Property Fund Flows and Returns

by

Stephen L Lee

Department of Land Management
University of Reading
Whiteknights
Reading
RG6 6AW
England

Phone: +44 (0) 118 931 6338, Fax: +44 (0) 118 931 8172 E-mail: S.L.Lee@reading.ac.uk

Abstract

This study is concerned with the impacts on property returns from property fund flows, and with the possibility of a reverse transmission from property fund flows to property returns. In other words this study investigates whether property returns "cause" fund flow changes, or whether fund flow changes "cause" property returns, or causality works in both directions.

Property Fund Flows and Returns

Introduction

Indirect investment in property by UK pension funds can be made through a number of vehicles, but for a number of reasons the nearest equivalent to that of direct property investment is through an 'unauthorised' Property Unit Trust (PUT), Investment Property Forum (1996). First investment in an 'unauthorised' unit trust is restricted under the Trustees Investment Act 1961 and other legislation unless the investors are tax exempt and approved pension funds and charities[1]. Consequently, because of the special status of their members as gross tax bodies, the PUTs are themselves have 'tax exempt' status under the Income and Corporation Taxes Act 1988 and other taxation statutes[2]. In addition while any distributions from net rents receivable or investment income by the PUT will be subject to income tax as the investors are tax exempt such tax is easily recoverable by a claim to the Inland Revenue. Secondly the illiquidity, large lot size and the requirement of management skills required by direct property investment have deterred many pension funds, especially small funds, from holding property. Consequently the Investors Chronicle (1966) saw the idea of a unit trust that invested in real property and not just property shares as particular attractive to "smaller, less well advised investors to get a good stake in good commercial properties". In addition PUTs have also appealed to larger pension funds on the basis that they are not, on their own, sufficiently large to undertake investment in real estate, where it is difficult to secure a broad spread of properties to have a diversified portfolio without substantial resources. Both large and small institutions, therefore, have looked for an arrangement by which they could 'pool' their resources into the sums required, to obtain a well-balanced property portfolio without the need to acquire the necessary management skills. A PUT provides such an arrangement since their unit trust structure means that investment in a PUT can be made in very small amounts. While the 'pooled' nature of their structure means that PUTs are able to offer a wider diversified portfolio of properties than could be held by one fund in isolation. Consequently Baring, Houston & Saunders (BHS) (1987) contend that with institutional investment in property still in its infancy in the late 60's and early 70's "PUTs offered an excellent opportunity to buy into a rising market and to secure immediate diversification". Indeed the idea of a unit trust which offered pension funds the chance to invest indirectly in property with all the tax advantages of direct ownership was so appealing that the UK PUT structure was adopted almost without change by the Prudential Property Investment Separate Account (PRISA) and other Commingled Real Estate Funds (CREFs) in the US, Melnikoff (1984).

Given the incremental nature of unit trust investment, it is reasonable to assume that the performance of PUTs is likely to be more closely monitored than that of direct property. In

[1] The term 'unauthorised' although technically correct has an unfortunate connertation as it seems to imply that PUTs are somehow not legally constituted. The term derives from the fact that unit trusts, which are open to the general public, are 'authorised' unit trusts under the Act. Consequently unit trust like PUTs which are not open to the general public must be by definition an 'unauthorised' unit trust. A less contentious term might be 'restricted' unit trust as investment in PUTs is restricted to certain investment groups.

[2] See Lee and Ward (1980) and Lee (1991) for a more detail discussion of the legal statutes under which PUTs operate.

order to determine the allocation of any new moneys or the reallocation of existing funds. This monitoring is helped by the valuation of such funds initially on a quarterly basis and more recently on a monthly basis. This suggests that the past performance of property will determine future fund flows. Indeed evidence from the mutual fund industry in the US indicates a strong relationship between aggregate money flows and market returns (see for example Warther, 1995). That is, increases in mutual fund inflows have tended to accompany market upturns and increases in out-flows have tended to accompany downturns. In other words returns determines future fund flows. Others meanwhile reverse this logical ordering, attributing the rise and fall in returns to inflows into the market. This is the "weight of money" argument (see Lindahl and Muldavin, 1997). Where a rise in inflows into the funds as a whole is taken to indicate that portfolio managers will be buying more property in the future, leading to an increase in prices and so returns. An increase in money into the funds leads to a rise in prices, because managers have to invest it in property. However, an increase in out-flows means that fund managers will have to redeem units and so spend less on property, leading to a fall in prices. In other words fund flows determine returns. A third alternative is that the two processes interact. Returns affect money flows and money flows affect returns. If valid, this dynamic interaction could result in a feedback process in which a shock (either positive or negative) to real estate market returns leads to a change in property fund inflows, which leads, in turn, to a further change in property returns. Indeed if such a feedback is especially strong, a cascade or snowball effect may result, with cycles in returns and flows getting larger over time. A spiral of decline of this nature could lead ultimately to market collapse. The existence or otherwise of such a feedback process is consequently of considerable importance to academics and professionals alike. This paper looks at these issues using quarterly data over the period 1970 Q1 to 1998 Q3.

