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ABSTRACT

We provide a model of closed-end fund pricing which includes investors who do not form expectations correctly and allows for salient country-specific news to affect this expectation formation process. We use panel data on prices and net asset values of closed-end country funds to examine investor reaction to news that affects fundamentals, and measure the response of the idiosyncratic change in fund prices to the idiosyncratic change in fund asset values. In a typical week, US prices underreact to changes in foreign fundamentals; the (short-run) elasticity of price with respect to asset value is significantly less than one. In weeks with major news (relevant to the specific country) appearing on the front page of *The New York Times*, prices react much more to fundamentals; the elasticity of price with respect to asset value is closer to one. These results are roughly consistent with the hypothesis that major news events lead some investors who normally lag behind in updating their expectations to temporarily react more quickly.

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I. Introduction

Some researchers believe that investor under- or overreaction to news explains anomalous findings in the time-series and cross-sectional properties of stock returns. Annual portfolio stock returns have negative serial correlation (Fama and French [1988]), while weekly portfolio returns have positive autocorrelation (Lo and MacKinlay [1988]). Long horizon returns for individual stocks follow a similar pattern, where the stocks of "losers" subsequently have positive abnormal returns and the stocks of "winners" have negative abnormal returns (De Bondt and Thaler [1986]). Daily and weekly individual stock returns also demonstrate significant negative serial correlation (French and Roll [1986]).[1] Last, aggregate dividend price ratios appear to have predictive power for aggregate stock returns, which Shiller (1984) interprets as prices "overreacting" to dividends.

A serious problem with interpreting these facts as "overreaction" or "underreaction" is that these explanations are usually *ex-post* justifications of anomalies present in the data. The underlying problem is that neither fundamentals, nor other possible determinants of investor behavior, such as "investor sentiment", are directly observable in either market prices or quantities. A further problem is thus that as a result, financial economists are usually forced to make assumptions about the dynamic properties governing fundamentals before applying tests of market efficiency to a set of data. Almost invariably, this results in all practical tests of market efficiency being joint tests of the efficient markets hypothesis and an auxiliary assumption concerning the properties of fundamentals and their implied pricing model. The autocorrelation

[1]Firms that have low price-to-book ratios, low price-to-debt ratios, and small size also exhibit outperformance in cross-sections. Like the time-series evidence, this may also be the result of investor overreaction.

findings cited above, for example, can be interpreted as a rejection of the joint hypothesis of market rationality and constant risk premia, and not of market rationality alone. A more relevant example for overreaction is Stein [1989], who studies the options market, and rejects the joint hypothesis that options do not "overreact" to stock-market volatility and that the Black-Scholes [1973] option pricing model is correct.

Although it may be difficult to show that investor over- or underreaction is the reason for the various anomalies discussed above, it has not been difficult to show that economic agents often do not act rationally in laboratory settings. Controlled experiments show that the cognitive errors made by subjects are many (See, for example, the volume edited by Kahneman, Slovic, and Tversky [1982] for biases and errors in handling uncertainty).

In this paper, we focus on a particular form of cognitive error as the source of real world investor over- and underreaction. Specifically, we examine the hypothesis that individual investors assign more importance to more prominent news and assign less importance to less prominent news, even though the two pieces of news may carry the same implication for economic fundamentals. We stress that the hypothesis to be tested is suggested by laboratory experiments, *not* by some anomaly already known to be present in financial market data.

That the relative "salience" of information affects laboratory subjects' forecasts of financial time-series and their trading behavior in simulated financial markets has been documented by Andreassen [1990] and Andreassen and Kraus [1990]. The former study explored the hypothesis that subjects' forecasts of stock prices vary as a function of the relative salience of recent vs. older observations, and that this relative salience is affected by news reports. The latter examined the relation of forecasts to various framing manipulations designed to affect salience of successive changes in time-series. Issues of salience, availability, and various framing effects have been central to a large body of studies of decision making behavior.

Our objective is to use financial market data to detect this salience effect on investor reaction in a non-laboratory setting. Our premise is that the "salience of news" is measurable at least to some extent. We test whether the high level of salience generated by the coverage of a major news event is correlated with the degree of reaction in financial asset prices. We measure salience using a (to us) plausible measure of prominence, a measure which does not come from endogenous financial market data.

The price and NAV data of closed-end country funds provide a natural way of testing the hypothesis concerning the salience of news, because by using data on closed-end funds we can apply an (arguably) accurate measure of fundamentals, namely the net asset values of the funds. This measure of fundamentals serves as a benchmark against which we can gauge the response of the price of a country fund to changes in fundamentals in the presence of news. That the NAV accurately measures fundamental value is the same feature of closed-end funds that allowed previous researchers, such as Lee, Shleifer, and Thaler [1991] and Hardouvelis, LaPorta and Wizman [1994] (hereafter HLW), to examine the issue of investor rationality without overly relying on auxiliary assumptions about the process of fundamentals.

The paper is organized as follows. Section II discusses closed-end country funds and reviews the unique features that make them useful in testing financial market hypotheses. Section III extends the noise-trader model of De Long, Shleifer, Summers, and Waldmann[1990] (hereafter DSSW) and HLW to allow for investor under- or over- reaction to fundamentals as well as allowing the nature of this reaction to be affected by relevant major news events. Section

IV discusses our data, our choice of country-specific news events, and our method of measuring their salience. The model developed in Section III serves as a heuristic guide for the empirical work presented in Section V. Section VI summarizes our results and presents conclusions.

