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Multi-asset class mutual funds: Can they time the market? Evidence from the US, UK and Canada

Andrew Clare[a,*], Niall O'Sullivan[b], Meadhbh Sherman[b] and Stephen Thomas[a]

[a]*The Centre for Asset Management Research,*
The Sir John Cass Business School, City University, London, UK.
[b] *Department of Economics, University College Cork, Cork, Ireland.*

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Abstract
The importance of asset allocation decisions in wealth management is well established. However, given its importance it is perhaps surprising that so little attention has been paid to the question of whether professional fund managers are skillful at timing market movement across asset classes over time. The timing literature has tended to concentrate on the timing skill of single asset class funds. Using data on US, UK and Canadian multi-asset class funds, we apply two alternative methodologies to identify the asset class timing abilities of managers. Overall, whether we apply a returns-based method or a holdings-based testing approach, we find evidence of only a tiny minority of funds with asset class timing ability.

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[*]Corresponding author: Tel.: +44 207 040 5169. *E-mail addresses:* a.clare@city.ac.uk

1. Introduction

In this paper we examine the asset class timing ability of a large sample of multi-asset class funds in the US, UK and Canada over the period 2000 to 2012. The interest in such funds continues to grow as investors embrace diversification following two particularly bad experiences with equity-concentrated portfolios since 2000 including the technology stock crash around 2001 and latterly the financial crisis from 2008. Furthermore, as more investors must now take responsibility for their own pension savings in the form of defined contribution savings vehicles, multi-asset class funds are seen as an important ingredient in any practical solution. Individual investors could themselves combine a range of single asset class mutual funds that together comprise a multi-asset class holding. However, it is reasonable to assume that in choosing a multi-asset class mutual fund investors want not just the low cost efficient diversification benefits but also the asset allocation skills of the fund manager. That is, the multi-asset class fund investor is also paying for the manager's ability to time asset class return movements. An important question therefore, largely unanswered, is whether the managers of such funds possess skill in timing the relative movements of asset classes.

Of course the skills of the multi-asset class fund manager will comprise both the selection of strategic long term asset class weights as well as tactical asset class timing and security selection abilities. In the case of most funds it is impossible to know these strategic weights without detailed interrogation of the trustees and their advisers (though see Andonov et al (2012)). The tactical asset allocation contribution is defined as the difference between the strategic weights and realized allocation weights with the asset class timing component being the over or under-weighting of asset classes relative to the long run strategic target weights. Ibbotson and Kaplan (2000) and Andonov et al (2012) is unusual in having access to strategic policy weights for a sample of pension funds. They find a roughly equal contribution to returns of 25bp pa from each of policy weights, asset class timing and security selection. Also Blake et al (1999) and find that while UK pension funds

did not show superior timing ability across asset classes, specialist managers do possess superior security selection skills. However, multi-asset class mutual funds provide a new context to explore market timing skills since their managers are focused on tactical adjustments to maximize their performance, top their league tables, and attract new capital conditional on asset allocations complying with their generic grouping, such as “Conservative”, “Aggressive”, etc. We present results for a large sample of funds with a variety of asset allocation categories and provide fresh insight into tactical asset class timing skills.

A much-investigated question in finance literature is the return performance attribution of strategic and tactical allocation and security selection. A number of researchers have emphasised the contribution of strategic asset allocation decision: Brinson et al (1986) and Brinson et al (1991) both suggest that asset allocation policy explains more than 90 percent of overall performance while more recent research suggests that strategic asset allocation accounts for only up to 50% of fund performance, the rest being attributable to tactical adjustments and security selection, Ibbotson (2010), Xiong et al (2010).

In a further detailed examination of performance attribution, Daniel et al. (1997) examine ‘Characteristic Timing’ (timing ability of different investment styles which determines whether funds can time portfolio weightings on characteristics such as size, book-to-market ratio and momentum) and ‘Characteristic Selectivity’ (whether funds can select stocks which outperform the average stock having the same characteristics). The authors find that while performance is significant, it is no greater than the difference between passive and active fund expenses. This is a vast literature. Our paper focuses on the tactical asset allocation skills of multi-asset class funds, specifically on monthly asset class timing and contributes to the mutual fund timing literature in particular.

To determine the extent of asset class timing skills amongst managers of multi-asset class funds we employ two methodologies. The first is based upon an extension of the conditional beta approach of Ferson and Schadt (1996) which simply requires fund returns as an input. We can think of this as the multivariate extension of the early single-asset market timing measures of Henriksson and Merton (1981) and Treynor and Mazuy (1966), which are based on non-linear regressions of realized fund returns against contemporaneous market returns, and which are generally referred to as 'returns-based' measures. A key difference in our paper is that since our focus is on multi-asset class funds, we are seeking evidence of timing ability in more than one asset class: hence we specify the fund beta as being conditional upon anticipated next period returns in multiple asset classes - equity, bond and cash. We test whether the managers of multi-asset funds can successfully 'time' their exposures to these markets over time.

