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Abstract

Empirical evidence from the UK market is brought to bear on recent theories of closed-end fund discounts. Market pricing of skill, relative to the fees charged for it, accounts for a significant portion of discount variation, but cannot explain the rarity of index funds or why they trade at a discount. Index funds have lower discount volatility. Discount risk is much more systematic on international than on domestic funds. It is argued that even idiosyncratic risk is priced in closed-end funds, because they are likely to represent a significant proportion of investors' risky portfolios.

Keywords: Closed-end fund; fund management; systematic risk

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1. Introduction

Why do closed-end funds (CEFs) tend to trade at a discount to their net asset value per share (NAV)? There is still considerable debate on this issue: to quote Shleifer (2000, p.53), "few problems in finance are as perplexing as [this] closed-end fund puzzle." The question raises issues of investor rationality, psychology and the efficiency of markets. The present paper asks whether we have come any closer to understanding the puzzle in the last ten years. As well as discussing recent theories, we bring some empirical evidence from the U.K. closed-end fund market to bear on the question.

Dimson and Minio-Kozerski (1999) provide a comprehensive survey of the subject up to the late 1990s. Their survey covers issues such as tax treatment, liquidity, agency costs (including managerial ability and fees), market segmentation and the investor sentiment theory originally suggested by Lee *et al*. (1991). They conclude that "[m]any hypotheses have been suggested to explain the discount, but none seem to be able to solve the closed-end fund puzzle" (p. 35). Although they go on to suggest that research has had some partial success in explaining movements in discounts, the question of why prices tend to be significantly below net asset values on average remains unanswered.

It is not our intention to go over all possible explanations in detail. Rather we focus on two particular hypotheses: the investor sentiment theory and managerial skill. Investor sentiment theory focuses on the fundamental feature of closed-end funds, as compared with open-end funds – that they carry discount risk – and argues, in line with the Capital Asset Pricing Model (CAPM), that this has to be rewarded to the extent that it is

systematic. The weakness of the theory is that it does a relatively poor job of explaining relative discounts on different funds.

The idea that managerial skill (relative to the fees charged for it) can explain the discount has been revived, although certainly not invented, by Ross (2002). It is an attractive idea because we know that demand for open-end funds is strongly related to past performance, so that a similar phenomenon is likely for closed-end funds. In general, the price which the marginal investor is willing to pay for a fund, relative to its net assets per share, should reflect the perceived value of the manager's skills; open-end funds are just a special case of this where the price and net asset value (NAV) are forced to be equal, so that this condition is met by net sales and purchases (Ferguson and Leistikow, 2001). Managers' perceived skill levels almost certainly have more time variation than fees charged, so this theory implies a negative correlation between some proxy for perceived skill (e.g. recent asset returns) and the discount. To explain why seasoned funds tend to trade at a discount requires something more, however. Recently Berk and Stanton (2007) have suggested that uncertain skill combined with the time profile of managerial compensation contracts explains closed-end fund discounts, even if investors are fully rational. We discuss this theory further below. Alternatively, investors are not fully rational and systematically overestimate managerial skill in newly issued funds, only recognizing this over the life of the fund (Ferguson and Leistikow, 2004).

Thus, even if managerial skill can help to explain the cross-sectional pattern of discounts, it remains an open question whether it explains why the average closed-end fund trades at

a discount, and whether the explanation is consistent with investor rationality. The main contribution of this paper is that we consider what we can learn from a study of closed-end index funds, a few of which have existed in the UK market. First of all, if managerial skill is the entire explanation for closed-end fund discounts, index funds should not trade at a discount, and new issues of closed-end index funds should be commonly observed (because they are not expected to trade at a discount in future and therefore the expected returns to purchasers of new issues are no lower than on an open-end index fund). Secondly, the managerial skill (MS) hypothesis predicts that discounts will be more volatile on actively managed than on index funds, where perceptions of skill cannot vary over time. Thirdly, if investors overestimate the skill factor in managers' asset returns, which is a possible explanation of discounts, discounts are likely to be more strongly mean-reverting on actively managed than on index funds, because of the mean-reversion in the perception of skill.