II. Closed-End Funds and Country Funds

Country funds are closed-end investment companies whose shares trade on organized stock exchanges, and unlike domestic-equity funds, hold and manage portfolios concentrating in the equity markets of particular foreign "host" countries. Throughout the 1980s and into the 1990s, country funds were the fastest-growing segment of the publicly-traded fund universe. The rise in country fund IPOs parallels the growth in capitalization and liquidity of foreign stock markets, as well as American institutional and retail investors' growing interest in these markets. In December 1984 only four U.S.-listed country funds existed. By December 1994, fifty-four single-country funds traded on the New York Stock Exchange, each specializing in one of thirty countries.[2] In addition, about thirty-six closed-end "regional" funds, each specializing in the equity markets of either Asia, Europe, Latin America, or Africa, existed.

Undoubtedly, country funds are popular with U.S.-based investors because they allow participation in foreign markets by providing a managed and diversified portfolio at a minimal transaction cost and without the use of foreign currencies to make settlements. From the manager's perspective, closed-end funds (as opposed to open-end mutual funds) are especially appealing as a retail international investment vehicle because they preclude the possibility of investor redemptions that would otherwise test the limits of market liquidity in the host country's

[2] Over the same period, the London and Hong Kong stock exchanges also emerged as centers for country fund trading.

stock market.[3]

Country funds have exhibited periods of high returns as well as high volatility. Like most publicly-traded closed-end funds, country funds also typically trade at a discount or premium to the underlying net asset value (NAV) of the portfolio they hold. The most dramatic deviations from net asset value have occurred in the wake of prominent news regarding the host country. For example, in autumn 1989 rumors that the Berlin Wall would fall, and the subsequent realization of that event, were followed by a dramatic rise in the premium of the Germany Fund, which reached 100 percent in January 1990. As the premium quickly dissipated thereafter, popular accounts attributed the episode to excessive speculation on the part of investors waiting to "cash in" on new investment opportunities in Germany.[4]

As several authors have noted, closed-end fund discounts and premia are an apparent contradiction of the value-additivity principle of efficient and frictionless capital markets. The intriguing issue is the source of the market frictions or market inefficiencies that give rise to the existence, persistence, and time-variation in closed-end fund discounts.

Two literatures have emerged to explain the behavior of closed-end fund discounts, one emphasizing market frictions and segmentation, and the other emphasizing non-rational agents and the role of sentiment. With regard to country funds, the first literature emphasizes that

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[3] Recent work on international investment has stressed the role of foreign and emerging markets in effective diversification (Divecha, Drach, and Stefek [1992]). Diwan, Errunza, and Senbet [1992] discuss the role of country funds from the host country's perspective.

[4] Since we focus on *weekly* changes in prices and asset values, our empirical methods cannot capture long-lasting phenomena such as this episode, where extraordinary premia persist for many months. If one wants to attribute the Germany episode to non-rational behavior, it is an open question whether it is best described as a change in animal spirits, or a gross overreaction to the increase in German stock prices following the collapse of East Germany. We do not think our empirical results about weekly elasticities are likely to be driven by this type of episode. That is the sense in which we claim that salience effects are not anomalies know to exist already in the data.

discounts (and their variation through time) reflect circumstances that preclude costless cross-border transactions, such as official and unofficial barriers to capital movements, transaction costs, and the risk arising from the time required to complete a full arbitrage transaction. For example, in segmented markets, the price of a U.S.-based country fund is determined by the diversification needs of U.S. investors, whereas the NAV of a country fund is determined by the diversification needs of investors in the fund's host country (Errunza and Losq [1985], Eun and Janakiramanan [1986]). Put differently, whenever markets are segmented, the priced systematic risks of the fund and its NAV differ because they are based on two different benchmark portfolios, one domestic and one foreign. In this context, time variation in the discounts is generated by time variation in the difference between these risk measures (Diwan, Errunza, and Senbet [1993]), or by the raising and lowering of cross-border investment restrictions (Bonser-Neal, Brauer, Neal, and Wheatley [1990]).

In the competing literature country fund discounts, and closed-end fund discounts generally, are caused not by market frictions but by the mechanism of public trading. This explanation emphasizes the role of irrational investors, called "noise traders" or "ordinary investors," who are prominent in the purchase and sale of closed-end funds and who interact in this market with rational investors (DSSW). The noise trader literature emphasizes that the variation in the demand of noise traders caused by shifts in "sentiment" or by "misperceptions" of fundamental value is the most important determinant of variation in fund discounts. Using a sample of primarily domestic-equity funds, Lee, Shleifer, and Thaler [1991] demonstrate that the noise-trader model of DSSW is consistent with the stylized facts about closed-end fund discounts.

In extending the empirical literature on noise-trading to country funds, HLW and

Bodurtha, Kim, and Lee [1995] provide evidence suggesting that mean-reverting sentiment is an important component of the price of country funds, and that the common component of sentiment across country funds accounts for a significant portion of the variation in country fund discounts. Both HLW and Bodurtha, Kim, and Lee [1995] show that fund prices are "sticky", that is, they do not move as much as their respective NAVs following movements in the host country's stock market. On the other hand, fund prices are overly sensitive to movements in world and domestic (U.S.) stock returns, especially returns on small-capitalization U.S. stocks, which have a clientele (small retail investors) that resembles that of country funds.

