Pension Fund Performance and Risk-Taking Under Decentralized Investment Management

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Abstract

This paper uses a proprietary dataset to study two key shifts in the structure of the UK pension fund industry from 1984 to 2004. Specifically, most pension fund sponsors shifted from balanced managers (those managing across all asset classes) to specialist managers (those specializing within a single asset class), and from a single manager (either balanced or specialist) to competing multiple managers within each asset class. We show that specialist managers exhibit greater pre-fee selectivity skills than balanced managers, which is consistent with the higher fees charged by specialists. Further, pension fund sponsors using multiple managers allocate lower risk budgets to each, which helps to compensate for the suboptimal diversification that arises from the absence of coordination between the different managers, as predicted by van Binsbergen et al (2008). Finally, pension funds allocate more money to managers with good performance, and are more likely to switch to a multiple manager structure (within an asset class) when single managers underperform their peers. Overall, our results provide strong support for the rational choice of delegation structure by pension funds.

Pension funds hold a significant portion of financial market assets. During 2005, worldwide pension fund assets exceeded $18 trillion, or more than 88% of OECD GDP; by comparison, worldwide mutual fund assets during 2005 amounted to about $17 trillion.[1] Typically, defined benefit pension funds employ fund managers to oversee their investment portfolios in an arrangement known as delegated portfolio management (DPM) . But the details of these investment mandates differ. Sometimes, a pension fund employs a single fund manager to manage a balanced mandate across all asset classes, while, in other cases, the pension fund employs multiple specialist fund managers in one or more asset classes.

The practice of using multiple managers, referred to as decentralized investment management by van Binsbergen et al (2008), may at first appear surprising, since there is the potential for suboptimal portfolio diversification, leading to a "diversification loss", with individual managers not accounting for the correlation of their own portfolio returns with the returns of other managers in the fund. This "coordination problem" has recently been analysed in van Binsbergen et al (2008).[2] Moreover, employing separate fund managers to oversee investments in individual asset classes, rather than hiring a single manager to oversee all asset classes, shifts the responsibility for sector allocation, or market-timing, away from fund managers. However, there are potential benefits from employing multiple managers. For example, pension funds may be able to diversify the strategies used to generate alpha, or to exploit the skills of specialist active managers to achieve higher fund alphas due to their better knowledge of a particular asset class (Sharpe, 1981). They may also do so to induce yardstick competition and higher effort levels among managers (Shleifer, 1985).

Despite the large fraction of financial assets controlled by pension funds, previous studies of pension funds (Lakonishok et al, 1992) did not take account of the effect of the specific delegation arrangement on performance and risk-taking due to the non-availability of data on specific fund mandates. Our paper, by contrast, reports results from a dataset on UK pension funds between March 1984 and March 2004 which contains not only quarterly returns and asset holdings, but also information on the type of mandate – balanced or specialist – followed by the pension fund manager over time, as well as the number of fund managers

[1] See oecd.org/daf/pensions/gps for pension fund statistics and http://www.ici.org/stats/mf for mutual fund statistics.

[2] van Binsbergen et al (2008) assume that all managers have equal skills. Therefore, in their setting, the decision to decentralize fund management (which is made outside of their model) always produces suboptimal outcomes.

employed at any time. Thus, we are able to test whether particular types of mandate lead to particular types of performance and/or risk-taking. For instance, we examine whether specialist mandates produce higher stock-selection alphas than balanced mandates to test the specialization hypothesis of Sharpe (1981).

There have been two major trends in the portfolio management of pension funds over our sample period, which we document. First, pension funds have systematically switched from employing a single fund manager overseeing the entire portfolio to using specialist fund managers to manage different asset classes. Second, we find a trend for pension funds to hire multiple managers. Specifically, funds that hire balanced managers moved toward multiple balanced managers, while funds that hire specialist managers hired multiple specialists within the same asset class.

We investigate whether the secular trend towards decentralization was a rational decision by pension fund sponsors, despite the greater coordination problem it poses. Specifically, we examine the overall pension fund performance, as well as the performance of each manager within the fund. We find that specialist managers outperform balanced managers, before fees, consistent with the notion that specialization in asset management has produced more talented managers. Our dataset does not contain information on the fees charged by the fund managers, although we know from industry surveys that the fees of specialists are higher than those of balanced managers, so we may infer that specialists capture at least some of the rents from their superior skills.

We also find that pension fund sponsors deal with the coordination problem by selecting overall risk levels. Specifically, the funds allocate risk budgets to their managers such that the overall pension fund risk is lower under decentralized management, as predicted by van Binsbergen et al (2008). Decentralized fund management is more typical of large funds and large funds tend to underperform smaller ones, but the overall effect of decentralization is to produce a Sharpe ratio that is comparable with that of funds that have not decentralized. This finding indicates that the shift to decentralized fund management has not resulted in a deterioration in performance for the overall pension fund portfolios, and can therefore be interprted as rational.[3][4]

[3]Indeed, had funds not decentralised and split assets between a number of fund managers, Sharpe ratios would have fallen, since over the sample period assets under management were growing.

[4]While we find a clear relationship between fund size and return performance (with small funds outper-

A key reason for employing multiple managers is to spur competition among managers and potentially lead to higher effort levels. For this to happen, it must be the case that investment managers either face a higher likelihood of being fired when they underperform or their asset allocation is reduced (a "partial firing" of the manager). We find that clear mechanisms are in place providing high-powered incentives for managers to perform well (Chen, Hong, Kubik, 2006). Specifically, we document statistically significant negative Jensen alphas in all four quarters prior to the firing decision, which supports the proposition that underperforming managers are disciplined. Further, during our sample period, many funds switched from a single manager to multiple managers, while other funds made the opposite switch. The first set of switches predominated in the dataset. This should not be surprising as it is likely that funds begin with a single fund manager, and might decide to switch to multiple managers for two possible reasons: either they become dissatisfied with the performance of their fund manager or the fund becomes too large to be managed by a single manager. Poor investment performance in the period prior to a switch would provide evidence supporting the first explanation, while above-average investment performance before the switch would provide evidence for the second explanation. We find statistically significant negative excess returns in the two quarters prior to a switch from single to multiple fund managers, thereby providing support for the first explanation. The probability of switching from single-managed to multi-managed mandates also increases if past (relative) performance is poor. We also find a significant relation between future portfolio weights and past-return performance measured relative to managers in the same asset class. Our results indicate that manager replacements, and the allocation of assets to managers, is rationally based on the inferred skills of the managers.

The remainder of the paper is as follows. In section I, we briefly review the literature and set out the hypotheses we wish to test. Section II describes the data. Section III analyzes empirically the relationship between pension fund performance and mandate type, distinguishing between specialist and balanced mandates. Section IV explores the effect of decentralized investment management on the return and risk characteristics of the pension funds. Section V looks at the incentive effects of funds' hiring and firing decisions and how past performance impacts inflow of funds to different managers. Section VI presents conclusions.

forming large funds), we fail to find any relationship between return performance and the number of managers employed, that is, between single-manager and multi-manager funds.

I. Decentralized Investment Management: Theory and Empirical Predictions

Following the decision to outsource the investment management of the pension fund, plan sponsors must decide on the best investment delegation arrangement.[5,6] There are two important dimensions through which this decision might be made. First, the sponsor must decide whether to employ generalist managers, under a "balanced mandate," or specialist managers, under a "specialist mandate." Under a balanced mandate, the fund manager is responsible for investing across the full range of assets permitted by the sponsor.[7] The sponsor also chooses the strategic asset allocation (SAA),[8] usually with the guidance of an actuarial or investment consultant. The balanced manager can make both market timing (or tactical asset allocation[9]) and security selection decisions. Under a specialist mandate, each manager is assigned only security selection responsibility, and the SAA is, as in the case of the balanced mandate, set by the sponsor.[10] Second, the sponsor must decide whether to employ a single manager or multiple managers. For instance, a sponsor might decide to employ multiple balanced managers, who invest across all asset classes, or multiple specialist managers within a single

[5] Our study assumes that the decision to outsource has already been made by the fund sponsor. Although this decision is also interesting, our dataset (which we will describe shortly) does not allow us to differentiate between pension fund sponsors who decide to manage money in-house and those who do not.

[6] In the UK, a pension plan operates under "trust law" (see, e.g., Blake, 2003). This means that a pension plan is run by independent trustees in the best interests of the plan members. The plan sponsor appoints the trustees, although up to one third can, if the members choose, be elected by them. Legally, all decisions are made the trustees, although they generally delegate investment decisions to investment professionals, and they have a duty to take into account the views of the sponsor, although they do not obliged to implement those views. Nevertheless, since the sponsor has an obligation to fund the plan on a balance-of-cost basis, it would be unusual for the trustees to completely disregard the views of the sponsor. In this paper, we do not have information on the governance structure of different pension funds (such as information on the trustees). Therefore, for simplicity, we refer to the "sponsor" as being the decision maker, even though legally this role is held by the trustees.

[7] Our data set consists of a maximum of seven asset classes: UK equities, UK bonds, international equities, international bonds, index-linked bonds, cash and property.

[8] The SAA is the target asset mix across all permitted assets. It is chosen to reflect the maturity structure of the pension liabilities, and will be more heavily weighted towards bonds as pension funds mature.

[9] The balanced fund manager is able to make short-term market timing deviations from the SAA within boundaries set by the sponsor.

[10] Although market timing by the specialist manager within the asset class is permissible.

asset class. Alternatively, the sponsor might use a single balanced manager or have a single specialist manager for each asset class. Even more complex arrangements can occur. For example, a sponsor might employ both balanced and specialist managers simultaneously, as well as employing a single manager within some assets classes and multiple managers within others. Another example is the use of multi-asset managers. These are managers who invest in more than a single asset category, but in less than the full range available to the balanced manager.

