level). Furthermore, we treated the temporary US capital gains tax cuts initiated by President George W. Bush as permanent disregarding the announced and subsequently extended sunset provision; this leads to a coefficient for the tax difference of -0.224 and a p-value of 1.9%, indicating robustness. Finally, we exclude firms which were majority owned by another company before the acquisition (15 firms). The motivation is that for such firms the marginal shareholder may not be an individual (our tax variable applies to individual taxation). Again, the key finding is robust: the coefficient for the tax difference is -.230 and is significant at the 1% level.

Overall, our results suggest a significant capitalization of future capital gains taxes into takeover premiums. The estimated capitalization effect is also economically significant. It suggests that if the average acquirer in a merger were to face no capital gains taxation, the takeover price would increase by 5% (5% is the product of the tax difference coefficient, 0.225, and the average acquirer tax rate, which is 22.4% in our sample).

5.2.   The choice of payment
The bidding firm faces the choice between payment in cash or in shares. Payment in cash entails high capital gains tax costs relative to equity finance if the acquirer-country capital gains tax rate is high relative to the target-country tax rate. Therefore, according to our third hypothesis we expect the propensity to use

cash financing to decrease with the difference between the acquirer and the target country tax rates.

Table 4 contains the sample means for the mode of financing in the low and high tax difference sample. As can be seen, the proportion of cash transactions in the sample with a low tax difference is 88.7%, while it is 62.9% in the high tax difference sample. The means for the two subsamples are significantly different from each other at 1%. Hence acquirers are less likely to offer cash if the acquirer-country tax rate is relatively high, consistent with the hypothesis that cash finance is used more often when the capital gains tax consequences are favorable.

Next, we examine the impact of the tax difference on the choice of takeover financing by estimating a probit model. In this model, the dependent variable is a dummy variable that takes a value of one if the transaction has cash or hybrid cash-equity financing, and a value of zero in case of pure equity financing. In addition to the tax variable, we consider a range of control variables at the level of the target firm, the deal and the countries (though we exclude deal characteristics that are chosen by the acquiring firm in order to avoid simultaneity issues). As in the premium regressions, the probit estimation includes target and bidder country fixed effects and year-fixed effects, and errors are clustered at the level of the target country.

Table 6 reports marginal effects, which are changes in the probability of a cash transaction induced by small changes in the independent variables on the assumption that all independent variables are at their means. Regression 1 includes the acquirer-target tax difference variable to proxy for the capitalization effect, analogously to regression 1 of Table 5. The tax difference is estimated with a marginal effect of -0.677 that is significant at the 1% level. This estimated marginal effect is economically meaningful. To see this, suppose that the average acquirer does not face any taxation of future capital gains. Given that the average

acquirer tax rate in our sample is 22.4%, this would increase the probability of cash finance by 15.2 (=22.4*0.677) percentage points.

Several control variables included in regression 1 are estimated with significant coefficients. Among these, target market value is estimated to have a negative and significant impact on the likelihood of cash financing, which may reflect that it is difficult to raise sufficient funds to purchase large targets. Target leverage is seen to make cash finance more likely, whereas target liquid assets reduce the likelihood of a cash payment. This could reflect that acquirer firms that wish to reduce their reliance on debt simultaneously purchase unlevered, liquid targets and pay for them with equity. Finally, cash is less likely to be paid for target firms that are subsidiaries, potentially because the selling firms want to remain strategically engaged or because informational asymmetries between acquiring and selling firms are smaller or less costly to overcome than in the case of selling individual shareholders.

Regression 2 includes the calculated capital gains tax liability associated with existing gains of target shareholders as a proxy for the lock-in effect. The lock-in tax liability variable obtains a coefficient of -0.403 that is significant at the 5% level. The sign of the coefficient is consistent with the notion that we should see equity deals more often in cases where cash deals would generate a significant realization of existing gains. The finding that lock-in considerations affect the choice of merger financing also offers a potential explanation for the insignificance of the lock-in proxy in Table 5: if acceleration of locked-in gains can be mitigated by structuring the merger as an equity deal, there is less reason to expect locked-in gains to strongly affect the premium. Regression 2 also shows that the tax base itself has a positive and significant effect on the likelihood of a cash-transaction, perhaps because shareholders that have seen significant stock price appreciation prefer to receive cash to rebalance their overall portfolios.