Although a model of rational traders could potentially explain these correlations if the model is enriched by introducing sufficient market frictions and segmentation, HLW present evidence that casts doubt on the ability of rational models in the context of market imperfections to fully explain variation in country fund discounts. For example, discounts of funds investing in countries that restrict cross-border investments do not behave differently from discounts of funds whose host countries do not restrict investment. Furthermore, HLW demonstrate that country fund discounts and premia are stationary, and that large discounts and premiums tend to be followed by a reversion of the country fund's price toward the NAV rather than an adjustment in the NAV toward the price of the fund. Such a finding cannot be supported by general theories of market segmentation, and empirically supports the tradition in the literature of taking the NAV as representative of the fundamental value of the closed-end fund.

Although we do not dismiss the idea that the level of the cross-sectional variation in the average discount of country funds may reflect cross-border investment barriers, and that changes in the level of the barriers or changes in the relative prices of risk are responsible in part for the existence and time-variation in discounts, our reading of the empirical literature suggests that most of the time-variation in the discounts of a fund, especially extreme movements, is due to changes in investor sentiment and misperceptions of fundamentals.[5] As such, the present paper extends the empirical literature on closed-end funds that emphasizes non-rational behavior as the principal determinant of country fund discounts. However, rather than focus on the general time-series properties of prices and NAVs of country funds or the correlations of discounts with other variables, we examine the relative impact of news on the relation between country fund prices and NAVs in the context of a model of cognitive error or misperception leading to investor under- and/or overreaction. We present a suggestive model of a closed-end fund market allowing for investor misperception that can be affected by news, and then go on to (loosely) apply it to the data on country funds.

III. A Model of Investor Sentiment and Reaction in the Closed-End Country Fund Market

III.1 *The market for the underlying asset*

We describe below a model of the closed-end country fund market. There are two markets, a market for the underlying assets in the country fund's host country, and a market for the closed-end country fund shares in the public market of the country in which the country fund is listed. The host economy is assumed to contain a riskless asset which earns a gross rate of return $1+r$, is in perfectly elastic supply, and has a price that we normalize to equal one unit of the consumable good. Additionally, there is a risky asset that is in fixed supply (the underlying security). We normalize the supply of this asset to one. Let n_t denote the price of the risky asset

[5] Bonser-Neal, Brauer, Neal, and Wheatley [1990] and Diwan, Errunza, and Senbet [1992] apply the ideas of cross-border segmentation to the data on the price and NAV of country funds. Although Bonser-Neal et al. generally find that the raising and lowering of official barriers affects the level of premia and discounts, such events explain a very small fraction of the total variation in discounts.

at the beginning of period t.

During each period, investors receive a public signal, d_t, regarding the value of the risky asset next period. The signal, d_t, may be thought of as the (retained) earnings of the productive assets underlying the risky security. We assume that all participants in the market are overlapping generations of traders who each live two periods. Each trader invests his endowment at the beginning of the first period, consumes the gross proceeds at the beginning of the second period, and leaves no bequests. Each trader is assumed to have a negative exponential utility function with coefficient of absolute risk aversion equal to α. Each investor's objective is to maximize his expected utility in the second period of life:

$$EU = \lambda_{i,t}\ [E_t(n_{t+1}|d_t) - n_t(1+r)] - \alpha(\lambda_{i,t}^2)E_t(\sigma^2_{n,t+1}|d_t) + Constant$$

where $\lambda_{i,t}$ denotes the amount that trader i invests in the risky asset at the beginning of period t.

We assume all variance and covariance terms are constant, and that the public signal d_t has a distribution given by:

$$d_{t+1} \sim N((1+r)d_t, \sigma_d^2).$$

We also assume that in equilibrium the mathematical expected value of the risky asset next period is equal to the sum of its current value and the magnitude of the public signal, or $E_t(n_{t+1}|d_t) = n_t + d_t$. Since the equilibrium price of the risky asset must be such that the demand for the risky asset equals its supply, solving for the equilibrium price yields:

$$n_t = \frac{d_t}{r} - \frac{2\alpha\sigma^2_d}{r^3}$$

$$E_t((n_{t+1} - E_t n_{t+1})^2|d_t) = \sigma^2_{n,t+1}|\ d_t = \frac{\sigma^2_d}{r^2}\ .$$

The reader can verify that the assumptions invoked to derive the equilibrium are indeed satisfied by the equations above. The first term in the equilibrium pricing equation reflects the discounted expected increase in net asset value due to the fundamental signal, and the second term is the adjustment for one-period price risk which derives from variation in fundamental value. The change in price from one period to the next is given by:

$$\Delta n_{t+1} = \frac{d_{t+1} - d_t}{r}$$

III.2 *The Market for the Country Fund*

Consider now the market for a closed-end fund that is listed domestically and invests exclusively in the risky asset of the host foreign country. The price of the country fund is denoted by p_t. We assume that a proportion γ of the participants in the market for the fund are "irrational noise traders" meaning simply that they misperceive either the fundamental-generating process or the actual expected return on the risky asset or both. Specifically, noise-traders process fundamental information as if they believed the fundamental signal had a distribution given by

$$d'_{t+1} \sim \mathrm{N}\left((1+r)[(1-\zeta)\, d_t \; + \; \zeta(1+r) d_{t-1}] ,\; \sigma_d^2 \right)$$

where d_t is the public signal. In other words, the noise-traders falsely believe that the expected value of the next period's signal is a weighted sum of the current and lagged public signal. In particular, this weighted sum corresponds to a weighted average of the current mathematical expectation of d_{t+1} and the one period lagged expectation of d_{t+1}. The value ζ is interpreted as a measure of the stickiness of noise-traders' perception of fundamentals. When $\zeta = 0$, the distribution perceived by the of noise traders is the same as the one perceived by the rational investors who make up the remainder of the market.