The Structure of PUTs and Redemptions

Like all unit trusts PUTs are open-ended investment vehicles in the sense that units are purchased from and sold to the managers of the fund. It follows therefore that sales by unit holders may cause liquidity problems for the fund mangers or for the industry as a whole because of the difficulty of the disposition of property investments, Rosenberg and Sack (1969). In other words while an increase in redemption's can be met initially by running down the funds' cash balances, as happened in the case of the Dutch property fund Rodamco (Europroperty, 1991). Once the cash reserves are exhausted the fund will have to start selling properties, as in the case of the Prudential PUT in 1982 and Legal & General in 1985, (Pensions, 1985). Consequently to try and avoid such a 'liquidity crisis' PUTs in the UK have developed a number of *ad hoc* solutions in order to try and deal with the redemption of units in an orderly fashion. First by requiring unit holders to give notice of their intention to dispose of units, so that the fund managers would have time to offer them to existing or new members. Second by holding a fair proportion of the funds assets in cash. So that if the units could not be placed with other members the units could be redeemed without selling properties. Finally the funds typically have the power to delay redemptions[3].

[3] Increasing the redemption period has also been used in other countries to avert a liquidity crisis in property unit trusts. For example in Australia prior to the market collapse in 1990 unlisted property unit trusts had been offering redemption periods of between seven and 30 days. Following the property market crash the redemption period was initially increased to 180 days and then to 12 months, Little

Indeed in the case of some funds the redemption delay could be delayed by as much as 18 months, which would hopefully give the fund enough time to dispose of properties if necessary. In extreme cases funds have also switched the valuation of the fund to a bid basis which leads to an immediate loss to investors who redeem due to the spread. For example in the UK Vanburgh property fund tried to delay redemption's, rather than starting to sell properties in order to avert disaster, by switching the funds valuation on to the bid basis, thus effectively reducing the value of the fund by 13%, (Pearce, 1983). In other words if investors decided to redeem their investment they faced an immediate loss of 13%, whereas if they stayed with the fund they would not, a delaying tactic that ultimately proved unsuccessful. Such tactics are rare.

Rosenberg and Sack (1969) argue, however, that the idea that open-ended property funds can offer liquidity to its members is unrealistic and advocate that all property funds should be closed-ended[4]. Thereby clearly signally to members that they cannot leave the fund until a certain date, thus avoiding the need for liquidity. A similar but less extreme view was expressed by some of the promoters of PUTs in the 1960s. Where it was argued that redemptions should be discouraged, as unhelpful to investors and the industry alike, because property is a long-term investment and so investors should be encouraged to take the long-term view. Others meanwhile took the alternatively view arguing that redemptions were necessary otherwise the whole basis of a PUT is undermined if dealing does not take place in the same way as in other unit trust vehicles. In other words the debate was whether funds should be allowed to "actively deal in units or should they be encouraged to hang onto their units whatever the variation in price?" (Redden, 1984). Fortunately or unfortunately redemptions were rare in the early days of the industry's development so the two opposing ideas were not fully debated, but they highlighted an issue that was to come to haunt PUTs later when fund performance started to falter.

Thus while it was easy to buy into the funds in the early day's investors were to face considerable problems when they wished to exit. Especially in terms the long delays before the money was actually realized, even if the PUT had sufficient liquidity to redeem the units from cash on deposit. These delays would be particularly acute for a large investor, as this would entail the sale of properties to redeem units. Since although PUTs are particularly attractive to small pension funds, PUTs have also appealed to larger schemes. Indeed the initial launch of the Pension Fund Property Unit Trust (PFPUT) needed the backing of a number of large pension funds to be assured of a successful launch, Redden (1984). This impact would be compounded in a falling market where unit prices would already be depressed. As funds would have to resort to selling their "best" properties to redeem units, resulting in even greater falls in unit values. In other words as a consequence of their open-ended structure redemptions, especially those by the largest investors, could only be met by running down liquidity and ultimately selling properties in a declining market, both actions putting an even greater strain on PUT investment performance, which could result in ultimate failure.

(1992).