A number of econometric issues arise around the returns-based timing literature. Jiang, Yao and Yu (2007) find that returns-based measures suffer from an artificial timing bias and a lack of statistical power. Artificial timing biases may occur because of a passive timing effect, examples include the non-linear relation between the fund and market returns arising from options holdings in a fund. Returns-based measures also suffer from low statistical power due to the low frequency of data generally available on fund returns. The authors argue instead in favour of a more robust 'holdings-based' method to evaluate timing ability. Since holdings-based measures are based on individual assets, data is available at a much higher frequency. Jiang et al argue that beta can be more accurately estimated from higher frequency data and find evidence of greater market timing ability compared to traditional returns-based techniques. Goetzmann, Ingersoll and Ivkovich (2000) highlight further methodological issues showing that returns-based measures are biased downwards due to a dynamic trading effect when funds trade between the observation dates of fund returns. This would occur if a fund engages in daily or weekly market timing but returns are measured using monthly data.

The holdings-based method of Jiang, Yao, and Yu (2007) uses observed mutual fund asset holdings data. This involves calculating a fund's beta as a weighted average of the betas of individual stocks held in a fund and testing whether the covariance between the fund betas at the beginning of a holding period and the holding period market returns is significant. This method relies on *ex ante* information on portfolio holdings rather than *ex post* realized returns and hence there can be no bias due to subsequent trading activity during a holding period or the dynamic trading effect. In market timing tests, Jiang et al (2007) find that holdings-based timing measures are generally small and insignificant while the returns-based timing measures are significantly negative. Using simulations they find that these holdings-based measures have superior statistical power even when fund holdings are observed less frequently than fund returns. Mutual fund holdings are also used in a range of studies evaluating fund performance including, for example, Grinblatt and Titman (1989,1993), Wermers (1999, 2000, 2004), and Ferson and Khang (2004): these show that measures based on holdings data are more powerful in detecting mutual fund stock selection ability. Finally, we note that several studies look at the portfolio allocation between cash and equity components to measure market timing and find little evidence of such timing skill (see for example Becker, Ferson, Myers, and Schill, 1999).

The above discussion highlights research findings that focus solely on equity funds and individual stock information. In this paper we focus on market timing skill in a multi-asset context and hence we develop a simple alternative approach based on relating changes in asset class weights within funds to future (next period) returns, in effect asking whether multi-asset class fund managers can successfully rebalance their portfolios ahead of anticipated returns.

To anticipate our findings, our results indicate overall that timing skill is rare and is found among a small minority of funds. This conclusion is supported by both the returns-based approach and the holdings-based tests. The rest of this paper is organised as follows: in section 2 we describe

our asset class timing methodology, section 3 describes our large data set while in section 4 we discuss our results.

2. Methodology

To investigate whether multi-asset class funds can 'time the market' we employ two methodologies. The first is a returns-based method and extends the conditional beta model of Ferson and Schadt (1996), which we apply to monthly fund returns and which we describe in section 2.1. The second is a holdings-based approach and makes use of the Morningstar multi-asset class funds' holdings (weights) monthly data which we describe this methodology in section 2.2.

2.1. Returns-Based Method

The returns-based methodology is a variant of the Ferson and Schadt (1996) conditional beta approach. To begin, we model the fund return as

$$Rp_t = \alpha_p + \beta_{1t}(Rbg_t) + \beta_{2t}(Rbc_t) + \beta_{3t}(Re_t) + \varepsilon_{pt} \quad (1)$$

where Rp_t is the excess return on fund p, α_p is an intercept term, Rbg_t is the excess total return on a broad government bond index, Rbc_t is the excess total return on a broad index of corporate bonds, Re_t is the excess total return on a broad index of equities and ε_{pt} is an error term. In keeping with the Ferson and Schadt approach, each beta coefficient in Eq. [1] is assumed to be conditional upon the anticipated next period return of its respective market, as follows:

$$\beta_{1t} = \theta_1 + \theta_2(Rbg_{t+1})$$

$$\beta_{2t} = \theta_3 + \theta_4(Rbc_{t+1})$$

$$\beta_{3t} = \theta_5 + \theta_6(Re_{t+1}) \quad (2)$$

Eq. [2] above acknowledges that a manager may be able to time their exposure to a market and therefore may be adjusting the asset class betas to take advantage of anticipated market developments. Substituting Eq. [2] into Eq. [1] gives Eq. [3] as follows:

$$Rp_t = \alpha_p + \theta_1(Rbg_t) + \theta_2(Rbg_t)^2 + \theta_3(Rbc_t) + \theta_4(Rbc_t)^2 + \theta_5(Re_t) + \theta_6(Re_t)^2 + \varepsilon_{pt} \quad (3)$$

Again, in keeping with the approach of Ferson and Schadt (1996), positive and statistically significant coefficients on the non-linear terms may be interpreted as timing ability of the associated asset class. Negative values for the coefficients indicate evidence of negative market timing , that is, evidence that managers increase (decrease) their exposures to the market in question at a time when the market is falling (rising). This is effectively the multi-asset class extension of the original equity market timing approach originating from Treynor and Mazuy (1966) and others.