Another source of noise traders' misperception is stochastic "sentiment", s_t, which, as in DSSW, adjusts the noise traders' expectations of next period's *price* up or down from the mathematical or rational expectation of price. We assume s_t is distributed normally with mean μ_s and variance σ^2_s. We include the sentiment term both because previous studies have found some empirical support for the presence of a common sentiment term, and to make our model a formal generalization of the noise-trader model of DSSW.

In the context of this model, the hypothesis we put forth in this paper is (1) there are noise traders ($\gamma > 0$); (2) these noise traders are usually slow to react to changes in fundamentals ($\zeta>0$); and (3) "major news events" (to be defined empirically in the next section) lead noise traders to temporarily react more quickly than usual (ζ temporarily decreases when a major news event concerning the foreign country occurs). To allow for this third effect, our model will allow each time period to fall into one of two possible states: the "usual" state when no major news event has occurred, and the "event" state when a major news event has occurred. Notationally, we differentiate these two states using the subscripts *u* and *e* respectively. Thus $\zeta = \zeta_u$ in usual periods and $\zeta = \zeta_e$ in periods with news events. We assume that there is a known, constant probability of $(1-q)$ per time period of a major event occurring in that period.

All traders in the closed-end fund market have negative exponential utility and are born with an initial endowment Y. Let ω denote the coefficient of absolute risk aversion of all traders in the closed end fund market, and let κ_i and κ_n denote the number of units of the fund purchased by the representative rational investor and noise trader, respectively. Let p_t denote the price of a fund share at the beginning of period t. We normalize the number of shares to one. We can express period t+1 wealth of an investor as :

$$W_{t+1} = (1+r)(Y-\kappa p_t) + \kappa(p_{t+1});$$

The corresponding expected utilities of a noise trader (n) and a sophisticated investor (i) are:

$$EU_i = constant + \kappa_i((Ep_{t+1}|d_t,d_{t-1}) - (1+r)p_t) - \omega(\kappa_i^2)(E(\sigma^2_{p,t+1}|d_t,d_{t-1}))$$

$$EU_n = constant + \kappa_n(E_n(p_{t+1}|d_t,d_{t-1}) - (1+r)p_t) - \omega(\kappa_n^2)(E_n(\sigma^2_{p,t+1}|d_t,d_{t-1})) + \kappa_n s_t .$$

Note the extra sentiment term in the noise traders' utility as well as the fact that noise traders' price expectations (excluding sentiment) are allowed to differ from those of rational investors. In equilibrium, the price of the fund, p_t, must be such that the demands of sophisticated investors and noise traders sum to one. Deriving each representative agent's first-order condition for maximizing expected utility, and applying the equilibrium condition, we can express price as a function of the agents' expectations:

$$p_t = \frac{1}{1+r} [\gamma E_n(p_{t+1}|d_t,d_{t-1}) + (1-\gamma) E_i (p_{t+1}|d_t,d_{t-1}) + \gamma s_t -2\omega\sigma^2_{p,t+1}]$$

where $\sigma^2_{p,t+1} = E [(p_{t+1} - E (p_{t+1}| d_t, d_{t-1}))^2| d_t, d_{t-1}]$. Since we allow the noise traders' expectation formation process to vary depending on whether a news event has occurred, we will actually have two equilibrium pricing formulas: one for usual periods and one for event periods. As before, we close the model by making assumptions about these expectations that will be true in the equilibrium we identify :

$$E_{n,e}(p_{t+1}|d_t,d_{t-1}) = E_i (p_{t+1}|d_t,d_{t-1})+((1-q)a_e+qa_u)(E_{n,e}(n_{t+1}|d_t,d_{t-1})-E_i(n_{t+1}|d_t,d_{t-1}))$$

$$= E_i\ (p_{t+1}|d_t,d_{t-1}) - ((1-q)a_e + qa_u)(1+r)\zeta_e(n_t - (1+r)n_{t-1} - \frac{2\alpha\sigma^2{}_d}{r^2})$$

$$E_{n,u}(p_{t+1}|d_t,d_{t-1}) = E_i\ (p_{t+1}|d_t,d_{t-1}) - ((1-q)a_e + qa_u)(1+r)\zeta_u(n_t - (1+r)n_{t-1} - \frac{2\alpha\sigma^2{}_d}{r^2})$$

$$E_i(p_{t+1}|d_t,d_{t-1}) = (1-q)[a_e E(n_{t+1}|d_t,d_{t-1}) + b_e n_t + Ec_e] + q[a_u E(n_{t+1}|d_t,d_{t-1}) + b_u n_t + Ec_u]$$

$$=((1-q))a_e + qa_u)((1+r)n_t + \frac{2\alpha\sigma^2{}_d}{r^2}) + ((1-q)b_e + qb_u)n_t + (1-q)Ec_e + qEc_u)$$

where

$$p_{t+1,e} = a_e n_{t+1} + b_e n_t + c_e$$

$$p_{t+1,u} = a_u n_{t+1} + b_u n_t + c_u$$

Also, we assume that all conditional variances are constant across time. Substituting our assumptions into the price equations (in terms of expectations) above and rearranging the resultant equations (solving for all the coefficients in terms of a_u) yields a preliminary expression for price in usual periods and price during event periods:

$$p_{t+1,u} = a_u n_{t+1} + \frac{a_u(1+r)\gamma\zeta_u}{1-\gamma(1-q)(\zeta_u-\zeta_e)}n_t + \frac{2a_u\alpha\ \sigma^2{}_d}{r^3}(1+\frac{(1+r)\gamma\zeta_u}{1-\gamma(1-q)(\zeta_u-\zeta_e)})$$
$$- \frac{2\omega\ \sigma^2{}_{p,t+1}}{r} + \frac{\gamma(s_{t+1} - \mu_s)}{1+r} + \frac{\gamma\mu_s}{r}$$

$$p_{t+1,e} = \frac{a_u(1+\gamma q(\zeta_u-\zeta_e))}{1-\gamma(1-q)(\zeta_u-\zeta_e)}n_{t+1} + \frac{a_u(1+r)\gamma\zeta_e}{1-\gamma(1-q)(\zeta_u-\zeta_e)}n_t + \frac{2a_u\alpha\ \sigma^2_d}{r^3}(1+\frac{(1+r)\gamma\zeta_u}{1-\gamma(1-q)(\zeta_u-\zeta_e)}) - \frac{2\omega\ \sigma^2_{p,t+1}}{r} + \frac{\gamma(s_{t+1}\ -\ \mu_s)}{1+r} + \frac{\gamma\mu_s}{r} - \frac{2a_u\alpha\sigma^2_d\gamma(\zeta_u-\zeta_e)}{r^2(1-\gamma(1-q)(\zeta_u-\zeta_e))}$$

It is interesting to compare the coefficients on the NAV terms in these two equations. If our hypothesis is correct and major news events cause the noise traders to have less sticky expectations (i.e. be less "behind the curve"), then $\zeta_u > \zeta_e$ and the coefficient on n_{t+1} is larger in event periods than in usual periods, while the coefficient on n_t is smaller in event periods than in usual periods.

Using the definition of $\sigma^2_{p,t+1}$, the equilibrium solution of n_t above, and knowledge of the distributions of d_t and s_t we also derive a closed-form expression for the conditional variance of price:

$$\sigma^2_p = \frac{\gamma^2\sigma^2_s}{(1+r)^2} + \frac{a_u^2\sigma^2_d(1+\gamma^2 q(1-q)(\zeta_u-\zeta_e)^2)}{r^2(1-\gamma(1-q)(\zeta_u-\zeta_e))^2} + \frac{4a_u^2\alpha^2\sigma^2_d\gamma^2(\zeta_u-\zeta_e)^2 q(1-q)^3((1+\gamma)\zeta_u+(1-\gamma)\zeta_e)}{r^4(1-\gamma(1-q)(\zeta_u-\zeta_e))^2(1+(1-q)(\zeta_u-\zeta_e))^2}$$

Substituting into the above expressions for price yields closed-form expressions for the price of the closed-end fund:

$$p_{t+1,u} = a_u n_{t+1} + \frac{a_u(1+r)\gamma\zeta_u}{1-\gamma(1-q)(\zeta_u-\zeta_e)} n_t + \frac{2a_u\alpha\,\sigma^2{}_d}{r^3}\left(1+\frac{(1+r)\gamma\zeta_u}{1-\gamma(1-q)(\zeta_u-\zeta_e)}\right)$$
$$-\frac{2\omega}{r}\left(\frac{\gamma^2\sigma^2{}_s}{(1+r)^2}+\frac{a_u{}^2\sigma^2{}_d(1+\gamma^2q(1-q)(\zeta_u-\zeta_e)^2)}{r^2(1-\gamma(1-q)(\zeta_u-\zeta_e))^2}+\frac{4a_u{}^2\alpha^2\sigma^2{}_d\gamma^2(\zeta_u-\zeta_e)^2q(1-q)^3((1+\gamma)\zeta_u+(1-\gamma)\zeta_e)}{r^4(1-\gamma(1-q)(\zeta_u-\zeta_e))^2(1+(1-q)(\zeta_u-\zeta_e))^2}\right)$$
$$+\frac{\gamma(s_{t+1}-\mu_s)}{1+r}+\frac{\gamma\mu_s}{r}$$

$$p_{t+1,e} = \frac{a_u(1+\gamma q(\zeta_u-\zeta_e)}{1-\gamma(1-q)(\zeta_u-\zeta_e)} n_{t+1} + \frac{a_u(1+r)\gamma\zeta_e}{1-\gamma(1-q)(\zeta_u-\zeta_e)} n_t + \frac{2a_u\alpha\,\sigma^2{}_d}{r^3}\left(1+\frac{(1+r)\gamma\zeta_u}{1-\gamma(1-q)(\zeta_u-\zeta_e)}\right)$$
$$-\frac{2\omega}{r}\left(\frac{\gamma^2\sigma^2{}_s}{(1+r)^2}+\frac{a_u{}^2\sigma^2{}_d(1+\gamma^2q(1-q)(\zeta_u-\zeta_e)^2)}{r^2(1-\gamma(1-q)(\zeta_u-\zeta_e))^2}+\frac{4a_u{}^2\alpha^2\sigma^2{}_d\gamma^2(\zeta_u-\zeta_e)^2q(1-q)^3((1+\gamma)\zeta_u+(1-\gamma)\zeta_e)}{r^4(1-\gamma(1-q)(\zeta_u-\zeta_e))^2(1+(1-q)(\zeta_u-\zeta_e))^2}\right)$$
$$+\frac{\gamma(s_{t+1}-\mu_s)}{1+r}+\frac{\gamma\mu_s}{r}-\frac{2a_u\alpha\sigma^2{}_d\gamma(\zeta_u-\zeta_e)}{r^2(1-\gamma(1-q)(\zeta_u-\zeta_e))}$$

Furthermore, we can now go back and check that all our initial assumptions on the expectations are satisfied at these prices and see what expression this implies for a_u. We find that if we let,

$$a_u = \frac{1-(1-q)\gamma(\zeta_u-\zeta_e)}{1-(1-q)\gamma(\zeta_u-\zeta_e)+\gamma\zeta_u},$$

then these prices and expectations do indeed form an equilibrium.