I.A. Balanced versus Multi-Asset versus Specialist Mandates

Figure 1 shows the proportion of UK Equity mandates in our sample using a balanced, multi-asset, or specialist strategy; these proportions are separately depicted for each type and further separated into proportions of each type that are in a single- or multi-managed mandate.[11] The figure illustrates the secular move among UK pension funds away from balanced managers and toward multi-asset and specialist managers during the period March 1984 to March 2004. Roughly 99% of portfolios were allocated to balanced mandates during 1984, but only about 12% by 2004. By 2004, 63% of mandates were multi-asset and 25% were specialist. It would be interesting to know whether multi-asset managers are more like balanced managers or more like specialist managers. Appendix A shows that they are more like balanced managers, although there are sufficient differences not to merge them in with balanced managers. As mentioned in the previous section, one dimension of the decentralization decision is whether to employ a single balanced or several specialist managers. As modeled by van Binsbergen et al (2008), the use of specialist managers results in less efficient portfolio diversification. van Binsbergen et al (2008) illustrate how to minimize the loss of diversification through a well-designed benchmark choice for each asset class, but they show that it is not possible to completely eliminate the

[11] To compute these percentages, we count the number of sponsor asset classes managed under each type of arrangement. For instance, a pension fund with a balanced manager who oversees management in seven asset classes would count as having seven balanced manager accounts, while a pension fund with a single balanced manager and seven specialists (one in each asset class) would count as having seven balanced and seven specialist manager relationships. Also, in the first case, the seven balanced managers would all count as single management, while, in the second case, they would count as seven multiple balanced managers and seven multiple specialists, reflecting that they are part of a system of competitive managers within individual asset classes.

effects of this negative externality. However, Sharpe (1981) provides some insight into why specialist rather than generalist managers might be employed. Specifically, specialists might have superior private information on securities within an asset class, giving them a higher expected performance than generalists.

In our context, if the movement toward specialist managers is rational, then specialist managers should deliver better performance than balanced managers to compensate for the diversification loss. On the other hand, balanced fund managers should exhibit some timing ability, since they are presumably hired in part to make tactical asset allocation decisions. Further, fees are generally higher for specialist managers.[12] Therefore, if fund sponsors optimally choose between balanced and specialist managers, then specialists should exhibit higher pre-fee performance – mainly through security selection – than balanced managers to compensate for higher fees as well as for the diversification loss.[13] This leads to our first hypothesis:

Hypothesis 1. Specialization of Investment Skills: *The measured performance of fund managers depends on mandate type: (i) specialist fund managers will display significant stock-selection abilities, (ii) balanced fund managers will have significant market-timing abilities, (iii) given that fees for specialist mandates are higher than for balanced mandates and that there will be a diversification loss with the use of specialists, the pre-fee performance of specialist managers will exceed that of balanced managers.*

I.B. Single versus Multiple Managers

The pension funds in our sample use both single and multiple managers. Sponsors who wish to employ a balanced strategy might hire either one or more balanced managers across all the

[12] We do not have information on fees in our data set, but Mercer (2006) surveys global investment management fees, and reports that, in 2006, the median annual fee for a balanced mandate is 57bp (basis points) per year (of assets under management), whereas specialist mandates command fees from 60 to 100bp per year, depending on the asset class. Further, McKinsey (2006) reports, from its survey of US institutional asset managers, that, in 2005, the average asset management fee for a balanced mandate was 50bp per year, while it was 54bp per year for large-cap equity specialist funds and 64 bp per year for mid-cap equity specialist funds.

[13] Obviously, all fund managers would prefer to maximize their fee income, and, therefore, might claim to have stock-selection skills. Therefore, the higher pre-fee performance of specialists depends on pension fund sponsors offering contracts to balanced and specialist managers that provide incentives to maximize their abnormal performance (for a given risk budget). Under such a contract, fund managers with better market-timing skills (but worse selectivity skills) will choose to emphasize market-timing performance.

asset categories. Similarly, a sponsor who wishes to employ a specialist strategy might hire either one or more specialist managers within each asset class.

Figure 1 shows the trend toward multiple managed asset classes during our sample period for balanced, multi-asset, and specialist mandates. For instance, the figure shows that the use of multiple balanced mandates within a pension fund has decreased over time, but that it has dramatically increased as a proportion of all balanced mandates. Similar trends are apparent among multi-asset and specialist managers. Clearly, pension funds have moved over the sample period toward decentralization, even within asset classes.

Why might pension fund sponsors consider employing multiple managers? According to standard principal-agent theory (Holmstrom,1982), a principal employs multiple agents for two reasons: (i) to take advantage of technology and (ii) to provide incentive effects. Under the first explanation, the principal requires multiple tasks to be performed and a single agent is unable to perform all these tasks adequately, particularly when specialist knowledge is required, so the principal employs multiple agents. In our context, a "value" manager and a "growth" manager would be examples of specialists within the equity class. With respect to incentive effects, hiring multiple managers induces an internal yardstick competition (Shleifer, 1985), allowing the principal to assess the managers' comparative performance and helping to overcome the problems of shirking and hidden actions. Mookherjee (1984) shows that, with multiple agents, relative performance evaluation when agents' outputs are correlated enables the principal to obtain first-best outcomes. Blake et al (1999), on the other hand, argue that the desire to avoid *relative* underperformance in a yardstick competition results in the construction of conservative portfolios that herd around that of the median fund manager in the peer group.

Another reason for employing multiple managers arises from the uncertainty inherent in determining the skills of each fund manager. Suppose fund managers have specialist skills that fit the needs of the pension fund, but sponsors have only noisy information about the skills of any particular fund manager. In such a case, Kapur and Timmerman (2005) show that pension funds will employ multiple managers to diversify the risk of employing a low-skill fund manager.[14]

[14]Sharpe (1981), in examining decentralized investment management, distinguishes between diversification of style (where funds employ multiple managers with different investment approaches) and diversification of judgment (where multiple managers are employed to analyze the same subset of securities). The latter is

However, hiring multiple managers introduces another coordination problem within an asset class, in addition to the cross-asset class coordination problem discussed in the last section. van Binsbergen et al (2008), in their analysis of optimal decentralized investment decisions, argue that the sponsor will contract with each fund manager in a way that induces the manager to optimally choose a more conservative (i.e., lower risk) portfolio than would be chosen without the coordination problem. This risk-reduction is a way to compensate for the diversification loss arising from the suboptimal coordination between individual managers' decentralized decisions. The total portfolio risk level desired by the sponsor is also lower with multiple-manager structures, compared with single-manager structures. The diversification loss can be reduced, however, by lowering the correlation between returns on the portfolios of individual managers. One way to accomplish this is to let different managers control separate asset classes (e.g., equities, bonds, cash and property) which are likely to be far more weakly correlated than, say, individual stocks. Indeed, the vast majority of multiple-manager arrangements in our dataset use specialist managers, rather than multiple balanced managers.

Sponsors choosing a multiple-manager arrangement should be compensated with higher abnormal performance, since the sponsor is pushed away from the optimal (centralized) risk-expected return portfolio due to the coordination problem. Our next hypothesis formalizes these predictions:

Hypothesis 2. Coordination of Fund Managers: *The greater the number of fund managers employed, (i) the higher the abnormal performance of each fund manager, and (ii) the lower the volatility of each fund manager's returns.*

I.C. Hiring and Firing of Managers

On an ongoing basis, the sponsor decides how to allocate assets to each fund manager. Of course, each fund manager will wish to maximize assets under management, since fees are usually based on the assets under management. In cases with significant incentive-based fees, the desire of managers to maximize assets managed will be reduced, but we understand that incentive-based fees produce a relatively minor portion of fund manager total fees over our

related to uncertainty about the true level of each manager's alpha. Given the weak evidence of persistence in performance evaluation studies, there may be a large amount of uncertainty about a given manager's talents.

sample period.[15]

Khorana (1996, 2001) examines the determinants and effects of mutual fund manager turnover. Khorana (1996) suggests that shareholder redemptions and managerial dismissal are, respectively, external and internal control mechanisms that can be used to discipline under-performing fund managers. He reports an inverse relationship between the probability of managerial change and past performance. Khorana (2001) goes on to examine the effect of a change in manager on a fund's subsequent performance, and finds underperforming funds subsequently improve post-replacement performance, and the change in manager for outperformng funds – for example, because a star manager is poached – results in a deterioration in post-replacement performance. He also finds that manager turnover in underperforming funds is preceded by decreases in net inflows into the fund.

The fund management company itself has an indirect incentive to control the fund manager's performance. Superior performance leads to high inflows and increases fee income. Consequently, several studies document an inverse relationship between fund performance and manager turnover. Promotions – the manager subsequently manages a larger fund – are positively and demotions – the fund manager subsequently manages a smaller fund – are negatively linked to past performance. However, rather than firing an underperforming manager, investment companies might close or merge the losing fund and then open a new one, since small, young funds tend to exhibit a higher flow sensitivity than large, old funds. It has been documented that funds which disappear due to merger or death tend to have poor performance immediately prior to disappearance (Lunde et al 1999). In line with Khorana (2001)'s findings, after the replacement of an underperforming manager, returns improve significantly, and, after an outperforming manager leaves, returns deteriorate.[16] These results underscore the importance of internal governance mechanisms that lead to a replacement of bad managers, while at the same time retaining good managers.

Chen et al (2004) investigate the effects of managerial outsourcing on the incentives and performance of mutual funds. They note that many families delegate the management of

[15] Elton and Gruber (2003) show that fewer than 10% of mutual funds have incentive-based fees. Further, a survey by the UK's Investment Management Association (2006) suggests that, for institutional investors, only 27% of assets under management are subject to performance-related fees.

[16] However, these results are based on performance measures that do not account for mean reversion in fund returns over time.

their funds to unaffiliated advisory firms, and they find that funds managed externally significantly underperform those that are run internally. Having controlled for the causality of this relationship, they argue that contractual externalities due to firm boundaries make it more difficult to extract performance from an outsourced relationship, and this leads them to test two additional predictions: (i) an outsourced fund faces higher-powered incentives than internally-managed funds in that the likelihood of fund closure or managerial termination is more sensitive to poor past performance for outsourced than internally managed funds; and (ii) risk-taking behavior by outsourced managed funds is less than the norm, since fund families closely monitor the outsourced funds

Berk and Green (2004) suggest that flows of monies into mutual funds will follow past performance, as investors rationally update their views on managerial ability in light of manager performance. However, if there are diseconomies from operating large funds, then money flows into successful mutual funds will continue until the expected return net of costs is zero. We would also expect pension fund sponsors to take account of the past performance of pension fund managers, when allocating investment mandates. Sirri and Tufano (1998) find that net flows to mutual funds from retail investors are strongly related to short-term past returns, although Del Guerdio and Tkac (2002) find that pension funds are much less sensitive to short-term past performance than mutual funds, which they argue is because pension fund sponsors take a long-term view of fund performance.

