Do Shareholders’ Preferences Affect their Funds’ Management? Evidence from the Cross Section of Shareholders and Funds

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ABSTRACT

We consider how fund managers resolve the conflicting preferences of their investors. We focus on the conflict between the taxable and retirement accounts of international funds, which face different tradeoffs between dividends and capital gains. In principle, managers could resolve this conflict through dividend arbitrage, but a proprietary database of dividend-arbitrage transactions shows that in practice they cannot. Thus, managers must resolve it through their investment policies, and we find robust evidence that the policies of managers with more retirement money favor the preferences of retirement investors. In aggregate data we find that these preferences strongly influence cross-border investment.
I. Introduction

A fund manager is an agent for diverse principals. His investors have something in common, that they chose his fund over others, but they can otherwise vary in what they want from him. One likely source of this variation is the tax code - in particular, its differing treatment of retirement and non-retirement accounts. Dividends and capital gains deliver different after-tax benefits to these two major account types, but the typical fund contains both types. Thus, the typical fund manager must serve these two preferences with one policy.

Retirement money varies in proportion from one fund to the next. This variation creates an opportunity to explore investment policies along a new and important dimension: by relating the variation of retirement money to that of a policy choice that favors retirement money, we can gauge the role of shareholders’ preferences in their funds’ investment policies. That is our goal in this paper.

The policy we explore is cross-border dividend yield. We choose this policy because its effect is simple, economically important and easily observed. Its effect is the withholding tax that retirement accounts pay on cross-border dividends, but not on capital gains or domestic dividends. Because non-retirement accounts generally do not pay this tax (owing to their offsetting tax credit), this means that fund managers favor their retirement accounts when they reduce cross-border dividends. As we demonstrate below, this tax claims about 4% of retirement savings allocated to international equity funds. And because the dividend income of a fund’s portfolio is easily observed, as is the tax that the fund’s retirement accounts pay, the policy’s variation across funds is easily observed.
Cross-border dividend policy has a second dimension which is not so easily observed. This is the dimension of dividend arbitrage, where funds avoid cross-border withholding by lending shares back across the border for their dividend record dates, and splitting the tax savings with the borrower through the lending fee. This tactic converts the tax credit into the lending fee, so it is Pareto-improving only if the fee is at least the credit. Otherwise, it leaves the fund’s non-retirement accounts worse off. Thus, the connection between funds’ cross-border dividend policies and the relative welfare of their retirement and non-retirement accounts hinges on the pricing of dividend-arbitrage transactions. But while the literature on dividends is extensive, it does not cover this pricing, presumably because such data is proprietary. That is where our proprietary database is instrumental.

Our data show the fees that lenders get for their credits, in the case of U.S. lenders of Canadian shares. We see a year of loans of Canadian securities by a large U.S. lending agent, including over $600MM of loans on dividend record-dates. This means we can observe the fees, calculate the credits, and thereby observe the crucial pricing: the fees that lenders get for their credits.

Our key finding with the proprietary data is that arbitrage is useful but incomplete. Lending fees convert only some of the tax credit into cash, falling significantly short of the full amount. This shortfall means that cross-border dividends impose a net tax on a mutual fund’s retirement accounts, and therefore that the welfare effect of its cross-border dividend policy depends on how much retirement money it serves.
So how do managers resolve this conflict between their account types? We take this question to mutual-fund data, and because cross-border dividends arise primarily at international equity funds, we focus on those funds. For each fund we have the proportion of defined-contribution money in its assets, as of year-end 2002, and we have the relevant measures of its cross-border dividend policy in fiscal-year 2003: the dividends paid by its portfolio, and the tax withheld from these dividends. We ask three questions. As retirement money goes up, does dividend yield go down? Does withholding tax go down? And, as dividend-arbitrage activity would imply, does the withholding tax per unit of dividend yield go down?

The answer to all three questions is yes. As retirement money grows, investment policies increasingly favor retirement accounts. This is true, we show, even if we control for the subcategories of international funds, both Lipper’s index groupings and Morningstar’s style boxes, so our finding does not result from retirement investors gravitating toward more-suitable fund types. We also observe that this is contrary to what would happen if managers simply maximized the total returns we observe.

The final tests turn from individual funds to aggregate cross-border holdings. This analysis focuses on the U.S./Canada border because it corresponds to the holdings data, and also because – for reasons we detail below – the cross-border dividend tax has much less incidence on Canadian retirement accounts, compared to U.S. retirement accounts. Thus we can observe the aggregate effect of the tax in the contrast between the sensitivity of U.S. investors to Canadian dividends on the one hand, and the sensitivity of Canadian investors to U.S. dividends on the other.
What we find is a strong aggregate effect. The aggregate portfolio of U.S. institutions is strongly averse to Canadian firms’ dividends – but not to U.S. firms dividends - and this is particularly so for U.S. mutual funds. This does not hold in the other direction; the aggregate portfolios of Canadian institutions, and of Canadian mutual funds, show no sensitivity to U.S. firms’ dividends. So the preferences of retirement investors induce, in their fund-manager agents, a strong sensitivity of cross-border ownership to dividend yield.

The rest of the article is organized as follows. Section II covers the relevant background, Section III describes the data, Section IV addresses dividend-arbitrage revenue, Section V addresses the cross-section of mutual funds, Section VI addresses the aggregate portfolios of Canada and the U.S., and Section VII summarizes and concludes.

II. Data

The equity-lending data is the data used in Geczy, Musto and Reed (2002), where it is described in detail. For the purposes of this study, a few facts are important. First, the data cover some Canadian firms because they cover all U.S.-listed stocks, and some Canadian stocks list in the U.S. These are not ADRs, but rather the same security that trades in Canada (see Eun and Sabherwal, 2003). Second, for each loan we have the lending fee. When the loan collateral is cash, the lending fee is a rebate reduction on interest earned by the lender on the collateral, and when collateral is in-kind, the lending fee is simply a cash payment from the borrower to the lender. The fee is annualized, so when we use it we must de-annualize. Finally, we have one year, 11/98 through 10/99, of
data, and the lender is a large U.S. custodian bank with trillions of dollars in custody, so
the loan amounts are significant, often in millions or tens of millions of dollars.

