The Performance of European Index Funds and Exchange-Traded Funds

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ABSTRACT

European index funds and exchange-traded funds underperform their benchmarks by 50 to 150 basis points per annum. The explanatory power of dividend withholding taxes as a determinant of this underperformance is at least at par with fund expenses. Dividend taxes also explain performance differences between funds that track different benchmarks and time variation in fund performance. Our results imply that not only fund expenses, but also dividend taxation can result in a substantial drag on the performance of mutual funds.

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ABSTRACT

European index funds and exchange-traded funds underperform their benchmarks by 50 to 150 basis points per annum. The explanatory power of dividend withholding taxes as a determinant of this underperformance is at least at par with fund expenses. Dividend taxes also explain performance differences between funds that track different benchmarks and time variation in fund performance. Our results imply that not only fund expenses, but also dividend taxation can result in a substantial drag on the performance of mutual funds.

1. INTRODUCTION

In this paper we investigate the performance of index mutual funds and exchange-traded funds (ETFs) that are listed in Europe. Despite the enormous size of the European mutual fund industry (more than $6 trillion in 2008) and the increasing popularity of passive investing in Europe, research on the performance of European passively managed funds has generally been lacking and important questions remain to be answered.[1] For example, do the results found in the academic literature on U.S. index funds and ETFs carry over directly to European funds? In particular, do European index funds and ETFs underperform their benchmarks with the magnitude of their expenses? And to which extent do regulatory issues such as taxes play a different role in Europe than in the United States?

Studies on the performance of U.S. passive funds report that fund returns are predictable with a high degree of accuracy and that there is a one-to-one negative relation between fund returns and their expenses [see, e.g., Elton, Gruber, and Busse (2004)]. Consistent with these studies, we find that expense ratios are an important determinant of European passive fund returns. However, we document two notable observations that cannot be explained by fund expense ratios. First, that European index funds and ETFs fall short of the (gross) total returns of their benchmark indexes by 50 to 150 basis points per annum, which is significantly more than the shortfalls reported for U.S. passive funds. This shortfall is also more than we would expect based on the funds'

[1] While European funds are an under-researched area, there are a few studies that investigate actively managed European funds, including Otten and Bams (2002, 2007).

reported expenses. Second, we observe substantial performance differences between funds that track different benchmark indexes that seem unrelated to their expense ratios. Even though funds that track the major stock market indexes in the United States and Europe generally have similar expenses compared to funds that track the major Japanese indexes, it appears that the latter funds display consistently better performance. Although passive funds that track the S&P 500 or MSCI USA indexes underperform their benchmarks by more than 120 basis points per year, this figure is only about 50 basis points for passive funds that track the MSCI Japan index or Topix. This is a very striking result.

We show that these two observations can be almost entirely attributed to dividend taxation. Because local revenue authorities impose dividend withholding taxes, European mutual funds often do not receive the full dividends on their investments, for example when investing in U.S. equities. However, when total return benchmarks are constructed, the default assumption is that dividends are fully reinvested. Because expense ratios do not take into account the performance loss due to dividend taxes, the differences that arise between the returns of European funds and their benchmarks cannot be explained by fund expense ratios.

By taking dividend taxes into account we can explain most of the underperformance of the passive funds in our sample. The explanatory power of dividend taxes as a determinant of the performance of European index funds and ETFs is at least at par with fund expense ratios. We find that on average, fund

expense ratios contribute to fund performance at -56 basis points per year, while the impact of dividend taxes amounts to -48 basis points. Moreover, dividend taxes almost completely explain the differences we observe in performance between funds that track different benchmark indexes. Our results indicate that the substantial underperformance of passive funds that track the major stock market indexes in the United States and Europe can be attributed to dividend taxation having a relatively high impact in these areas.

The funds in our sample also exhibit significant time variation in their performance, which we attribute to dividend taxation. This time variation is particularly strong for funds that invest in Europe. When we split our sample in months with a high or low dividend-tax impact, we find that passive funds fall short of their benchmarks by 51 basis points per year during the low-impact subsample, but that this figure is close to 100 basis points during the high-impact subsample. This observation provides additional evidence for the critical importance of dividend taxes for the performance of European index funds and ETFs.