Our final hypothesis formalizes our predictions about the allocation of assets to fund managers, by the pension fund sponsor, as well as about the hiring and firing decision under a rational framework:

Hypothesis 3. Hiring and Firing of Fund Managers: *(i) the probability of replacing a manager and (ii) the probability of switching from single-managed to multi-managed mandates are negatively related to past peer-adjusted return performance, while (iii) portfolio weights on fund managers are positively related to past peer-adjusted return performance.*

II. Data and Background on UK Pension Fund Trends

The dataset used in this study was provided by BNY Mellon Asset Servicing (formerly Russell-Mellon-CAPS – commonly known as "CAPS"), and consists of quarterly returns on the investment portfolios of 2,385 self-administered UK pension funds from March 1984 to March

2004. The investment portfolios of each pension fund are allocated across seven asset sectors: UK equities, UK bonds, international equities, international bonds, index-linked bonds, cash and property. In addition, for each unique fund-quarter, the coded identity of the investment manager (or managers) and the size of the investment mandate under management are provided. These pension funds are self-administered, as distinct from pooled or co-mingled investments, and are typically occupational defined benefit (principally final salary) pension funds that had their performance monitored by CAPS at some stage during this period. The assets of these pension funds were managed by up to 364 different investment management houses, including external and in-house management teams.

Panel A of Table 1 shows the total size of pension fund assets, in constant 2004 pounds, and the aggregate asset allocation at three evenly spaced dates over the sample period for our dataset. These numbers are consistent with the full sample of UK self-administered pension fund assets reported in UBS (2006) as being £761 billion in 2004, since the CAPS dataset monitors, on average, about half of all self-administered funds. In the UK, there is one other major provider of pension fund performance measurement responsible for the other half of the sample. The real value of pension fund assets grew by 262% between 1984 and 1994, and fell by 23% between 1994 and 2004. This contraction over the second half of the period reflects a combination of the closure of some defined benefit pension plans to new members and low investment returns over the period 2000-2003.

The most striking feature of the aggregate asset allocation is the increased allocation to UK equities during the first half of the period, followed by a rapid reduction during the second half. Apart from the fact that the UK equity market in 2000 fell by more than other equity markets, the reduced allocation to UK equities is the result of the increased maturity of the beneficiaries of pension funds over the second half of the sample period – making volatile equities a less suitable matching asset for maturing liabilities – together with a change in the tax rules in 1997 that ended UK pension funds' right to reclaim the tax paid on UK dividends. There was some substitution to international equities over the whole period, so that the total allocation to equities (UK plus international), by 2004, was almost the same as during 1984. There is a corresponding inverse pattern in the allocation to UK bonds, with the weighting first falling, then returning to its original level by the end of the sample period. Again reflecting the increasing maturity of pension funds, the allocation to index-linked bonds has increased steadily. Of the remaining asset categories, there is little discernible pattern,

except for a declining weight given to property. The three most important asset categories are UK equities, UK bonds and international equities, and we focus on these three categories in most of the rest of the paper.

Panel B of Table 1 shows the number of pension funds and fund manager mandates across the different asset classes for three different time periods. UK equities is the only asset class in which every pension fund in the sample invests. The table illustrates that both the number of funds and the number of managers have contracted over time. This is partly explained by the closure of funds and the merger or closure of fund management houses, but also, as mentioned, to switches to CAPS's rival performance measurement service.

We have already seen in Figure 1 that there has been a switch from balanced to specialist and multi-asset mandates, and an increased use of multiple manager mandates in a given asset class over the sample period. As well as showing the coded identity of the fund manager employed by the pension fund during any quarter, the CAPS dataset also reports the investment mandate under which the fund manager is operating. Table 2 provides further information on the use of multiple manager mandates and the move to specialist mandates. Panel A shows the average size of a fund manager mandate by number of fund managers employed across asset categories at three different dates. Panel B shows the distribution of funds and the number of fund managers employed for each of the investment mandates, again across asset classes and at the three different dates.

From Panel A, it can be seen that, during 1984, over 80% of contracts in each asset class were for a single fund manager as part of a balanced mandate. The remaining contracts employed two or more managers, as part of competing balanced mandates. The size of the mandate was approximately constant within an asset class, irrespective of the number of managers employed, and, in the case of UK equities, the mean mandate size was £30.87 million. Panel B shows that the dominant investment mandate was balanced.[17] Even during 1984, property was sometimes recognized as a specialist asset category, and our classification of balanced mandates includes those mandates that were balanced-excluding-property (BXP), with any property holdings managed by specialist managers. In UK equities, the average number of fund managers per balanced mandate was 1.26. There were negligible (non-property)

[17]Note that the number of funds in each asset class is not the same–although fund managers would have been operating under a balanced mandate, they might have chosen not to invest in certain asset classes, and therefore the CAPS data would not include these funds reporting returns in those assets classes.

specialist mandates operating in 1984.

Over time, there was an increase in the use of multiple-manager balanced mandates (as Figure 1 shows)–by 1991, 35% of mandates were multiple-balanced. However, the number of balanced mandates has fallen throughout the remaining period, as pension funds turned to more specialist and multi-asset mandates. By 1994, for UK equities, international bonds and international equities, the picture of a single fund manager operating a balanced mandate was changing, with increased use of two or more managers per asset class. Balanced and BXP mandates had fallen to around 75% of the total; although they were still the dominant mandate-type, they were being replaced by active multi-asset mandates and specialist equity mandates. Pension funds were becoming aware that a single fund management house might not have sufficient expertise across all asset classes. Some houses were able to demonstrate superior skills in managing equities, while others were better in managing bonds.

Panel A shows that, in asset classes such as UK equities, almost half of all mandates involved multiple managers by 2004. However, in other asset classes, such as property and the various bond categories, the preferred delegation arrangement remained single-manager mandates. Further, Panel B shows that Balanced mandates had fallen to around 15% of total mandates by 2004. These had been replaced by a mix of active multi-asset, specialist UK equity and international equity mandates, as well as a smaller number of passive mandates in each of these categories. Specialist equity mandates accounted for 7.5% of the total, covering such specialities as small, medium, and large cap stocks, as well as Pan-European and Pacific Basin equities. The mean size of mandates employing multiple managers, relative to the size of single-manager funds, had also increased. This result implies that it was the larger pension funds that were increasingly turning to multiple managers. For example, in international equities in 2004, the mean size of the mandate of funds employing a single manager in that asset class was £35.96 million, whereas for funds employing three or more managers, the mean fund size was £62.35 million.

III. Performance and Mandate Type

We now turn to presenting the results of our empirical tests. The first two components of Hypothesis 1, namely that specialist fund managers possess stock selection skills, while balanced fund managers possess timing skills, can be tested as follows. We concentrate on the

three main asset classes, UK equities, UK bonds and international equities.

To test for stock selection skills in UK equities, we estimate a four-factor model and save the intercept coefficients as a measure of the Jensen-alpha in the regression:

$$r_{it}^f = \alpha_i^f + \beta_{1i}^f r_{mt} + \beta_{2i}^f SMB_t + \beta_{3i}^f HML_t + \beta_{4i}^f MOM_t + \varepsilon_{it}^f, \tag{1}$$

where r_{it}^f is the excess pre-fee return of pension fund f by fund manager i in quarter t, r_{mt} is the excess return on the benchmark portfolio, SMB_t, HML_t and MOM_t are the Fama-French (1993) size and value common risk factors augmented by the Carhart (1997) momentum factor.[18] Under the null hypothesis of no-abnormal performance, α_i^f should be equal to zero. We can test for abnormal performance across, for example, all specialist pension fund mandates, by testing for the significance of the average, $\bar{\alpha}$ when there are F funds and M fund managers in the sample:

$$\bar{\alpha} = \frac{1}{F}\sum_{f=1}^{F}\frac{1}{M}\sum_{i=1}^{M}\alpha_i^f \tag{2}$$

To conduct inference about the statistical significance of this alpha estimate, we use a bootstrap procedure. For each bootstrap iteration, we sample with replacement from the fund-specific error terms. Using these innovations, we generate bootstrapped returns from (1), imposing $\alpha_i = 0$. We then re-estimate the model and obtain a fitted value for each fund alpha in that bootstrap. These are averaged cross-sectionally to form an average bootstrapped alpha. Repeating this for $b = 1,\ldots,$ B bootstraps, we obtain a bootstrapped distribution of the average alpha estimate which can be used to compute the p-value for the average alpha estimate obtained in the actual data.

To separate selectivity from timing skills, we apply the Treynor-Mazuy (1966) test, using the four-factor model, augmented by a quadratic term on the excess return on the market:

$$r_{it}^f = \alpha_i^f + \beta_{1i}^f r_{mt} + \beta_{2i}^f SMB_t + \beta_{3i}^f HML_t + \beta_{4i}^f MOM_t + \beta_{5i}^f r_{mt}^2 + \varepsilon_{it}^f \tag{3}$$

We can test for the significance of the average market timing term $\bar{\beta}_5$ over funds in the balanced sample, using a bootstrap procedure similar to the one described above. Then, the

[18] CAPS use the total return on the FTSE All-Share Index as the benchmark for UK equities. We take the excess return over the UK Treasury bill rate (Thomson Financial Datastream code IUQAJNB). SMB_t, HML_t and MOM_t are UK versions of these factors supplied by Professor Alan Gregory of Exeter University.

Treynor-Mazuy total performance measure (TM) for each pension fund manager is defined as:

$$TM_i^f = \hat{\alpha}_i^f + \hat{\beta}_{5i}^f Var(r_m), \tag{4}$$

where $\hat{\alpha}_i^f$ and $\hat{\beta}_{5i}^f$ are the estimated coefficients in (3) and $Var(r_m)$ is the variance of the excess returns on the market.