Since our results suggest that the MS hypothesis cannot entirely explain the discount puzzle, we reconsider the investor sentiment (IS) hypothesis of Lee *et al*. (1991). We find that the systematic component of discount risk is small on domestic closed-end funds, but much larger on international funds. We consider a possible explanation for this, and we examine its implications for the plausibility of the IS hypothesis.

2. Closed-end Funds and the Capital Asset Pricing Model

The existence of a fund management industry violates the predictions of the basic Capital Asset Pricing Model (CAPM) with zero transactions costs and identical beliefs amongst

investors about the probability distribution of future returns on all securities, since in this case the CAPM predicts that all investors would hold the market portfolio directly. With transactions costs, for some investors it is prohibitively expensive to acquire the market portfolio. An index fund can then charge a small fee for pooling these costs amongst a large number of investors, who get a slightly lower expected return, but also much less risk, than if they held a few securities chosen at random. Open-end index funds of this kind are now common, and (particularly for those investors who have read Burton Malkiel's *A Random Walk Down Wall Street*) may be the only risky asset held by many investors. Their existence shows that the portfolio diversification benefits can exceed the fees charged. In a closed-end index fund, this effect could potentially generate a premium (Kim and Lee, 2007). In the debate about closed-end funds, index funds have virtually never been mentioned, probably because few of them exist (and none in the US market). Index funds can provide vital evidence in this debate, however, for the reasons discussed above.

3. Managerial Skill in Actively Managed Funds

Berk and Stanton (2007) provide an elegant theory in which investors rationally buy new issues of closed-end funds of known fixed life. The skill of a fund's manager is not known with certainty, but investor rationality ensures that expected managerial quality matches the fees charged over the life of the fund. Whether, after issue, the fund trades at a premium or a discount depends on realized returns, which lead investors to update their estimates of managerial quality, and the time pattern of fees. To explain the tendency for

seasoned funds to trade at a discount, the authors focus on the case of a long-term contract where managerial fees cannot go down, but competition can force them up if realized returns are good. This ratchet effect ensures a tendency for managerial fees to rise over time, particularly in the early years, over the life of the average fund, whilst skill is unchanged. Since the balance of skill and fees is most favorable to investors in the early years, and least favorable later on, seasoned funds trade at a discount on average.

Berk and Stanton (2007) do not cite any direct evidence that managerial compensation in the closed-end fund market does follow this pattern. In the UK market, it is a well-known phenomenon that older funds tend to charge the lowest management fees, in direct contradiction of this model. Gemmill and Thomas (2006) estimate a cross-section regression for the expense ratios of 186 conventional closed-end funds in the UK market on various fund and board characteristics.[1] Both fund age and fund size have highly statistically significant negative coefficients, with a doubling of fund age estimated to add about 10% to the expense ratio. Although this evidence refers to a cross-section at a given date rather than a time series over funds' lives, it is extremely difficult to reconcile with the Berk-Stanton model unless it happened to be the case that younger funds have consistently demonstrated superior performance.

A more widely held view is that the market exaggerates the contribution of managerial skill in the dispersion of returns across funds and underestimates the role of luck, either

[1] "Conventional" in this context means that the fund issues only one class of share.

because investors fail to act rationally on the information available or because they are subject to biased information. In the context of mutual fund advertising, Jain and Wu (2000) show that mutual funds that advertise good past performance receive more funds, even though they do not show superior performance in the post-advertisement period. Elton *et al*. (1989) find that new issues of publicly traded commodity funds produce returns far below the very high rates advertised in the prospectus. Ferguson and Leistikow (2004) argue that a similar phenomenon applies to initial public offerings of new closed-end funds: a manager with unusually good recent performance is selected, whose apparent skill outweighs the fees charged. Because in fact much, if not all, of the good performance advertised is a matter of luck rather than skill, investors subsequently revise downwards their estimate of the manager's skill, and for this reason seasoned funds tend to fall to a discount.[2]

It is difficult to test these explanations of the closed-end fund discount empirically. If the MS hypothesis is true, however, in a cross-section of funds those with better past performance should be on lower discounts. In Table 1 we provide evidence on this for a sample of 66 UK funds in sectors populated by a good number of funds.[3] The dependent variable is the discount (NAV minus price divided by NAV) at 31 December 2005. The independent variables are the seven-year NAV return on the fund and a set of sector

[2] According to this theory, a fund run by a manager with exceptional skill would not be expected to fall to the same discount as other funds, so the high perceived skill of the manager encourages investors to believe that there will not be much of a capital loss from buying an initial public offering at a premium.