The sample of international funds starts with data purchased from *Pensions and
Investments*. The periodical surveyed mutual funds, asking them their dollar amount of
defined-contribution retirement savings as of 12/31/02. This is not precisely the same as
all retirement money, because some mutual funds hold some defined-benefit assets as
well, but the size of the difference appears small.\(^1\) Of the international funds that
responded, we take all funds for which FY 2003 SEC filings and 12/31/02 total net assets
are available, and from those we take the 64 funds with at least $100M under
management as of 12/31/02. Note that we do not include global funds, because they
invest also in domestic equities, and we are interested only in funds where all dividends
are cross-border. This sample represents about half, by dollar value, of the universe of
international funds.\(^2\) For each fund we get its FY 2003 withholding tax and dividend
income from the Statement of Operations in its Annual Report, and we get its total net
assets as of the beginning, middle and end of FY 2003 from its Annual and Semiannual
Reports. Summary statistics of the sample are provided in Table 1.

The data on portfolio holdings are from two databases compiled by Thomson
Financial: the 13f database and the mutual-fund database. The 13f database includes both
U.S. and Canadian institutions, and shows the holdings of all U.S.-listed stocks by
institutions that hold at least $100M worth, and that do some business in the U.S.

\(^1\) According to the 2003 *Mutual Fund Fact Book*, $11BB of the $158BB of retirement money in foreign
equity mutual funds as of 12/31/02 “[i]includes 457 plans, private defined benefit plans, state and local
government employee retirement funds, Keoghs, and other defined contribution plans without 401(k)
features.” (p. 56).

\(^2\) According to the 2003 *Mutual Fund Fact Book*, The sum of International, Emerging Market and Regional
(but not Global) funds’ assets was $217.6BB as of 12/31/02, about twice the $117.1BB in Table 1.
Because, as discussed above, some Canadian firms list in the U.S., this means we see both U.S. and Canadian investment in both U.S. and Canadian stocks. We use the 13f data for 12/31/2000; the SEC’s Official List of 13f Securities for 12/31/2000 lists the stocks that institutions had to disclose. For each of these stocks, we take its dividend yield to be the dividends paid in 2001 divided by the 12/31/00 price, as reported in the CRSP data. The Mutual Fund database includes both U.S. and Canadian mutual funds; we use the most recent disclosures as of 12/31/2000. The holdings data cover spot but not derivative holdings, which is why (as discussed in detail below) they cover the U.S. holdings of general-purpose, but not RSP, Canadian international-equity funds.

III. Background

We briefly summarize the relevant empirical literature on mutual funds in Section III.A. In Section III.B we show that, for our sample, retirement accounts prefer dividends to capital gains, but non-retirement accounts are indifferent. Section III.C provides the necessary information on dividend arbitrage, with details collected in the Appendix.

A. Literature

Mutual funds have emerged as an ideal hunting ground for breakdowns of agency. This is partly because they present a classic principal/agent problem, partly because the trillions under management make even small breakdowns economically important, and partly because the data are so good. Also, the literature’s skepticism about managers’ ability to add value (e.g., Jensen, 1968) begs the question of what else they could try to do. Considering this context, our research question about a potential success of agency is
a departure. In this section we run briefly through some of the findings that frame our own.

The key agency conflict in the mutual-fund literature is between a fund’s current and prospective investors. Most notably, the convex relation between performance and future inflows (Ippolito, 1993, Sirri and Tufano, 1998) may push funds from the risk choices best for current investors toward risk choices which boost expected net new investment, and a growing literature (Brown, Harlow and Starks, 1996, Chevalier and Ellison, 1997, Busse, 2001, Nanda, Wang and Zheng, 2003) considers whether this happens. Similarly, it may push funds toward quarter-end purchases of stocks they already hold (Carhart, Kaniel, Musto and Reed, 2002).

Beside risk management, current and prospective investors also clash over tax management. Managers can increase their funds’ appeal to new taxable investors, at the expense of their current taxable investors, through their realizations of capital gains and losses. Evidence suggests this occurs (Barclay, Pearson and Weisbach, 1998). It is not clear, however, that it has its intended effect, since Bergstresser and Poterba (2002) find little difference between the effect on retail flows, which they take to be largely taxable, and institutional flows, which they take to be largely non-taxable.

Investors vary along other dimensions, beside tax status, with economic significance. As Johnson (2003) documents with data from no-load funds, some investors have predictably shorter holding periods than others, and this imposes significant transactions costs on the others. A natural remedy to this problem, as Nanda, Narayanan and Warther (2000) observe, is to separate the investor types by charging loads. Another important dimension, first established by the mortgage literature, is
investor sensitivity: some investors are simply less sensitive to price and performance, and Christoffersen and Musto (2002) find that funds with less sensitive investors maximize their profits by charging more.

A very different agency problem that bears mentioning is the conflict between buy-and-hold fund investors and stale-price arbitrageurs (together with their in-house collaborators). As Goetzmann, Ivkovic and Rouwenhourst (2001) predict, and as subsequent events bear out, this was a significant redistribution from the buy-and-hold investors of international equity funds, which are the funds we study here. This appears to be orthogonal to the tax issue we address, but it is worth remembering that evidence of this activity is strong (though probably not as strong for our FY 2003 sample period, when scrutiny and enforcement increased).

B. Relative Preferences of Retirement and Non-retirement Accounts

Earlier work (e.g., Bergstresser and Poterba, 2002) shows that taxable accounts get more, after tax, from capital gains than from dividends, but retirement accounts do not. Thus, it would seem that taxable accounts prefer capital gains and retirement accounts are indifferent. But for two reasons, the opposite is true for our sample. The first reason is that retirement accounts pay a tax on cross-border dividends that they do not pay on capital gains. The second reason is that after 2002, taxable accounts marginal rates are the same for dividends and long-term capital gains. The next two sections document these reasons in detail.
B.1 Tax Retirement Accounts Pay on Cross-Border Dividends

Three elements of tax law combine to create the tax that mutual funds’ retirement accounts pay on cross-border dividends. First, major economies generally tax dividends headed over the border (see, e.g., Callaghan and Barry, 2003). The tax rate can depend on bilateral treaties; the usual rate, and the rate for the U.S./Canada border, is 15%. Second, taxable accounts generally get a full offsetting credit for foreign tax paid, so for them the tax generally means nothing. By contrast, non-taxable accounts get no credit, so to them this is a net tax. Third, dedicated pension funds can apply for exemption from the tax, but mutual funds cannot, not if they are open to taxable accounts. Few if any U.S. funds – and none of the funds in our sample – are structured to be exempt from withholding. The structure of Canadian mutual funds is quite different in this respect, a difference we explain and exploit below in Section VI.