To test for stock selection skills in UK bonds, we estimate a three-factor model consisting of the excess return on the benchmark portfolio, the term spread and the credit spread.[19] For international equities, we use a three-factor model based on the excess return on the benchmark portfolio, a value and a growth factor.[20] Both models can be extended to allow the TM measure to be estimated.

Table 3 presents key quantiles of the distribution of return performance for the three key asset classes. Panel A reports the distribution of mean returns measured across funds, and we can see that the mean of the distribution is highest for UK equities, next for international equities, and lowest for UK bonds. Panels B and C report the distribution of the alpha and beta estimates. The mean annual alpha for UK equities is -3 basis points,[21] while, for UK bonds and international equities, the annual alpha is 70 and -162 basis points, respectively. As we will see shortly, these results change when we condition on the investment mandate. The mean beta results suggests that the models for UK equities and UK bonds are appropriate, while the model for UK bonds is marginally less satisfactory, since the mean beta estimate is not quite centred on unity.

Table 4 presents the results of the security selection and market timing measures of perfor-

[19] CAPS use the total return on the FTSE All-Gilts Index as the benchmark for UK equities. We take the excess return over the UK Treasury bill rate. The yield spread is the difference between the UK 10-year gilt yield (Thomson Financial Datastream code UKMGLTB) and the Treasury bill rate. The credit spread is the difference between the UK corporate bond yield (Thomson Financial Datastream code UKMCRPB) and the Treasury bill rate.

[20] CAPS use the total sterling return on the FTSE World ex UK Index as the benchmark for international equities. We take the excess return over the UK Treasury bill rate. As the value factor, we use the sterling return on the World ex UK Standard Value Index (MSCI Barra). As the growth factor, we use the sterling return on the World ex UK Standard Growth Index (MSCI Barra). We were not able to find a suitable size factor, but during the period under consideration, UK pension funds would have invested only in the largest foreign companies.

[21] This result is consistent with previous studies of the UK pension fund investment behaviour (see, e.g., Blake et al, 1999).

mance for each mandate type, with bootstrapped p-values. The results show that specialist managers outperform balanced managers in all three asset classes, under the selectivity and most of the timing performance measures: the alpha from (1), the alpha from (3), the TM measure from (4), and the corresponding measures for managers investing in UK bonds and international equities discussed above. Typically, the results for the multi-asset mandates lie between the specialist and balanced mandates. Specifically, for UK equities, the average alpha for specialist mandates is a significant 67 basis points, and these mandates also display positive measures of market timing (at greater than a 90% confidence level). Multi-asset mandates also display significant selectivity skills, particularly in International Equities, where they exhibit an average alpha of 1.91%/year. These results confirm Hypothesis 1, parts *(i)* and *(iii)*–specialist fund managers display significant stock selection abilities, and their pre-fee performance exceeds that of balanced managers. However these results fail to confirm part *(ii)* of Hypothesis 1, since balanced mandates generally underperform specialists at market timing (the difference between the Jensen alpha and the Treynor-Mazuy measure). These results on performance measures contrast with the results in Table 3, and confirm that splitting the data according to investment mandate allows us to identify evidence of outperformance in a way that is not possible when the data are in an aggregated form.[22]

Table 5 presents the outcome of a non-parametric bootstrap for the cross-sectional distribution of performance measures by the three mandate types: specialist, multi-asset and balanced. For each mandate type, we show the percentage of funds that generated a performance estimate greater than what we would have expected, as represented by the 1%, 5% and 10% quantiles. For example, in UK equities, we find that 17.4% of the specialists generated alphas in excess of the tenth percentile of the bootstrapped distribution, which is computed under the null that managers have no skills. In general, for UK equities (panel A) and UK bonds (panel B), the multi-asset and specialist mandates generate alphas that are significantly above the alphas of balanced mandates. However, balanced managers appear to outperform multi-asset and specialist mandates in international equities (panel C).

An alternative approach to testing Hypothesis 1 part *(i)* is to follow Grinblatt and Titman

[22]It is very unlikely that UK pension funds held their international equity holdings with the same market-value weights as the index. Timmermann and Blake (2005) provide evidence that UK pension funds took substantial (and ex-post unsuccessful) market timing bets against the US in the 1990s.

(1993) and use the portfolio change measure (PCM) for selectivity, denoted SEL_i[23]

$$SEL_i = \frac{1}{T}\sum_{t=1}^{T}\sum_{j=1}^{J} w_{i,j,t}(R_{i,j,t} - R_{j,t}^{Index}), \tag{5}$$

where there are J asset classes, $R_{i,j,t}$ is the return produced by manager i in asset class j during period t, and $R_{j,t}^{Index}$ is the benchmark return on asset class j during period t. We compute SEL_i for each manager over the life, T, of the fund that they manage. Table 6 shows the results of this test. The average SEL_i is positive for specialist managers (0.63% per year), but insignificant for multi-asset managers, and significantly negative for balanced managers (-0.21% per year). Further, roughly three times the number of specialist managers have a significantly positive SEL_i (at the 5% significance level) compared with the balanced managers. These results confirm that specialist managers are more skilled at selecting securities, especially relative to balanced managers.

The corresponding timing measure for testing Hypothesis 1 part *(ii)* across asset categories is

$$TIM_i = \frac{1}{T}\sum_{t=1}^{T}\sum_{j=1}^{J} \Delta w_{i,j,t} R_{j,t}^{Index}, \tag{6}$$

where $\Delta w_{i,j,t}$ is the change in manager i's weight in asset class j during period t.

To summarize the results from this section, we find evidence consistent with Hypothesis 1. That is, specialist managers and multi-asset managers outperform balanced managers, before fees, and their outperformance is due to their stock-selection skills. Though as we have previously noted, the higher fees charged for specialist mandates (Mercer, 2006) will dissipate a chunk of this outperformance. Nevertheless, the results go some way to explaining the systematic switch away from balanced mandates over the sample period.

III.A. Persistence in performance and mandate type

To test for persistence in the performance of a given fund/manager pairing, we next divide the data into non-overlapping three-year periods. For each period, we first run the performance regression (3), and obtain estimates of performance, such as $\hat{\alpha}$, $\hat{\beta}_5$, and the TM measure listed

[23] A number of papers (e.g., Admati and Ross (1985), Admati, Bhattacharya, Pfleiderer and Ross (1985), and Dybvig and Ross (1985)) have examined whether it is possible to separate selectivity and timing elements of fund manager performance using observed fund returns. In general, this is quite difficult. This motivates using portfolio allocations to measure timing skills.

in (4). In the second step, we test whether the value of the performance estimate obtained during one three-year period predicts its value during the subsequent three-year period. Such evidence would suggest that there is persistence in fund manager performance.

In particular, to explore if a fund's prior ability to generate above-median alpha performance increases the likelihood that it will generate above-median alpha performance in the current period, we estimate the following regression in the second step:

$$I_{\{\hat{\alpha}>\bar{\alpha}\}} = \beta_0 + \beta_1 I_{\{\hat{\alpha}_{-1}>\bar{\alpha}_{-1}\}} + \varepsilon, \tag{7}$$

where $\overline{\alpha}$ indicates the median $\hat{\alpha}$ across all mandates and the subscript "-1" indicates the alphas estimated on the previous three-year period. We split the funds into above- and below-median performance groups due to the small number of observations, particularly for the managers operating under specialist mandates. Identical procedures are followed for the market timing betas and TM measures.

The estimated coefficients in (7) represent the following probabilities:

$$\begin{aligned} \hat{\beta}_0 &= Pr(\hat{\alpha}> \bar{\alpha}|\hat{\alpha}_{-1} \leq \bar{\alpha}_{-1}) \\ \hat{\beta}_1 &= Pr(\hat{\alpha}> \bar{\alpha}|\hat{\alpha}_{-1} > \bar{\alpha}_{-1}) - Pr(\hat{\alpha}> \bar{\alpha}|\hat{\alpha}_{-1} \leq \bar{\alpha}_{-1}), \end{aligned}$$

and so

$$\hat{\beta}_0 + \hat{\beta}_1 = Pr(\hat{\alpha}> \bar{\alpha}|\hat{\alpha}_{-1} > \bar{\alpha}_{-1})$$

is a measure of the fund-managers' overall persistence.

Table 7 shows the results from this analysis. In each panel, the first column shows $\hat{\beta}_0 + \hat{\beta}_1$, while subsequent columns show the persistence estimate, $\hat{\beta}_1$, along with standard errors and t-statistics.

Panel A shows that, for two out of three asset classes (namely UK equities and international equities), persistence is strongest for fund managers operating under a specialist mandate. For instance, 66.7% of specialist UK Equity managers with above-median alphas during a three-year period generate above-median alphas during the following three years ($\hat{\beta}_0 + \hat{\beta}_1$). This far exceeds the expected value of 0.5 under the null of no persistence. The results are weaker for the market timing measure, for which we fail to find evidence of persistence in any asset

class for any type of mandate. However, for the TM measure, we do find much stronger evidence of persistence for specialist fund managers managing UK equities than for any other mandate/asset-class pairing. This again provides evidence explaining the switch to specialists over the sample period, since UK Equities comprised the most important asset class for the UK pension fund industry during our entire sample period.

IV. Performance, Risk and the Number of Fund Managers Employed

IV.A. Performance

In order to explore the relationship between the number of fund managers and fund performance, we regress fund returns on a constant, the size of the fund and a multi-manager dummy that captures whether the fund employed multiple managers ($MLT = 1$) or just a single manager ($MLT = 0$). We also apply a specification that introduces separate dummies for the number of fund managers, i.e., two, three, or four or more managers. The two specifications under consideration are therefore

$$\begin{aligned} r_t^f &= \alpha + \beta_1 SIZE_t^f + \beta_2 MLT_t^f + \varepsilon_t^f \\ r_t^f &= \alpha + \beta_1 SIZE_t^f + \beta_2 TWO_t^f + \beta_3 THREE_t^f + \beta_4 FOUR(or MORE)_t^f + \varepsilon_t^f. \end{aligned} \quad (8)$$

The superscript f indicates that these variables are computed at the fund level. The results (which we do not report here) showed no evidence that multi-managed funds perform significantly different from single-managed funds. This suggests that yardstick competition has been ineffective in improving performance.