We deem that our paper contributes to the existing literature in at least four important ways. First, we provide new insights on the performance of European index funds and ETFs. Most current studies are based on U.S. funds and attribute fund performance to fund expenses, which are measured by expense ratios and organizational structures [see, e.g., Elton, Gruber, Comer, and Li (2002); Poterba and Shoven (2002); Blume and Edelen (2004); Elton, Gruber, and Busse (2004); Gastineau (2002, 2004); and Agapova (2009)].

However, it is currently not known what the relative importance of these factors is in explaining the performance of passive funds listed in Europe, or which other factors are important determinants for their performance.

Second, our results suggest that investors should refine their measures of fund costs.[2] Although its name suggests that the total expense ratio covers all relevant costs, in fact the total expense ratio ignores a cost component that turns out to be very important for a large group of funds. For the funds in our sample, the impact of dividend taxes on performance is about as large as that of all other expenses combined.

Third, our results have implications for the performance evaluation of actively managed funds that are subject to dividend withholding taxes. The typical approach to measuring managerial skill is to test if fund alphas are different from zero. However, we argue that this approach may paint a picture that is too pessimistic in certain cases about the value added by active management. The benchmark indexes against which actively managed funds are typically evaluated ignore the significant costs of dividend taxation, thus projecting return levels that cannot be achieved by passively managed funds. Therefore, it would be fairer to set the hurdle rate for actively managed funds equal to the returns that passive funds are actually able to realize. This argument applies not only to European mutual funds, but also to all funds that are subject

[2] Ramos (2009) observes a large dispersion in fund fees across different countries. Taking dividend taxation into account will likely further increase this dispersion. Korkeamaki and Smythe (2004) analyze the competitiveness of the Finnish mutual fund market by analyzing the fund's expense ratio and do not separately measure tax efficiency.

to dividend taxes, including, for example, U.S.-listed mutual funds that invest in international or emerging equity markets.

Fourth, and finally, our results indicate that ignoring dividend taxes can lead not only to biased inferences about mutual fund performance on aggregate, but can also distort relative fund comparisons. Estimated alphas of funds that invest in regions in which the impact of dividend taxation is relatively high are underestimated if the benchmarks an investor uses assume that dividends are fully reinvested. This implication also goes beyond our sample of European-listed funds and carries over to, for example, U.S.-listed funds that invest abroad.

This paper proceeds as follows. In section 2 we describe the data that we use in our analysis. Section 3 contains the empirical results. In section 4 we discuss the implications of our findings.

2. DATA

In our analysis of passive funds we include both traditional index mutual funds and the more novel ETFs, that are listed in Europe. According to Barclays (2009), at the end of July 2009, the estimated number of ETFs globally numbered 1,678, with roughly 3,100 listings and over $850 billion assets under management. The number of ETFs in Europe was 753 compared to 706 for the United States. The total amount invested in ETFs is estimated to be $183 billion in Europe and $582 billion in the United States.

We use a sample of passive funds listed in Europe that invest in all major global stock markets. We start by creating a comprehensive list of passive funds.

To do so, we search Thomson Financial Datastream and the Morningstar websites for all funds listed in Europe with names that include the word “index” or “idx”, and by considering all available ETFs. We clean this sample by removing enhanced indexing funds, institutional funds, and insurance funds. To obtain the investment policy of the fund (passive or enhanced) and the clientele that the fund is allowed to attract (retail or institutional), we check the Morningstar website and the website of the provider of these funds on a case-by-case basis. For insurance funds, the cost load may be unclear, since costs may be charged within the insurance contract instead of within the fund itself.

Next, we filter for funds that track one of the broadly diversified equity market indexes that are of primary importance for a global investor who is looking for passive equity market exposure. These indexes are the S&P 500 or MSCI USA (United States equities), MSCI Europe (European equities), MSCI Japan, or Topix (Japanese equities), MSCI World (global equities) and MSCI Emerging Markets (emerging markets equities).[3] Most index funds are based on one of these indexes, but many ETFs tend to be based on either thematic indexes or on narrow (e.g., single country or sector) indexes.[4] Although such funds can be of interest to investors who wish to obtain easy access to a certain investment theme, they are not the focus of our study so we remove them from our sample.

[3] We do not include funds which use one of the Nikkei indexes (e.g., Nikkei 225 or Nikkei 300) as their benchmark, because of the fact that proper total return series are not available for these indexes.