[3] The sectors are UK Growth, UK Growth and Income, UK Smaller Companies and Global Growth, as defined by the Association of Investment Companies (AIC). The funds are listed in Appendix 3.

dummies (funds in the UK Smaller Companies sector tend to have higher discounts). The first column of Table 1 shows that good past returns significantly reduce the discount. An extra one per cent of annual average NAV returns was associated with about a 0.4 per cent (= 7 x 6.10 x 0.01) reduction in the discount. Studies of open-end funds have found significant non-linearities in the relationship between past performance and net inflows, with stronger effects at the higher end (Chevalier and Ellison, 1997; Sirri and Tufano, 1998). Non-linearities are investigated in columns (2) and (3). In column (2) the square of past returns is positive and significant, suggesting a stronger effect for good than for bad returns, as for open-end funds. The third column shows that the performance effect appears to be confined to the top quartile of sector performance.

These results strongly suggest that perceived managerial skill affects the discount, but they are not sufficient to show that MS explains discounts in general. To obtain some further insight into this, we now turn to index funds.

Table 1. Discounts and Long-Term NAV Returns on UK Funds

	Dependent variable: Discount (%) at 31 December 2005		
Independent variables	(1)	(2)	(3)
Constant	8.48 (7.01)	6.44 (4.33)	7.14 (6.12)
7-year NAV returns (31.12.98-31.12.05)	–6.10 (–3.67)	4.45 (2.01)	0.98 (0.40)
Square of 7-yr NAV returns		–8.79 (–2.23)	
7-yr NAV returns * upper quartile dummy			–7.19 (–3.62)
UK Growth sector dummy	2.64 (1.59)	3.28 (2.01)	2.48 (1.63)
UK Growth & Income sector dummy	–0.64 (–0.39)	–1.17 (–0.74)	–1.45 (–0.97)
UK Smaller Cos sector dummy	7.80 (4.87)	8.25 (5.27)	5.98 (3.86)
Sample size	66	66	66
R-squared	0.370	0.418	0.483
Standard error	4.69	4.54	4.28

Notes. Figures in parentheses are *t*-statistics. Discount = 100*[1–(price/NAV)]. Seven-year NAV returns are calculated as ln (total return index at 31.12.05 ÷ total return index at 31.12.98). Upper quartile dummy = 1 if fund is in upper quartile of sector for seven-year NAV returns, =0 otherwise. See Appendix 3 for funds in sample and sector affiliation. Data source: Fundamental Data Ltd.

4. Index Funds

Although index funds have become increasingly popular in the UK open-end fund market, as in the US, the striking feature is that closed-end index funds (as distinct from exchange traded funds, which undertake to create and liquidate shares actively to keep prices very close to net asset value) are rare. None exist in the US and there have only ever been a few (currently two) in the UK. Of these, the Edinburgh UK Tracker Trust tracks the FTSE All-Share Index, as did the now defunct Tribune Index Trust. The Edinburgh US Tracker Fund tracks the S&P 500 Index of US stocks. The Edinburgh UK Smaller Companies

Trust tracked the FTSE Smaller Companies Index (the lowest 10% of the market by value) until its liquidation in 2006.

A feature of these funds is that with one exception none of them was an index fund at first issue. The first to be available was the Edinburgh UK Tracker Trust, which came about in 1990 as a result of the reorganisation of the poorly performing Globe Investment Trust. Tribune Index Trust originated in 1997 as an index option for the actively managed Tribune Trust, with investors having the right to convert between the two portfolios on a specified date each year. Because the actively managed portfolio performed poorly, conversions favoured the index portfolio, and in 2006 the actively managed portfolio was liquidated. The index fund was itself liquidated in 2007. The Edinburgh US Tracker Trust evolved out of the actively managed American Investment Trust in 1993, also following a period of poor performance. Only the Edinburgh UK Smaller Companies Trust was a new issue (in 1993), and was liquidated in 2007. It had no open-end counterpart, perhaps because the shares in the index sometimes lack liquidity, which suggests that this is a case where the advantages of the closed-end structure outweigh the disincentive to invest in a new closed-end index fund.

