Inflation Illusion and Institutional Ownership in REITs

Preliminary - Please do not distribute. Comments welcome.

Kiat-Ying Seah*

March 31, 2011

Abstract

This paper is an exploratory study of the implication of the inflation illusion hypothesis on institutional tilting. It joins the literature which looks at the rationality of institutional investment behavior. The paper relies on the premise of the Fisher effect - that correctly priced assets are good inflation hedges and that during times of high inflation, the prices of these assets will be bid up. If the market suffers from inflation illusion, then holders of these rationally-priced securities will liquidate their positions and tilt toward underpriced assets. I focus my study on the real estate investment trust (REIT) market. I find that institutions do in fact tilt their portfolios away from REITs that are good hedges in periods of high unexpected inflation holding constant other reasons that may influence institutional ownership (e.g. size, liquidity, momentum, etc.). Furthermore, these assets are less likely to be mispriced as institutional ownership decreases with the amount of mispricing in these securities.

Keywords: Real Estate Investment Trust, Portfolio Tilting, Institutions, Inflation Illusion

*Address: Department of Real Estate, National University of Singapore, 4 Architecture Drive, SDE1-05-05, Singapore 117566 (Email: rstsky@nus.edu.sg)

1 Introduction

This paper evaluates portfolio tilting among institutions in the presence of inflation illusion and mispricing in the public REIT market. An implication of the Modigliani-Cohn's (1979) money illusion hypothesis is that if the stock market suffers from inflation illusion then stocks will generally be undervalued in times of high inflation. The inflation illusion hypothesis is a behavioral explanation of the failure of the Fisher Effect which states that assets' nominal returns should rise with inflation. Consequently, an asset that is a good hedge against inflation will be held by rational agents who correctly price these assets. Thus, in times of high inflation, the prices of these assets will increase and the rational agents holding these assets will tilt their portfolios toward undervalued assets. I test the above hypothesis in the REIT market. REITs (and real estate) are conventionally considered inflation hedges, we therefore expect the ownership of REITs to relate inversely with the time variation of inflation and mispricing in the market.

I find that institutions do in fact tilt their portfolios away from REITs in periods of high unexpected inflation, holding constant other reasons that may influence institutional ownership (e.g. size, liquidity, momentum, etc.). Furthermore, these assets are less likely to be mispriced because institutional ownership decreases with the amount of mispricing in these securities.

The rest of the paper is organized as follows. Section 2 reviews the relationship between the Fisher effect and the Modigliani-Cohn's hypothesis and section 3 describes the data and the empirical strategy used in this paper. I discuss my results in section 4 and section 5 concludes.

2 The Fisher Effect and the Inflation Illusion

The Fisher effect, a hypothesis posited by Irving Fisher (1930), argues that nominal interest rates fully reflect available information concerning the expectations of inflation. Consequently, nominal returns on financial assets should increase with the rate of inflation, whereas real rates of return are independent of the inflation rate. Because the ownership of common stocks represents ownership of physical capital whose real value is assumed to be independent of inflation, common stocks should be an inflation hedge. The hypothesis spawned a large number of empirical studies on the effectiveness of assets as an inflation hedge. One of the earlier studies by Reily, Johnson and Smith (1970) defined an asset to be a *complete* inflation hedge if its real rate of return remains the same in high and low inflationary periods. An asset is considered a *partial* hedge if its nominal return in inflationary times is greater than its nominal return in non-inflationary times. They conclude that stocks are, at best, partial hedges. Evidence against the Fisher effect was also found in Lintner (1975), Fama and Schwert(1977) and Amihud (1996). These studies invariably find a negative correlation between nominal stock returns and inflation. Fama (1981) argued that the negative correlation results from the "proxy effect". That is, inflation acts as a proxy for future economic growth: high inflation is associated with a depressed economy and thus nominal returns will tend to be lower when inflation is high.

Another interpretation of the observed negative correlation is put forward by Modigliani and Cohn (1979). They hypothesize that stock market investors incorrectly discount real cash flows with nominal discount rates.

This mispricing error is exacerbated in inflationary environments. As a result, when inflation is high low), stocks are undervalued (overvalued). The Modigliani-Cohn hypothesis has been empirically tested in more recent studies. For example, Ritter and Warr (2002) find that the value-price ratio is positively correlated with inflation and the effect increases with leverage. Campbell and Vuolteenaho (2004) conclude that mispricing in the dividend-price ratio can be explained by inflation illusion. Inflation illusion seems to plague the real estate market as well. If homebuyers suffer from inflation illusion, a reduction in inflation could cause a housing bubble (Brunnermeier and Julliard, 2008), as could large uncertainty about the level of inflation (Piazessi and Schneider, 2008).