[4] Ranaldo and Häberle (2007) advocate the use of broadly diversified indexes for passive investors, as they consider narrow indices active strategies because of their selection rules and resulting turnover.

We obtain expense ratios for the funds from the Morningstar European websites or from their parent firm websites, and total return data for the funds and their benchmark indexes from Thomson Financial Datastream. We note that we do not account for front- or back-end load fees that might be charged for different share classes of the mutual funds.

We include all the leading providers in our final sample, which comprises index mutual funds from Vanguard, State Street Global Advisors (SSgA), Crédit Agricole (CAAM), Pictet, BNY Mellon / Mellon, Coutts, HSBC, Société Générale (SGAM), and Winterthur, and ETFs from Barclays (iShares), Société Générale (Lyxor), and State Street (StreetTracks). We do not include Deutsche Bank (x-trackers) in our sample due to these funds' very short data history. For the Barclays iShares we show results for both the Irish and German listings. We also find multiple listings for some of the other funds (e.g., a dividend-paying fund and a capital appreciation fund), all of which we include in our final sample. Our final sample is composed of over 40 passive funds that are relevant for investors who are looking for a passive exposure to global equity markets. Because only a small number of funds have a return history that goes back to before 2003, our sample covers the period January 2003 to December 2008.

3. EMPIRICAL RESULTS

In this section, we investigate the impact of fund expenses and dividend withholding taxes on European passive fund performance.

3.1 Relative fund returns

We first analyze realized fund performances by comparing the return of passive funds and their benchmark indexes. We focus on the median 12-month return differences. We use medians to reduce the impact of the first and last data points in our sample. When we compare the performance differences for two funds, we bear in mind that these may be based on data histories with different lengths.

[INSERT TABLE 1 ABOUT HERE]

In Table 1 we summarize the realized benchmark-relative performances of the funds in our sample. The table shows that basically all passive funds underperform their benchmark. The typical underperformance ranges from 50 to 150 basis points per annum, with a median of 84 basis points. This underperformance is significantly more than the figure reported for U.S. listed passive funds. For example, Svetina and Wahal (2008) report that U.S. equity ETFs exhibit an estimated underperformance of 31 basis points with respect to the index they are tracking. Elton et al. (2002) indicate that the Standard & Poor's Depositary Receipts (SPDRs) on the S&P 500 Index exhibit a performance shortfall of 28 basis points.

If we focus on the best-performing funds, we see that for each benchmark there is at least one fund that underperforms by no more than 70 basis points per annum. We are suspicious about the few funds that seem to outperform their benchmark, as these appear to be funds with either relatively high tracking error

levels or with only a small number of return observations available. We conclude that the passive funds in our sample generally earn returns that are substantially lower than their benchmark returns.

We also observe large performance differences between funds that track different benchmark indexes. The median underperformance is 123 basis points for funds that track the S&P 500 or MSCI USA Index, 81 basis points for funds that track the MSCI Europe Index, and 76 basis points for funds that track the MSCI World Index. Interestingly, the median underperformance for funds that track the MSCI Japan Index or Topix is smallest, at only 51 basis points. Funds that track the MSCI Emerging Markets Index exhibit relatively high tracking errors, as a result of which it is arguable if they truly qualify as being passive.[5] As a result, we are not surprised to find a relatively broad range of benchmark-relative performances for this group of funds. Taking into account the high tracking errors of the emerging markets funds, we do not consider their median underperformance of 60 basis points to be a particularly meaningful number.

3.2 Expense ratios and fund performance

Here, we investigate the extent to which the underperformance of passive funds can be attributed to their expense ratios. The expense ratios that are reported by the funds include management fees and other fees charged by the asset managers, such as share registration fees, fees payable to auditors, legal fees,

[5] We find median tracking error levels ranging from 0.5 to 0.8 percent per year for funds tracking the United States, Europe, Japan, and World indexes. In comparison, the median tracking error for funds tracking Emerging Markets is 1.5 percent per year.

and custodian fees. In Table 2 we summarize the reported total expense ratios of the passive funds that comprise our sample.