By definition index funds do not claim to possess managerial skill, and no investor could sensibly believe otherwise. If managerial skill explains the closed-end fund discount puzzle, index funds should therefore trade on lower discounts than actively managed funds, and if it is the entire explanation, then index funds should not trade at a significant discount at all. One would think that a closed-end structure is particularly suitable for

index funds, because an open-end structure requires considerable number of transactions when there are significant net inflows or outflows, if tracking error is to be minimized. In principle, therefore, in a competitive market fees on a closed-end index fund could be less than on an open-end index fund. The extreme rarity of new issues of closed-end index funds thus suggests an expectation amongst potential investors that they are likely to trade at a discount in the future, so that buyers at inception would face a capital loss that could be avoided by holding an exchange-trade fund or open-end index fund.

We now provide some evidence relating to quarterly observations on discounts on index funds and comparable actively managed funds in the UK market from the end of 1997 to the end of 2007. There are two index funds (Edinburgh UK Tracker Trust and Edinburgh US Tracker Trust) and ten large actively managed funds, nine that specialize in UK stocks and one in North American stocks. Table 2 shows the mean premium, the *t*-statistic for a test that the mean premium is negative, the standard deviation of the change in and of the level of the premium, the premium range and the estimated mean-reversion coefficient of the premium. The bottom two rows of Table 2 relate to a test for significant differences in each of these statistics between index funds and actively managed funds.[4]

Both index and actively managed funds tend to trade at a discount, although the discount tends to be lower (although not statistically significantly so) for index funds. Mean-reversion is also slower for index funds, although again the difference is not statistically

[4] There are no significant differences between funds holding North American and UK assets.

significant. There is, however, a statistically significant difference in discount volatility, with actively managed funds having greater volatility. The MS hypothesis predicts the higher discount volatility on actively managed funds but not the significant discount on indexed funds.

Table 2. Comparing Index and Actively Managed Funds

Fund	Mean discount (%)	*t*-statistic of mean discount	St. dev. of change in discount (%)	St. dev. of level of discount (%)	Discount range (%)	Mean-reversion coefficient
Index						
EUK	1.62	2.83	2.34	3.66	12.6	-0.19
EUS	4.22	9.34	2.06	2.89	13.1	-0.25
Active						
COL	4.85	6.59	2.72	4.71	19.1	-0.17
DUN	11.47	17.4	4.73	4.22	29.9	-0.61
ED	13.67	27.4	3.01	3.19	14.6	-0.52
CLA	1.20	1.89	2.81	4.05	18.0	-0.26
MER	6.36	8.99	4.40	4.53	17.5	-0.46
MUR	10.31	19.7	3.00	3.36	12.5	-0.39
PIG	6.55	8.12	2.80	5.17	20.8	-0.17
SIG	6.23	7.16	3.59	5.57	21.6	-0.22
TB	3.09	4.39	4.31	4.51	18.7	-0.47
AM	7.99	11.1	3.06	4.62	20.4	-0.21
Difference*	4.25	5.19	1.24	1.12	6.46	-0.13
(t-statistic)	(1.50)	(0.88)	(2.22)	(2.01)	(1.89)	(-1.08)

Notes. *Active minus index. The funds are: Edinburgh UK Tracker Trust, Edinburgh US Tracker Trust, City of London Investment Trust, Dunedin Income Growth Investment Trust, Edinburgh Investment Trust, JPMorgan Claverhouse Investment Trust, Mercantile Trust, Murray Income Trust, Perpetual Income & Growth Trust, Schroder Income Growth Fund, and JPMorgan American Investment Trust.