2.2. Holdings-Based Method

The second methodology that we employ is an asset class holdings-based approach. This approach is distinguished from the returns-based method because unlike the vast literature on performance which imputes funds' investment styles based on the Sharpe (1992) return-based style analysis or the Fama and French (1996) and Carhart (1997) performance attribution methods, our data enable us to directly observe funds' asset class weights and furthermore we are able to so dynamically at a monthly frequency. As noted previously, Jiang, Yao and Yu (2007) argue that holdings-based measures of timing ability are more robust than returns-based measures. The methodology that we use here represents a new, but relatively simple way of determining market timing ability. The technique involves using the proportion invested in a broad asset class at time *t* as the dependent variable in an OLS regression where the independent variable is the return on this asset class at time

t+1. In effect, we are trying to establish whether the proportion allocated to an asset class changes in anticipation of positive return in that asset class. We estimated the following expression for the change in the proportion held in each asset class, $\%\Delta AC_j$, where $\%\Delta$ represents the change between t-1 and t, and j represents the three main asset classes: government bonds, corporate bonds and equities.

$$\%\Delta AC_{j,t} = \alpha + \beta_j(R_{j,t+1}) + \varepsilon_{j,t} \quad (4)$$

The coefficient β_j indicates the degree to which a manager can time the j^{th} asset class. A positive value for β_j indicates that on average a manager increases their holding in asset class j, ahead of a positive return in this asset class. A negative value for the coefficient indicates that the manager tends to increase (decrease) their holding in the asset class ahead of a decline (rise) in its value. We also investigate a further variant of the model which focuses equity market timing relative to government bonds and corporate bonds. Here, we use a measure of asset class relative return as the independent variables as follows:

$$\%\Delta AC_{e,t} = \alpha + \beta_1 \left(\frac{Re}{Rbg}\right)_{t+1} + \beta_2 \left(\frac{Re}{Rbc}\right)_{t+1} + \varepsilon_{e,t} \quad (5)$$

A positive value for β_1 and/ or β_2 indicates that a manager increases their allocation to equities ahead of a time when equities outperform government bonds and/or corporate bonds.

3. Data

Our mutual fund dataset comprises 617 multi-asset class funds from three mutual fund markets: the USA, UK and Canada. The data span the period from January 2000 to December 2012. For each fund we collect monthly return data as well as the monthly weights that these funds had invested in broad asset classes - equity, government bonds, corporate bonds, cash and 'other' asset classes.

These data were obtained from Morningstar. After careful filtering, the funds in our dataset are independent funds, that is, any merged, split or combined funds were carefully examined to ensure that no duplicate funds were included in the dataset. 'Second units' were also removed. 'Second units' are essentially the same fund but packaged in a different way and sold to different types of investors (for example, retail versus institutional investors). The second units contain the same securities as the 'independent' fund and so were eliminated from the dataset. Fund returns are gross of buying and selling expenses and net of the annual management fee. Returns are gross of income-tax to control for any differential tax treatments between the regions. Fund returns are inclusive of reinvested income.

Using Morningstar's filters we identified multi-asset class US, UK and Canadian mutual funds. We identified three broad multi-asset class categories that are referred to in the US as "Conservative Allocation", "Moderate Allocation" and "Aggressive Allocation". In the UK, the loosely equivalent categories are referred to as "Cautious Managed", "Balanced Managed" and "Active Managed" while in the case of Canada they are referred to as "Fixed Income Balanced", "Neutral Balanced" and "Equity Balanced". We provide full definitions of these categories in an appendix to the paper. The more cautious allocation category generally seeks to provide both capital appreciation and income by investing in three major areas: stocks, bonds and cash. These portfolios tend to have relatively low maximum allowances for equities. The equity allocation in Canada's Fixed Income Balanced category is restrcited to between 5% and 40%; the UK's Cautious category is restricted to a maximum of 60% in equities while the US Cautious category must invest between 20% and 50% in equities. At the other end of the scale, Canada's Equity Balanced funds must hold a minimum of 70% in equities; the UK Active category is permitted to hold 100% in equities while the US Aggressive category specifies that funds typically hold between 70% and 90% in equities. These investor guidelines and limits are quite broad. It is clear that the manager of an "Aggressive" fund could at times have the same alloctaion to equities as the manager of a "Cautious" fund. These

very loose guidelines therefore give the managers ample latitude to add value to their clients' portfolios over time through their asset class timing decisions. In Table 1, we show the time series average of the cross-sectional (across funds) monthly average asset class weights by asset class and region from our sample of funds.

[Table 1 Here]

In the case of the US, for example, we can see that the "Aggressive" funds have higher average exposure to equities than the "Moderate" funds, which in turn have higher average exposure to equities than the "Conservative" funds. As the allocation to equities declines as we move from aggressive to moderate to conservatively managed multi-asset funds, the allocations to bonds and to cash rise. Table 1 also shows that the allocations to cash, bonds and equities make up the vast majority of fund positions since the average exposure to 'Other' asset classes is very low. The standard deviations of these positions, shown in italics, are all relatively high. For example, the average exposure of the UK Active multi-asset class funds to equity is just over 67% but the standard deviation of these exposures is nearly 16%. The standard deviation of the allocations indicate that there is considerable diversity in asset class allocations across funds within the same category allowing ample scope for us to examine funds' asset class timing.