[INSERT TABLE 2 ABOUT HERE]

The lowest expense ratios reported by funds vary from 35 basis points for certain U.S. and European funds to 65 basis points for emerging markets funds.[6] The median expense ratio of the funds in our sample is 59 basis points, which implies a gap of 25 basis points with the median underperformance of 84 basis points we discuss above. This result indicates that the substantial underperformance of the passive funds cannot be attributed solely to their expense ratios.

Furthermore, although there seems to be a negative relation between fund performances and expense ratios, the performance differences we observe between funds often cannot be explained by differences in their expense ratios. For example, even though the most expensive funds are also the funds with the worst performance (the BNY Mellon / Mellon fund tracking the S&P500, and the Pictet fund that tracks the MSCI emerging markets index), it is not true that the cheapest funds consistently display the best performance. For example, with an expense ratio of 35 basis points per year, the Lyxor ETF tracking the S&P500, is

[6] Hortaçsu and Syverson (2004) show that there is a wide variety in expense ratios among passive index funds tracking the S&P500 index. They develop a model in which the nonfinancial attributes of passive index funds can explain that relatively expensive funds are not competed away by the cheapest funds. Svetina and Wahal (2008) report that most new ETFs are based on indexes for which no index mutual fund exists, to avoid competition.

one of the cheapest funds in our sample, but it is also among the worst-performing funds, showing an underperformance of 1.61 percent per year.

An even more striking observation is that the differences in performance between funds that track different benchmark indexes cannot be explained by expense ratios. Even though funds that track the major stock market indexes in the United States and Europe generally have expense ratios similar to those of funds that track the major indexes in Japan, we find that the latter funds display consistently better performance. Passive funds that track the S&P 500 or MSCI USA Indexes underperform their benchmarks by more than 120 basis points per year and funds that track the MSCI Europe underperform their benchmark by about 80 basis points per year. This figure compares to only 50 basis points for passive funds that track the MSCI Japan or Topix index.

3.3 Dividend taxes and fund performance

We investigate the extent to which dividend taxes may help explain the observed performance differences. We examine the taxation of dividends that are received by the funds in our sample. Dividends that are paid out by a fund may also be subjected to withholding taxes, depending on the tax status of the end-investors in the fund. However, analyzing the after-tax returns of the end-investors in a fund is beyond the scope of this paper, since our focus is on mutual fund performance evaluation. Thus, consistent with the literature on mutual fund performance evaluation, we assume that fund dividend payments are fully reinvested when calculating fund total returns.

Dividend taxes need to be considered separately because they are not incorporated in fund total expense ratios. Index providers such as MSCI have been aware of the importance of dividend withholding taxes and have acted on this by providing two types of total returns indexes. So-called *gross* return indexes assume that dividends are fully re-invested, while *net* return indexes assume that dividends are re-invested after taxation according to the worst possible withholding tax rate. Consequently, the gross return represents an upper bound on the expected return of a fund that perfectly replicates an index, while the net return represents a lower bound. Table 3 lists the withholding-tax rates used in the calculation of the MSCI net total return series and the average dividend yields for the most relevant regions for the funds in our analysis.

[INSERT TABLE 3 ABOUT HERE]

The results in Table 3 imply that the potential impact of withholding taxes on fund performance is substantial. For example, the U.S. dividend withholding-tax rate is equal to 30 percent, which, together with a dividend yield of roughly 2 percent per year on the S&P 500 during our sample period, implies a potential performance drag due to dividend taxation that amounts to 60 basis points per year for U.S. equity investments. Internationally, dividend taxation rates vary considerably across countries. For example, in Japan the withholding tax rate is only 7 percent, while in France dividends are taxed against 25 percent. As a

result, the impact of dividend taxation can vary significantly across funds with different geographic exposures.

Since individual funds do not report on the amount of lost income due to dividend taxation, we need a proxy for the impact of withholding taxes. We propose to use the return differential between the gross and net total return index of the benchmark tracked by a passive fund. Consistent with our expectations, our measure for dividend taxes reflects significant variations in dividend taxation for the different regions. The annualized return differential between the gross and net total return indexes amounts to roughly 60 basis points for the S&P500 and MSCI USA Index; 50 basis points for the MSCI Europe Index; 10 basis points for the MSCI Japan Index or Topix; 50 basis points for the MSCI World Index; and 25 basis points for the MSCI Emerging Markets Index.