The finding that some assets are better inflation hedges than others (Fama and Schwert, 1977) suggests that good hedges are less likely to be mispriced and that the owners' assessments of these assets are not *illusory*. This implies that in a market composed of both inflation-illusioned and rational investors, the prices of good hedges will be bid up during periods of relatively higher inflation. Rational investors who own these good hedges will then liquidate their positions and purchase assets that are underpriced by way of the Modigliani-Cohn hypothesis. Since real estate has conventionally been considered a relatively good hedge against unexpected inflation, it is a natural sector in which to examine the above notion of portfolio tilting. Moreover, the availability of ownership data on real estate investment trusts makes it easier to distinguish "rational" investors from those more susceptible to inflation-illusion. Specifically, I use the effectiveness of real estate investment trusts (REITs) as an inflation hedge to identify "smart investors". I then examine the preferences of these investors and evaluate whether these preferences change with the level of

unexpected inflation and inflation-induced mispricing.

3 Data and Empirical Methodology

The main database is created from institutional ownership data from Thomson-Reuters Institutional Holdings (13F) Database which was formerly known as CDA/Spectrum 3.4 database. The database is created from the SEC's form 13F, which arises from the 1978 amendment to the Securities and Exchange Act of 1934 that requires all institutions with greater than $100 million of securities under discretionary management to report their holdings to SEC quarterly. My data includes quarterly reports from 1990 Q1 through 2009 Q3. I merge this database with REIT data from the Center for Research in Security Prices (CRSP). In particular, we obtain REIT characteristics such as share prices, number of shares outstanding and market capitalization from the CRSP/Ziman data series. The data series includes information on all REITs that have traded on the primary exchanges since 1980.

3.1 The good and bad hedges

My main tests examine whether institutions tilt their portfolios toward *mispriced* assets during periods of high unexpected inflation within the REITs submarket. Each REIT is assessed based on (1) its inflation-hedging ability as well as (2) how mispriced it is relative to a theoretical construct. The estimation strategy is the following. First, I construct dynamic stock portfolios that are likely to show a consistent spread in their inflation-hedging ability. Specifically, I measure inflation-hedging ability

using Fama-Schwert's (1977) regression model:

$$\tilde{R}_{i,t} = \alpha_i^I + \beta_i^I E\left(I_t \mid \Omega_{t-1}\right) + \gamma_i^I \left[I_t - E\left(I_t \mid \Omega_{t-1}\right)\right] + \tilde{\eta}_{i,t}$$

where $\tilde{R}_{i,t}$ is the nominal return on REIT i at time t, $E\left(I_t \mid \Omega_{t-1}\right)$ is the expected inflation rate I given $t-1$ information Ω_{t-1} and $\left[I_t - E\left(I_t \mid \Omega_{t-1}\right)\right]$ is the unanticipated inflation rate. An estimate of $\beta_i^I = 1$ says that nominal return varies one-to-one with expected inflation rate (that is, the Fisher effect holds); an estimate of $\gamma_i^I = 1$ implies that the asset is a good hedge against unexpected inflation. Fama and Schwert defines an asset with $\beta_i^I = \gamma_i^I = 1$ as a *complete* hedge. In this anaysis, I focus on the estimation of$\hat{\gamma}_i^I$ which measures the effectivenss of a REIT as a hedge against unexpected inflation. I measure $\hat{\gamma}_i^I$ for an individual REIT using at least 3 years of quarterly returns. I then use these REIT-level estimates to sort REITs into 5 portfolios with different inflation-hedging ability. Finally, I re-estimate a REIT's inflation-gamma on a rolling basis using a trailing window of 12 quarters. These inflation-gammas form a time series of rolling inflation-gammas which I use to rank and sort REITs into quintile portfolios at each quarter. The cross-sectional, time-series average of inflation-gamma in the worst inflation-hedging portfolio is -11.6; the best inflation-hedge REIT portfolio has an average inflation-gamma of 19.10.

3.2 Mispricing

Measuring the mispricing of REIT returns requires "correct" benchmark return. That is, mispricing is a relative concept and requires the establishment of a "true" or fundamental return. Computation of the mispricing measure will require the assumption that market values follow an asset

pricing model. For simplicity, I assume that fundamental values follow the simple one-factor CAPM model. Robustness checks using other asset pricing models will be followed up in subsequent refinements of this paper. For each REIT, I estimate the time-series of its mispricing by applying a Kalman filter to the residuals from the one-factor CAPM model. The estimated state variable is our measure of mispricing[1].