In order to provide a more granular insight into funds' asset allocation, we also perform a 'returns-based style analysis' on the sample (see Sharpe, 1992). Tables 2i, 2ii and 2iii present the results of this analysis of the multi-asset class funds for the US, UK and Canadian markets respectively. The first column of figures in Panel A in each table gives the breakdown of the average fund style exposures across the asset types as indicated. The style exposures of the US and Canadian multi-asset class funds are broadly similar. Perhaps the largest differences between the three markets relate to the average style exposures of the UK funds with regard to small cap and

emerging market equities. On average UK mutual funds have a small cap style exposure of 15.1% compared to 5.1% and 7.0% in the US and Canada respectively, while the UK style exposure to emerging market equities is 12.8%, compared with 3.3% for US funds and 1.0% for Canadian funds. Panel B of Tables 2i, 2ii and 2iii show the results aggregated to a broader asset class level – equities, bonds and cash. From this aggregation we find that the UK multi-asset class funds have the highest style exposure to equity risk, 61.5%, compared to 54.6% for the US funds ad 43.7% for Canadian funds.

The remaining columns in the tables give the style exposures for the different asset allocation categories. We see that the funds with the highest average exposure to equities are the Aggressive US multi-asset class funds with an average exposure of 74.3%. Another noteworthy finding is that UK Cautious funds appear to have a higher equity style exposure (58.5%) than the UK's Balanced funds, which is broadly equivalent to the equity style exposure of Active class funds.

[Tables 2i, 2ii, 2iii here]

Finally, given the large number of benchmarks required for our timing tests in Section 3 as well as our returns-based style analysis, we tabulate these benchmarks and data sources in Table 3.

[Table 3 here]

4. Empirical Results

In this section we present the empirical results around the asset class timing skills of funds in the three regions, USA, UK and Canada. We first present results based on the fund returns-based methodology and then report our findings from the fund holdings-based approach.

4.1. Returns-Based Approach

In Table 4 we present results from the estimation of Eq. [3], which is an extended version of the Ferson and Schadt methodology to test for asset class timing. Panels A, B and C present findings for the US, UK and Canada respectively. We report the cross-sectional average of each estimated coefficient from Eq. [3] as indicated as well as its standard deviation across funds. For each coefficient we present the proportion that are positive and negative as well as the proportion that are statistically significant in each case. We also present the average R^2 and the standard deviation of these R^2 values.

[Table 4 Here]

4.1.1 US multi-asset funds

The results for the US multi-asset class funds are presented in Panel A. We find that only 1.7% of funds demonstrate statistically significant positive equity market timing ability while a comparable figure mistime equity market movements. In some contrast, 17.5% of US managers display positive timing ability with regard to corporate bonds while a smaller 4.3% do so in relation to Treasury bonds. A high 90.5% and 99.4% of the funds have a significant positive exposure to corporate bond and equity returns respectively but this figure falls to a low 8.30% in relation to Treasury bonds. Indeed, 31.5% of fund returns have a negative and statistically significant relationship with the US Treasury market. We briefly note, on security selection ability, that on average US multi-asset class funds yield a negative alpha.

4.1.2 UK multi-asset funds

A noteworthy feature of the UK multi-asset class funds (Panel B) is the high 17.2% of funds that exhibit significant positive timing of government bond markets compared to funds in the US and Canada. A further interesting statistic for the UK funds, in contrast to the other two regions, relates

to the ability to time the equity market: 16.3% of funds are found to have statistically significant negative timing coefficient while none is found to have statistically significant positive equity market timing ability. In the case of timing corporate bonds, 66.4% of the timing coefficients are found to be positive, although only 9.0% are positive and significant (at 5% significance). So there is some evidence to suggest that UK multi-asset funds benefit from at least some bond market timing skill. The average alpha is negative. Indeed, 91% of the funds generate a negative alpha, although only 24% generate a statistically significant negative alpha, far lower than the equivalent 61% figure for Canadian multi-asset class funds, but still a high proportion. By contrast, only 9% generate a positive alpha, and only 1.5% generate a significantly positive alpha.

4.1.3 Canadian multi-asset funds

The results for the Canadian multi-asset class funds are presented in Panel C. The results indicate that while 49.8%, 58.8% and 41.6% of the Canadian multi-asset funds have positive timing coefficients relating to the asset classes of government bonds, corporate bonds and equities respectively, only a small percentage of the funds have statistically significant positive asset class timing ability at the 5% significance level. The remaining funds exhibit negative market timing, although, again, only a small proportion demonstrate statistically significant negative asset class timing. Overall, these results indicate that Canadian multi-asset class funds are unable to time their equity and bond markets. On security selection ability, only 12% of the funds are found to have produced a positive alpha where only 0.4% are found to be statistically significant). The results also show that 98.7% of the funds have a positive exposure to the equity market which is statistically significant and that 69.5% have a positive and significant exposure to corporate bond risk. Only a small proportion (8.2%) have a positive and significant exposure to government bond risk.