To test for the incremental explanatory power of dividend taxes over fund expense ratios, we use a regression framework in which we cross-sectionally regress relative fund performances on expense ratios, our measure of dividend taxes and, later on, a number of control variables. We present the regression results in Table 4.

[INSERT TABLE 4 ABOUT HERE]

In regression specification 1 we regress fund performances on their expense ratios. We observe a negative slope coefficient of about one, which is statistically highly significant with a *t*-statistic of -3.06. The adjusted R-squared

value of the regression indicates that expense ratios can explain up to 17 percent of the cross-sectional variability that we find in passive fund performance. These results indicate that we can attribute a substantial portion of the variation in the performance of passively managed funds to differences in their expenses.

In regression specification 2 we regress fund performances on our measure of dividend taxes. We observe a statistically significant negative slope coefficient of 1.29 and an adjusted R-squared value of 20 percent. These results indicate that, from a statistical point of view, the explanatory power of dividend taxes as determinant of the underperformance of passive funds is at least at par with the explanatory power of expense ratios

In regression specification 3, to test for any interaction between fund expenses and dividend taxes, we run a multiple regression that contains both variables. The slope coefficients remain nearly unchanged and the explanatory power of the two-factor model increases to an impressive 34 percent. Based on the results of these regressions, we conclude that fund expense ratios and dividend taxes are distinct sources of passive fund underperformance. To get a feeling for the economic magnitude of the impact of expense ratios and dividend taxes on fund performance, we multiply the estimated slope coefficients with the average values of the expense ratios and our measure for dividend taxes. The resulting figures are -56 basis points and -48 basis points per year, respectively. This finding implies that expense ratios and dividend taxes have an economically significant and generally comparable impact on the performance of passive funds.

3.4 Tax efficiency

One of the most striking observations of our regression analyses is that the estimated coefficient of tax impact is very close to -1. The negative one-to-one relation between dividend withholding taxes and fund performance indicates that the typical European passive fund is unsuccessful in alleviating its tax burden. Ways in which funds could improve their tax efficiency include benefiting from tax reclaims based on international dividend tax treaties, applicable to the legal structure and the country of incorporation of the fund; or engaging in "dividend enhancement" securities lending practices; or investing in derivatives, such as total return swaps instead of physical, dividend-paying stocks. Of course, an additional requirement in this regard is that the revenues of such activities accrue primarily to the fund. If the funds were to be successful in alleviating their tax burden to some extent, then the estimated tax impact coefficient should be smaller than one in absolute terms.

The funds in our sample themselves do not report on their dividend tax efficiency. For example, the information on dividend withholding taxes in the prospectuses of the funds is typically limited to a general statement that these taxes may negatively affect fund returns and that the fund may try to mitigate the impact of these taxes, but that the fund makes no commitment whatsoever as to how this mitigated impact might affect the fund's bottom line.[7] Most funds

[7] In theory end-investors might be able to improve their after-tax returns by reclaiming themselves some or all of the dividend withholdings experienced by their fund. In practice this is not a realistic

evaluate their performance against net return indexes, indicating that investors should expect the worst with respect to dividend withholding taxes.

We also contacted several fund management companies to obtain more details on the impact of dividend taxation, but we were not able to receive clear, unambiguous feedback. In some instances we were even given contradictory information. One of the few exceptions was Deutsche Bank. This newcomer in the ETF market explicitly mentions dividend tax efficiency as one of its competitive advantages, which it achieves by investing in derivatives instead of physical stocks. In light of our findings and these recent developments, we conjecture that in coming years tax efficiency will increasingly be recognized as an important competitive advantage in the European passive fund industry.[8]

3.5 Listing and fund performance

We perform several follow-up regressions to test for possible interactions with fund listing. First, we construct dummy variables indicating whether the funds are listed in Luxembourg (LU), Ireland (IR), France (FR), or Germany (GE). Based on expense ratios alone, we would expect funds listed in Luxembourg to underperform funds listed in Ireland, France, and Germany, because funds in Luxembourg have an average expense ratio of 92 basis points, compared to 59, 49, and 52 for funds listed in Ireland, France and Germany, respectively. In

possibility though, as it would require a detailed, investor-specific overview of the impact of withheld dividends, which the funds do not provide.