Similar to the estimation of the inflation-gamma, the estimation of the mispricing is carried out using the same rolling window as was used in the estimation of the inflation-gammas. For each REIT, I estimate a time-series of pricing errors which are used to rank individual REITs into quintile portfolios each quarter. The average level of mispricing within each inflation-gamma portfolio is shown in Table 1. We see that weak inflation hedges tend to be underpriced while strong hedges are overpriced relative to the CAPM. This suggests that mispricing is related to a REIT's inflation-hedging ability. Although there isn't a pattern in institutional ownership across the quintiles, portfolio returns increase with the inflation-hedging ability of REITs. This suggests that strong hedges have a larger mispricing component in their returns.

4 Empirical Results

A first look at portfolio tilting Table 2 reports the average temporal change in institutional ownership among REITs that are sorted sequentially by their inflation hedging ability and the level of mispricing.

Although the relationship is not monotonic, it appears that within a given mispricing group, institutions tend to favor strong hedges. This is

[1]This definition of mispricing follows the methodology in Brennan and Wang (2006).

Table 1: Average Size of Mispricing, Institutional ownership and Equally-weighted portfolio return ranked by inflation-hedging ability. Sample period is from 1993Q1 - 2009Q3. In percentages (%). Standard deviations are in parenthesis.

	Low γ^I				High γ^I
	1	2	3	4	5
Mispricing	-0.14	-0.14	0.02	-0.09	0.30
	(3.34)	(2.63)	(2.36)	(2.58)	(3.46)
Institutional Ownership	25.23	33.65	39.50	39.95	29.77
	(28.76)	(30.88)	(32.41)	(33.66)	(31.23)
Portfolio Returns	3.91	2.70	2.83	4.12	6.17
	(18.89)	(14.79)	(13.59)	(13.54)	(18.47)

most evident for the third mispricing quintile, which shows a mean decrease of 0.38 percent in institutional ownership among weak hedges and an increase of 0.79 percent among the better hedges. Across different levels of mispricing, institutions tend to abandon REITs that are poor inflation hedges.

To examine how the different levels of mispricing and inflation-hedging ability affect returns, Table 3 reports the equally-weighted portfolio returns of the quintiles. Portfolio returns increases with both inflation-hedging ability as well as mispricing. Evidently, the portfolio analysis is preliminary in the sense that it does not account for other stock characteristics that may affect institutional tilting. Moreover, averaging portfolio returns and ownership data this way may mask any temporal dynamics at the individual level. A closer look at these issues is provided in a regression framework in the next section.

Table 2: Average change in institutional ownership of REITs, ranked into quintiles sequentially by inflation-hedging ability and the level of mispricing. In percentages (%). Sample period is from 1993Q1 - 2009Q3.

Change in institutional ownership for 25 portfolios

		Low Mispricing				High Mispricing
		1	2	3	4	5
Low γ^I	1	-0.70	-0.41	-0.38	-0.13	0.68
	2	-0.36	-0.08	-0.51	-0.13	-0.65
	3	0.28	0.11	0.15	0.38	0.39
	4	-0.19	0.14	0.44	-0.07	0.11
High γ^I	5	0.41	-0.08	0.79	1.37	-0.42

Motivation for Institutional Tilting Beyond the standard risk-return argument, several studies have shown that institutions prefer securities with characteristics deemed "desirable". For example, Del Guercio (1996) examines the prudent behavior of institutions by looking at stock ownership by banks and mutual funds and shows the varying standards of legal framework within which institutions operate as fiduciaries affect their risk appetites. In particular, she finds that banks, which are governed by common-law "prudent-man rule", behave in a far more risk-averse manner than do other institutions. Institutions also seem to be sensitive to transaction costs and prefer liquid securities with large market capitalization and thick markets (Schwartz and Shapiro, 1992). Momentum trading is yet another factor driving institutional tilting. Nofsinger and Sias (1999) and Wermers (1999) find a positive relation between returns and subsequent institutional ownership.

The regression analysis that follows attempts to control for these other

Table 3: Average equally-weighted portfolio returns for quintile portfolios ranked sequentially by inflation-hedging ability and the level of mispricing. In percentages (%). Sample period is from 1993Q1 - 2009Q3.