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Regression 3 includes several proxies for the institutional environment in acquirer and target countries analogously to regression 3 of Table 5. Of these, the difference in acquirer-country legal quality relative to the target country is estimated with a negative coefficient that is significant at 5%. This means that acquirers located in countries with relatively high-quality legal systems are more likely to offer equity. This makes sense as equity issued by firms located in countries with good legal systems may be more valuable.

Overall, our results indicate that capital gains tax considerations are an important determinant of the means of payment in M&As. Specifically, an equity offer is more likely if the acquirer country has a relatively high capital gains tax rate (signaling a relatively high taxation of future capital gains) and if mergers have large tax consequences for target shareholders due to the acceleration of existing gains.

6.   Discussion of the results

This section first discusses to what extent our estimate of the capitalization effect in takeovers is also informative about the issuance of new equity. Next, we calculate measures of effective tax rates and cost of capital implied by our estimate. Finally, we highlight some repercussions for international taxation.

6.1.   Capitalization effect at takeovers and when new equity is issued

Our tax difference estimate from section 5 suggests that a one unit increase in the tax rate on prospective capital gains reduces the valuation of firms in takeovers by -0.225%. A key question is to what extent our estimation also informs about how capital gains taxation affects the pricing of new equity issues so as to finance real investment. Note first that when new equity is issued, there is no lock-in effect and hence our estimate that isolates the capitalization effect is the appropriate one. However, there are several reasons to expect that the

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capitalization effect of future capital gains taxation in the pricing of equity issuances is somewhat larger than in takeovers.

To start, the estimated capitalization effect reflects the extent to which acquiring-firm shareholders can shift capital gains taxation to target-firm shareholders by way of a lower premium. This pass-through is likely to be less than complete, which suggests that the full valuation of future capital gains taxation exceeds its discounting in the takeover premium. We expect any difference to be small though. Research by Andrade, Mitchell and Stafford (2001) finds that most of the gains from M&As tend to accrue to target shareholders. Interpreting gains as net-of-tax gains, this suggests that acquirer-shareholders should be able to pass through tax costs almost fully to target-firm shareholders. Consistent with this, Huizinga, Voget and Wagner (2012) find a full pass-through of corporate income taxation to target shareholders.

Furthermore, our capitalization discounts are estimated from a sample of relatively large companies that are active in the international takeover market. While such firms represent a significant part of the overall stock market capitalization, they differ from smaller and younger firms for which new equity is relatively more important for financing real investment. First, shareholders of younger firms can expect a larger part of their returns to come in the form of capital gains. Second, smaller firms may be owned to a large extent by domestic investors who are subject to domestic capital gains taxation.[12] For both reasons, we expect the impact of capital gains taxation on firms in the start-up phase to be stronger than for firms that are active in the international takeover market.

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[12] Our estimation informs about the impact of domestic capital gains taxation on the cost of capital of domestic firms given that these firms are in part foreign-owned. At any rate, we expect the role of foreign ownership to be limited since there is a significant home bias in portfolio holdings (French and Poterba, 1991).

Overall, we conclude that our estimated capitalization effect may understate the discounting of future capital gains taxation in the pricing of new equity to finance real investment, especially for younger and smaller firms.