How economically significant is the tax that cross-border dividends impose on retirement accounts? Table 1 shows $330.4MM of withholding in FY 2003 on $127.0B of average total net assets, or 26bp per year. At this rate, retirement savers lose 4% of their international-equity savings over a 30-year career. As 4% is in the neighborhood of a year of spending from retirement savings, this is an economically significant impact on U.S. consumers.

B.2 Taxation of Dividends and Capital Gains in FY 2003

How does the preference of international funds’ retirement accounts for dividends compare to that of its taxable accounts? Our sample period is FY 2003, so the relevant question is how the tax code of this period treats the dividends and capital gains of

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3 A saver investing evenly over 30 years has the average dollar invested 15 years, and 15(26bp)=3.9%.
retirement and non-retirement accounts. The sample falls primarily in one tax regime but spills a little into another; four fifths of the sample (i.e. 79% of the fund-months) is in 2003 and the remaining fifth in 2002, and the tax regime changes after 2002. Thus our primary interest is in after-tax returns in the 2003 regime, but the earlier regime is worth reviewing.

For retirement accounts, the answer is simple and the same for both 2003 and earlier: capital gains are better. This is because these accounts pay one tax at retirement on accumulated dividends and capital gains, but they pay an extra tax, the foreign tax, on the dividends. The first column of Table 2, Panel A, illustrates this. If we let $\tau_T$ be the tax applied at retirement, $\tau_F$ be the foreign tax and $n$ be the number of shares of a mutual fund, then the value to a retirement account of an additional $1 of dividends is $1(1-\tau_T)(1-\tau_F)/n$, whereas the value of an additional $1 of capital gains is $1(1-\tau_T)/n$. So the retirement accounts of international funds, whatever the tax brackets of their owners, strictly prefer capital gains to dividends.

For non-retirement accounts, the answer is simple for 2003 and murkier for 2002. In 2003, these accounts are largely indifferent between dividends and capital gains. This is because the 2003 tax code equalizes the tax rate on “qualified” dividends with the rate on capital gains distributions and long-term capital gains. Since international funds’ dividends are overwhelmingly “qualified”,\(^4\) this means that taxable accounts pay exactly or nearly the same rate on dividends, capital-gains distributions and long-term capital gains. The foreign tax does not enter because taxable accounts receive the offsetting credit. Of course, investors might boost their capital-gains rates by redeeming their

\(^4\) For example, 100% of the ordinary dividends paid in 2003 by the largest international fund, American Funds’ EuroPacific Growth Fund, were qualified (from the tax information on the American funds website, www.americanfunds.com).
shares too soon for long-term treatment of their price returns, or lower them by deferring redemption (though funds eventually realize and distribute gains anyhow), but to a close approximation, dividends deliver non-retirement accounts the same value that capital gains deliver in 2003.

For comparison with the retirement case, we present non-retirement accounts analogously in the second column of Table 2, Panel A, denoting the tax rates on dividends and capital gains with $\tau_D$ and $\tau_G$, respectively. These are about the same for 2003, but for 2002 they are different for higher-income investors. The tax situation for 2002 is essentially the one described by Bergstresser and Poterba (2002), who observe that investors in higher tax brackets earn more, post-tax, from long-term capital gains than from dividends. They also observe that the median mutual-fund dollar appears to come from such a bracket, though it is much less likely that the median mutual fund investor does. So in 2002 some non-retirement accounts share retirement accounts’ aversion to dividends, and some do not.

To summarize, all retirement investors prefer capital gains to dividends for our whole sample. Also, they prefer less foreign withholding tax. In contrast, all non-retirement accounts have no preference between dividends and capital gains for four fifths of our sample, and some have no preference in the remaining fifth as well. Also, non-retirement accounts are indifferent to foreign withholding tax. Thus, funds benefit their retirement accounts in our sample period by reducing dividend yield and foreign withholding tax.

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5 The characterization of the median mutual-fund investor in the *2003 Mutual Fund Fact Book* puts the median investor in a low bracket. The median investor is married with a household income of $62,100, as of 2001. In 2001 (and also 2002), a married household with two kids, standard deductions and that income would have been in the 15% tax bracket.
C. Dividend Arbitrage

There is one thing fund managers can do to help their non-taxable accounts with respect to this tax, and that is dividend arbitrage. The basic idea of cross-border dividend arbitrage (see McDonald, 2001, for a detailed exposition) is to move shares back to their home countries for the record dates of their dividends, and to split the resulting tax savings through the pricing of the transaction. If the pricing gives the fund manager all the tax savings, then it eliminates the tax on non-taxable accounts, while having no effect on taxable accounts. However, if the pricing gives less than all of the tax savings, then it reduces the tax on non-taxable accounts, while having a negative effect on taxable accounts.

To show this formally, we can go back to Table 2, and consider what happens if the fund arbitrages a fraction \( a \) of its dividend income of 1. That is, the fund takes \( a \) of the dividend-paying shares and transfers them to an investor in the shares’ home country. Because this foreign investor is not withheld, he gets their full cash dividend of \( a \), rather than the \( a - \tau_F a \) cash that the fund would have received. Therefore, ignoring the tax credit for the moment, the gains from trade are \( \tau_F a \), and we can denote the fund’s share of these gains with \( x \): the fund gets \( a - \tau_F a + xa \) in cash and the foreign investor gets \( (\tau_F - x)a \).

Because no foreign tax was paid, nobody gets a tax credit. The resulting values for retirement and non-retirement accounts are in Panel B of Table 2.