		Equally-weighted portfolio returns				
		Low Mispricing				High Mispricing
		1	2	3	4	5
Low γ^I	1	2.28	4.18	3.25	4.25	5.74
	2	0.53	2.50	1.75	4.10	4.73
	3	1.16	2.72	3.15	2.21	4.85
	4	1.84	4.02	4.37	4.50	6.04
High γ^I	5	4.12	5.55	4.60	6.14	10.21

factors that are exogenous to inflation illusion. Specifically, I use 4 firm-level characteristics: share price, measures of liquidity, size and lagged returns, as control variables when estimating the following regression:

$$\Delta IO_{i,t} = \delta_p + \rho_p X_{i,t} + \lambda_p Y_{i,t} + \epsilon_{i,t} \tag{1}$$

where $\Delta IO_{i,t}$ is the natural logarithm of the change in institutional ownership from period $t-1$ to t and $X_{i,t}$ is a vector of the four characteristics for the ith REIT in quarter t:

1. Size: market capitalization
2. Price, per share
3. Momentum: the past quarter gross return
4. Turnover, as a liquidity measure: volume divided by shares outstanding measured for the month prior to the beginning of the quarter

and $Y_{i,t}$ is a vector of the inflation-illusion variables we are interested in:

5. γ^I: a REIT's ability to hedge against inflation risk
6. Mispricing: deviation from fundamental value, computed as the state variable from the Kalman Filter estimation described earlier
7. UI_{t-1} : previous quarter unexpected inflation rate
8. $\gamma^I * UI_{t-1}$: interaction variable

I use the natural logs of the control variables except for momentum, mispricing, and the inflation gamma.

Table 4 presents the pooled OLS regression results. I do not distinguish here between portfolios of different inflation-hedging ability. In column (1), the results suggest that institutions who invest in REITs do not show a consistent appreciation for liquidity. In fact, the coefficients on both turnover and size are negative, although the size effect is statistically negligible. However, institutions seem to prefer higher-priced REITs. Given that the REIT market is relatively small, it is perhaps not surprising that size is not significant factor in large institutions' portfolio decisions. On the other hand, institutions seem to be chasing returns in the REIT market; the momentum variable is positive and is statistically significant.

Last period's unexpected inflation rate has a strong positive effect on institutional ownership suggesting that institutions tilt toward REITs when inflation has increased. However, overpriced REITs are also favored by institutions, although this effect is second to lagged unexpected inflation. Being a good hedge against unanticipated inflation is not statistically significant. The interaction variable between lagged inflation and inflation gamma is also not statistically different from zero.

The mispricing measure that I use is an agnostic measure: it simply

represents a latent variable that consistently drives the REIT prices away from fundamental values. The extant literature has suggested that mispricing could be idiosyncratic or perhaps represent unpriced systematic factors, such as idiosyncratic risk, inflation illusion or market illiquidity. To test the possibility that the mispricing measure is associated with inflation illusion, I included a second interaction variable into the regression; this variable captures the interaction between lagged inflation and the mispricing of a REIT. The results are shown in column (2) of Table 4.

The estimates in column (2) are largely consistent with those in column (1) except that we now see a positive and statistically significant coefficient estimate on the interaction variable of mispricing and lagged inflation. It seems plausible that REITs are perceived by large institutions to be effective hedges against unanticipated inflation. However, the positive sign on this interaction is puzzling. Why would institutions be willing to invest in overpriced assets during times of high unexpected inflation? If the stock market is suffering from inflation illusion as Cohen, Polk and Vuolteenaho (2005) has suggested, rational investors (in this case, large institutions) should tilt toward **underpriced** assets instead. However, the interaction term could be capturing mispricing that's being explained by inflation. That is, REIT prices are bid up above their fundamental values by inflation-illusioned investors who realize that the assets they are holding are performing badly against inflation risk. They therefore tilt toward better hedges.