We may also compare discount levels and volatility on the managed and index portfolios run in parallel for some years by Tribune Trust. The seven-year performance of the managed portfolio was ranked 21st out of 23 surviving funds in the Global Growth sector at the end of 2005.[5] According to our theory, this should be taken as evidence of low skill, which would raise the discount. Table 3 provides some analysis of 29 quarterly observations on the percentage discount of the two portfolios from 31st December 1998 to 31st December 2005. The managed portfolio had both a significantly higher average discount (10.6% compared with 6.8%) and significantly higher discount volatility, as measured by absolute quarterly discount movements (3.21% compared with 1.81%). The higher volatility of the managed portfolio is consistent with the evidence in Table 2, and the relatively high average discount is also what we would expect for a managed fund experiencing poor returns.

Table 3. Discounts on Indexed and Managed Portfolios of Tribune Trust

	Dependent variable	
	Discount (%)	Absolute Quarterly Change in Percentage Discount
Constant	6.81 (13.4)	1.81 (3.72)
Dummy for Managed Portfolio	3.79 (5.29)	1.40 (2.02)
Sample size	29	28
R-squared	0.353	0.071
Standard error	2.73	2.58

Notes. Sample: quarterly observations 31.12.98 to 31.12.05. Figures in parentheses are *t*-statistics.

[5] Its annual sector rankings from 1999 to 2005 were respectively: 8th/15, 20th/30, 25th/30, 13th/32, 32nd/33, 19th/33 and 24th/32.

5. The Investor Sentiment Theory

The evidence provided above suggests that perceived managerial skill is an element of closed-end fund discounts, but that it is not the whole story. Past returns help to explain the cross-sectional pattern of discounts, and discounts are more volatile on actively managed than on index funds. There is also some evidence that discounts are on average higher on actively managed funds. Nevertheless index funds also trade at a discount, and new issues of index funds have occurred only with extreme rarity, despite the attractions of a closed-end structure, which suggests that investors have good reasons for not buying them. The MS hypothesis cannot explain these phenomena.

The only difference between a closed-end index fund and an open-end index fund charging identical fees is the discount risk. Investors can be rewarded for accepting discount risk if there is a discount in equilibrium, because they pay less for the same income flow. An equilibrium discount means, however, that investors will only buy new funds, which sell at a premium to cover marketing expenses, in special circumstances (e.g. where the asset class or the manager is perceived as "hot") that cannot apply to index funds. Thus the absence of new issues of index funds may reasonably be interpreted as additional evidence that, if they existed, they would tend to trade at a discount.

Let us return, then, to the investor sentiment theory of Lee *et al*. (1991). Their argument is that discount risk is to a significant degree systematic, and therefore has to be rewarded according to the CAPM, which is achieved through the mechanism mentioned above, i.e. by funds trading at a discount in equilibrium. Although Lee *et al*. (1991) offer

considerable evidence for their theory (which has been challenged in some quarters), they fail to implement the most straightforward test of their proposition, which is to investigate whether the market beta on a closed-end fund's shares is significantly greater than on its underlying assets.

In Table 4 we provide some evidence on this issue for a panel of monthly data for sixty funds traded in the United Kingdom from 1980 to 2001. The sample is divided into funds specializing in domestic equities (23) and those specializing in international equities (37). For international equities the index used is the Datastream World Market Index (UK£). Although the beta on the funds' prices is higher than on their assets in both cases, the difference is really only quantitatively significant for international funds. Thus it is far from clear that discount risk is universally systematic.

Table 4. Market Betas on UK Closed-end Fund NAVs and Prices

	Dependent Variable		
Fund type	NAV Returns	Share Price Returns	Share Price Returns minus NAV Returns
	Coefficient (*t*-statistic) of Index Returns		
Domestic funds	0.884 (49.7)	0.915 (34.8)	0.032 (1.77)
International funds	1.026 (16.7)	1.206 (16.8)	0.181 (4.69)

Notes. The figures in parentheses are robust standard errors. Betas are estimated from the regression $R = \alpha + \beta M + u$, where R is the one-month excess return on the closed-end fund relative to the one-month eurodeposit rate, and M is the one-month excess return on the stock market index relative to the eurodeposit rate. The stock market index is the Datastream UK Market Index for domestic funds, and the Data Stream World Market Index (in sterling) for international funds. The sample of funds used is listed in Appendices 1 and 2.