[4] In Holland the largest Dutch property fund Rodamco only staved off liquidation in 1990 by ending its open-ended structure guarantee, after spending more than 20% of its assets supporting its share price (Kynoch, 1990).

Precisely the scenario faced by the Pennine PUT in the 1980s. Pennine had been having problems for some time due to its heavy exposure to industrial property in the Midlands at the time of the severe recession in the early 1980s. Thus return performance had been poor for sometime. However, the liquidation of the Pennine PUT was finally set in motion by the withdrawal of a major investor (the Plessey Pension Fund), at a time when the fund had agreed to purchase and develop a site in Wakefield. This required the fund to increase its borrowing to continue the project. Leading to yet further problems and even lower fund performance. This poor performance led to further withdrawals with the fund's value falling by 36% in 1984. The unit price ultimately suspended in November 1984. The Pennine PUT finally liquidated in 1985, Pearce (1985). Even though a number of commentators at the time saw this as a one off event, due to the small size of Pennine and its concentration of investment in a declining sector of the market. The demise of Pennine only heralded things to come. Indeed by 1987 the property consultants BHS suggested this scenario may be about to be repeated across the whole industry when they commented that:

> "..the sector is now in danger of haemorrhaging. The cut back by pension funds into direct property recently has probably been more acutely felt by the PUTs than any other sector of the market. The never ending call for redemptions…have left the Trusts drained of new resources….. now reflected in their performance figure. Indeed some funds could well find themselves cut back in size by 50% or more over the next 12 months". BHS (1987)

From these examples and others it can be seen that an increase (decline) in returns leads to increases (decline) in property fund investment flows, which in turn leads to an increase (decline) in returns and so on. This implies that not only do returns affect money flows but that money flows affect return. Thus in order to test for the existence of such a dynamic positive feedback process, the causal link between market-wide real estate returns and aggregate flows into UK PUTs is examined over the period 1970 Q1 to 1998 Q3 using quarterly data. A quarterly time horizon more consistent with the dynamics of a downward spiral in property prices than say annual performance.

Previous Studies of Fund Flows and Returns

Previous studies of the link between net flows and fund performance are concentrated in the US mutual fund industry. The original focus of such work investigated the effects of past performance on flows into individual mutual funds, typically with a one-year lag separating cause and effect. Studies by Spitz. (1970), Smith (1978), Ippolito (1992), Sirri and Tufano (1993), and Patel, Zeckhauser, and Hendricks (1994) all use annual data to show that investors shift their money to funds that performed well in the previous year.

However, a lag of one year is too long to investigate the positive-feedback hypothesis that could lead to a self-sustaining decline. At the same time, shifts in flows from one individual fund to another that do not change aggregate flows are unlikely to move prices in the market as a whole. As a result later work in the mutual fund market shifted to examining aggregate flows and returns over a shorter time horizon, typically a month. Since this period is too

short for most investors to know precisely how their own investments have performed relative to other funds, but they will be able to surmise how the funds, including their own, have performed on average. Hence, in order to investigate the possibility of a positive feedback process between flows and returns it is necessary to measure the effects of market returns on aggregate flows.

The first study to examine this question in the US mutual fund industry was Warther (1995). Warther investigated the relationship between mutual fund flows and past returns as well as the contemporaneous relationship between mutual fund flows and current returns, which he calls the "feedback-trader" hypothesis. Using monthly data for January 1984 to June 1993, the author decomposed net new money inflows into expected and unexpected components. Expected fund flows were estimated by regressing current flows on past flows, and unexpected fund flows derived as the residual from the expected flow regression. Using this approach Warther finds that unexpected money inflow into both equity and bond mutual funds are significantly positively correlated with current-month returns. However, no evidence was found linking past returns and new money flows. In a market in which current prices react rapidly to new information (i.e. an efficient market) this is not surprising. For market equilibrium to be reached quickly requires that any shocks be evaluated within a short period, certainly within a month, creating contemporaneous correlations but no correlations with past values. Warther also finds no statistically significant effect of past mutual fund inflows on current security returns. In short, he rejects both sides of a "feedback-trader" hypothesis, arguing that security returns neither lag nor lead mutual fund flows.

Remelona, Kleiman, and Gruenstein (1997) used a method similar to Warther's, involving decomposition of mutual fund flows into expected and unexpected components. However, the authors included returns on other securities not held by the fund as well as own-returns as determinants of unexpected fund flows. Their results, based on the instrumental variables method rather than Ordinary Least Squares (OLS), found that unexpected equity fund flows were not affected by *either* contemporaneous *or* lagged stock returns. In addition to which they found that bond fund flows (specifically, government, corporate, and municipal bond fund flows) were affected by contemporaneous bond returns but not by lagged bond returns. The coefficient measuring the effect of bond returns on bond fund flows was higher in Remolona et al. than in Warther's study, a result they attribute to the ability of Instrumental Variables estimation to eliminate biases due to reverse feed-backs.