To test this idea, I regress mispricing on lagged unexpected inflation and the natural log of turnover - inflation illusion and liquidity preference being the two candidates that have been widely established to be responsible for priced risks that are not accounted for in a conventional asset pricing

Table 4: Determinants of Insitutional Ownership - pooled regression. Standard errors are in parenthesis and t-statistics are italicized. There are 8674 observations.

$$\Delta IO_{i,t} = \delta_p + \rho_p X_{i,t} + \lambda_p Y_{i,t} + \epsilon_{i,t}$$

	(1)	(2)
Turnover	-0.003	-0.004
	(0.001)	(0.001)
	-2.97	*-2.97*
Size	-0.089	-0.093
	(0.107)	(0.107)
	-0.84	*-0.86*
Price	0.008	0.008
	(0.002)	(0.002)
	4.00	*4.07*
Momentum	0.017	0.017
	(0.007)	(0.007)
	2.32	*2.30*
Inflation Hedge γ^I	0.038	0.040
	(0.078)	(0.078)
	0.49	*0.52*
Mispricing	0.106	0.135
	(0.040)	(0.041)
	2.65	*3.25*
Unexpected Inflation UI_{t-1}	0.579	0.607
	(0.150)	(0.150)
	3.87	*3.87*
$\gamma^I \times UI_{t-1}$	0.006	0.006
	(0.013)	(0.013)
	0.46	*0.47*
Mispricing $\times UI_{t-1}$		15.49
		(5.558)
		2.79
R^2	0.008	0.024
F	8.28	8.23

framework. The results[2] are as follows:

$$\begin{array}{rcccc} \widehat{Mispricing}_{it} & = & 0.062\, UI_{t-1} & - & 0.00003\, \log(Turnover_{it}) \\ & & (0.04) & & (0.0003) \\ & & \textit{1.55} & & \textit{-1.07} \end{array} \tag{2}$$

$$R^2 = 0.0004, \quad F = 1.62, \quad n = 8674$$

The positive relation between the mispricing in REITs and inflation is contradictory to the Modigliani-Cohn's hypothesis. At the same time, mispricing is not related to institutional's liquidity preferences. To get a cleaner measure of the mispricing component, I collect the residuals (and call them "Mispricing II") from the above regression and re-run the specification in (1) for different inflation-gamma portfolios. The results are presented in Table 5. Similar to the results in Table 4, liquidity does not seem to drive changes in institutional ownership. The estimated turnover coefficient is mostly negative and its effect is negligible. Firm Size has mixed results; it is associated with increased institutional ownership for the worst inflation hedges but is inversely related to institutional ownership for the best inflation hedges.

Across the portfolios, institutions prefer higher-priced REITs and appear to be momentum investors.

Lagged unexpected inflation increases institutional ownership only among the worse inflation hedges. Institutions decrease their holdings of the better hedges when there is an increase in unexpected inflation in the previous quarter. This confirms our hypothesis in the following sense. Because strong inflation hedges are rationally-priced assets in that they are *not*

[2]Standard errors are in parenthesis and t-statistics are italicized.

Table 5: Determinants of Insitutional Ownership by quintile portfolios. Standard errors are in parenthesis and t-statistics are italicized.

$$\Delta IO_{i,t} = \delta_p + \rho_p X_{i,t} + \lambda_p Y_{i,t} + \epsilon_{i,t}$$

	Low γ^I				High γ^I
	1	2	3	4	5
Turnover	-0.014	-0.003	-0.004	-0.001	0.001
	(0.004)	(0.003)	(0.002)	(0.002)	(0.003)
	-3.41	*-1.28*	*-1.54*	*-0.59*	*0.35*
Size	0.392	-0.281	0.055	0.112	-0.435
	(0.394)	(0.226)	(0.215)	(0.187)	(0.286)
	1.00	*-1.24*	*0.26*	*0.60*	*-1.52*
Price	0.007	0.013	0.001	0.003	0.011
	(0.006)	(0.004)	(0.004)	(0.003)	(0.005)
	1.12	*3.10*	*0.35*	*0.89*	*2.45*
Momentum	0.020	0.015	0.003	0.026	0.017
	(0.023)	(0.017)	(0.018)	(0.014)	(0.017)
	0.86	*0.93*	*-0.50*	*1.80*	*1.01*
Unexpected Inflation UI_{t-1}	0.649	0.358	0.848	-0.374	-0.519
	(0.455)	(0.309)	(0.376)	(0.258)	(0.488)
	1.43	*1.16*	*2.26*	*-1.45*	*-1.06*
Mispricing II	0.170	0.031	0.203	0.275	-0.145
	(0.116)	(0.092)	(0.095)	(0.074)	(0.086)
	1.46	*0.34*	*2.13*	*3.71*	*-1.68*
R^2	0.035	0.011	0.005	0.012	0.008
F	4.49	3.52	2.02	4.63	1.78

subjected to underpricing in times of high inflation, owners of these strong hedges are therefore rational investors who are not inflation-illusioned. In periods of high unexpected inflation, the demand for REITs that are strong hedges will rise. The prices of these strong hedges will be bid up, while securities owned by inflation-illusioned investors will be underpriced. Rational investors who own the good hedges should liquidate their positions

in these assets and tilt toward the underpriced securities. The negative sign that we see on unexpected inflation supports the notion that rational institutions owning the good hedges decrease their holdings of these assets in order to purchase underpriced assets in their portfolios. The negative sign on the "Mispricing II" variable for the best inflation-hedge portfolio is consistent with the rational tilting hypothesis as well: rational institutions abandon overpriced good hedges. Nevertheless, it remains a puzzle as to why the mispricing variable remains a substantive determinant of increased institutional ownership for the other 4 portfolios.