Is it reasonable, however, to appeal to a version of the CAPM that assumes no transactions costs when analyzing the pricing of collective investment funds, which would not exist in such a world? With transactions costs, small investors would own relatively few equity investments (individual stocks or stock mutual funds), each of which would represent a significant portion of their risky portfolio. Kim and Lee (2007, p. 383, footnote 3) quote a 2002 study that shows that US equity investors owned on average a median of four equity investments. In that situation, the CAPM prediction that only covariance affects portfolio risk, and that the variance of returns on individual assets does not do so, is not valid, because it depends on individual assets each representing a negligible proportion of the total portfolio. In a world where few risky assets are held, discount risk is going to add to the riskiness of the portfolio of the typical holder, even if it is uncorrelated with returns to the underlying assets. To put it another way, the excess volatility of closed-end fund shares (i.e. higher volatility of returns to shareholders than on the underlying assets) is more relevant than having "excess beta". For closed-end fund shares not to have excess volatility they would actually have to have negative excess beta, which is clearly not the case.[6]

A secondary question is why international funds, many of which in our sample are quite geographically specialized, display much stronger evidence of excess beta than domestic funds. Most probably this is a case of neglected stocks in the sense of Merton (1987). More specialized funds are held by relatively few investors except when this class of assets

[6] See Pontiff (1997) for evidence that closed-end funds in the US market are also characterized by excess volatility.

hits the headlines with spectacular returns (as was the case for emerging markets in the mid-1990s or commercial property in 2006-07), which draw in investors that would not normally hold them and drives them to a premium.

6. Conclusion

We have reviewed recent work on closed-end fund discounts in light of evidence from the UK market. In particular, we have argued that more attention should be paid to index funds, for which investors cannot be claimed to misestimate managerial skill. Index funds tend to trade at a significant discount, and this probably accounts for their rarity, since it discourages new issues. There is considerable evidence that perceived managerial skill affects discounts on actively managed funds, both from the cross-sectional pattern of discounts and from the tendency for discounts to be more volatile on actively managed than on index funds. It is less clear that managerial skill accounts for the general tendency for funds to trade at a discount. Management fees are significantly lower on older funds, in direct contradiction of the assumptions in Berk and Stanton's (2007) model, which combines uncertain managerial skill with rational investors. In particular the managerial skill hypothesis cannot explain why index funds also typically trade at a discount.

We have implemented a simple test of Lee *et al.*'s (1991) hypothesis that closed-end funds trade at a discount because discount risk is to some extent systematic. Our results suggest that, although closed-end fund shares display excess return volatility relative to their underlying assets, discount risk is mostly idiosyncratic, with the systematic element mainly confined to more specialized funds. The investor sentiment explanation of discounts of

Lee *et al*. (1991) is that they exist because an investor who holds closed-end funds carries greater portfolio risk than one who holds open-end funds. We have argued that this can be true even if discount risk is purely idiosyncratic, because, in a world with transactions costs, investors only hold a small number of risky assets, each of which represents a significant proportion of the portfolio. In such a world, it is the excess volatility of closed-fund returns rather than the systematic element of discount risk that is important for portfolio risk.

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Appendix Table 1: U.K. Domestic Equity Funds in Table 4 sample

GENERAL EQUITY		**EQUITY INCOME GROWTH**	
3i UK Select	1981.12-2001.8	City of London	1980.1-2001.8
Albany	1980.1-2001.8	Dunedin Income Growth	1980.1-2001.8
Edinburgh	1980.1-2001.8	Lowland	1980.1-2001.8
Finsbury Growth	1980.1-2001.8	Merchants	1980.1-2001.8
Finsbury	1981.3-2001.8	Murray Income	1980.1-2001.8
Fleming Claverhouse	1980.1-2001.7	Securities Trust of Scotland	1980.1-2001.8
Govett Strategic	1980.1-2001.8	Temple Bar	1980.1-2001.8
		Value and Income	1981.7-2001.8
SMALL COMPANIES			
3i Quoted Smaller Companies	1980.1-2001.8		
Dresdner RCM Smaller Companies	1980.1-2001.8		
Dunedin Smaller Companies	1980.1-2001.8		
Gartmore Smaller Companies	1980.1-2001.8		
Henderson Smaller Companies	1980.1-2001.8		
INVESCO English	1980.1-2001.8		
Perpetual UK Smaller Companies	1988.2-2001.8		
Throgmorton	1980.1-2001.8		