6.2. The effective burden of capital gains taxation and the cost of capital

Our estimate of the impact of capital gains taxation on firm valuation can be used to calculate an *effective* tax on capital gains. Protopapadakis (1983, p. 128) defines the effective capital gains tax as 'the tax rate on capital gains that, if levied continuously, would leave the investor with the identical wealth as a capital gains tax, τ, levied when the capital gains tax are realized'. The effective rate of tax will be less than the statutory rate of tax, τ, because of allowed deductions (of realized losses on other shares), exemptions, and the fact that investors only pay taxes when they realize their capital gains. Let ρ be the effective tax on capital gains, and let σ be the share of capital gains in total shareholders returns. We can then compute ρ using the equation $\rho*\sigma = 0.225 *\tau$, thus taking into account that the effective capital gains tax only applies to the part of total shareholder returns that arises in the form of capital gains.[13]

We can compute σ using historical returns on the MSCI World Index over the 1970-2010 period. During this period, the average annual total shareholder return was 10.60%, which can be divided into an average capital gains return of 7.63% and an average dividend yield of 2.97%. The average capital gains share σ in total returns is hence 0.720. The effective capital gains tax rate relative to the statutory tax rate, ρ/τ, then is 0.313 (=0.225/0.720). The share of capital gains in the S&P500 index over this period was very similar (0.723), reflecting annual capital gains and dividend yields of 8.08% and 3.09%. The effective capital gains

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[13] In this equation, we take the capital gains share in total shareholder returns to be constant. Chetty and Saez (2005), however, show that the US dividend tax cut from 35% to 15% enacted in 2003 caused many firms to initiate or increase dividend payments the following year.

tax rate – relative to the statutory tax rate – for the US is hence also similar (0.311 =0.225/0.723).

These tax rates can be compared to the estimate of effective U.S. capital gains taxation in Protopapadakis (1983, Table 1). The effective tax rate is estimated to be in the 4.8-6.6% range, on the basis of individual investor data on asset holding periods and actual capital gains tax liabilities. In 1987 (the final year of the study), the statutory capital gains tax rate in the US was 21.5%. This gives a range for the ρ/τ of 0.223 – 0.307. Our estimates based on an international sample at thus in line with the U.S. estimates of Protopapadakis (1983) – especially considering that we have argued in the previous section that our estimate may somewhat underestimate the impact of capital gains taxation on the cost of equity.[14]

Finally, we calculate the costs of capital. Using MSCI World Index data, the average effective tax rate ρ can be calculated to be 7.01%, 0.313 times the average acquirer-country capital gains tax rate τ of 22.4%. Thus the effective annual capital gains tax yield is 0.53%, or 7.01% of the annual capital gains tax yield of 7.63 on the MSCI World Index. This suggests that in the absence of capital gains, the total yield on the MSCI World Index would have been 10.07% (the actual total pre-tax yield of 10.60 minus 0.53). Capital gains taxation hence increases the cost of capital by 5.26% (= 100*0.53/10.07).[15]

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[14] However, it should be noted that our estimate of the effective burden of capital gains taxation as reflected in takeover prices, unlike the Protopapadakis (1983) figures, is inclusive of any indirect costs created by capital gains taxation. See Dammon, Spatt and Zhang (2001) for an analysis of how capital gains taxation can create indirect costs by distorting consumption and investment decisions.

[15] For the US the figure is very similar (5.38%) and can be obtained as follows. The average long term capital gains tax rate over the 1985-2007 period was 22.74%. This implies an effective capital gains tax rate ρ of 7.07 (=0.311*22.74) % using historical S&P 500 data. The effective annual capital gains tax yield then is 0.57 (=7.07*8.08/100), implying an increase in the cost of equity capital for firms of 5.38 (=100*0.57/(8.08 + 3.09 – 0.57))%.

6.3. International repercussions of capital gains taxation

National capital gains taxation affects takeover premiums in international M&As. This implies that part of the economic incidence of capital gains taxation lies with foreign residents. A higher capital gains tax rate in the acquirer country, in particular, lowers the takeover premium paid by the acquiring firm. Countries are thus able to export part of their capital gains tax burden when their firms take over firms in other countries. In some instances, high capital gains taxation in a potential acquirer country may also prevent an otherwise profitable international takeover – because it lowers the reservation price of a (potential) acquirer. In addition, international differences in capital gains taxation may give rise to international clientele effects, increasing the likelihood that firms located in countries with low capital gains taxation acquire firms in high-tax countries.