In general, the results of the returns-based analysis of asset class timing points to a small percentage of funds with timing ability where in most cases the percentage is less than the test size.

We now go on to examine the alternative holdings-based testing approach using actual fund asset class weights to determine whether this approach confirms the results so far or presents an alternative picture.

4.2. Results based on asset class holdings data

The results of the holdings-based approach to testing asset class timing are presented in Table 5. As described in Section 3 on methodology, we test two slightly alternative approaches here in Eq. [4] and Eq. [5]. In Table 5, the results of these estimations are presented in Panel A and B respectively. In both cases we report the cross-sectional average timing coefficient as well as its standard deviation. We then present the proportion of funds which exhibit positive, positive and statistically significant, negative and negative and significant timing coefficients. In Panel A, we see evidence of statistically significant positive equity market timing among 13.6% of Canadian funds and 6.4% of US funds but not among UK funds. There is also some evidence of government bond market timing among UK funds (10.5%) and US funds (9.3%) though less so among Canadian funds (5.4%) while across the three regions there is generally less evidence of corporate bond market timing ability. The results in Panel B are generally consistent with those in Panel A where, for example, 4.8% of Canadian funds show evidence of an ability to time the relative movements of equities to bonds – from Panel A 13.6% of Canadian funds displayed equity timing skill. Similarly, from Panel B, 5.3% of UK funds are able to time the equity to corporate bond movements – the same percentage of UK funds that display corporate bond timing ability in Panel A. In terms of perverse negative timing, Canadian and US funds stand out somewhat in terms of timing government bond market movements.

Overall, the combined evidence on asset class timing ability from both the returns-based approach and holdings-based tests indicate that in the case of the US multi-asset class fund industry there is little evidence of positive equity timing ability but little evidence that negative timing is

prevalent either. There is greater evidence of US funds' ability to time government bond market returns. In the case of the UK fund industry there is a complete lack of evidence of equity market timing ability but among the three regions examined, the UK industry has the greatest prevalence of government bond market timing skill while there also some, but less, evidence of an ability to time movements in the corporate bond market. Finally, in the case of Canada, what is particularly noteworthy is the comparatively high level of equity market timing ability in the multi-asset fund industry.

5. Conclusions

The popularity of multi-asset class investing and the desire for greater asset class diversification received a significant boost with the collapse of equity markets in the early part of this century and then again by the financial crisis that followed in 2008. As a consequence, multi-asset class funds have been embraced by many institutional investors, and increasingly by retail investors too as evidenced, at least in the UK, by the recent proliferation of diversified growth funds. However, if investors are to embrace multi-asset class investing it raises a number of questions: which asset classes, in which proportions, and do asset managers have the skills to manage these portfolios? Our paper focuses on this latter question. Using both the returns on multi-asset class funds and, separately, the dynamic weights that these funds allocate to different asset classes, we assess whether the managers of these funds can time asset class return movements. Given the institutional nature of the fund categorisations (eg, "Conservative" etc), we suggest that this limits the discretionary role of strategic allocation by the managers, leaving a purer revelation of market timing ability between asset classes. Using two very different approaches, we find overall that asset class timing skills amongst multi-asset class funds is rare existing only among tiny minority of funds.

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Table 1: Average Weights by Investment Category.

The figures in bold are the cross-sectional (across funds) average asset class holding weights in percentages. The figures in italics are the respective standard deviations of these average holdings. The table also presents the number of funds in each category. A fuller definition of each investment category is provided in the appendix.

Panel A: USA

	All categories	Fixed Income balanced	Neutral balanced	Aggressive
Cash	**9.67**	**12.93**	**8.73**	**5.08**
	15.43	*20.62*	*12.61*	*3.84*
Bond	**35.79**	**49.84**	**30.16**	**16.92**
	16.22	*15.57*	*9.19*	*5.86*
Equity	**50.99**	**33.49**	**57.81**	**74.03**
	17.86	*13.49*	*10.35*	*7.35*
Other	**3.55**	**3.74**	**3.31**	**3.97**
	5.94	*5.41*	*6.20*	*6.74*
No. of funds	329	113	174	36

Panel B: UK

	All categories	Cautious	Balanced	Active
Cash	**11.39**	**9.48**	**11.60**	**11.53**
	13.68	*6.30*	*8.72*	*15.34*
Bond	**16.98**	**58.55**	**13.75**	**13.57**
	16.38	*9.32*	*17.43*	*9.35*
Equity	**63.13**	**28.64**	**61.44**	**67.17**
	20.29	*5.97*	*25.76*	*15.82*
Other	**8.50**	**3.33**	**13.20**	**7.73**
	11.98	*3.14*	*11.37*	*12.43*
No. of funds	80	6	16	58

Panel C: Canada

	All categories	Conservative	Moderate	Aggressive
Cash	**7.46**	**10.11**	**7.51**	**3.97**
	6.89	*8.63*	*5.27*	*4.13*
Bond	**40.34**	**58.41**	**37.68**	**25.82**
	16.19	*11.82*	*8.79*	*8.10*
Equity	**49.20**	**27.26**	**52.82**	**67.20**
	18.97	*12.49*	*10.33*	*8.49*
Other	**3.00**	**4.22**	**2.00**	**3.02**
	7.28	*8.98*	*4.40*	*7.36*
No. of funds	223	67	89	58

Table 2i: Return Based Style Analysis of US Multi-Asset Class Funds.