5 Conclusion

This paper explores the implications of the inflation illusion hypothesis on institutional tilting. It joins the literature which looks at the rationality of institutional behavior. To that end, I use the inflation-gamma measure as a barometer to establish whether a REIT is a strong or a weak hedge against unexpected inflation. I then test whether institutions which own these strong hedges will tilt away from these securities in search of underpriced securities in periods of high inflation; that is when the stock market is believed to be prone to inflation illusion.

I find that institutions do in fact tilt their portfolios away from REITs that are strong hedges in periods of high unexpected inflation holding constant other reasons that may influence institutional ownership (e.g. size, liquidity, momentum, etc.). Furthermore, these assets are less likely to be mispriced as institutional ownership decreases with the amount of mispricing in these securities. It remains a puzzle as to why institutions continue to increase their holdings of overpriced REITs that have been shown to be

less-than-ideal inflation hedges in inflationary times. To answer the question, one would need to first determine the economic substance that makes up this mispricing variable which is independent of any inflation-induced pricing error and is not related to individual liquidity.

References

[1] Amihud, Y., 2002, "Illiquidity and Stock Returns: Cross-Section and Time-Series Effects." *Journal of Financial Markets*, vol. 5, 31-56.

[2] Brennan, Michael., and Ashley Wang, 2006, "Asset Pricing and Mispricing," *Working Paper*, University of California at Los Angeles.

[3] Brunnermeier, Markus K., and Christian Julliard, 2008, "Money Illusion and Housing Frenzies," *Review of Financial Studies,* vol. 21(1), 135-181.

[4] Campbell, John Y. and Tuomo Vuolteenaho, 2004, "Inflation Illusion and Stock Prices," *American Econnomic Review*, vol. 94, 19-23.

[5] Del Guercio, Diane., 1996, " The Distorting Effect of the Prudent-Man Laws on Institutional Equity Investments," *Journal of Financial Economics*, vol. 40, 31-62.

[6] Fama, Eugene F., 1981, "Stock Returns, Real Activity, Inflation and Money," *American Economic Review*, vol. 71, 545-565.

[7] Fama, Eugene., and G. William Schwert, 1977, "Asset Returns and Inflation," *Journal of Financial Economics*, vol. 5, 115-146.

[8] Lintner, John., 1965, "The Valuation of Risky Assets and the Selection of Risky Investments in Stock Portfolios and Capital Budgets, " *Review of Economics and Statistics*, vol. 97, 13-37.

[9] Modigliani, Franco., and Richard Cohn, 1979, "Inflation, Rational Valuation, and the Market," *Financial Analysts Journal,* vol. 35, 24-44.

[10] Norsinger, J.R., and Sias, R. W., 1999, "Herding and Feedback Trading by Institutional and Individual Investors," *Journal of Finance,* vol. 54, 2263-95.

[11] Piazessi, Monika., and Martin Schneider, 2008, "Inflation Illusion, Credit and Asset Pricing," in John Campbell (ed.) *Asset Prices and Monetary Policies,* Chicago, IL: Chicago University Press, 147-81.

[12] Reily, F.K., Johnson, G.L, and Smith, R.E., 1970, "Inflation, Inflation Hedge, and Common Stocks," *Financial Analysts Journal,* vol. 28, 104-10.

[13] Ritter, Jay, R., and Richard S. Warr, 2002, "The Decline of Inflation and the Bull Market of 1982-1999," *Journal of Financial and Quantitative Analysis*, vol. 37, 29-61.

[14] Schwartz, R., and J. Shapiro., 1992, "The Challenge of Institutionalization for Equity Markets," in Saunders, A. (eds) *Recent Developments in Finance,* Business One Irwin, Homewood, IL, USA.

[15] Wermers, R., 1999, "Mutual fund herding and impact on stock prices," *Journal of Finance,* vol. 54, 581-622.