These distortions justify international coordination of capital gains taxation. In the EU, coordination exists in the form of the Mergers and Acquisitions Directive of 1990. However, this directive eliminates capital gains taxation only for cross-border deals where the share of cash-financing is 10% or less. It hence does not remove distortions for deals that are mainly cash-financed, which are the majority of deals in our sample.

7. Conclusion

In a cross-border takeover, buyers and sellers are residents of different countries and hence subject to different regimes of capital gains taxation. This implies that international M&As provide an ideal setting to study the impact of capital gains taxation, which generally applies at both sides of the transaction. International takeovers provide a particularly interesting opportunity to estimate a capitalization effect associated with future capital gains taxation, as they induce an unanticipated transfer of the taxation of future capital gains from shareholders of the target country to shareholders of the acquirer country.

We find that a one percentage point increase in the acquirer-country capital gains tax rate reduces the takeover price by 0.225%. The average capital gains tax rate imposed by acquirer countries in cross-border transactions is 22.4%. Capital gains taxation on the side of the acquirer thus reduces the price of target equity in cross-border deals by about 5%, which is economically meaningful. Firms that issue new equity in the capital market can expect a similar discounting of shareholder capital gains. Our discount estimate implies that the effective capital gains tax, after taking account of deductions, exemptions, and deferral options, is about 31% of the statutory capital gains tax. For an average statutory capital gains tax rate of 22.4%, the average effective capital gains tax rate is thus about 7%. This implies that capital gains taxation significantly raises the cost of equity capital, potentially reducing investment in the economy.

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Appendix A. Variable definitions and data sources

Variable	Description	Sources
Cash	Dummy signaling that acquisition is financed by cash or by cash and equity	Thomson SDC
Premium	Bid premium computed as ratio of bid price and the share price four weeks before announcement minus the ratio of the target country stock market index and the target country stock market index four weeks before the announcement	Thomson SDC
Tax difference	Difference in forward-looking capital gains tax rates between acquirer and target for holding period of five year.	IBFD (2008a, 2008b)
Tax base * Rate	Maximum capital gains tax burden relative to share price which could have been achieved for any share purchase in the five years prior to the take-over. (Five year horizon ends four weeks before the announcement.)	Datastream, IBFD (2008a, 2008b)
Tax base	Capital gain relative to share price for which the capital gains tax burden (Tax base * Rate) over the previous five years is maximized.	Datastream, CRSP
Rate	Applicable capital gains tax rate at which the capital gains tax burden (Tax base * Rate) over the previous five years is maximized.	IBFD (2008a, 2008b)
Difference capital controls acquirer target	Difference between acquirer and target index of the absence of capital controls.	Gwartney et al. (2009)
Difference legal systems acquirer target	Difference between acquirer and target index of the quality of the legal structure and the security of property rights	Gwartney et al. (2009)
Difference shareholder protection acquirer target	Difference between acquirer and target index of the degree of shareholder protection	Spamann (2010)
Market value	Log of market value of target four weak prior to announcement in millions of U.S. dollars	Thomson SDC
Leverage	Ratio of liabilities to market value of equity of the target 4 weeks prior to announcement	Compustat NA, Compustat Global, and Thomson SDC
Liquidity ratio	Ratio of liquid assets to total assets of the target	Compustat NA, Compustat Global, and Thomson SDC
Book-to-market	Book value of target divided by its market value 4 weeks prior to announcement	Compustat NA, Compustat Global, and Thomson SDC
ROE	Target's return on equity	Compustat NA, Compustat Global, and Thomson SDC
Toehold	Percentage acquirer ownership in target prior to merger	Thomson SDC
Subsidiary	Dummy variable indicating that the target is majority owned by another company	As above

Competing bid	Dummy variable indicating a competing bid	Thomson SDC
Hostile	Dummy variable indicating that an offer is not supported by the target board	As above
Tenderoffer	Dummy variable indicating a tender offer for all stocks	As above