This table presents the results of Sharpe's (1992) returns-based style analysis (RBSA) on US multi-asset class funds. Panel A presents the average RBSA style proportion for each investment category. Panel B aggregates the style proportions into the broader categories of cash, bonds and equities.

USA

	All	Conservative	Moderate	Aggressive
Panel A				
Bills	16.5%	20.3%	15.8%	9.6%
Int-Govt	1.2%	2.9%	0.5%	0.4%
LT-Govt	0.9%	0.9%	0.9%	0.9%
Corporates	18.3%	25.7%	16.0%	8.8%
MBS	5.4%	7.8%	4.6%	3.0%
Large cap growth	13.9%	10.0%	15.5%	16.9%
Large cap value	18.3%	11.4%	22.0%	18.2%
Mid cap	10.2%	6.9%	10.7%	17.2%
Small cap	5.1%	5.2%	4.4%	8.3%
Global bonds	2.8%	3.6%	2.3%	2.9%
European eq	4.0%	3.0%	3.7%	9.0%
EM eq	3.3%	2.2%	3.6%	4.8%
Panel B				
Equity	54.6%	38.7%	60.0%	74.3%
Bond	28.9%	41.1%	24.3%	16.0%
Cash	16.5%	20.3%	15.8%	9.6%

Table 2ii: Return Based Style Analysis of UK Multi-Asset Class Funds.

This table presents the results of Sharpe's (1992) returns-based style analysis (RBSA) on UK multi-asset class funds. Panel A presents the average RBSA style proportion for each investment category. Panel B aggregates the style proportions into the broader categories of cash, bonds and equities.

	UK			
	All	**Cautious**	**Balanced**	**Active**
Panel A				
Bills	10.7%	16.1%	11.0%	8.7%
Int-Govt	1.6%	0.3%	1.6%	1.3%
LT-Govts	0.5%	0.5%	0.6%	0.2%
Corps	19.9%	16.5%	21.6%	17.1%
MBS	1.0%	0.8%	1.3%	0.4%
Large cap growth	12.5%	11.8%	10.8%	14.9%
Large cap value	7.3%	5.2%	7.8%	7.6%
Mid cap	6.7%	3.2%	8.2%	6.3%
Small cap	15.1%	18.3%	13.3%	16.7%
Global bonds	4.8%	7.3%	5.8%	3.5%
US equity	7.1%	4.5%	7.6%	8.1%
EM eq	12.8%	15.6%	10.5%	15.2%
Panel B				
Equity	61.5%	58.5%	58.1%	68.8%
Bond	27.8%	25.4%	30.9%	22.5%
Cash	10.7%	16.1%	11.0%	8.7%

Note: We were unable to identify a total return index of mortgage-related securities for the UK. For this risk source we used the appropriately currency-adjusted version of the US MBS index for the UK style model.

Table 2iii: Return Based Style Analysis of Canadian Multi-Asset Class Funds.

This table presents the results of Sharpe's (1992) returns-based style analysis (RBSA) on Canadian multi-asset class funds. Panel A presents the average RBSA style proportion for each investment category. Panel B aggregates the style proportions into the broader categories of cash, bonds and equities.

Canada

	All	Fixed income balanced	Neutral balanced	Aggressive
Panel A				
Bills	21.9%	23.1%	24.5%	15.7%
Int-Govt	3.2%	3.9%	3.3%	2.6%
LT-Govt	5.6%	5.6%	6.5%	4.2%
Corporates	20.6%	35.3%	15.2%	14.1%
MBS	2.5%	3.7%	1.8%	2.7%
Large cap growth	4.4%	1.8%	4.9%	6.7%
Large cap value	15.6%	8.9%	16.1%	22.3%
Mid cap	7.2%	2.8%	9.0%	9.0%
Small cap	7.0%	3.8%	6.5%	10.9%
Global bond	2.4%	3.4%	2.3%	1.9%
European eq	8.4%	6.9%	8.8%	8.6%
EM eq	1.0%	0.8%	1.0%	1.3%
Panel B				
Equity	43.7%	25.0%	46.4%	58.9%
Bond	34.4%	51.9%	29.2%	25.4%
Cash	21.9%	23.1%	24.5%	15.7%

Note: We were unable to identify a total return index of mortgage-related securities for Canada. For this risk source we used the appropriately currency-adjusted version of the US MBS index for the Canadian style model.

Table 3: Benchmarks and Data Sources

This Table presents the sources of each benchmark index by country for the market timing models employed and for the Returns Based Style Analysis. All indices are at monthly frequency and comprise reinvested income (total returns).