In summary no the study finds evidence that mutual fund flows are affected by past security returns, or that security returns are affected by past mutual fund flows. In other words previous studies in the US mutual fund industry find no evidence supporting a positive-feedback process in which a shock to security returns or to fund flows is associated with subsequent changes in flows or returns. However, they do find evidence that fund flows are positively correlated with contemporaneous returns on the same type of securities held by the fund.

Property Fund Net Inflows

Data on pension fund flows into property funds was collected form Financial Statistics the data covering the period 1970 Q1 to 1998 Q3. Then because estimation of the causal equations below requires that the variables be stationary, following Warther (1995), and Remelona, Kleiman, and Gruenstein (1997) the net-flows data are normalised by dividing them by the aggregate market value in the previous quarter. The net investment data was partitioned into expected and unexpected components, by regressing the net flows on lagged inflows and on a number of dummy variables[5]. The number of lags to use was determined by the Akaike information criterion, (AIC), Akaike (1974). This method was chosen in preference to others because in a study by Meese and Geweke (1984), which investigated the performance of several methods of choosing lag lengths for univariate autoregressions used to predict 150 macroeconomic time series, the authors found that the AIC produced the best forecasts more often than any other method studied. The predicted values from the regressions then serve as the expected flows and the residuals as the unexpected flows.

Real Estate Returns

Within the PUT sector some funds will do better than others, and flows may shift to the best performers. However, the interest here is in the aggregate flow, which depends not on the performance of specific portfolios but on that of whole market sector. Therefore only an overall measure of real estate performance is required for this analysis. In addition choosing among the various property market indexes, it is not critical which index is chosen because the various indexes tend to be highly correlated (see Wu 1997). The data used in this study comes from two sources. For the period from 1967 Q1 to 1977 Q2, the data comes from Blake (1996). The second data set covering the period 1977 Q3 to 1998 Q3 is the JLL Property Index, as published by the Jones Lang LaSalle (1998). The data in Blake is based upon the backtracked performance of the JLL index which itself is based upon of 162 properties with a market value of £487 million at the end of 1998.

The data are used, in preference to the others currently available in the UK for number of reasons. First the data from Blake and JLL is essential based on the same data set and is therefore a consistent data series. Secondly although the largest index produced in the UK, the Investment Property Databank (IPD) Index is only available annually. However, a shorter time horizon is deemed more appropriate to test any feedback effects. Consequently quarterly data is preferred. Third the larger IPD Monthly Index, from which quarterly returns could be derived, is only available from 1987[6]. Fourthly the quarterly index of property fund performance, the UBS Phillips and Drew Pooled Property Fund Index, which it may be felt would the most relevant index to use in this case does not start until 1973 Q1 and was discontinued in 1997. Finally the index shows similar performance characteristics to the other quarterly data series (Nanthakumaran and Newell, 1995 and Wu 1997). Thus the Blake/JLL data constitutes the longest quarterly data series currently

[5] From inspection of the data on net flow in Figure 1 there are a number of spikes in the data which can attributed to the liquidation or sale of a number PUTs in 1982 and 1987 and the sudden switch into property in 1993 and 1997. Dummies were thus used to control for these events.

[6] This data has been backtracked to 1981 but is still far shorter than the Blake/JLL quarterly data series, see Cullen and Rawlinson (1992).

available in the UK. The data, providing a time series of 127 data points and covering a number of property cycles.

In a similar way as described above for the normalised net flow data the total Property returns data was regressed on lagged values of itself and a constant to derive an Expected and Unexpected returns series. The number of lags to use determined by the AIC.

Results

Net Flows and Property Returns

Figure 1 shows the development of net investment flows into UK PUTs along with the returns to property over the period 1970 to 1998. As can be seen the graph indicates that the inflows into PUTs and the performance of property show three distinct phases over this time period. The first period following the launch of PFPUT in 1966 was one of rapid development of the industry with PFPUT alone raising £6.7 million in the first year, without the aid of a single advertisement[7]. Consequently the success of PFPUT was immediately followed by two more funds in the following year, Redden (1984). After three years PFPUT alone had grown by £37m with the total investment in the movement up to £80m. The total investment rose to £200m by 1972. Figure 1 shows that this initial eagerness of pension funds for PUT investment was maintained despite the property market crash of 1973. Indeed BHS (1987) contend that " in the late '60's and early '70's the attractions of PUTs were considered overwhelming, and this lead to a rapid expansion of the Movement". Consequently as the market improved 1976 saw several new funds formed.