To gain some insight into the implications of the model and how it relates to other models, we make several observations. First, if there are no noise traders ($\gamma = 0$) and both domestic and foreign investors have identical risk preferences ($\alpha = \omega$) the expression for price (event or usual) becomes:

$$p_{t+1} = n_{t+1}$$

which is the benchmark fundamental pricing equation. Second, if there are noise traders ($\gamma > 0$) but they do not lag in their perception of fundamentals ($\zeta_u = \zeta_e = 0$), and risk attitudes in the two markets are the same ($\alpha = \omega$), we have

$$p_{t+1} = n_{t+1} - \frac{2\gamma^2 \sigma^2{}_s \omega}{r(1+r)^2} + \frac{\gamma(s_{t+1} - \mu_s)}{1+r} + \frac{\gamma \mu_s}{r}$$

which is the noise-trader model of DSSW. This equation says that variation in noise-trader sentiment will cause the price of the fund to vary in relation to its NAV. However, as is implicit in DSSW, even in periods when sentiment is absent ($\mu_s = 0$, s = 0), the fund will still trade at a discount because of the presence of undiversifiable noise-trader risk represented by σ_s.

Third, if there are noise traders and there is some lag effect, but it is not affected by major news events ($\zeta_u = \zeta_e \neq 0$), then the pricing equation will be the same whether an event occurs or not and lagged NAV should have a non-zero coefficient (of the same sign as ζ). There will be underreaction of price to current NAV (i.e. coefficient on current NAV less than 1) if ζ is positive and overreaction if ζ is negative. Additional constant terms appear in the pricing equation to reflect the fact that this over- or under- reaction changes the risk characteristics of the fund, and thus modifies the risk premium built into the price. Note that underreaction (all else equal, and in contrast to the sentiment effect) decreases the riskiness of the asset.

Finally, as we pointed out above, if events do cause the noise traders' to temporarily adjust their expectation formation, then the coefficients in the two pricing equations will no longer be the same. In particular, if, as we hypothesize, ζ falls in periods where there are major events, the elasticity of prices with respect to current asset values will rise.

Before turning to the data, we make several comments on how our theoretical model relates to reality and to previous research. First, we note that previous research (such as Lee, Shleifer, and Thaler [1991] in the general case and HLW in the case of country funds) has focussed on s_t, the sentiment term. This research has examined the cross-sectional and time series properties of sentiment, and documented that there is a common component in fund prices that may reflect sentiment. In contrast, in our empirical specification we will use time dummies to account for common movements in fund prices, so we will have nothing to say about sentiment or noise trader risk.

Second, previous research has also documented that fund prices are "sticky" with respect to asset values, so we already know in advance that one feature of the model - underreaction of prices to fundamentals - is true. The innovation in the model that we test is that this stickiness varies with the salience of news.

Third, we also know from previous research that our model is not literally true. HLW, for example, document that the lagged discount has predictive power for future returns; this is not allowed for in the model, which says only that prices dependent on lagged NAV's, not the difference between NAV's and prices. Therefore, in turning to the data, we will use what we view as sensible specifications, consistent with the known empirical facts about closed end funds, to examine the changing response of prices to asset values. There is not a one-to-one correspondence between the model and these sensible specifications. The point of the model is to show that it is possible to have time-varying cognitive error affecting asset prices in equilibrium, and to guide our intuition as to what we'd expect to see in a world where the salience of news affects traders' expectation formation.

In Section V, we estimate several empirical specifications related to the model above with an aim of investigating the role of current versus lagged NAV terms in determining price and whether major news events seem to change this role in ways suggested by the observations above. In particular, (A) if there are investors that lag-behind there should be underreaction in general, and (B) if country-specific major news stories make salient to these less-than fully informed/rational investors that they are behind the curve and lead them to "wake up", then our model predicts that these news stories should increase the weight on the current versus the lagged terms in explaining price.

IV. Data

IV.1 *The Sample of Country Funds*

The sample of country funds used in our empirical work consists of the 39 single-country publicly traded funds that were covered in *Barron's* publicly-traded funds column from January 1985 through March 1994, and for which at least twelve months of price and NAV data exist within that period. Table 1 provides the name of the funds in our sample with the date of their respective IPOs.

A complete time series of weekly prices and NAVs adjusted for splits and in-kind distributions was obtained for each of the 39 country funds from *Barron's*, the *Bloomberg* system, and the funds themselves. Information on dividends and other distributions was obtained from *Standard and Poor's Dividend Record* and from *Bloomberg*.

Prices and NAV's are (in more cases) those reported as of Friday. The funds compute their reported NAVs by translating the local currency price of the assets at the local market close into U.S. dollars. The translation to dollars, however, is not uniform as some funds use the exchange rate at the local market close, whereas others use an afternoon fix in New York. Moreover, since foreign markets close on a given day prior to the close in New York, prices and NAVs will only be approximately synchronous, even though they correspond to the same calendar day's trading sessions. Because of the lag involved in completing the NAV audit and disseminating the results to the financial press, most investors are unaware of the reported NAV of a country fund until after Friday's trading session in New York ends.