[8] Just like capital gains tax efficiency is a known important feature for funds listed in the United States.

addition to expenses, the impact of dividend taxation may also be different for funds with different listings, because, depending on their country of incorporation, funds might be able to benefit from international dividend tax treaties. However, since funds do not report on their tax reclaim activities, we do not have any a priori expectations on the possible interactions between fund listings and dividend taxes.

In our analysis, we regress fund returns on the dummy variables IR, FR, and GE (regression 4). The results in Table 4 indicate that on average, Luxembourg funds underperform their benchmarks by 126 basis points per year. For funds listed in Ireland, this figure is 71 (-126 + 54) basis points. The difference of 54 basis points per year is statistically significant with a *t*-statistic of 2.46. French and German funds also seem to do somewhat better than Luxembourg funds, although their respective differences of 39 and 55 basis points are only marginally significant from a statistical point of view.

To investigate the extent to which performance differences between funds with different listings can be attributed to their expense ratios and our measure for dividend taxes, we augment regressions 1 to 3 with these listing dummy variables. The results of regressions 5 to 7 in Table 4 indicate that the underperformance we find for funds listed in Luxembourg can be fully attributed to these fund having higher expenses. Once we add fund expenses to the regression, all coefficient estimates for the listing dummies are indistinguishable from zero. However, adding dividend taxes to the regression does not seem to affect the coefficient estimates for the listing dummies. This finding indicates that

performance differences across funds with different listings are unrelated to dividend taxes.

3.6 Dividend taxes and time variation in passive fund performance

We investigate if dividend taxes are also helpful in explaining variations in passive fund performance over time. If dividend taxes are indeed an important determinant of passive fund underperformance, then we would expect passive funds to display worse performance during time periods when losses due to dividend taxes are relatively high compared to periods when losses due to dividend taxes are relatively low. Time variation in the impact of dividend taxes is probable, in light of the fact that dividends tend to be distributed mainly during certain periods in the year. To formally investigate this effect, we split the sample, separately for each benchmark index, into two mutually exclusive parts. The high-tax-impact subsample consists of the months during which the return difference between the gross and net benchmark indexes is above median, and the low-tax-impact subsample comprises the months during which this difference is below the median. Table 5 shows the median fund performances under both regimes.

[INSERT TABLE 5 ABOUT HERE]

Panel A of Table 5 shows the return differences between gross and net benchmark indexes for both subsamples. We see that these differences can be

quite substantial. For the United States, the median difference between the gross and the net return index of the S&P500 during high-tax-impact months is 76 basis points (annualized). During low-tax-impact months this figure is only 43 basis points, i.e., 34 basis points lower. This difference is 40 basis points for the MSCI Europe Index, three basis points for the major Japanese stock indexes, 25 basis points for the MSCI World Index, and 35 basis points for the MSCI Emerging Markets Index.

Panel B of Table 5 shows the median fund performances for both subsamples. Interestingly, we also observe substantial performance differences for the funds in the two subsamples. For example, during high-tax-impact months, passive funds that track the S&P500 or the MSCI USA display an underperformance of 114 basis points, which compares to 85 basis points during low-tax-impact months. The difference of 29 basis points is very close to the 34 basis point difference which we find at the index level. For the other regions we also note comparable differences between fund returns and index returns in the two tax-impact subsamples. These results imply significant time variation in passive fund performance that can be attributed to dividend taxes being higher in some periods than in others. Thus, the results also provide corroborating evidence for the importance of dividend taxes as a determinant of passive fund returns in general.

4. CONCLUSIONS AND IMPLICATIONS

In this paper we investigate the performance of index mutual funds and exchanged-traded funds listed in Europe that track the major stock market indexes for the United States, Europe, Japan, and emerging markets. Consistent with other studies, we observe considerable differences in performance between the funds, and find that expense ratios are an important determinant of relative fund performance. However, we document two notable observations that cannot be explained by differences in fund expense ratios: the index funds and ETFs in our sample fall short of the total returns of the benchmarks they track by substantially larger amounts than their reported expenses, and we observe substantial performance differences between passive funds that track different benchmark indexes, differences that seem unrelated to their expense ratios.