However, the second period from 1980 shows that as pension funds grew in size and property holdings were already reaching their target level of about 15% a number of funds in the early 1980s, especially the larger funds, started to switch out of PUTs into direct property. Pension funds seeing direct investment offering the opportunity for greater control in the selection and management of properties, Wootton (1989). Unfortunately this switch away from indirect property investment into direct property came at a time when property in general was underperforming, relative to equities and bonds. Thus as the recession in the UK began to bite in the early 1980s, leading to slow down in rental growth and increased vacancies, pension funds increasingly turned to equities and gilts, which offered superior returns. The introduction of index-linked gilts only made the situation worse. Both developments encouraging pension funds to leave property entirely. In other words pension funds were not only starting to invest directly in property, at the expense of PUTs, but many pension funds were liquidating all their holdings in property, indirect or otherwise. In order to try and control these outflows funds started to increase redemption periods. Thus although in 1983/4 the standard redemption periods was typically three months some funds had powers to delay this for much longer periods, and as redemptions grew they started to exercise their powers, Wootton (1989). Even the Legal and General PUT, the largest fund

[7] Due to their 'unauthorised' status PUTs are restricted from advertising directly for new funds from investors. However, funds are easily able to side step such restrictions by reporting on recent deals and announcing new development projects or the creation of new funds. Thus constantly advertising themselves indirectly to potential investors.

at this time, was quoting a six month delay when pension funds inquired about the possibility of redemption of a mere seven figure sum. In response to this problem the stockbrokers Phillips and Drew establishment an unofficial secondary market to match buyers and sellers and so reduce the redemption period. However such a secondary market may have inadvertently increased the decline of PUTs. That is the existence of a secondary market, where trades could be completed in a week or two compared with the months previously, meant that investors would place PUTs investment performance under greater scrutiny. Any lack of performance would therefore be punished by even more redemptions. Casual evidence seems to support this in that although the trades were done at a discount of between 6 and 12 percent it appears that investors, including some of the major funds, were prepared to take such a loss to redeem their investment more quickly (Pensions, 1985). This increase in redemptions came at a time when the absence of any reinvestment income[8] and a lack of investment opportunities, due to the poor market conditions, meant that PUT performance declined even more leading to yet more redemptions, Wootton, (1989).

Finally enthusiasm for PUTs was still lacking even during the surge in the performance of the property market in the late 1980's. Net investment into PUTs remained weak and stayed so during the long market crash of the 1990s. It is not until the reappraisal of the property market in 1993 that investment rose once again. Investment falling back in 1994-1996, along with the fall in market returns. Net investment picking up again in 1997 with the Budget changes of that year, which increased the tax slippage of equity investment faced by pension funds, that interest was renewed in PUT investment. The industry seeing over £556m invested in PUTs in 1997 alone, a sum unheard of since the early 1970s.

These three phases of net investment flows into the PUT since 1970 has important implications for testing the existence of a causal link between net investment and property returns. The first period up to the start of the 1980s is one of rapid growth with PUTs seeing positive net investment in every quarter during this time even during the crash of 1973, almost irrespective of property return behaviour. This implies little linkage between property returns and investment flows during this period. In contrast the 1980s up to the third quarter 1987 was a period of reappraisal of property as an asset class in general and PUTs in particular. PUTs seeing a general decline in net investment and the liquidation of a number of funds, closely match with the decline in property market performance. Indicating a strong relationship between property returns and net flows. The final period up to the present time is one of much more irregular growth in PUT net investment. PUT net inflows rising and falling more closely in line with the rise and fall of property returns. This suggests a much more positive relationship between property returns and net investment flows over this period than even of that of the 1980s. Whether this positive association between property returns and net investment flows is indicative of a positive feedback process is unclear and the next section sets out to resolve this issue,

Correlation

Panel A of Table 1 presents the correlation between current and lagged property market

[8] In order to maintain their tax-exempt status PUTs must distribute all income.

returns against net flows: total, expected and unexpected. As can be readily seen Table 1 shows a positive correlation with current property returns (0.326 which is significant at greater than the 1 per cent level), with none of the lagged property returns showing a significant relationship with current net flows. However, the significant correlation between current returns and net investment flows can be attributed almost entirely to the Unexpected component which shows a positive relationship (0.426, significant at greater than the 1 per cent level). These findings are consistent with previous studies in the US equity market, see Warther (1995) and Remelona, Kleiman, and Gruenstein (1997).