IV.B. Risk

To explore whether pension fund sponsors adjust the risk of their funds under decentralization, as predicted by van Binsbergen et al (2008), we decompose fund risk according to the number of managers employed by the fund. For each fund, we computed the value-weighted average returns across all managers. We then performed a 3×3 double sort, in which we divided the funds into terciles according to their size (small, medium, large) and the number of

fund managers (1, 2, 3 or more). We subdivide by fund size, since portfolio volatility is highly (negatively) correlated with fund size (since smaller funds generally have lower equity weightings than large funds).

For each period, we computed the cross-sectional sample variance in portfolio returns. We then averaged this over time to get a summary measure of the average variance through time and across the funds included in each of the nine cells. Hence our analysis is based on the following measure:

$$\widehat{\sigma}^2 = \frac{1}{T}\sum_{t=1}^{T}\left(\frac{1}{N_t - 1}\sum_{i=1}^{N_t}\left(r_{it} - \overline{r}_t\right)^2\right), \tag{9}$$

where $\overline{r}_t$ is the (cross-sectional) average return, N_t is the number of managers in a given size-manager tercile, and $T = 81$ quarters.

Empirical results are shown in Table 8. They reveal a clear pattern between fund size, the number of fund managers employed, and the portfolio risk for the total pension fund portfolio. Specifically, the larger the fund and the greater the number of managers, the lower the dispersion of portfolio returns. These results are strongest for UK equities, but also hold for larger UK bond and international equity funds.

As a second test, we compute the average variance of returns for single- and multi-managed funds for the full sample, as well as four sub-samples. Each quarter, we group funds according to whether they are single- or multi-managed. Only funds with a minimum of 20 quarterly observations are included in the analysis, and funds that switch from being single-managed to becoming multi-managed (or vice versa) are categorized as separate funds.

The results are shown in Table 9. Clearly, multi-managed funds have, on average, a lower volatility than single-managed funds. Moreover, these findings are not just a result of multi-managed funds becoming more prevalent in the latter part of the sample, since the multi-managed funds have lower variance than the single-managed funds in three of four sub-samples, including the last five-year period from 1999-2004.

These results confirm Hypothesis 2 part *(ii)* that an increasing number of managers being employed by a fund lowers the volatility of each fund manager's returns. But we found no evidence to support part *(i)* that performance is affected by the number of fund managers. These results together suggest that Sharpe ratios will be increasing as the the number of managers rises.

V. Performance and Managerial Incentives

As mentioned in Section I, a key reason for employing multiple managers is that this can spur competition among managers and potentially lead to higher effort levels.[24] For the strategy to be credible, it must be the case that investment managers either face a higher likelihood of being fired when they underperform or they have assets taken away from them (a "partial firing" of the manager).

To explore if these conditions are in place, we conducted three tests. First, we tested whether underperformance pre-dates managers being fired which, if confirmed, gives managers a clear incentive to avoid underperformance. Second, we tested whether poor performance led to a switch in the number of managers employed. In the third test, we searched for a relationship between past performance – measured relative to managers within the same asset class – and future inflows of assets from the pension fund sponsor: a positive association would be suggestive of internal competition for funds and that allocations depend on relative performance.

V.A. Hiring and firing decisions

Table 10 shows the mean return and the Jensen's alpha at the manager level around the hiring and firing dates. We can compute the mean returns (across manager-fund pairings) for a manager in the quarters preceding the hiring by a new fund by observing the manager's returns across the other funds he manages and this is reported in Panel A. Panel B shows the mean returns at the manager-fund level after the hire. In a similar fashion, Panel C repeats this calculation but now using firing as the event. Finally, panel D uses the returns on a manager's remaining portfolios after he has been fired by a particular client to track the post-firing return performance.

Panel C in the table shows that there were statistically significant negative Jensen alphas in all four quarters prior to the firing decision. For example in the fourth and third quarters before being fired, manager performance was -214 and -203 basis points respectively. This provides support for Hypothesis 3(i) that the probability of replacing a fund manager is negatively related to past performance.

[24] We know from Section IV, however, that for our sample of fund managers, any increase in effort induced by employing multiple managers does not lead to any increase in performance.

V.B. Switching number of managers employed

During the sample period, some funds switched from a single manager to multiple managers, while other funds made the opposite switch. The first set of switches predominate in the data set. This should not be surprising as it is likely that funds begin with a single fund manager, and may decide to switch to multiple managers. Two possible reasons would be: either (i) they become dissatisfied with the performance of their fund manager or (ii) the fund becomes too large to be managed by a single fund manager. Poor investment performance in the period prior to a switch would provide evidence supporting the first explanation, while above-average investment performance before the switch would provide evidence for the second explanation.

Table 11 shows that there were statistically significant negative excess returns of -97 and -81 basis points in the two quarters prior to a switch from single to multiple fund managers, thereby providing support for the first explanation. The new fund managers performed well in the second quarter after the switch, but then returned to normal. The switch from multiple to single manager was not prompted by statistically significant underperformance prior to the switch and did not generate superior performance after the switch. This indicates that the switch was prompted by a different explanation, such as a desire to reduce fund management costs (including monitoring costs).

These results provide support for Hypothesis 3(ii) that the probability of switching from single to multiple manager mandates is negatively related to past performance.

V.C. Past performance and allocation of funds

We have data on portfolio weights and returns and can thus extract net cash flows from the following approximate accounting identity:[25]

$$\Delta \log \left(w_{i,t+1}^{f} \right) = r_{it}^{f} - r_{t}^{f} + NCF_{it}^{f} - NCF_{t}^{f} \tag{10}$$

where $w_{i,t+1}^{f}$ is the weight of fund manager i in fund f at the beginning of period t+1, r_{it}^{f} is the return on manager i's portfolio in fund f during period t, r_{t}^{f} is the fund's return during period t, NCF_{it}^{f} is the value-weighted net cash flow to manager i in fund f during period t and NCF_{t}^{f} is the net cash flow into fund f during period t. Here net cash flows are measured in percentage points.

[25] Assuming continuous cashflows through the quarter.

We regress the net cash flows into manager i's portfolio – measured relative to the value-weighted net cash flow into the fund as a whole – on the manager's performance, again measured relative to the average, value-weighted returns of the fund as a whole

$$NCF_{it}^{f} - NCF_{t}^{f} = \alpha_i + \beta_i CUMDIFFRx_{i,t-1} + \varepsilon_{i,t} \tag{11}$$

where $CUMDIFFRx_{i,t-1}$ measures the lagged cumulative x-period return difference between the performance of manager i and that of the fund as a whole, calculated across all managers. Positive and significant values of β_i indicate that higher past performance for a particular manager – irrespective of asset class – leads to a larger inflow of money towards that manager.

Table 12 shows the outcome from this analysis when we vary the period over which past performance is measured from 2 quarters (i.e, the most recent performance) to 4, 6 and 8 quarters. In panel A, dealing with the total portfolio, the sensitivity of cashflows to cumulative lagged returns (β_i) is positive and statistically significant for horizons between 2 and 8 quarters. The results suggest that a 1% outperformance leads to a 5% increase in the outperforming manager's relative flow of funds. Hence, if the manager would normally get allocated, say, 40% of the new cash flows, a 1% outperformance leads the manager to instead get 42% of the new cash flows.

Panel B looks at the three key asset classes and relates net cash flows in an asset class to the cumulative past performance of the manager in that asset class

$$\Delta \log \left(w_{i,j,t+1}^{f} \right) = r_{i,j,t}^{f} - r_{j,t}^{f} + NCF_{i,j,t}^{f} - NCF_{j,t}^{f} \tag{12}$$

$$NCF_{i,j,t}^{f} - NCF_{j,t}^{f} = \alpha_{i,j} + \beta_{i,j} CUMDIFFRx_{i,j,t-1} + \varepsilon_{i,j,t} \tag{13}$$

where j refers to the j'th asset class. Panel B shows that UK equities have a positive sensitivity to past performance, although this sensitivity is less than for the total portfolio. For UK bonds, there is no significant relationship, while for international equities, we find a negative sign for the effect of differential return performance over the previous two quarters on the flow of funds to the outperforming manager.

Overall, these results provide some support for Hypothesis 3(iii) that portfolio weights on fund managers are positively related to past performance, although the results in the individual asset classes are more mixed.

VI. Conclusions

We have examined the performance of pension fund managers within a delegated portfolio management framework. A prediction of hidden-action principal agent models is that the principal offers a menu of contracts to different types of agents to induce the agents to self-select into particular contracts in a separating equilibrium. If specialist and balanced fund managers self-select into their preferred contractual arrangements, we would expect to see evidence that balanced fund managers display market timing abilities and specialist fund managers selectivity skills. By conditioning on fund manager mandates, we found that specialist managers did display significant stock selection skills, and also demonstrated some market timing skills. Balanced fund managers in contrast did not exhibit any significant market timing skills. In addition, the overall total performance of balanced managers was less than the performance of specialist managers, which is consistent with the higher management fees charged by specialist managers.

We went on examine whether there was any evidence of persistence in performance of stock selection and market timing skills, and were not able to reject the hypothesis of no-persistence. The implication of this result is that the observed difference in performance between specialist and balanced fund management is the result of moral hazard considerations, rather than adverse selection.

We also examined the extent of competition in the type of mandate, and the extent that the introduction of multiple-manager mandates induced managers to work harder. We found no evidence of superior performance with respect to market timing or selectivity as a result of multiple manager mandates. We also looked at the diversification of manager risk and found that the volatility of portfolio returns was negatively related to the number of managers employed.

Our findings go some way to explaining both the shift from balanced to specialist managers over the sample period – pension funds benefited from superior performance as a result of the shift – and the shift from single to multiple managers – pension funds benefited from risk reduction by employing multiple managers

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VII. Appendix A: Analysis of Multi-Asset Managers

We investigate whether multi-asset managers are closer to specialist managers or to balanced managers.