We show that these two observations are almost completely explained by the fact that funds' expense ratios do not incorporate dividend taxes. Once we take dividend taxes into account, we can explain most of the passive funds' underperformance. The explanatory power of dividend taxes as a determinant of index fund and ETF performance is at least at par with the importance of expense ratios. We find that on average, fund expense ratios contribute -56 basis points to fund performance, and that the corresponding figure for dividend taxes amounts to -48 basis points. Moreover, dividend taxes almost completely explain the differences in performance that we observe between funds that track different benchmark indexes, and are also successful in explaining time variation in monthly fund performances. Our results indicate that the sizeable

underperformance of passive funds that track the major stock market indexes in the United States and Europe can be attributed to the impact of dividend taxation being relatively high in these regions.

Our study has several important implications. First, for a proper understanding of European fund performance, we believe it is important to realize that dividend taxes constitute a cost component with a magnitude that is, in many cases, comparable to that of expense ratios. We conjecture that this conclusion carries over to all funds that are subject to dividend taxes, including, for example, mutual funds listed in the U.S. that invest outside of the U.S. A brief analysis on certain U.S.-listed funds over the same sample period suggests that this is indeed the case. We find that the U.S.-listed Vanguard Index fund and the U.S.-listed Barclays iShares, both of which track the S&P 500 Index, lag the index (on a gross total return basis) by an amount which is close to their reported expense ratios, but the shortfall of the U.S.-listed Vanguard fund on MSCI Europe and the U.S.-listed iShares on MSCI EAFE is about 50 basis points larger than their expense ratios would suggest. This 50 basis point gap closely matches our measure for the impact of dividend withholding taxes, i.e., the difference between gross and net total index returns. A more thorough analysis of the impact of dividend withholding taxes on funds listed outside Europe is beyond the scope of this paper, but would constitute an interesting avenue for follow-up research that could naturally extend our results.

Second, our analysis shows that the "total expense ratio" is not, as its name suggests, a comprehensive measure of the costs incurred by a fund. Our results encourage the development of more refined of measures of fund costs.

Third, our results imply that if actively managed mutual funds are evaluated against index returns that assume full reinvestment of dividends and ignore expenses, then the bar for these funds is raised too high. A more appropriate hurdle rate is the performance of passively managed funds that are available to investors in reality.

Finally, our results indicate that ignoring dividend taxes may also distort relative fund comparisons. The estimated alphas of funds that invest in regions in which the impact of dividend taxation is relatively high are underestimated if the benchmarks the investor uses assume that dividends are fully reinvested.

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TABLE 1: Performances. This table reports the performance of the passive funds in our sample measured against gross benchmark index returns. For each fund we report the median 12-month return difference measured over the January 2003 to December 2008 period.

	S&P 500 or MSCI USA	MSCI Europe	MSCI Japan or TOPIX	MSCI World	MSCI EM
ETFs iShares	-0.65% -1.54%	0.04% -0.60%	-0.45% -0.92%	-0.27% -0.76%	0.42% 0.29%
ETFs Lyxor	-1.61%	-0.47%	-0.50%	-0.67%	-1.73%
ETFs StreetTracks		-0.87%			
Index funds Vanguard	-0.95%	-0.80%	-0.37% -0.32%	-0.89%	-0.60%
Index funds State Street	-0.91%	-0.88%	-0.52%	-0.84%	
Index funds Crédit Agricole	-0.83%	-0.81%	-0.67%		
Index funds Pictet	-0.93%	-1.39%	-0.68%		-1.73%
Index funds BNY Mellon / Mellon	-1.83% -1.09%				
Index funds Coutts	-1.62% -1.32%				
Index funds HSBC	-1.21% -1.23%				
Index funds Société Générale	-1.31%				
Index funds Winterthur	-1.56%				
Median	*-1.23%*	*-0.81%*	*-0.51%*	*-0.76%*	*-0.60%*

TABLE 2: Expense ratios. This table contains an overview of total expense ratios, as reported by the funds themselves.