Variable	United States	United Kingdom	Canada
Panel A: Proxies for asset class returns			
Return on market	Russell	FTSE	S&P/TSX
Return on corporate bond	Barclays	IBOXX	Dex Capital
Return on government bond	Barclays	IBOXX	Dex Capital
Return on cash	Thomson Financial	Thomson Financial	Thomson Financial
Panel B: Indices for Returns-based style analysis			
Bills	Kenneth French	Thomson Financial	Thomson Financial
Intermediate-term Gov Bonds	Barclays	Barclays	Barclays
Long-term Gov bonds	Barclays	Barclays	Barclays
Corporate bonds	Barclays	IBOXX	Dex Capital
Mortgage Related Securities	FTSE	N/A	N/A
Large Cap Value stocks	Dow Jones Wilshire	MSCI	MSCI
Large Cap Growth stocks	Dow Jones Wilshire	MSCI	MSCI
Medium Cap stocks	Dow Jones Wilshire	FTSE	FTSE
Small Cap stocks	S&P	MSCI	MSCI
Non-US/EU bonds	CGBI WGBI	JP Morgan	JP Morgan
European/US stocks	MSCI	MSCI	MSCI
Japanese stocks	MSCI	MSCI	MSCI

Notes: We could not identify a total return index of mortgage-related securities for Canada or for the UK.

Table 4: Multi-Asset Class Timing Results: the Returns-Based Approach

The results presented in this table are based upon the estimation of the following model:

$$Rp_t = \alpha + \theta_1(Rbg_t) + \theta_2(Rbg_t)^2 + \theta_3(Rbc_t) + \theta_4(Rbc_t)^2 + \theta_5(Re_t) + \theta_6(Re_t)^2 + \varepsilon_{pt}$$

The first two rows in each panel present the cross-sectional average values of the coefficients as indicated as well as their standard deviations. The remaining rows present respectively: the proportion of coefficients that are positive, the proportion that are positive and statistically significant, the proportion of the coefficients that are negative, and finally the proportion that are negative and statistically significant. Tests are carried out at 5% statistical significance.

	α	θ_1	θ_2	θ_3	θ_4	θ_5	θ_6	R^2
Panel A: USA								
Average	-0.1	-0.1	0.0	0.4	0.0	0.5	0.0	89.0
Stdev	0.2	0.2	0.0	0.2	0.0	0.2	0.0	11.3
+ve	25.8%	22.6%	35.8%	97.7%	63.0%	99.4%	41.3%	
+ve & sig	2.3%	8.3%	4.3%	90.5%	17.5%	99.4%	1.7%	
-ve	74.2%	77.4%	64.2%	2.3%	37.0%	0.6%	58.7%	
-ve & sig	17.5%	31.5%	6.3%	0.6%	3.4%	0.0%	1.4%	
Panel B: UK								
Average	-0.2	0.0	0.0	0.2	0.0	0.6	0.0	81.5
Stdev	0.2	0.2	0.0	0.2	0.0	0.2	0.0	12.0
+ve	9.0%	44.0%	92.5%	80.6%	66.4%	100.0%	12.7%	
+ve & sig	1.5%	17.9%	17.2%	38.8%	9.0%	100.0%	0.0%	
-ve	91.0%	56.0%	7.5%	19.4%	33.6%	0.0%	87.3%	
-ve & sig	24.0%	10.3%	0.0%	1.7%	0.9%	0.0%	16.3%	
Panel C: Canada								
Average	-0.2	0.0	0.0	0.4	0.0	0.4	0.0	75.4
St.dev.	0.2	0.2	0.0	0.2	0.1	0.2	0.0	12.5
+ve	12.0%	63.5%	49.8%	95.7%	58.8%	99.1%	41.6%	
+ve & sig	0.4%	8.2%	2.1%	69.5%	3.9%	98.7%	3.9%	
-ve	88.0%	36.5%	50.2%	4.3%	41.2%	0.9%	58.4%	
-ve & sig	61.4%	5.2%	3.4%	0.0%	6.4%	0.0%	5.6%	

Table 5: Multi-Asset Class Timing Results: the Holdings-Based Approach

The results presented in Panel A are based upon the estimation of Eq. [4] in the text:

$$\%\Delta AC_{j,t} = \alpha + \beta_j(R_{j,t+1}) + \varepsilon_{j,t}.$$

The first two rows of Panel A present the cross-sectional average coefficient values of β_j for each region and asset class as indicated as well as their standard deviations. The remaining rows present respectively: the proportion of the β_js that are positive, the proportion that are positive and statistically significant, the proportion of the β_js that are negative, and finally, the proportion that are negative and statistically significant.

The results presented in Panel B are based upon the estimation of Eq. [5] in the text:

$$\%\Delta AC_{e,t} = \alpha + \beta_{j1}\left(\frac{Re}{Rbg}\right)_{t+1} + \beta_{j2}\left(\frac{Re}{Rbc}\right)_{t+1} + \varepsilon_{e,t}$$

The first two rows of Panel B present the cross-sectional average values for the β_{j1} and β_{j2} coefficients for each region as indicated as well as their standard deviations. The remaining rows present respectively: the proportion of the β_{j1} and β_{j2} values that are positive, the proportion that are positive and statistically significant, the proportion of the β_{j1} and β_{j2} values that are negative and finally, the proportion that are negative and statistically significant. Tests are carried out at 5% statistical significance.