What Table 2, Panel B makes plain is that retirement accounts benefit from dividend arbitrage as long as \( x > 0 \), but non-retirement accounts are hurt if \( x < \tau_F \). Thus,
dividend arbitrage moves value from non-retirement to retirement accounts if and only if $0 < x < \tau F$. Thus, the key empirical question is whether this is true.

We can observe directly whether $0 < x < \tau F$ in the case of U.S. funds holding Canadian shares. We can do this because we have a proprietary database of dividend-arbitrage transactions by U.S. investors in Canadian firms. These transactions are record-date equity loans, and while the extensive form of the arbitrage, documented in the Appendix, is complex, the part we use is simple. For a given record date, the $\tau F$ in our example corresponds to 15% of the dividend, and the $x$ in our example corresponds to the lending fee in the proprietary data. So we can easily and unambiguously compare the U.S. investors’ arbitrage revenues to the tax savings at stake.

This comparison is a big departure from the literature. The many studies of dividend-arbitrage topics have uncovered much (see Elton, Gruber and Blake, 2002, for a review), but they do not show, as we do, what dividend arbitrageurs actually get. It is generally unclear whether arbitrage is even feasible at all, since these studies rely on anonymous transactions in spot markets, where trading spreads can easily overwhelm the targeted tax savings. For example, if a firm pays a 2% dividend in quarterly installments, then the targeted tax savings on a record date is 15% of 0.50%, or 0.075%, which is 3 cents on a $40 stock. Considering how big trades have to be to make economic sense (n.b., the trades in our proprietary data are typically millions of dollars), a roundtrip transaction cost smaller than this seems highly unlikely. This transactions-cost problem does not arise with equity loans because they do not convey economic exposure, and thus do not incur the adverse selection costs associated (e.g., Bagehot, 1971) with conveying economic exposure.
To summarize, mutual funds damage the after-tax returns of their non-taxable accounts, but not their taxable accounts, when they increase the dividend yields of their cross-border holdings. Dividend arbitrage may undo some of this damage, but if it doesn’t undo all of it then it does new damage to taxable accounts, in which case funds face conflicting preferences among their shareholders. This raises the two empirical questions we address next: what does dividend arbitrage accomplish, and what do funds do?

IV. What does Dividend Arbitrage Accomplish?

Dividend arbitrage converts tax credits that only taxable accounts value into cash that all accounts value. The rate of this conversion determines whether funds trade off the utilities of taxable and non-taxable accounts when choosing their dividend yields. In this section we determine this conversion rate by comparing tax credits to arbitrage revenues, using our proprietary data on U.S. investors in Canadian shares.

The tax credit is simply 15% of the dividend amount. That is, if the fund does not arbitrage, it gets 85% of the dividend in cash and 15% as a credit. The arbitrage revenue that it compares to is the lending fee. That is, if the fund does arbitrage, it gets 85% of the dividend in cash (as a reimbursement from the borrower, rather than as a payment from the issuer) plus the lending fee, but no credit. Our database provides $676MM of record-date lending of Canadian shares, which includes 223 loans on 34 different record dates; for each record date \( i \) we calculate a single fee \( F_i \) by value-weighting the fees of
the loans originated then. Since this fee is per dollar of stock value, it compares to the dividend per dollar of stock value, i.e., the dividend yield, so for record date \( i \) we let \( Y_i \) be the dividend divided by the closing price on the day before the record date (the price that is used to determine the collateral for the loan). With these definitions, the empirical question is whether \( F \) is less than 15% of \( Y \).

We answer the question by regressing \( F \) on \( Y \). We convert both to basis points by multiplying by 10,000, and we get (standard errors in parentheses):

\[
F_i = -2.9 + 0.1026Y_i \quad R^2=53.8\% \\
(0.95) \quad (0.017) \quad N(\text{obs})=34
\]

The slope coefficient is both significantly greater than 0 (t-statistic 6.11) and significantly less than 15% (t-statistic 2.82). Thus, dividend arbitrage gives the lender some, but not all, of the tax savings, about two thirds of it at the point estimate.

To summarize, dividend arbitrage revenue falls short of recovering the cross-border dividend tax. A fund’s retirement accounts thus face a net tax on cross-border dividends, so the fund’s manager faces a tradeoff between the preferences of his retirement and taxable accounts. Retirement accounts prefer lower withholding tax and lower dividend yield, so if funds’ investment policies reflect their shareholders’ preferences, we should see withholding tax and dividend yield go down as the proportion of retirement money goes up. The next section tests these predictions.

V. Cross Section of International Equity Funds

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6 The lending fee in our database is an annual rate, and it applies to collateral equal to 102% of the shares’ value, so the fee we use is 102%(annual rate)(\(n/360\)), where \(n\) is the number of calendar days from the record date to the next business day.

7 Because one of the datapoints appears influential, having the highest values of both \( F \) and \( Y \), we repeat the regression with this datapoint removed and we find the same thing: the slope is significantly greater than 0 (t-statistic 3.43) and significantly less than 15% (t-statistic 4.12).
We take our predictions to the sample of 64 large international equity funds. For each fund we have the proportion of the fund that is defined-contribution retirement money as of 12/31/02, and we have FY 2003 figures for dividends, withholding taxes and total net assets. Therefore, we see directly whether dividends and withholding taxes, per dollar of shareholder money, decrease as retirement money, per dollar of shareholder money, increases.

The variables we need are easily calculated. For fund \( i \), let \( R_i \) be the proportion of its assets that was DC retirement money as of 12/31/02, i.e., the DC figure for that fund as reported by *Pensions and Investments* divided by its 12/31/02 total net assets. Also, let \( A_i \) be its average total net assets during its FY 2003, defined as the average of its total net assets as of the beginning, middle (i.e., semiannual) and end of FY 2003, and let \( D_i \) and \( W_i \) be its total dividend income and foreign withholding tax, respectively, during FY 2003. Table 1 provides summary statistics. With this notation, the hypothesis to test statistically is whether \( D_i / A_i \) and \( W_i / A_i \) go down as \( R_i \) goes up.

We test the hypothesis with simple regressions of \( D_i / A_i \) and \( W_i / A_i \) on \( R_i \), reported in Panel A of Table 3. Both regressions reject the null, showing significant negative relations. Thus, dividend yields and withholding taxes fall as retirement money rises, as they would if managers balance the preferences of their shareholders.