Here is one possible scenario. Specialists were first used by large funds because they became disappointed with the performance of their balanced manager. Smaller funds could not afford seven specialists, so they used lower cost multi-asset managers. These would be specialists in related asset categories (such as UK and international equities, or UK and international bonds). If this is true, multi-asset managers are really specialists for smaller funds.

Another scenario is that balanced managers fought back against the rise of specialists by setting up mini-balanced managers called multi-asset managers. If this is true, there would be no particular link between fund size and the use of multi-asset managers and no particular link between asset categories offered by the multi-asset managers.

We investigate these possibilities in two ways. We first measure in how many asset classes multi-asset managers are generally active and we then try to understand in what asset classes multi-asset managers are active in. The same analysis is conducted for specialist and balanced managers.

The six columns of Table A contain the following information respectively:[26]

1. The number of observations, which is provides the number of "fund-manager-portfolio-time" pairings. We use this because the number of asset classes in a given "fund-manager-portfolio" pairing varies over time.
2. The average number of asset classes contained in the portfolios.[27]
3. The standard deviation of the number of asset classes contained in the portfolios.[28]
4. The percentage of portfolios active in both UK equities and UK bonds.
5. The percentage of portfolios active in both UK equities and international equities.
6. The percentage of portfolios active in UK equities, UK bonds and international equities.

It is clear from the table that multi-asset managers are very close to being mini-balanced managers.

[26] The data set used in our study is described in detail in section II of the main paper.

[27] To be precise, the cross-sectional and time-series average of the number of asset classes contained in the portfolios.

[28] The cross-sectional and time-series standard deviation of the number of asset classes contained in the portfolios.

Table 1. Evolution in fund size, number of funds, managers and asset allocation.

Panel A: Fund size and asset allocation

Asset	Jan-84		Jan-94		Jan-04	
	Amount	Percentage	Amount	Percentage	Amount	Percentage
UK Equities	64.4	50.7	266.3	57.9	150.8	42.7
UK Bonds	23.0	18.1	9.7	2.1	59.6	16.9
Int. Equities	21.4	16.9	121.3	26.4	94.7	26.8
Int. Bonds	0.2	0.1	15.9	3.5	3.7	1.0
Index-Linked	1.8	1.4	10.8	2.4	32.1	9.1
Cash	2.8	2.2	21.8	4.7	5.4	1.5
Property	13.3	10.5	14.0	3.0	7.0	2.0
Total	126.9	100.0	459.7	100.0	353.3	100.0
TOTAL UK	291.1		576.8		761.1	

Panel B: Number of funds and fund managers by asset class

Asset	Jan-84		Jan-94		Jan-04		In Existence	
	Funds	Managers	Funds	Managers	Funds	Managers	Funds	Managers
UK Equities	955	113	1044	112	630	82	2385	280
UK Bonds	943	109	652	96	612	61	2319	247
Int. Equities	911	108	1019	118	627	89	2350	279
Int. Bonds	74	22	761	75	210	41	1603	181
Index-Linked	545	75	513	76	412	48	2044	205
Cash	779	108	816	113	463	75	2351	304
Property	718	93	543	86	232	43	1657	184

Note: This table reports descriptive statistics for the assets under management, the number of funds and the number of managers in our sample of UK pension funds. For each of the seven asset classes, Panel A shows the total size of funds under management in Billions of pounds (using the 2004 consumer price index as the base year) along with the portfolio allocation to each asset class. The bottom line of Panel A reports the total market value of all occupational self-administered pension fund assets in the UK, available from the UBS Pension Fund Indicators, 2008. Panel B reports the number of funds and the number of managers by asset class. Also shown is the total number of different funds and managers in existence at some point during our sample from 1984 - 2004.

Table 2. Distribution of Funds

Panel A: Distribution of funds by number of managers

		Jan-84		Jan-94		Jan-04	
# of managers		**Mean Size**	**Percentage**	**Mean Size**	**Percentage**	**Mean Size**	**Percentage**
	1	30.87	80.42%	72.06	72.99%	42.44	56.83%
UK Equities	2	32.01	14.76%	62.25	19.83%	45.76	26.19%
	3	38.06	4.82%	129.13	7.18%	71.51	16.98%
	1	12.33	82.18%	8.66	87.27%	35.45	72.55%
UK Bonds	2	11.98	13.47%	7.80	11.35%	46.05	21.41%
	3	14.64	4.35%	24.01	1.38%	51.51	6.05%
	1	9.83	81.34%	29.19	75.37%	35.96	64.27%
Int. Equities	2	13.10	14.05%	27.03	17.76%	33.01	23.92%
	3	13.58	4.61%	56.69	6.87%	62.35	11.80%
	1	2.49	98.65%	5.03	77.27%	6.13	79.52%
Int. Bonds	2	1.77	1.35%	8.89	18.79%	13.42	17.62%
	3	-	-	26.96	3.94%	12.37	2.86%
	1	2.23	87.89%	9.31	88.30%	33.40	75.97%
Index-Linked	2	2.88	10.46%	19.98	11.11%	34.45	19.90%
	3	1.01	1.65%	21.11	0.58%	47.69	4.13%
	1	1.84	82.67%	4.63	79.04%	2.03	68.25%
Cash	2	1.22	13.35%	4.79	14.46%	3.13	21.17%
	3	2.73	3.98%	9.05	6.50%	4.72	10.58%
	1	16.03	86.21%	14.88	90.79%	26.09	88.36%
Property	2	5.43	11.56%	7.89	8.66%	13.62	10.34%
	3	6.38	2.23%	2.63	0.55%	12.78	1.29%

Panel B: Distribution of funds by mandate type

		Jan-84		Jan-94		Jan-04	
Mandate		**Funds**	**Managers**	**Funds**	**Managers**	**Funds**	**Managers**
	Specialist	12	2.33	119	2.03	284	2.17
UK Equities	Multi-Asset	2	2.00	173	1.36	384	1.67
	Balanced	952	1.26	821	1.36	83	1.46
	Specialist	10	1.80	46	1.35	203	1.56
UK Bonds	Multi-Asset	2	2.00	103	1.19	399	1.37
	Balanced	938	1.24	516	1.14	76	1.34
	Specialist	10	2.00	98	1.90	275	1.89
Int. Equities	Multi-Asset	2	2.00	157	1.31	365	1.57
	Balanced	907	1.25	815	1.34	81	1.36
	Specialist	3	1.00	25	1.48	63	1.22
Int. Bonds	Multi-Asset	0	0.00	71	1.15	90	1.22
	Balanced	71	1.01	676	1.29	64	1.36
	Specialist	6	1.33	30	1.37	139	1.47
Index-Linked	Multi-Asset	2	1.50	112	1.12	286	1.32
	Balanced	540	1.14	378	1.12	24	1.29
	Specialist	26	1.92	129	2.09	236	1.80
Cash	Multi-Asset	2	1.50	122	1.20	204	1.37
	Balanced	766	1.23	631	1.29	63	1.43
	Specialist	30	1.27	87	1.21	83	1.13
Property	Multi-Asset	1	1.00	66	1.12	98	1.19
	Balanced	692	1.17	402	1.10	53	1.06

Panel A sorts the funds according to the number of managers they employ, i.e. a single manager, two managers, or three managers or more. For each of these categories we report the average size of the funds in millions of pounds, using 2004 as the base year. We also show the percentage of all funds in a given asset class that employ one, two or three or more managers. Panel B sorts the funds according to the managers mandate type, as defined by specialist, multi-asset (more than one asset class, but less than all asset classes) and balanced (all asset classes). We report the number of funds as well as the average number of managers operating under each mandate type.

Table 3. Return performance by asset class.

Panel A: Mean Returns

Asset class	1%	5%	10%	25%	50%	75%	90%	95%	99%	mean	mean_w
UK Equities	-4.39%	1.45%	6.75%	10.96%	14.18%	17.81%	21.88%	24.49%	30.13%	14.15%	12.65%
UK Bonds	4.78%	6.37%	7.93%	9.42%	10.59%	11.57%	12.71%	13.39%	15.88%	10.43%	9.65%
International Equities	-6.11%	2.11%	5.27%	8.67%	11.22%	14.13%	17.29%	19.65%	23.95%	11.10%	9.85%

Panel B: Alpha Estimates

Asset class	1%	5%	10%	25%	50%	75%	90%	95%	99%	mean	mean_w
UK Equities	-5.15%	-2.41%	-1.66%	-0.68%	0.11%	0.96%	2.02%	2.85%	5.73%	-0.03%	0.64%
UK Bonds	-1.69%	-0.63%	-0.36%	0.13%	0.64%	1.18%	1.77%	2.20%	3.58%	0.70%	0.77%
International Equities	-12.26%	-8.30%	-6.34%	-3.16%	-1.14%	0.32%	1.92%	3.08%	7.74%	-1.62%	-0.61%

Panel C: Beta Estimates

Asset class	1%	5%	10%	25%	50%	75%	90%	95%	99%	mean	mean_w
UK Equities	0.83	0.92	0.95	0.98	1.01	1.04	1.08	1.10	1.18	1.03	0.98
UK Bonds	0.53	0.83	0.93	1.07	1.16	1.24	1.31	1.35	1.48	1.14	1.07
International Equities	0.59	0.80	0.86	0.93	0.97	1.02	1.11	1.15	1.28	0.97	0.97

Note: This table presents the raw return performance as well as the risk-adjusted return performance for the three main asset classes held by the pension funds, namely UK Bonds, UK Equities and International Equities. All results are based on quarterly data over the period from 1984-2004. Panel A reports percentiles for the distribution of mean returns measured across funds. Panels B and C present alpha and beta estimates. In the case of the UK Bonds, these are based on a two-factor model that uses the return on medium and long-term government bonds . For UK Equities, we use a four-factor model that includes the return on a broad market portfolio, a size factor, a value factor and a momentum factor. Finally, for International Equities we use a four-factor model based on return indices for North America and the EAFE area, augmented by a size and a small cap factor. The unweighted and weighted mean returns are reported in the last two columns. All results are measured in percentage terms and have been annualized

Table 4. Measures of security selection and market timing skills by types of mandate.