	S&P 500 or MSCI USA	MSCI Europe	MSCI Japan or TOPIX	MSCI World	MSCI EM
ETFs iShares	0.40% 0.40%	0.35% 0.35%	0.59% 0.59%	0.50% 0.50%	0.75% 0.75%
ETFs Lyxor	0.35%	0.35%	0.50%	0.45%	0.65%
ETFs StreetTracks		0.50%			
Index funds Vanguard	0.38%	0.50%	0.50% 0.50%	0.50%	0.65%
Index funds State Street	0.60%	0.60%	0.60%	0.60%	
Index funds Crédit Agricole	0.40%	0.40%	0.40%		
Index funds Pictet	0.76%	0.77%	0.78%		1.22%
Index funds BNY Mellon / Mellon	1.15% 0.51%				
Index funds Coutts	0.85% 0.70%				
Index funds HSBC	1.00% 1.00%				
Index funds Société Générale	0.81%				
Index funds Winterthur	1.05%				
Median	*0.70%*	*0.45%*	*0.55%*	*0.50%*	*0.75%*

TABLE 3: Withholding taxes and dividend yields. This table contains an overview of withholding taxes used in the calculation of the MSCI net total return series. The withholding tax rates used are the maximum rates applicable to non-resident institutional investors who do not benefit from double taxation treaties as per 2006. The table also shows dividend yields over the period January 2003 to December 2008.

	Withholding taxes	Dividend yield
United States	30%	1.9%
Japan	7%	1.3%
Europe		
United Kingdom	0%	3.5%
France	25%	3.1%
Germany	21%	2.5%
Emerging markets		
Korea	27.5%	2.0%
Taiwan	20%	3.4%
Brazil	0%	3.6%
Russia	15%	1.8%
India	0%	1.4%
China	0%	2.3%

TABLE 4: Regression results. This table reports the results of several regressions designed to explain the cross-section of passive fund performances. The dependent variable is the median benchmark-relative performance of each fund as reported in Table 3. In regression specification (1) we regress fund performances on expense ratios in isolation, and in specification (2) on dividend taxes in isolation. Our main analysis consists of regression specification (3), in which we regress fund performances on expenses and dividend taxes together. In regression (4) the explanatory variables consist of listing dummies representing Ireland (IR), France (FR), and Germany (GE). Regressions (5), (6) and (7) are based on regressions (1), (2) and (3) respectively, augmented with the listing dummies of regression (4).

	(1)		(2)		(3)		(4)		(5)		(6)		(7)	
	coef	t-stat	coef	t-stat	coef	t-stat	coef	t-stat	coef	t-stat	coef	t-stat	coef	t-stat
Intercept	0.24	1.10	0.34	1.99	0.16	0.71	-1.26	-7.05	-0.37	-0.78	-0.69	-2.85	0.27	0.59
Expense ratio	-1.02	-3.06			-0.91	-3.03			-0.96	-2.04			-1.21	-3.39
Dividend taxes			-1.29	-3.35	-1.16	-3.31					-1.17	-3.08	-1.02	-2.45
IR							0.54	2.46	0.22	0.84	0.47	2.33	0.12	0.52
FR							0.39	1.71	-0.03	-0.10	0.27	1.29	-0.18	-0.66
GE							0.55	1.91	0.16	0.47	0.39	1.48	-0.03	-0.10
Adj.Rsq	*0.17*		*0.20*		*0.34*		*0.08*		*0.16*		*0.26*		*0.35*	

TABLE 5: Dividend tax regimes. This table reports the performance of the passive funds in our sample during high- and low-dividend tax regimes. For each individual benchmark index we split the sample into two mutually exclusive parts. The high-tax-regime subsample consists of the months during which the return difference between the gross and net benchmark indexes is above median, and the low-tax-regime subsample consists of the months during which this difference is below median. Panel A reports the median difference between gross and net index returns under the two regimes and Panel B reports the median benchmark-relative fund performances under each regime.

	S&P 500 or MSCI USA	MSCI Europe	MSCI Japan or TOPIX	MSCI World	MSCI EM
Panel A. Gross-minus-net return index					
High dividend taxes	0.76%	0.52%	0.04%	0.57%	0.48%
Low dividend taxes	0.43%	0.11%	0.01%	0.32%	0.13%
Difference	*0.34%*	*0.40%*	*0.03%*	*0.25%*	*0.35%*
Panel B.Performance versus benchmark index					
High dividend taxes	-1.14%	-0.98%	-0.55%	-0.93%	-1.73%
Low dividend taxes	-0.85%	-0.51%	-0.47%	-0.78%	-1.03%
Difference	*0.30%*	*0.47%*	*0.08%*	*0.15%*	*0.71%*

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