The hypothesis also makes a prediction for the relation between withholding taxes and dividends. Because dividend arbitrage benefits retirement accounts at the expense of non-retirement accounts, and because it reduces \( W \) relative to \( D \), we should also expect \( W_i / D_i \) to fall as \( R_i \) rises. We test this with an analogous regression, reported in the same panel. In this case we find borderline statistical significance, with a p-value of 6.7%.
A potential concern with the Panel A regressions is that they do not account for the subtypes of international equity funds. Retirement investors might sort into international-fund subtypes that have low dividends for some other reason, and that might drive our result. To test our hypothesis against this possibility, we repeat the regressions with indicator variables for the various subtypes. We have two sources of subtypes, Lipper’s index groupings and Morningstar’s style boxes.

The Lipper subtypes correspond to their indices of international-equity mutual fund returns. The sample includes funds in five of these subtypes: International, Emerging Market, European, International Small Cap, and Pacific. Accordingly, we re-run the three regressions with indicator variables for each type except International. The results, in Panel B of Table 3, are similar to those from simple regressions. The relations of withholding tax and dividends to the proportion of retirement money are significantly negative, and the relation of withholding tax per dollar of dividends is negative but less significant, now with a p-value of 10.7%. So at these rejection levels, the regressions bear out the hypothesis even when we control for subtypes within the fund category.

Morningstar style boxes are a 3 by 3 matrix, {Value, Blend, Growth} by {Small Cap, Medium Cap, Large Cap}. They are appealing for our purpose in that they are widely reported, but they have a drawback in that they introduce some endogeneity. This is because assignments to boxes are not by funds’ stated objectives, but rather by their portfolio weights, which means they impute funds’ adaptations to their investors. We employ them analogously to Panel B, with indicator variables for Value, Growth, Small-Cap and Large-Cap. The results, in Panel C of Table 2, are again similar to before, though significances have swapped. Now the relations of withholding tax and
withholding tax per dollar of dividends are significantly negative at standard rejection levels, and dividend yield is negative with a p-value of 13.1%.

To summarize, managers’ investment policies reflect their investors’ preferences. Policies grow more favorable to retirement accounts when they serve more retirement accounts. This is not what we would see if managers maximize their total returns, at least not the total returns the public sees. To do that, they would all avoid tax credits as much as possible, since the credits do not figure in the total returns the public sees even though they are valuable to taxable accounts. In other words, managers would behave as if all of their money were retirement money, but we find that they don’t. By the same token, funds’ objective is not after-tax returns either, because then they would behave as if all their money were taxable money, which they don’t.

The immediate implications of our results are for mutual-fund investors. But due to the magnitude of retirement investing, it also has implications for aggregate cross-border investing. The next section addresses the effect of dividend yield on aggregate cross-border investing by U.S. institutions in general and mutual funds in particular, and it also compares this effect to the analogous effect in Canada, where cross-border retirement investing is different in a key way.

VI. Aggregate Investment

Does the aversion of individual U.S. funds to cross-border dividends aggregate to a national aversion to cross-border dividends? To find out, we build the aggregate U.S. institutional portfolio and establish its sensitivity to the dividend yields of U.S. and Canadian stocks. We simultaneously do the same thing for the aggregate Canadian
institutional portfolio. The point of including the Canadian portfolio is that the cross-border dividend tax has much less incidence in Canada than in the U.S., owing to the very different structure of Canadian retirement investing. Thus, the effect of the tax on cross-border investing is apparent as the difference between the U.S. and Canadian effects.

The U.S./Canadian difference is that Canadian retirement money flows to retirement-only funds that do not hold equities. Unlike in the U.S., Canadian retirement savings are not mingled with non-retirement savings, but rather isolated in Retirement Savings Plan, or RSP, funds. Furthermore, the RSP funds that invest cross-border do not hold equities, due to Canada’s Foreign Content Rule. This rule grants retirement-savings tax treatment only to funds invested at least 80% in Canada, but a fund satisfies this rule if it invests in Canadian securities, such as government bonds, and swaps their returns for cross-border returns with a Canadian swap counterparty.

This may seem obscure but it has two important effects. First, because RSP funds hold swaps rather than equities, their holdings do not show up on databases of equity holdings. Second, because non-RSP do hold equities and do not have retirement accounts, the holdings that we see are by funds whose accounts are not affected by cross-border dividend taxation. Therefore, when we compare U.S. institutional equity holdings to Canadian institutional equity holdings, we compare holdings chosen for accounts that pay a cross-border dividend tax to holdings chosen for accounts that do not. The hypothesis, then, is that the U.S. holdings show aversion to Canadian dividends, but neither the U.S. nor the Canadian holdings show aversion to U.S. dividends.
In addition to not being withheld, Canadians have another potential advantage with respect to Canadian dividends, which is Canada’s Dividend Tax Credit (see, e.g., Lakonishok and Vermaelen, 1983, and Booth, 1987). This is a tax break for individual investors on their dividend income from domestic corporations, and as such is likely to further increase the relative appeal of Canadian holdings to taxable Canadian individuals.

Our universe of equities for testing our hypothesis is the list of U.S.-listed stocks from the U.S. and Canada, as of 12/31/00. For each stock \( i \) we set \( CDN_i \) to 1 if it is Canadian and 0 otherwise, and we calculate its annual dividend yield \( ADY_i \) to be its 2001 dividends divided by its 12/31/00 price. We then calculate five portfolio weights, all as of 12/31/00: \( VW_i \) is its value weight in this universe, \( US13F_i \) and \( CDN13F_i \) are its weights in the aggregated 13f filings of U.S. institutions and Canadian institutions, respectively, and \( USMF_i \) and \( CDNMF_i \) are its weights in the aggregated filings of U.S. and Canadian mutual funds, respectively (for each fund active as of 12/31/00, the last filing dated on or before 12/31/00).