Table 1. Capital gains taxation of individuals in 2007

	Long run	Short run	Long-run threshold in years
Australia	22.5	45	1
Austria	0	50	1
Belgium	0	0	
Canada	23.1	23.1	
Czech Republic	0	32	0.5
Estonia	22	22	
Denmark	43	43	3
Finland	28	28	
France	0	27	8
Germany	0	23.7	1
Greece	0	0	
Hungary	20	20	
Ireland	20	20	
Italy	12.5	12.5	1
Japan	20	10	2^a
Luxembourg	0	39	0.5
Mexico	0	0	
Netherlands	0	0	
New Zealand	0	0	
Norway	28^b	28^b	
Poland	19	19	
Portugal	0	10	1
Slovakia	19	19	
South Korea	0	0	
Spain	18	18	1
Sweden	30	30	
Switzerland	0	0	
Turkey	0	10	1
United Kingdom	32	40	6^c
United States	20^d	35	1
Average	12.57	20.14	

These tax rates apply to capital gains in newly acquired listed shares. The short run rates apply to shares which are held for a day. The long-run rates apply to shares which are held for ten years. The threshold is the holding period in years at which investors qualify for the long run rate. The top rate is assumed to apply in case of several tax brackets. The holding of stocks is assumed to be non-substantial, i.e. less than one percent of outstanding stocks. Different tax codes may apply to substantial shareholders in some countries. Special cases are indicated by superscripts.

a The lower rate of 10% applied only from 2003 to 2008. In 2009, the capital gains tax rate increased back to 20% as scheduled.
b Dividends and capital gains are exempt up to the respective risk free return on capital during the holding period according to the *shielding* method.
c The capital gains tax base is gradually reduced by 2 percentage points for the third, fourth, fifth and sixth year of holding an asset.
d The maximum tax rate on capital gains is 15% for capital assets disposed of after 6 May 2003 and before 1 January 2009. The reduced 15% tax rate on qualified dividends and long term capital gains, introduced on 6 May 2003 and previously scheduled to expire after 2008, was extended through 2010 as a result of the Tax Reconciliation Act signed into law by President George W. Bush on May 17, 2006. This was extended through 2012 by President Barack Obama on December 17, 2010.

Table 2. Summary information for takeovers

	By target nation				By acquirer nation			
	Number	Total value of transactions	Mean premium	% Cash	Number	Total value of transactions	Mean premium	% Cash
Australia	273	110,347	0.28	56.78	229	113,468	0.25	54.15
Austria	5	4,803	0.56	100.00	8	4,594	0.20	100.00
Belgium	20	19,361	0.27	90.00	30	23,833	0.41	80.00
Canada	234	208,923	0.37	60.68	254	184,392	0.37	56.69
Czech Republic	6	3,869	0.23	83.33				
Denmark	28	32,563	0.22	89.29	31	34,805	0.38	87.10
Estonia					1	180	0.13	100.00
Finland	19	8,150	0.28	78.95	22	19,597	0.44	77.27
France	155	294,728	0.16	81.29	183	446,134	0.29	80.33
Germany	78	273,316	0.18	87.18	124	197,997	0.35	88.71
Greece	15	4,430	0.22	66.67	14	3,122	0.28	64.29
Hungary	4	64	0.38	100.00	3	52	0.47	100.00
Ireland	16	11,034	0.41	75.00	20	12,398	0.33	65.00
Italy	35	73,918	0.25	80.00	68	116,298	0.37	88.24
Japan	510	161,248	0.09	58.82	528	188,258	0.12	60.42
Luxembourg	3	8,184	0.75	33.33	8	16,281	0.18	87.50
Mexico	3	361	0.37	100.00	6	7,576	0.74	100.00
Netherlands	54	99,464	0.39	74.07	88	162,327	0.34	88.64
New Zealand	30	7,531	0.19	93.33	29	6,565	0.22	96.55
Norway	29	13,875	0.28	79.31	28	13,591	0.26	85.71
Poland	5	1,249	0.29	80.00	3	868	0.03	33.33
Portugal	1	23	-0.06	100.00	2	158	0.17	100.00
Slovakia					1	24	0.38	100.00
South Korea	26	5,936	-0.05	69.23	27	6,315	-0.05	70.37
Spain	22	75,934	0.18	72.73	33	66,928	0.26	75.76
Sweden	75	42,250	0.57	77.33	73	37,809	0.55	82.19
Switzerland	27	37,502	0.23	70.37	70	118,481	0.44	88.57
Turkey	1	45	-0.57	0.00	1	45	-0.57	0.00
UK	288	448,937	0.41	77.08	403	755,972	0.36	78.66
USA	3,387	5,086,252	0.43	63.98	3,062	4,496,229	0.43	61.30
Total	5,349	7,034,295	0.37	65.68	5,349	7,034,295	0.37	65.68