We have a total of 9917 fund-weeks of observations; on average there are 254 weeks of observations per fund and 20 fund-observations per week. Our empirical specifications will use data from all 39 funds, using a fixed effects panel data specification.

Table 2 shows summary statistics for the country funds in our sample. Several points stand out. First, although country funds on average traded at a discount during this period, the average discount is only about one percent. Second, discounts and premia vary enormously, from a premium of 205% to a discount of 56%.[6] Last, consistent with basic Shiller (1981) results, the prices of country funds are far more variable than their NAV's. The standard deviation of R_p is about half again as big as the standard deviation of R_n. Last, as is common in high-frequency asset data, prices are negatively autocorrelated, possibly for market micro-structure reasons.

IV.2 *News Events*

Our goal is to find recent historical events which are "salient" - that is, which are dramatic,

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[6] The remarkable 205% premium, meaning that the price was more than three times the NAV, occurred during the second week of the Taiwan's fund trading. Thus it might be regarded as part of the new issues puzzle, documented for closed-end funds by Weiss (1989). The Taiwan fund's premium stayed above 100% for ten weeks and above 50% for 30 weeks.

large, and which in the opinion of the average individual investor would be important for stock market returns in the relevant country. We isolate and measure the salience of major news events using the column width of front page articles in *The New York Times*. Although this is an imperfect measure of the importance that investors/readers attach to news stories, it is probably the best measure that can be verified and constructed after the fact. Specifically, for each country fund, we searched on the *Nexis* database for key words appearing either in an article headline or in the first paragraph of an article on the front page of the *Times*. For example, for the Germany Fund, we searched for articles containing the words "German", "Germany", "Germans", etc. Having found the articles, we then judgementally discarded the articles which, in our opinion, were not relevant to the average investor's perception of economic fundamentals. These included human interest stories, sports stories, and analysis not prompted by a news event. We also excluded items that did not contain at least part of the article actually appearing on the front page, as when the *Times* featured a picture and caption without an accompanying front-page news article.

Several items appeared in more than one search. For example, in reporting on the European currency crisis of 1993, the *Times* had front page articles mentioning both Germany and France. In two cases, we judgementally attached events to country funds even though their host countries did not appear in the headline or first paragraph. The first instance was the coup against Gorbachev in 1991, where the *Times* mentioned only Germany, and which we also attached to the Austria Fund. In the second instance, we attached the 1989 Tianannmen Square incident in the People's Republic of China to the Taiwan Fund and the ROC Taiwan Fund. This series of filters left us with 231 fund-weeks of news events (out of 9917 fund weeks in the total sample). For each event, we then collected by hand the column width of the headline as a measure of the importance of the event. News stories ranged in importance from a single column to up to six columns.

Because our aim is to focus on prominent news stories, in our benchmark specification we label an item as "news" if the associated width was greater than or equal to two columns.[7] We felt that the two-column test was an adequate criteria to balance the need to focus on prominence, and the need to maintain an adequately large sample of news events.[8] For illustrative purposes, Table 3 displays the entire list of events attached to one country, Israel, from 1992 (when the First Israel Fund is listed) to March 1994.

Since we work with weekly data on fund prices and NAVs, we need to be sure that events enter the information set of agents prior to the time that we observe the end-of-week price. For most of our sample, prices and NAVs are recorded on Friday afternoon. For these funds, we recorded events as occurring within a particular week if the article appeared in the Times on or before that week's Friday. For example, consider an event taking place on Friday, September 10. This event would be presumably be reported in the *Times* on Saturday, September 11, and thus would be counted as affecting prices and NAVs observed on Friday, September 17. For those funds reporting Thursday or Wednesday prices and NAVs, an analogous scheme was used to match news events with the return week. In our final sample, then, salient "news" (two-or-more-column events) occurred in 66 different weeks. Since some events were attached to more than one fund, there were 97 fund-weeks in which salient news events took place. This represents

[7] As we will see below, this particular cut-off is not crucial for the results.

[8] In their analysis of news and returns Mitchell and Mulherin [1994] delete articles smaller than three columns.

about 1% of the fund-week sample. For each fund-week, we create an indicator variable, NEWS(t), equal to one if a news event occurred within the week.

We define the return on price to be $R_p(t) = \ln(P(t) + D(t)) - \ln(P(t-1))$ and the return on NAV as $R_n(t) = \ln(N(t) + D(t)) - \ln(N(t-1))$, where P(t) is the price of the fund, N(t) is the net asset value, and D(t) is the total distribution (income plus capital gains distributions) made from the fund or the NAV. In a world of costless arbitrage, full information, and rational agents, it is clear that $P(t) = N(t)$ and $R_p(t) = R_n(t)$. As mentioned previously, in the real world, the precise level of N(t) is not in the information set of agents when they set the P(t) that we observe. In the absence of bias, we would therefore expect that $P(t) = EN(t)$.