To test our hypothesis, we regress \( CDN13F_i-US13F_i \) on \( CDN, ADY \) and \( CDN*ADY \). With this model, \( CDN \) picks up non-dividend sources of home bias and \( ADY \) picks up dividend preference across stocks in general, leaving the interaction term to pick up the preference for Canadian dividends in particular. Note also that the regression results do not reflect general preferences of institutional investors, which Dahlquist and Robertsson (2002) conjecture could explain their results on ownership of Swedish stocks, because the dependent variable is the difference between two groups of institutional investors. That is, the general preferences of institutional investors are on both sides, so they wash out. Results are in the first row of Table 4, Panel A.
What we find is that Canadian and U.S. preferences for Canadian dividends are indeed significantly different, with U.S. investment declining rapidly compared to Canadian investment as yields go up, while the preferences for U.S. dividends are not significantly different. This result is additional support for the conclusion of the previous section: the U.S. institutions inherit their accounts’ aversion to cross-border dividends, and the Canadian institutions inherit their accounts’ indifference. And as before, this is not what would obtain if institutions simply maximized their total returns, because while cross-border withholding does not harm the Canadian institutions’ accounts, it does harm their total returns. The regression also shows, in the significantly positive coefficient on CDN, home bias not driven by dividend yield.

We can break our comparison of Canadian and U.S. institutions into its Canadian and U.S. components by running two more regressions, one where we replace the dependent variable with US13F-VW, and one where we replace it with CDN13F-VW. The results, in the second and third rows of Table 4, Panel A, show that neither U.S. nor Canadian institutions respond to U.S. dividends, but Canadian dividends increase Canadian weights at about ten times the rate that they decrease U.S. weights, the ratio one would expect from market clearing given the relative sizes of the two economies.

Because the 13f data include pension funds that can apply for exemption from the cross-border dividend tax, the hypothesis best fits the mutual-fund-only sample. We repeat the three regressions with US13F and CDN13F replaced by USMF and CDNMF, respectively, and report the results in Panel B of Table 4.
The mutual-fund only results are qualitatively similar to the previous results. The notable quantitative difference is a much larger effect of dividend yield on the difference between U.S. and Canadian investment in Canadian stocks.

Finally, we can look at the holdings data from the issuer’s perspective and ask what effect dividend yield has on the ownership of a firm. That is, how does U.S. ownership of Canadian firms change as the firms’ dividend yields increase? To answer this question, we first add up for each firm the shares owned by U.S. institutions and the shares owned by Canadian institutions (as shown on 13f), and divide by the firms’ shares outstanding, then we sort firms into dividend-yield buckets and average across the firms in each bucket. What we find, in Figure 1, is a strong relation. Canadian firms see their U.S. ownership decline rapidly as they boost their dividend yields. While our holdings data are not exhaustive, this pattern indicates a potentially important unexplored dimension of dividend policies: as yield goes up, foreign ownership - and thus foreign voting power - goes down.

VI. Summary and Conclusion

The shareholders of a fund do not agree on what its manager should do. In particular, retirement and non-retirement accounts have conflicting preferences, and one of these conflicts concerns cross-border dividends. The tax credits they produce are useless to retirement accounts but useful to non-retirement accounts, so a manager cannot maximize expected utility of both account types unless he can convert the credits into their full cash value through dividend arbitrage. Our first main empirical result is that this conversion is significantly less than full, so managers of international-equity funds
have a choice to make, *if* they are maximizing with their shareholder preferences in mind. They can favor their retirement accounts with lower dividends and tax credits, so if funds’ investment policies reflect their shareholders, then these quantities should go down as retirement money goes up.

Our second main empirical result is that in the cross section of international funds, this is exactly what we find. As the proportion of retirement money goes up, dividend yield goes down, foreign tax credits go down, and tax credits per dollar of dividends go down. This is true even if we control for the *subtypes* of international funds, both the Lipper index groups and the Morningstar style boxes. So the managers’ objective is not the returns enjoyed by retirement accounts, or the returns enjoyed by non-retirement accounts, but somewhere in between, depending on how much retirement money resides in their particular funds.

Does the aversion of individual funds toward cross-border dividends aggregate to a significant effect on cross-border investing? We take this question to holdings data, and our final main empirical result is that U.S. investment in Canadian firms is significantly negative in their dividends, whereas Canadian investment in U.S. firms is unaffected by their dividends. This contrast, we show, follows from the contrasting structures of retirement investing in the two countries, which might provide guidance toward more efficient structuring of U.S. retirement savings in mutual funds.

Our findings open up a new dimension in the analysis of mutual funds. We trace an important cross-sectional variation among funds to the composition of their current investors. This is not an agency problem but rather the opposite, a successful delegation of investment decisions. This is not to say that money management does not exhibit
agency problems, evidence of such problems is strong and diverse, but it does show that to at least some extent, we can understand what fund managers do by looking closely at what they are supposed to do.
References


Appendix

Suppose a U.S. mutual fund, call it Taxwise International Fund, has 100,000 shares of TransCanada Pipelines, which paid C$0.27/share to shareholders of record on 6/30/03. Absent arbitrage, Taxwise will get \((0.85)(C$0.27)(100000) = C$22,950\) in cash and the remaining C$4,050 as a credit. Here is a structure, represented in Figure A1, by which Taxwise converts the credit into some cash:\(^8\)

A U.S. arbitrageur shorts 100,000 shares cum-dividend to a Canadian arbitrageur, and repurchases them ex-dividend, borrowing the shares from Taxwise. The U.S. arbitrageur earns market interest on the short-sale proceeds.

The arbitrageurs enter a swap whereby the Canadian pays his price return plus C$22,950, and gets market interest on the proceeds minus a discount \(D\).

The U.S. arbitrageur pays C$22,950 to Taxwise as reimbursement for the dividend, and also pays a lending fee \(F\).

All put together, Taxwise exchanges the C$4,050 credit for \(F\) in cash, the U.S. arbitrageur makes \(D-F\), and the Canadian arbitrageur makes C$4,050-\(D\). In our data we see the C$4,050 and the \(F\), it’s only the sharing \(D\) between the arbitrageurs we don’t see.