Value of transactions is in billions of U.S. dollars. The premium is the net premium and it is expressed as a share. % cash is the percentage of cash transactions.

Table 3. Summary statistics of premium, cash, tax and control variables

	Number of observations	Average	Standard deviation	Minimum	Maximum
Premium	4,872	0.370	0.625	-0.998	20.805
% Cash	5,349	0.657	0.475	0	1
Tax difference	5,349	-0.005	0.075	-0.47	0.43
Target rate * tax base	5,349	0.120	0.079	0	0.446
Tax base	5,349	0.444	0.257	0	1
Target rate	5,349	0.285	0.112	0	0.570
Market value	5,349	4.942	1.870	0.956	8.751
Leverage	5,349	2.218	4.051	0.022	22.270
Liquidity ratio	5,349	0.281	0.523	0.001	2.984
Book-to-market ratio	5,349	0.753	0.664	-0.297	3.191
ROE	5,349	-0.067	0.392	-2.083	0.25
Toehold	5,349	4.603	11.643	0	49.9
Subsidiary	5,349	0.006	0.076	0	1
Competed	5,349	0.075	0.264	0	1
Hostile	5,349	0.033	0.178	0	1
Tenderoffer	5,349	0.345	0.478	0	1

The premium is the net premium and it is computed as a share. % cash is the percentage of cash transactions. For other variable definitions, see Appendix A.

Table 4. Means in the low and the high tax difference sample

	Premium	% Cash
Low tax difference sample	43.86	88.71
High tax difference sample	36.15	62.94
T-test of equal means	3.46***	17.15***
Signs as predicted?	Yes	Yes

The premium is the net premium and it is computed as a share. % cash is the percentage of cash transactions. *** denotes significance at 1%.

Table 5. Capital gains taxes and the takeover premium

| VARIABLES	(1) Benchmark	(2) Lock-in effect	(3) Institutional quality	(4) Equity transactions	(5) Including outliers	(6) Heckman
Tax difference	-0.225***	-0.234**	-0.208***	-0.262	-0.324***	-0.192**
	(0.0803)	(0.0841)	(0.0736)	(0.193)	(0.0551)	(0.0766)
Target rate * Tax base		-0.180				
		(0.206)				
Tax base		-0.0414				
		(0.0590)				
Target rate		-0.132				
		(0.113)				
Difference capital controls acquirer-target			-0.00902			
			(0.00583)			
Difference legal systems acquirer-target			0.00271			
			(0.0173)			
Difference shareholder protection acquirer-target			0.00445			
			(0.00845)			
Market value	-0.0170***	-0.0180***	-0.0172***	-0.0142***	-0.0237***	-0.0115***
	(0.00194)	(0.00215)	(0.00195)	(0.00442)	(0.00338)	(0.00264)
Leverage	0.00428*	0.00465*	0.00430*	0.00254**	0.0189**	0.00424*
	(0.00214)	(0.00226)	(0.00213)	(0.000905)	(0.00812)	(0.00218)
Liquidity ratio	0.0153	0.0153	0.0147	0.0426***	0.122***	0.0224**
	(0.00963)	(0.00916)	(0.00922)	(0.0148)	(0.0259)	(0.00910)
Book-to-market ratio	0.0405***	0.0295*	0.0396**	0.0640***	0.0852***	0.0370**
	(0.0137)	(0.0164)	(0.0141)	(0.00907)	(0.0182)	(0.0158)
ROE	0.0278***	0.0335***	0.0269**	0.0403	-0.122	0.0197*
	(0.00958)	(0.0117)	(0.00971)	(0.0310)	(0.0854)	(0.0114)
Toehold	-0.00131***	-0.00129***	-0.00135***	-0.000984**	-0.000895	-0.00167***
	(0.000223)	(0.000231)	(0.000237)	(0.000384)	(0.000923)	(0.000238)
Subsidiary	0.0808	0.0722	0.0746	-0.0755	0.0858*	0.0875*
	(0.0486)	(0.0492)	(0.0483)	(0.0622)	(0.0490)	(0.0494)
Competed	0.0701**	0.0714**	0.0693**	0.0879***	0.202***	0.0662**
	(0.0318)	(0.0319)	(0.0313)	(0.0230)	(0.0146)	(0.0326)
Hostile	0.123***	0.121***	0.121***	0.0601	0.0949***	0.116***
	(0.0236)	(0.0227)	(0.0239)	(0.0448)	(0.0264)	(0.0249)
Tenderoffer	0.0872***	0.0913***	0.0871***	0.0497*	0.157***	0.0501***
	(0.0173)	(0.0169)	(0.0176)	(0.0280)	(0.0325)	(0.0137)
Observations	2,823	2,823	2,807	1,561	3,137	2,823
R-squared	0.237	0.244	0.236	0.224	0.213	-