Appendix Table 2: U.K. International Equity Funds in Table 4 sample

	Sample Range		
Fleming American	1985.1-2001.12	Fleming European Fledgeling	1990.4-2001.12
F&C U.S..Smaller Companies	1992.12-2001.12	TR European Growth	1990.7-2001.12
North Atlantic Small Companies	1985.1-2001.12	Aberdeen Emerging Economies	1993.9-2001.12
Baring Emerging Europe	1993.12-2001.12	Dresdner RCM Emerging Markets	1993.6-2001.12
Aberdeen Latin America	1994.10-2001.12	F&C Emerging Markets	1987.9-2001.12
Deutsche Latin America	1994.2-2001.12	Templeton Emerging Markets	1989.6-2001.12
F&C Latin America	1990.7-2001.12	Baillie Giff. Japan	1985.1-2001.12
Aberdeen New Thai	1989.12-2001.12	Baillie Shin Nippon	1985.7-2001.12
Fleming Indian	1994.3-2001.12	Fidelity Japanese Values	1994.2-2001.12
Gartmore Irish	1995.5-2001.7	Fleming Japanese	1985.1-2001.12
Old Mutual South African	1994.6-2001.7	Perpetual Japan	1993.6-2001.12
Aberdeen New Dawn	1989.5-2001.12	Schroder Japan	1994.5-2001.12
Edinburgh Dragon	1987.9-2001.12	Charter European	1985.1-2001.8
Henderson Far East	1985.1-2001.12	Fleming Continental Europe	1985.1-2001.8
Pacific Assets	1985.1-2001.12	F&C Eurotrust	1985.1-2001.8
Pacific Horizon	1989.9-2001.12	Gartmore European	1985.1-2001.8
Fidelity European Values	1991.10-2001.12	Perpetual European	1989.11-2001.8
Martin Currie Europe	1990.2-2001.12	European Assets	1985.1-2001.8
Merrill Lynch European	1994.2-2001.12		

Appendix Table 3 – Funds used in Table 1 regressions, by sector

UK Growth (13)
Albany, Aurora, Edinburgh, Fidelity Special Values, Hansa, ISIS UK Select, JPM Claverhouse, JPM Mercantile, JPM Midcap, Keystone, Manchester and London, Schroder UK Growth, UK Select.

UK Growth and Income (14)
British and American, City of London, Dunedin Income, F&C Capitla and Income, Finsbury Growth and Income, INVESCO Income Growth, Lowland, Merchant, Murray Income, Perpetual Income and Growth, Schroder Income Growth, Securities Trust of Scotland, Standard Life Equity Income, Temple Bar.

UK Smaller Companies (18)
Aberforth, Dunedin Smaller Companies, Eaglet, Edinburgh Small Companies, Framlington Innovative Growth, Gartmore Fledgling, Gartmore Growth Opportunities, Gartmore Smaller Companies, Henderson Smaller Companies, Henderson Strata, INVESCO English and International, INVESCO Perpetual UK Smaller Companies, ISIS Smaller Companies, JPM Smaller Companies, Merrill Lynch British Smaller Companies, Montanaro, Platinum, Throgmorton.

Global Growth (21)
Advance UK, Alliance, Bankers, British Empire Securities and General, Brunner, Electric and General, Establishment, Foreign and Colonial, Gartmore Global, INVESCO City and Commercial, Jupiter Primadona, London and St Lawrence, Majedie, Martin Currie Portfolio, Personal Assets, RIT Capital Partners, SVM Global, Scottish, Scottish Mortgage, Second Alliance, Witan.