A key goal of this structure is for Taxwise not to loan directly to the Canadian. If it were to loan to the Canadian then the Canadian tax authority would obligate the Canadian to withhold from the dividend reimbursement just as TransCanada would withhold from the dividend. It is worth noting also that the hedge from the swap makes the Canadian ineligible for Canada’s dividend tax credit (though the Canadian might evade detection by routing the swap through another party).

---

\(^8\) Market participants tell us this is the popular structure.
<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Median</th>
<th>Min</th>
<th>Max</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002 DC</td>
<td>591.4</td>
<td>96.0</td>
<td>3.8</td>
<td>11047.0</td>
<td>37847.8</td>
</tr>
<tr>
<td>2002 TNA</td>
<td>1829.7</td>
<td>553.0</td>
<td>108.8</td>
<td>24786.0</td>
<td>117101.8</td>
</tr>
<tr>
<td>R</td>
<td>24.0%</td>
<td>17.5%</td>
<td>0.5%</td>
<td>87.8%</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>47.2</td>
<td>17.1</td>
<td>2.5</td>
<td>506.4</td>
<td>3021.6</td>
</tr>
<tr>
<td>A</td>
<td>1985.0</td>
<td>636.0</td>
<td>118.7</td>
<td>24911.6</td>
<td>127039.9</td>
</tr>
<tr>
<td>W</td>
<td>5.2</td>
<td>1.7</td>
<td>0.2</td>
<td>61.9</td>
<td>330.4</td>
</tr>
<tr>
<td>D/A</td>
<td>2.41%</td>
<td>2.42%</td>
<td>1.48%</td>
<td>3.80%</td>
<td></td>
</tr>
<tr>
<td>W/A</td>
<td>26.3bp</td>
<td>25.8bp</td>
<td>12.9bp</td>
<td>41.2bp</td>
<td></td>
</tr>
<tr>
<td>W/D</td>
<td>10.9%</td>
<td>11.1%</td>
<td>6.4%</td>
<td>14.0%</td>
<td></td>
</tr>
</tbody>
</table>

**NOTE.** – 2002 DC and 2002 TNA are DC money and Total Net Assets as of 12/31/02, A is average Total Net Assets across the beginning, middle and end of FY 2003, D and W are dividend income and foreign withholding in FY 2003, all in $MM. R is 2002 DC divided by 2002 TNA.
<table>
<thead>
<tr>
<th></th>
<th>Retirement</th>
<th>Non-Retirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. No Dividend Arbitrage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 of Dividends</td>
<td>$(1-\tau_T)(1-\tau_F)/n$</td>
<td>$(1-\tau_D)/n$</td>
</tr>
<tr>
<td>1 of Capital Gains</td>
<td>$(1-\tau_T)/n$</td>
<td>$(1-\tau_G)/n$</td>
</tr>
<tr>
<td>B. Arbitrage $a$ of Dividend</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 of Dividends</td>
<td>$(1-\tau_T+ax)(1-\tau_T)/n$</td>
<td>$(1-a[\tau_F-ax])(1-\tau_D)/n$</td>
</tr>
<tr>
<td>1 of Capital Gains</td>
<td>$(1-\tau_T)/n$</td>
<td>$(1-\tau_G)/n$</td>
</tr>
</tbody>
</table>

**Note.** – The value in a cell is the value to one share in an account of the type indicated at the top of the column that accrues from income into the fund, which has $n$ shares, of the type indicated at the left of the row. The tax rates applied to retirement accounts upon retirement is $\tau_T$, the rates applied to dividend and capital-gains income of non-retirement accounts are $\tau_D$ and $\tau_G$, respectively, and the tax rate of foreign dividend withholding is $\tau_F$. Panel A assumes no dividend arbitrage, and Panel B assumes arbitrage of a fraction $a$ of dividend income, where the fund receives $x$ of the dividend amount in cash in exchange for the credit.
### TABLE 3  Investor Composition and Tax Efficiency

<table>
<thead>
<tr>
<th>Dep. Variable</th>
<th>$W/A$</th>
<th>$D/A$</th>
<th>$W/D$</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. No Category Controls:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>28.69</td>
<td>0.0256</td>
<td>0.112</td>
</tr>
<tr>
<td></td>
<td>(24.06)</td>
<td>(28.98)</td>
<td>(36.99)</td>
</tr>
<tr>
<td>$R$</td>
<td>-9.923</td>
<td>-0.0060</td>
<td>-0.014</td>
</tr>
<tr>
<td></td>
<td>(-2.66)**</td>
<td>(-2.15)**</td>
<td>(-1.52)*</td>
</tr>
<tr>
<td><strong>B. Lipper Index Controls:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>28.376</td>
<td>0.0252</td>
<td>0.113</td>
</tr>
<tr>
<td></td>
<td>(22.41)</td>
<td>(26.71)</td>
<td>(34.28)</td>
</tr>
<tr>
<td>$R$</td>
<td>-8.171</td>
<td>-0.0047</td>
<td>-0.012</td>
</tr>
<tr>
<td></td>
<td>(-2.24)**</td>
<td>(-1.75)**</td>
<td>(-1.26)</td>
</tr>
<tr>
<td>Emerging</td>
<td>1.174</td>
<td>0.0035</td>
<td>-0.01</td>
</tr>
<tr>
<td></td>
<td>(0.42)</td>
<td>(1.66)</td>
<td>(-1.43)</td>
</tr>
<tr>
<td>Europe</td>
<td>4.891</td>
<td>0.0028</td>
<td>0.004</td>
</tr>
<tr>
<td></td>
<td>(1.57)</td>
<td>(1.20)</td>
<td>(0.54)</td>
</tr>
<tr>
<td>Intl. Small</td>
<td>-2.177</td>
<td>-0.0022</td>
<td>0.003</td>
</tr>
<tr>
<td></td>
<td>(-0.70)</td>
<td>(-0.93)</td>
<td>(0.34)</td>
</tr>
<tr>
<td>Pacific</td>
<td>-11.801</td>
<td>-0.0069</td>
<td>-0.027</td>
</tr>
<tr>
<td></td>
<td>(-2.73)</td>
<td>(-2.13)</td>
<td>(-2.36)</td>
</tr>
<tr>
<td><strong>C. Morningstar Style-Box Controls</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>27.659</td>
<td>0.0267</td>
<td>0.104</td>
</tr>
<tr>
<td></td>
<td>(11.58)</td>
<td>(16.67)</td>
<td>(16.36)</td>
</tr>
<tr>
<td>$R$</td>
<td>-8.164</td>
<td>-0.0029</td>
<td>-0.020</td>
</tr>
<tr>
<td></td>
<td>(-2.12)**</td>
<td>(-1.13)</td>
<td>(-1.98)**</td>
</tr>
<tr>
<td>Small</td>
<td>0.922</td>
<td>-0.0014</td>
<td>0.011</td>
</tr>
<tr>
<td></td>
<td>(0.19)</td>
<td>(0.42)</td>
<td>(0.87)</td>
</tr>
<tr>
<td>Large</td>
<td>2.472</td>
<td>0.0003</td>
<td>0.008</td>
</tr>
<tr>
<td></td>
<td>(1.03)</td>
<td>(0.19)</td>
<td>(1.28)</td>
</tr>
<tr>
<td>Value</td>
<td>0.730</td>
<td>0.0001</td>
<td>-0.001</td>
</tr>
<tr>
<td></td>
<td>(0.28)</td>
<td>(0.07)</td>
<td>(-0.12)</td>
</tr>
<tr>
<td>Growth</td>
<td>-3.905</td>
<td>-0.0051</td>
<td>0.006</td>
</tr>
<tr>
<td></td>
<td>(-2.28)</td>
<td>(-4.47)</td>
<td>(1.31)</td>
</tr>
</tbody>
</table>