The dependent variable is the takeover premium. Tax variables are measured as shares. See the Appendix for variable definitions and data sources. All regressions include year, industry and acquirer and target country fixed effects. The sample consists of cash transactions only in columns 1-4 and 6, and of equity transactions only in column 5. Standard errors are clustered at the level of the target country. * denotes significance at 10%, ** significance at 5%, and *** significance at 1%.

Table 6. Capital gains taxes and the choice of payment for the takeover

| VARIABLES	(1) Benchmark	(2) Lock-in effect	(3) Institutional quality
Tax difference	-0.677***	-0.684***	-0.830***
	(0.233)	(0.232)	(0.227)
Target rate * Tax base		-0.403**	
		(0.172)	
Tax base		0.110**	
		(0.0507)	
Target rate		0.106	
		(0.105)	
Difference capital controls acquirer-target			-0.00461
			(0.0170)
Difference legal systems acquirer-target			-0.107***
			(0.0390)
Difference shareholder protection acquirer-target			0.0671
			(0.0478)
Market value	-0.0560***	-0.0564***	-0.0554***
	(0.00778)	(0.00797)	(0.00765)
Leverage	0.00569***	0.00572***	0.00585***
	(0.00206)	(0.00199)	(0.00207)
Liquidity ratio	-0.0701***	-0.0696***	-0.0713***
	(0.0163)	(0.0167)	(0.0155)
Book-to-market ratio	0.0203	0.0193	0.0212
	(0.0419)	(0.0409)	(0.0425)
ROE	0.0483	0.0473	0.0485
	(0.0374)	(0.0395)	(0.0369)
Toehold	0.00364	0.00366	0.00361
	(0.00230)	(0.00232)	(0.00232)
Subsidiary	-0.140*	-0.140*	-0.144*
	(0.0839)	(0.0834)	(0.0860)
Observations	5,309	5,309	5,297
Pseudo R-squared	0.144	0.145	0.147

The dependent variable is a dummy variable that equals 1 for a cash or hybrid offer and 0 for an equity offer. Tax variables are measured as shares. See the Appendix for variable definitions and data sources. Coefficients are marginal effects from probit regressions. All regressions include year, industry and acquirer and target fixed effects. Standard errors are clustered at the level of the target country. * denotes significance at 10%, ** significance at 5%, and *** significance at 1%.