UK Equities

Specialist Mandates

	Avg. Coefficient	P-Value
Jensen's Alpha	0.67%	0.014
Beta (Market Timing)	0.093	0.066
Treynor-Mazuy	1.31%	0.000

Multi-Asset Mandates

	Avg. Coefficient	P-Value
Jensen's Alpha	0.46%	0.006
Beta (Market Timing)	-0.005	0.545
Treynor-Mazuy	0.47%	0.003

Balanced Mandates

	Avg. Coefficient	P-Value
Jensen's Alpha	-0.24%	0.857
Beta (Market Timing)	0.091	0.000
Treynor-Mazuy	0.14%	0.276

UK Bonds

Specialist Mandates

	Avg. Coefficient	P-Value
Jensen's Alpha	1.17%	0.000
Beta (Market Timing)	-0.206	0.598
Treynor-Mazuy	0.98%	0.000

Multi-Asset Mandates

	Avg. Coefficient	P-Value
Jensen's Alpha	0.81%	0.002
Beta (Market Timing)	0.767	0.080
Treynor-Mazuy	0.55%	0.007

Balanced Mandates

	Avg. Coefficient	P-Value
Jensen's Alpha	0.62%	0.057
Beta (Market Timing)	-0.253	0.889
Treynor-Mazuy	0.65%	0.031

International Equities

Specialist Mandates

	Avg. Coefficient	P-Value
Jensen's Alpha	2.26%	0.002
Beta (Market Timing)	-0.138	0.834
Treynor-Mazuy	1.55%	0.019

Multi-Asset Mandates

	Avg. Coefficient	P-Value
Jensen's Alpha	1.91%	0.007
Beta (Market Timing)	-0.331	0.998
Treynor-Mazuy	1.04%	0.065

Balanced Mandates

	Avg. Coefficient	P-Value
Jensen's Alpha	0.48%	0.313
Beta (Market Timing)	-0.563	0.999
Treynor-Mazuy	-1.85%	0.966

Note: This table reports evidence of security selection and market timing skills for three types of manager types, namely specialists, multi-asset managers (managing more than one asset class, but not all asset classes) and balanced managers (managing all asset classes). For each mandate type we show the average estimates of Jensens alpha from simple three- or four factor regressions extended to include the squared excess return on the associated market portfolio. Finally, we report the beta coefficient on the market timing term along with the Treynor-Mazuy performance measure. P-values are based on a non-parametric bootstrap that uses a one-sided test for the ability of funds to generate alphas, betas or Treynor-Mazuy measures in excess of the mean values estimated using the actual data sample.

Table 5. Distribution of performance measures by types of mandate

Panel A: UK Equities

	Alpha			Beta			TM		
Mandate	1%	5%	10%	1%	5%	10%	1%	5%	10%
Specialist	3.1%	11.2%	17.4%	1.2%	3.9%	10.9%	11.2%	22.5%	31.0%
Multi-Asset	5.6%	13.4%	23.7%	1.1%	4.3%	7.0%	9.5%	26.0%	34.2%
Balanced	1.3%	5.9%	10.5%	2.0%	9.6%	17.5%	5.4%	12.8%	19.9%

Panel B: UK Bonds

	Alpha			Beta			TM		
Mandate	1%	5%	10%	1%	5%	10%	1%	5%	10%
Specialist	14.7%	22.4%	30.1%	0.7%	1.4%	3.5%	20.3%	30.8%	40.6%
Multi-Asset	14.8%	25.2%	33.1%	0.4%	2.2%	3.9%	22.2%	33.1%	40.4%
Balanced	2.1%	7.6%	11.5%	2.2%	6.5%	11.8%	5.5%	10.9%	14.5%

Panel C: International Equities

	Alpha			Beta			TM		
Mandate	1%	5%	10%	1%	5%	10%	1%	5%	10%
Specialist	2.7%	11.5%	17.2%	0.3%	2.4%	7.5%	7.5%	14.7%	20.1%
Multi-Asset	0.5%	3.6%	7.7%	0.4%	2.7%	5.2%	2.0%	5.9%	11.1%
Balanced	4.2%	18.2%	29.4%	0.2%	0.7%	1.3%	9.1%	22.1%	33.2%

Note: This table presents the outcome of a non-parametric bootstrap for the cross-sectional distribution of performance measures by three types of managers, namely specialists, multi-asset managers (managing more than one asset class, but not all asset classes) and balanced managers (managing all asset classes). For each mandate type we show the percentage of funds that generated a performance estimate greater than what we would expect, as represented by the 1%, 5% and 10% quantiles. For example, we find that 18% of the funds generated alphas in excess of the one percentile of the bootstrapped distribution computed under the null that managers have no skills. As performance measures we use the estimate of Jensens alpha from three- or four factor regressions extended to include the squared excess return on the associated market portfolio. Finally, we report the beta coefficient on the market timing term along with the Treynor-Mazuy performance measure.

Table 6. Mandate types and selectivity skills based on the portfolio change measure

Mandate	Average Selectivity	t-test	Positive Selectivity	Significantly Positive Selectivity
Specialist	0.63%	5.715991	60.26%	8.31%
Multi-Asset	0.07%	1.279539	51.11%	2.51%
Balanced	-0.21%	-5.75626	48.71%	2.88%

Note: This table reports estimates of the selectivity skills based on the portfolio change measure proposed by Grinblatt and Titman which uses quarterly changes to the pension funds portfolio weights and their returns to estimate the selectivity skills. Results are reported separately for three types of managers, namely specialists, multi-asset managers (managing more than one asset class, but not all asset classes) and balanced managers (managing all asset classes). The first two columns report the mean selectivity measure, averaged across fund-manager pairings, and a t-test for its significance. The third and fourth columns report the percentage of managers with a positive selectivity estimate along with the proportion of the estimates that are statistically significant and positive.

Table 7. Persistence in performance and mandate type

Panel A. Jensen's Alpha

Specialist Mandates

	$\hat{\beta}_0 + \hat{\beta}_1$	$\hat{\beta}_1$	S.E. $\hat{\beta}_1$	t-stat	R^2
UK Bonds	0.588	-0.112	0.195	-0.573	0.012
UK Equities	0.667	0.246	0.105	2.340	0.060
Int. Equities	0.561	-0.043	0.104	-0.413	0.002

Multi-Asset Mandates

	$\hat{\beta}_0 + \hat{\beta}_1$	$\hat{\beta}_1$	S.E. $\hat{\beta}_1$	t-stat	R^2
UK Bonds	0.625	0.000	0.116	0.000	0.000
UK Equities	0.456	0.166	0.086	1.926	0.030
Int. Equities	0.418	0.028	0.091	0.303	0.001

Balanced Mandates

	$\hat{\beta}_0 + \hat{\beta}_1$	$\hat{\beta}_1$	S.E. $\hat{\beta}_1$	t-stat	R^2
UK Bonds	0.418	-0.021	0.035	-0.593	0.000
UK Equities	0.516	0.002	0.023	0.096	0.000
Int. Equities	0.513	0.050	0.025	2.016	0.002

Panel B. Beta (Market timing)

Specialist Mandates

	$\hat{\beta}_0 + \hat{\beta}_1$	$\hat{\beta}_1$	S.E. $\hat{\beta}_1$	t-stat	R^2
UK Bonds	0.571	0.187	0.196	0.951	0.035
UK Equities	0.596	0.167	0.106	1.579	0.028
Int. Equities	0.563	-0.004	0.111	-0.038	0.000

Multi-Asset Mandates

	$\hat{\beta}_0 + \hat{\beta}_1$	$\hat{\beta}_1$	S.E. $\hat{\beta}_1$	t-stat	R^2
UK Bonds	0.590	0.075	0.119	0.627	0.006
UK Equities	0.491	-0.088	0.090	-0.987	0.008
Int. Equities	0.387	-0.174	0.091	-1.915	0.030

Balanced Mandates

	$\hat{\beta}_0 + \hat{\beta}_1$	$\hat{\beta}_1$	S.E. $\hat{\beta}_1$	t-stat	R^2
UK Bonds	0.461	-0.019	0.035	-0.543	0.000
UK Equities	0.523	0.030	0.023	1.285	0.001
Int. Equities	0.487	-0.017	0.025	-0.706	0.000

Panel C. Treynor-Mazuy

Specialist Mandates

	$\hat{\beta}_0 + \hat{\beta}_1$	$\hat{\beta}_1$	S.E. $\hat{\beta}_1$	t-stat	R^2
UK Bonds	0.611	-0.167	0.187	-0.891	0.028
UK Equities	0.732	0.278	0.106	2.615	0.077
Int. Equities	0.531	0.020	0.104	0.187	0.000

Multi-Asset Mandates

	$\hat{\beta}_0 + \hat{\beta}_1$	$\hat{\beta}_1$	S.E. $\hat{\beta}_1$	t-stat	R^2
UK Bonds	0.667	0.152	0.117	1.297	0.024
UK Equities	0.510	0.173	0.090	1.913	0.029
Int. Equities	0.316	-0.120	0.089	-1.348	0.015

Balanced Mandates

	$\hat{\beta}_0 + \hat{\beta}_1$	$\hat{\beta}_1$	S.E. $\hat{\beta}_1$	t-stat	R^2
UK Bonds	0.404	-0.038	0.035	-1.078	0.001
UK Equities	0.523	0.005	0.023	0.195	0.000
Int. Equities	0.505	-0.001	0.025	-0.056	0.000

Note: This table reports the results from a regression of an indicator tracking above-median performance (estimated over a three-year period) for a particular fund-manager pairing on a constant and the fund-manager pairing's prior performance (estimated over the previous 3-year period). The performance is based on the following equation:

$$r_{ipt} = \alpha_{ip} + \beta_{1ip} r_{mt} + \beta_{2ip} SMB_t + \beta_{3ip} HML_t + \beta_{4ip} MOM_t + \beta_{5ip} r_{mt}^2 + \epsilon_{ipt}.$$

We estimate the following: $I_{\{\alpha > \bar{\alpha}\}} = \beta_0 + \beta_1 I_{\{\alpha_{-1} > \bar{\alpha}_{-1}\}} + \epsilon$. A positive and significant estimate of β_1 indicates persistence in performance. Panel A tests for persistence in the fund's alpha. Panel B tests for persistence in the market timing coefficient; finally, panel C tests for persistence in the Treynor-Mazuy performance measure, i.e. $\alpha + \beta_5 \cdot \sigma_m^2$.