**Note.** — * represents a significant one-sided p-value at the 10% level, ** represents a significant one-sided p-value at the 5% level, and *** represents a significant one-sided p-value at the 1% level. p-values are provided only for the null hypothesis that the coefficient on $R$ is not negative. T-stats are provided in parentheses. $R$ is the defined contributions reported by Pension and Investments on December 31, 2002 divided by the TNA reported in CRSP for the same time. These include the 64 largest international equity mutual funds with TNA over $100 million. $W$ and $D$ are Withholding Tax and Dividend Income, respectively, from the income statement of the annual reports for each mutual fund with the annual reporting reported for FY 2003, and $A$ is average TNA over the same period. The fund indicators Emerging, Europe, Small International, International (measured as the intercept) and Pacific are descriptions used by Lipper Analytics to classify international equity funds. Note some classifications are omitted if they did not appear in our sample. Large, Small, Growth, and Value are the indicators used by Morningstar to classify funds.
# Table 4  Canadian and U.S. Institutional Equity Holdings Related to Dividend Yields

<table>
<thead>
<tr>
<th>Dep. Variable</th>
<th>Intercept</th>
<th>CDN$_i$</th>
<th>ADY$_i$</th>
<th>CDN$_i$*ADY$_i$</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. All Institutions:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CDN13F$_i$-US13F$_i$</td>
<td>-0.00002</td>
<td>0.00082</td>
<td>0.00012</td>
<td>0.0977</td>
</tr>
<tr>
<td></td>
<td>(-4.01)</td>
<td>(14.9)</td>
<td>(0.65)</td>
<td>(25.0)</td>
</tr>
<tr>
<td>CDN13F$_i$-VW$_i$</td>
<td>-0.00002</td>
<td>0.00077</td>
<td>0.00001</td>
<td>0.08933</td>
</tr>
<tr>
<td></td>
<td>(-4.11)</td>
<td>(13.7)</td>
<td>(0.07)</td>
<td>(22.3)</td>
</tr>
<tr>
<td>US13F$_i$-VW$_i$</td>
<td>-0.000001</td>
<td>-0.0005</td>
<td>-0.00011</td>
<td>-0.00837</td>
</tr>
<tr>
<td></td>
<td>(-0.44)</td>
<td>(-2.13)</td>
<td>(-1.33)</td>
<td>(-4.94)</td>
</tr>
<tr>
<td>B. Mutual Funds:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CDNMF$_i$-USMF$_i$</td>
<td>-0.00009</td>
<td>0.00173</td>
<td>0.00013</td>
<td>0.25001</td>
</tr>
<tr>
<td></td>
<td>(-7.23)</td>
<td>(14.5)</td>
<td>(0.26)</td>
<td>(29.3)</td>
</tr>
<tr>
<td>CDNMF$_i$-VW$_i$</td>
<td>-0.0001</td>
<td>0.001719</td>
<td>-0.00017</td>
<td>0.2427</td>
</tr>
<tr>
<td></td>
<td>(-6.71)</td>
<td>(13.4)</td>
<td>(-0.32)</td>
<td>(26.5)</td>
</tr>
<tr>
<td>USMF$_i$-VW$_i$</td>
<td>-0.0000</td>
<td>-0.0002</td>
<td>-0.00029</td>
<td>-0.00731</td>
</tr>
<tr>
<td></td>
<td>(-0.00)</td>
<td>(-0.36)</td>
<td>(-1.68)</td>
<td>(-2.38)</td>
</tr>
</tbody>
</table>

**Note.** – VW$_i$ is the value weight of stock $i$ among all U.S.-listed stocks. From the 13f filings for 12/31/00 we calculate the aggregate portfolio of all reporting U.S. institutions, and the aggregate portfolio of all reporting Canadian institutions; US13F$_i$ is the weight of stock $i$ in the former, and CDN13F$_i$ is its weight in the latter. From mutual funds’ most recent portfolio disclosures as of 12/31/00 we calculate the analogous statistics USMF$_i$ and CDNMF$_i$. The dividend yield of stock $i$, ADY$_i$, is its 2001 dividends divided by its 12/31/00 price. CDN$_i$ is 1 if stock $i$ is Canadian, and 0 otherwise. The table reports coefficients and t-statistics (below, in italics and parentheses) from regressions where the independent variables are CDN$_i$, ADY$_i$, and CDN$_i$*ADY$_i$, and the dependent variables are as indicated.
Figure 1: Fraction of Canadian Firms Held by Canadian and U.S. Institutions, Sorted by Dividend Yield. Holdings are as of 12/31/00, as reported to the SEC on form 13f.

Figure A1. Structure of Withholding-Tax Arbitrage Between U.S. and Canada.