Figure 1. Long-term capital gains tax rates during 1985-2007
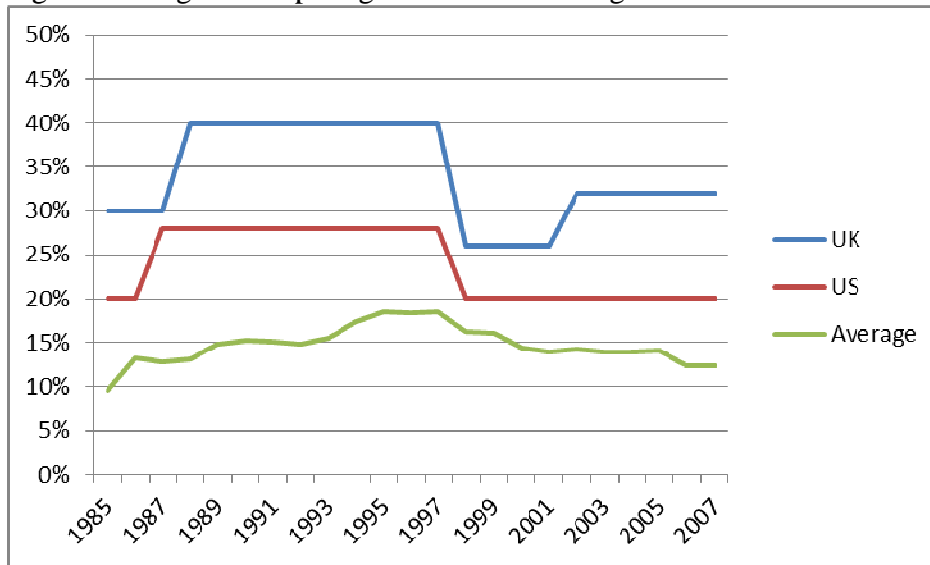
These tax rates apply to capital gains in newly acquired listed shares which are held for ten years. The top rate is assumed to apply in case of several tax brackets. The holding of stocks is assumed to be non-substantial, i.e. less than one percent of outstanding stocks. The average includes only countries for which capital gains tax information is available over the entire 1985-2007 period. See Table 1 for more notes.

Figure 2. Short-term capital gains tax rates during 1985-2007
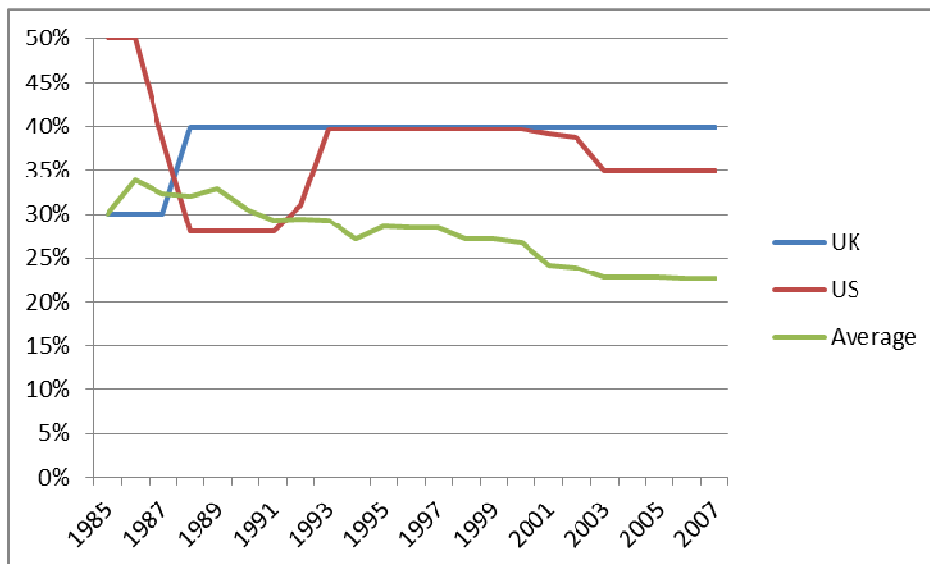
These tax rates apply to capital gains in newly acquired listed shares which are held for a day. The top rate is assumed to apply in case of several tax brackets. The holding of stocks is assumed to be non-substantial, i.e. less than one percent of outstanding stocks. The average includes only countries for which capital gains tax information is available over the entire 1985-2007 period.