Table 8. Portfolio variance sorted by number of fund managers and size of funds

Total Portfolio

	Size tercile		
Managers	1	2	3
1	0.471	0.335	0.310
2	0.393	0.255	0.224
3 or more	0.240	0.221	0.189

UK Equities

	Size tercile		
Managers	1	2	3
1	0.344	0.270	0.208
2	0.318	0.188	0.161
3 or more	0.279	0.187	0.127

UK Bonds

	Size tercile		
Managers	1	2	3
1	0.184	0.107	0.119
2	0.128	0.133	0.083
3 or more	0.441	0.121	0.085

International Equities

	Size tercile		
Managers	1	2	3
1	0.853	0.615	0.622
2	0.847	0.422	0.379
3 or more	1.301	0.514	0.378

Note: This table shows the average return variance for funds sorted by the number of managers (one, two or three or more), and by size terciles. Each quarter, we sort the funds into nine categories according to the number of funds employed and the size of the funds portfolio. We then compute the cross-sectional variance of fund returns for each category and finally calculate the time-series mean of this number. All variances have been multiplied by one thousand and are based on the full sample from 1984-2004.

Table 9. Return variances for multi-and single-managed funds

Panel A

	Mean of Variances of Returns	S.D. of Variances of Returns	Observations
Single Managed funds	0.0051291	0.0016487	46576
Multi-Managed funds	0.0046767	0.0013389	22335

Panel B

Summary statistics by Sub-Periods

t=1 to 20

	Mean of Variances of Returns	S.D. of Variances of Returns	Observations
Single Managed funds	0.0079413	0.0027382	11458
Multi-Managed funds	0.0077717	0.0026485	3879

t=21 to 40

	Mean of Variances of Returns	S.D. of Variances of Returns	Observations
Single Managed funds	0.0050775	0.0015268	11458
Multi-Managed funds	0.0048550	0.001385	5623

t=41 to 60

	Mean of Variances of Returns	S.D. of Variances of Returns	Observations
Single Managed funds	0.0028505	0.0014768	12378
Multi-Managed funds	0.0029624	0.0017965	6349

t=61 to 81

	Mean of Variances of Returns	S.D. of Variances of Returns	Observations
Single Managed funds	0.0048396	0.0020914	8635
Multi-Managed funds	0.0043258	0.0017455	6464

Note: This table presents the average variance of returns for single- and multi-managed funds for the full sample (1984-2004) as well as for four sub-samples. Each quarter we group funds according to whether they are single- or multi-managed. Only funds with a minimum of 20 quarterly observations are included in the analysis. Funds that switch from being single-managed to becoming multi-managed (or vice versa) are categorized as separate funds.

Table 10. Excess returns around hiring and firing dates.

Panel A

	Mean	Standard Deviation	Jensen's Alpha	T-statistic
Before Being Hired				
4 Quarters	0.27%	0.58%	0.22%	0.85
3 Quarters	0.47%	0.57%	0.41%	1.6
2 Quarters	0.30%	0.60%	0.25%	0.93
1 Quarter	0.08%	0.58%	0.04%	0.15

Panel B

After Being Hired				
4 Quarters	-0.58%	1.25%	-0.32%	-0.62
3 Quarters	0.23%	0.75%	0.15%	0.44
2 Quarters	0.31%	0.93%	0.16%	0.39
1 Quarter	0.26%	0.83%	0.15%	0.4

Panel C

Before Being Fired				
4 Quarters	-2.14%	0.95%	-2.08%	-4.8
3 Quarters	-2.03%	0.92%	-2.02%	-4.79
2 Quarters	-0.81%	0.95%	-0.86%	-1.99
1 Quarter	-1.00%	1.07%	-0.97%	-1.98

Panel D

After Being Fired				
4 Quarters	-0.07%	0.67%	-0.04%	-0.12
3 Quarters	-0.24%	0.75%	-0.04%	-0.57
2 Quarters	-0.12%	0.75%	-0.20%	-0.2
1 Quarter	0.12%	0.76%	0.14%	0.41

Note: This table shows the mean return and the Jensen's Alpha at the manager level around the hiring and firing dates. Since in most cases we observe manager's returns across other funds, we can compute the mean returns (across manager-fund pairings) for a manager in the quarters preceding the hiring by a new client (fund). This is reported in Panel A. Panel B shows the mean returns at the manager-fund level after the hire. Panel C does the same thing, but now using firing as the event. Finally, panel D uses the returns on a managers remaining portfolios after he has been fired by a particular client to track the post-firing return performance. The Jensen's Alpha is calculated using a one-factor model (benchmark: FTSE-All Share). All numbers are in percent per annum and are based on the full data sample from 1984-2004.

Table 11. Return Performance around switches in the employment of single versus multiple managers

	Single-to-Multiple		Multiple-to-Single	
Quarters before/ after switch	**Excess Returns**	**t-stat**	**Excess Returns**	**t-stat**
-4	-0.52%	-1.2496	1.92%	1.3635
-3	0.29%	0.6891	0.99%	0.7004
-2	-0.97%	-2.6623	-0.41%	-0.4196
-1	-0.81%	-2.1519	-0.37%	-0.2833
1	0.38%	1.0507	0.30%	0.3402
2	0.77%	2.4991	-0.02%	-0.0208
3	-0.58%	-1.6642	1.29%	1.4908
4	-0.69%	-1.9043	0.21%	0.2535

Note: This table shows the mean returns, and the associated t-statistics, around the quarters where a fund switches from employing a single to employing multiple managers or vice versa. Returns are value-weighted and computed at the portfolio level, i.e. across all managers employed. All numbers are in percent per annum and are based on the full sample from 1984-2004.

Table 12. Net cash flows and past cumulated return performance.

Panel A: Total Portfolio

	Beta	Standard Errors (Beta)	t-statistic	Observations
2 QUARTERS	0.088	0.039	2.253	30346
4 QUARTERS	0.268	0.090	2.970	26383
6 QUARTERS	0.255	0.123	2.075	23741
8 QUARTERS	0.354	0.153	2.309	21099

Panel B: Results by Asset-Class

UK Equities

2 QUARTERS	0.138	0.066	2.107	18957
4 QUARTERS	0.130	0.0321	4.031	16410
6 QUARTERS	0.085	0.027	3.161	14712
8 QUARTERS	0.099	0.0254	3.892	13014

UK Bonds

2 QUARTERS	0.057	0.379	0.151	5604
4 QUARTERS	-0.190	0.251	-0.757	4602
6 QUARTERS	0.120	0.237	0.506	3934
8 QUARTERS	0.025	0.235	0.108	3266

International Equities

2 QUARTERS	-0.134	0.062	-2.175	14684
4 QUARTERS	-0.005	0.033	-0.157	12674
6 QUARTERS	0.000	0.0301	0.012	11334
8 QUARTERS	0.021	0.030	0.700	9994

Note: This table shows the results from regressing the net cash flow that a manager of a particular asset class sees (relative to the overall flow into that asset class) on a constant and his past differential return performance, again measured relative to the funds overall, value-weighted return in the same asset class, cumulated over the previous 2, 4, 6 or 8 quarters. Along with the cash-flow, past-differential return sensitivity (measured by beta), we also present its statistical significance.

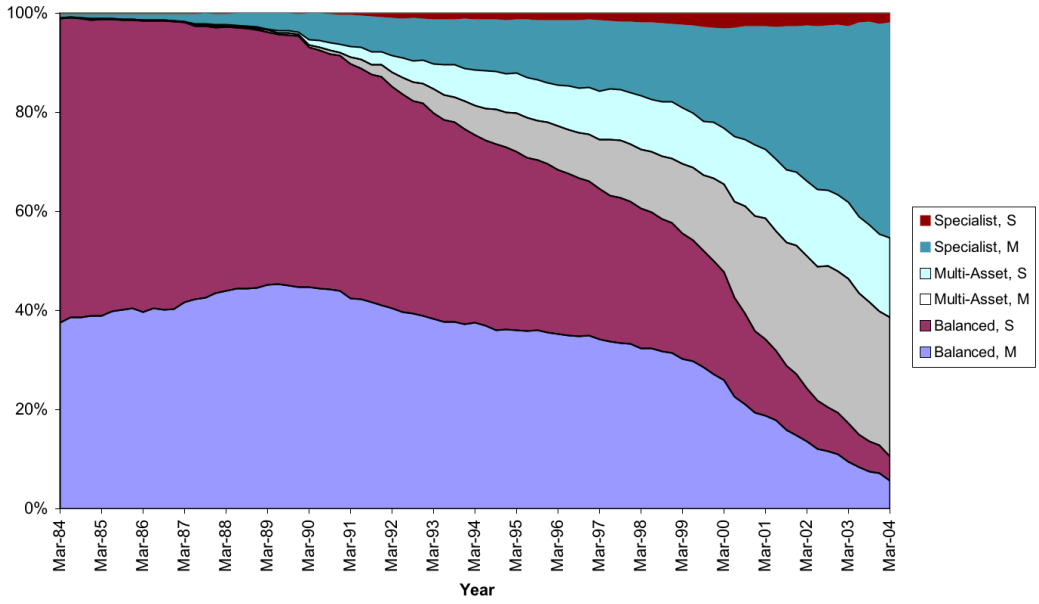

Figure 1: Distribution of percentage of UK Equity Mandates by Single and Multiple Manager and Mandate Type

Note: This figure shows the evolution through time in the proportion of types of UK Equity manager mandates, namely specialists, multi-asset managers (managing more than one asset class, but not all asset classes), and balanced managers (managing all asset classes), and whether these mandates were managed within the UK equity asset by a single or multiple fund managers.