Panel B of Table 1 presents the correlation between current Property returns and current and lagged total Net flows. As is to be expected the current relationships display a very similar picture to that in Panel A of Table 1[9]. That is current Net flows have a significant relationship to current Property returns, with most of the impact again on Unexpected returns. However, in contrast with the results in Panel A, net flows lagged one period also have a significant association on property returns but here the main influence is on expected Property returns.

Table 1: The Correlation between Quarterly PUT Net Flows and Property Returns

Panel A	**Fund Flows**					
Property Returns	**Net**	**p-value**	**Expected**	**p-value**	**Unexpected**	**p-value**
Current	0.326	0.000	0.145	0.127	0.426	0.000
Lag 1	0.112	0.240	0.016	0.869	0.211	0.025
Lag 2	0.119	0.213	0.067	0.484	0.128	0.177
Lag 3	0.066	0.490	0.042	0.657	0.061	0.523
Lag 4	0.005	0.955	-0.007	0.946	0.024	0.802
Panel B	**Property returns**					
Net Flows	**Net**	**p-value**	**Expected**	**p-value**	**Unexpected**	**p-value**
Current	0.309	0.001	0.081	0.406	0.334	0.000
Lag 1	0.188	0.051	0.307	0.001	-0.026	0.791
Lag 2	0.051	0.599	0.209	0.030	-0.118	0.222
Lag 3	-0.025	0.794	0.035	0.719	-0.064	0.508
Lag 4	-0.067	0.488	0.075	0.443	-0.155	0.110

However, a significant correlation between net investment flows and returns does not necessarily mean that a strong positive-feedback process is at work. There are at least two ways in which such correlation can arise in the absence of this process. First, Granger (1980) points out, that two variables can be highly correlated yet causally independent. Under such a scenario, the observed correlation between net flows and property returns may simple be the result of both variables responding to effects emanating from other

[9] The current correlations shown here between property returns and net flows will not be precisely the same as for the current correlations presented in Table 1 due to loss of data resulting for lagging the Net flow data which is of a shorter duration than the property returns data. Nonetheless the figures are qualitatively the same.

factors. Second, the correlation may arise from a causal relationship in only one direction: i.e. flows may cause returns but not vice versa, a causal relationship in only one direction. For a positive-feedback process to exist the causation must run both ways. In other words two variables may be highly correlated yet causally independent. Indeed the results in Tables 1 seem to imply only a one way causal linkage running from net flows to property returns.

The "Causal" Connection between Fund Flows and Property Returns

The relationship between real estate returns and PUT performance is examined using a Granger-causality test (see Granger, 1969 and 1980). In a Granger-causality test, one observes whether the past history of a variable X can help to predict the current outcome of another variable Y given the past history of Y. If past X helps to predict current Y, X is said to Granger-cause Y. Granger causation is, therefore, determined by whether a variable is useful in predicting another variable, and not necessarily by whether a variable "causes" another in a philosophical sense. In spite of this difficulty Granger causation has become a widely used concept. The fundamental reason is that any definition of "causation" is subject to criticism, and the definition chosen should be determined by the uses to which the concept will be put. Granger causation is an appropriate definition for our purposes because we are concerned primarily with whether a change in property returns appears to be correlated with future property fund flows, and vice versa. It is in such leads and lags that would indicate the signs of destabilising behaviour and the possibility of a spiral of decline may be found. The test of Granger causality based on the following regression:

$$\text{Netflows}_t = \alpha + \sum_{i=1}^{2} \beta \text{Netflows}_{t-i} + \sum_{i=1}^{2} \gamma \text{Returns}_{t-i} + \varepsilon_1 \qquad 1a$$

$$\text{Returns}_t = \alpha + \sum_{i=1}^{2} \beta \text{Net flows}_{t-i} + \sum_{i=1}^{2} \gamma \text{Returns}_{t-i} + \varepsilon_2 \qquad 1b$$

where: returns represents the quarterly returns of the aggregate property market in general and net flow is the normalised aggregate net investment flows into PUTs. Both return and net flows are assumed to be stationary variables and the two disturbance terms (ε) in equation 1a and 1b are assumed to have a zero mean and constant variance and to be individually serially uncorrelated that is the errors are homoscedastic and show no signs of significant autocorrelation.

The respective causality test are that Returns do not Granger-cause Net flows if and only if all the coefficients of the lagged Returns variables in equation 1a are zero, or

$$H_0 : \gamma_{11} = \gamma_{22} = 0$$

and Net flows does not Granger-cause Returns if and only if all the coefficients of the lagged net flow variables in equation 1b are zero, or

$$H_0 : \beta_{11} = \beta_{22} = 0$$

The system of equations represented by (1a) and (1b) can be estimated by ordinary least squares (OLS) techniques since the equations have identical independent variables. OLS methods are used to estimate the coefficients separately and the null hypothesis (H_0) are tested by a simple F-test. The results presented in Table 2.