Panel A: Based upon β_j coefficients from expression (6) (Method 2 results)

	Equity			**Govt bond**			**Corporate bond**		
	USA	**UK**	**Canada**	**USA**	**UK**	**Canada**	**USA**	**UK**	**Canada**
Average	2.4	-0.3	3.3	10.6	2.9	-0.7	-2.5	-3.4	-0.9
Stdev	7.6	10.3	5.9	38.9	17.9	23.5	25.0	22.8	31.2
+ve	72.5%	47.4%	81.0%	68.8%	52.6%	63.9%	42.2%	36.8%	44.9%
+ve & sig	6.4%	0.0%	13.6%	19.3%	10.5%	5.4%	2.8%	5.3%	2.0%
-ve	27.5%	52.6%	19.0%	31.2%	47.4%	36.1%	57.8%	63.2%	55.1%
-ve & sig	1.8%	0.0%	0.7%	7.3%	0.0%	6.1%	4.6%	5.3%	2.0%

Panel B: Based upon β_{j1} and β_{j2} coefficients from expression (7)

	Equity v govt bond (β_{i1})			**Equity v corporate bond (β_{i2})**		
	USA	**UK**	**Canada**	**USA**	**UK**	**Canada**
Average	-0.1	0.0	0.3	0.3	-0.3	-0.2
Stdev	0.3	3.2	0.9	0.9	2.5	0.9
+ve	27.5%	47.4%	66.7%	76.1%	57.9%	32.0%
+ve & sig	0.9%	0.0%	4.8%	1.8%	5.3%	2.7%
-ve	72.5%	52.6%	33.3%	23.9%	42.1%	68.0%
-ve & sig	4.6%	5.3%	0.7%	0.9%	0.0%	3.4%

Appendix

This table presents the definitions of the multi-asset class fund classifications used in the empirical work.

Definition of fund categories	
	CANADA
Fixed Income Balanced	Funds in the Canadian Fixed Income Balanced category must invest at least 70% of total assets in a combination of equity securities domiciled in Canada and Canadian dollar-denominated fixed income securities. In addition, they must invest greater than 5% but less than 40% of their total assets in equity securities.
Neutral Balanced	Funds in the Canadian Neutral Balanced category must invest at least 70% of total assets in a combination of equity securities domiciled in Canada and Canadian dollar-denominated fixed income securities. In addition, they must invest greater than or equal to 40% but less than or equal to 60% of their total assets in equity securities.
Equity Balanced	Funds in the Canadian Equity Balanced category must invest at least 70% of total assets in a combination of equity securities domiciled in Canada and Canadian dollar-denominated fixed income securities. In addition, they must invest greater than 60% but less than 90% of their total assets in equity securities.
	UK
Cautious Managed	Funds investing in a range of assets with the maximum equity exposure restricted to 60% of the fund and with at least 30% invested in fixed interest and cash. There is no specific requirement to hold a minimum % of non UK equity within the equity limits. Assets must be at least 50% in Sterling/Euro and equities are deemed to include convertibles.
Balanced Managed	Funds would offer investment in a range of assets, with the maximum equity exposure restricted to 85% of the Fund. At least 10% of the total fund must be held in non-UK equities. Assets must be at least 50% in Sterling/Euro and equities are deemed to include convertibles.
Active Managed	Funds would offer investment in a range of assets, with the Manager being able to invest up to 100% in equities at their discretion. At least 10% of the total fund must be held in non-UK equities. There is no minimum Sterling/Euro balance and equities are deemed to include convertibles. At any one time the asset allocation of these funds may hold a high proportion of non-equity assets such that the asset allocation would by default place the fund in either the Balanced or Cautious sector. These funds would remain in this sector on these occasions since it is the Managers stated intention to retain the right to invest up to 100% in equities.
	USA
Conservative Allocation	Conservative allocation portfolios seek to provide both capital appreciation and income by investing in three major areas: stocks, bonds, and cash. These portfolios tend to hold smaller positions in stocks than moderate allocation portfolios. These portfolios typically have 20% to 50% of assets in equities and 50% to 80% of assets in fixed income and cash.
Moderate Allocation	Moderate-allocation portfolios seek to provide both capital appreciation and income by investing in three major areas: stocks, bonds, and cash. These portfolios tend to hold larger positions in stocks than conservative-allocation portfolios. These portfolios typically have 50% to 70% of assets in equities and the remainder in fixed income and cash.
Aggressive Allocation	Aggressive allocation portfolios seek to provide both capital appreciation and income by investing in three major areas: stocks, bonds, and cash. These portfolios tend to hold larger positions in stocks than moderate-allocation portfolios. These portfolios typically have 70% to 90% of assets in equities and the remainder in fixed income and cash.