Table 2 shows the result of the Granger causality tests for net flows against property returns and for property returns against net flows, over the whole data period and for the three sub periods identified in the previous section. This table prompts the following comments. Focusing first on the results for the whole period it seems to be the case that neither net flows affect property returns nor property returns affect net investment flows. That is there is no causal link between net investment flows and property returns in either direction! Thus there can be no positive feedback process. However, when the analysis is conducted on the three sub-periods there are noticeable differences. For the first period from 1970:2 to 1979:4 the results are similar as that of the whole period. That is net flows are affected by lagged net flows, while property returns are affected by past returns, but that property returns do not influence net flows and net flows have no influence over property returns. In contrast in the second period from 1980 Q1 to 1987 Q3 property returns do Granger cause net flows (at the 6% significance level) but net flows do not Granger cause property returns, a uni-directional causal relationship from property returns to net flows. Finally the third period from 1987 Q4 to 1998 Q3 shows net flows Granger cause changes in property returns but that property returns do not cause changes in net flows. In other words there is a uni-directional causal link from net flows to property returns, but only at the 15% significance level. The diagnostic tests indicating that the are no serious problems with the models in terms of serial correlation based on the Breusch-Godfrey serial correlation LM test. However heteroscedasticity is a problem in period 2 for the net flow model and in period 3 for the property return model based on White's heteroscedasticity tests.

Table 2: Tests for the 'Causation' Between Fund Flows and Property Returns

	Net Flows				Property Returns			
Variables	**Total**	**Period 1**	**Period 2**	**Period 3**	**Total**	**Period 1**	**Period 2**	**Period 3**
Constant	0.881	2.594	-1.012	0.799	0.990	0.826	0.267	0.519
	(1.363)	(2.816)	(1.466)	0.535	(2.814)	(0.607)	(0.474)	(1.122)
NET(-1)	0.322	0.490	0.363	0.264	0.032	0.272	-0.032	0.025
	(3.192)	(2.534)	(1.924)	(1.521)	(0.590)	(0.951)	(0.210)	(0.500)
NET(-2)	0.157	-0.050	0.259	0.041	-0.050	-0.068	-0.095	-0.103
	(1.599)	(0.271)	(1.385)	(0.245)	(0.941)	(0.252)	(0.619)	(2.001)
PRET(-1)	-0.168	-0.093	0.912	-0.638	0.598	0.546	1.385	0.350
	(0.883)	(0.673)	(2.435)	(1.194)	(5.764)	(2.668)	(4.524)	(2.112)
PRET(-2)	0.148	0.049	-0.525	0.516	0.063	-0.018	-0.441	0.404
	(0.780)	(0.368)	(1.445)	(0.940)	(0.614)	(0.095)	(1.485)	(2.380)
Granger causality								
F-statistic	0.426	0.227	3.207	0.718	0.474	0.475	0.386	2.004
P-value	0.654	0.798	0.057	0.494	0.624	0.627	0.684	0.148
R-squared	0.137	0.116	0.490	-0.016	0.398	0.332	0.504	0.452
LM Test:	0.078	0.580	0.967	1.678	0.691	0.190	0.728	2.290
W Test	1.355	1.819	1.617	2.618	0.073	1.024	2.500	0.410

Notes: 1 t-statistics in parentheses.
2 The LM test is the Breusch-Godfrey Serial Correlation Test:
3 The W test is Whites' test for heteroscedasicity

Why the difference in the three periods? Period 1 was a period of rapid growth into property, both direct and indirect by pension funds. PUTs in particular offered an easy way into the property, with low investment requirements making it easy for pension funds to test the waters. Property returns at this time averaged 4.1% per quarter. Equities in contrast only showed average returns of 3.5%, while gilts only achieved average returns of 2.8% per quarter, mainly due to the high inflation during this period. Thus during this period the average normalised net investment by pension funds into PUTs was on average 4.9 per cent per quarter, of the previous quarters total investment. However, it as can be seen from Table 2 it appears that these higher returns to property seemed to have no significant influence on net flows. In other words even allowing for the fact that property was offering superior returns to equities and gilts, net flows were increasing at a rate that can not be explained by relative return performance alone. It was as if pension funds were increasing their stake in property at any price to bring their holdings up to a target level similar to that of insurance companies, i.e. about 15%. A possible reason for this is the rapid growth of contractual savings at this time, where rapid growth into pension funds in general meant that such had to find a home for their increased in flows, especially into investments offering real returns. In addition the high inflation in the UK in the 1970s led pension funds to seek inflation-proof investments. Thus the desire of pension funds to achieve diversification and inflation hedging lead them to acquire increased holdings in property and equities at the expense of gilts. Stated another way, net investment flows in the period up to the start of the 1980s seems to have been driven by factors unrelated to property returns, even though net investment were closely tied to property returns.

In the case of Period 2 (1980 Q1 to 1987 Q3) the situation is reversed. Property returns show a significant influence on net investment flows. A number of reasons may exist which explains this. First, it is a period of low property returns. During this periods property market returns averaged only 2.6% per quarter. In contrast average returns for the whole period from 1967:1 to 1998:3 were 3.1%. More importantly over this period equities and gilts achieved average returns of 4.1% and 7.1% per quarter respectively. Second, probably in response to the lower returns to property relative to those on equities and gilts, redemptions outpaced sales leading to negative net sales. From 1980 Q1 to 1987 Q3 average normalised net investment is negative 0.2%, compared to a positive 1.9% for the entire period. Thus while the overall results show no link between net flows and property returns, during periods of lacklustre performance and high redemptions, property returns may affect net flows.

Finally the period since 1987 Q4 shows yet another picture to previous periods. The results of the Granger-causality test showing the existence of a weak uni-directional link from net flows lagged two quarters, to property returns. Figure 1 showing that net investment flows since 1987 has shown a much greater cyclical behaviour. Net flows rising and falling with the prospects of the property market. Consequently it is not surprising to see a significantly greater linkage between flows and returns. Whether this is now the norm is unknown.

Conclusions

This study is concerned with the implications of property returns on PUT fund flows, and with the possibility of a reverse transmission from fund flows to property returns. In other words do in property prices "cause" fund flow changes, or do fund in-flows and out-flows flows "cause" changes in property prices, or does the causality works in both directions.

Using data on aggregate PUT net investment flows over the period 1971 Q1 to 1998 Q3 the Granger causality tests generally do not support the conclusion that lagged property returns have a significant affect on net flows or that lagged net flows significantly affect property returns. In other words the existence of any causal link can be discounted! However, this conclusion seems to be influenced by the period up to the 1980s were the rapid growth in pension funds led them to invest in property to catch up to insurance company target levels in property and to hold assets with greater inflation hedging potential than UK government bonds. In contrast the period up to the end of 1987 shows a reappraisal of property as an asset class and PUTs in particular. Net flows into PUTs declining first as a result of the switch out of PUTs into direct property, as pension funds grew to a sufficient size to make direct investment a viable proposition. Then the switch out of property in general with the fall in property returns relative to that of equities and gilts. The decline in property returns leading to a causal link running from property returns to net flows. Finally the data since 1987 indicates a weak causal link form net investment flows to property returns. Thus like previous studies in the mutual fund industry there is no positive feed back process involved between net investment flows and returns. Nonetheless causal links between property returns and net flows and net flows and property returns can be identified in different sub-periods. However, where there are causal links the results are weak which could result from two effects.

First the methodology is too limited to detect causality. Granger-causality is a limited view of causality in several ways. First, Granger-causality focuses only on lead-lag relationships. Consequently contemporaneous related variables are not considered. Yet Table 1 shows a strong contemporaneous relationship between fund flows and property returns. The incorporation of contemporaneous and past values is possible in a Granger based framework, through the use of vector autoregression (VAR) model. Indeed the estimation methods used by Warther, Remolona et al and in this paper are equivalent to a restricted VAR, with some variables arbitrarily excluded in some equations. If those exclusions are not valid, the results will be biased in favour of rejecting past property returns as a variable that explains property fund flows! A second criticism is that Granger-causality tests are based on a linear forecasting model. If the true economic relationship is non-linear, a Granger based test will be misleading. Finally the Granger-causality test assumes that the parameters are constant. Clearly the results in Table 2 show this is not the case.

A second reason why the results may have failed to find a strong causal relationship between fund flows and property returns is that other factors may be involved in the decision making process. Remelona, et al (1997) for example suggest the returns on other asset classes may play a role as economic models of portfolio choice assume that investors will consider the

returns on all assets when they determine their optimal portfolios. This will be true of both direct and indirect investors. Thus, we should expect that relative rates of return on securities will have value in predicting flows of money into alternative assets. The discussion above about the 1980s suggests that this may be the case. Investigation of both these issues will, therefore, provide future areas of research.

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Figure 1: Normalised PUT Net Flows and Property Returns 1969 Q1 to 1999 Q1