Table 4 documents the effect of news on both R_p and R_n. The absolute value of both price returns and NAV returns are sharply higher in weeks when NEWS=1. Column (1) shows that, where the absolute value of fund returns is usually about 3.8 percent per week (as also shown in Table 2), $|R_p|$ is about 1.6 percentage points higher in news weeks. Column (3) shows that the effect of news on NAV returns is similar: volatility is 0.9 percent higher in news weeks than in non-news weeks. Adding week dummies to these regressions (columns (2) and (4)) do not change the results: incremental volatility in news weeks is large and significant. This confirms that we have correctly identified fund-specific news that effects specific funds on specific weeks (since the week dummies control for events that affect all funds equally). As a side note, observe that although price and NAV returns are more volatile in news weeks, our news dummies explain very little of the variation in returns, in line with similar results in Cutler, Poterba, and Summers (1989)

V. The Empirics

V.1 *Underreaction*

Table 5 documents the systematic underreaction of fund prices to fund asset values. We first start in column (1) by simply regressing R_p on R_n and 39 different intercept terms for the 39 different funds. We find that when NAV rises by one percent in a given week, prices rise by only .64 percent. This basic result, which as we will see is quite robust, is what we call "underreaction".

Column (2) adds two lags of weekly asset returns on the right hand side. Even two weeks after the initial change in asset value, fund prices only incorporate 80% of the asset return (the sum of the coefficients is 0.8 with a standard error of 0.02; thus the reaction is significantly below one.) This stickiness has been documented by previous studies, including HLW and Frankel and Schmukler (1996).[9] Note that the NAV return *two* weeks ago is still making its way into this week's price return, so that it cannot be the timing issue related to the release of NAV information that is driving the stickiness of prices. Using very different econometric techniques, Frankel and Schmukler (1996) find that it takes three to six weeks for NAV changes to become incorporated into prices.

Column (3) captures the dynamic adjustment of prices to asset value by including the lagged premium and lagged price returns on the right-hand side. This reproduces a standard result in the closed-end fund literature: discounts and premia help forecast fund returns (see, for

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[9] One study which has not found much stickiness is Chen, Kan, and Miller (1993). They use monthly data on aggregate price and NAV returns (from 1965 to 1985) to estimate a reaction parameter of 0.957, with an R-squared of 0.73. Presumably the difference lies in the use of aggregate data, which smooths over the behavior of different funds.

example, HLW)[10]

Table 5 does not attempt to estimate the common components of the error term in this regression across all funds in each week. For example, HLW estimate that returns on the US stock market cause fund prices to deviate from fund NAV's.[11] We can control for these aggregate effects by including week dummies - that it is, an individual intercept for each of the 482 weeks - in the regression. The data strongly reject the hypothesis that week dummies are jointly insignificant. Column (4) shows that including week dummies slightly increases the estimated underreaction; the (idiosyncratic components of) price returns only reflect half of the (idiosyncratic) contemporaneous NAV returns.

The regressions in Table 5 restrict the coefficients to be the same across all 39 funds. There are strong a priori reasons for thinking that different funds may have different characteristics. HLW, for example, document that in analogous regressions, the coefficients on lagged discounts vary widely across funds. Fund prices may have different reactions to fund NAV's due to differences in liquidity, differences in the type of investor in each fund, or for other reasons.[12]

We therefore tried reestimating column (4) allowing for different funds to have varying coefficients on the lagged premium, contemporaneous NAV returns, and on lagged price returns. The data strongly rejected the hypothesis that coefficients on the various terms are equal across

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[10] $R_p(t-2)$ and $R_n(t-3)$ are not significant in this regression and so we exclude them.

[11] Hardouvelis, La Porta, and Wizman [HLW,1994] model noise-trader sentiment as an autoregressive process and derive an expression relating the level of sentiment to the country fund discount. They find that variation in the common unobserved component of country fund discounts accounts for roughly 20% of the variation in country fund discounts over time.

[12] HLW were unable to explain differences in the "stickiness" of funds using country-specific features such as cross-border investment restrictions.

funds. We are therefore obliged to estimate 39 different slope coefficients for each term in Table 5.[13]

Therefore, when testing for different reaction to news, we will be careful to include both week dummies and fund-varying terms on the five variables in Table 5. Since it is awkward to report these estimates, we will also report the pooled results (where the coefficients are constrained to be equal across funds), which represent an "average" of the individual coefficients for each fund.

Our null hypothesis is that the presence of news events does not change the reaction of price to contemporaneous changes in NAV. Our alternative hypothesis is one-sided: salient news raises the reaction of price to contemporaneous changes in NAV.

V.2 *The Effect of News*

Table 6 shows our estimates of the reaction equation in news weeks. Column (1) repeats equation (2) of Table 5, but now allows the coefficients on R_n to vary between news-weeks and non-news weeks. This regression shows the basic empirical result of this paper: reaction to contemporaneous NAV is significantly higher in news weeks. In non-news weeks, the elasticity of prices with respect to NAV is 0.47, significantly below one. In news weeks, the elasticity is 0.82, significantly higher than 0.47 but not significantly different from one. Columns (2) through (5) explore this result: it appears to be robust across different specifications.

In, column (2), we allow the coefficients on all of the coefficients that appeared in Table 5

[13] We estimated a version of (4) which had both the week dummies and 39 different coefficients for each of the five variables listed in Table 5. We then tested whether, for each of these six sets of coefficients, we could reject the hypothesis that the fund-specific coefficients were equal. We found the data strongly rejected the hypothesis that the coefficients were equal across fund. The one exception was the twice-lagged NAV return term. For that variable, we rejected the hypothesis that the coefficient was the same across funds only at a p-value of 0.06.

to vary across funds (including the coefficient on R_n in non-news weeks). We restrict the incremental effect of news, NEWS*R_n, to be equal across funds. Again, reaction is significantly higher in news weeks. Since the lagged NEWS*R_n terms are insignificant in column (2), we drop them in column (3), which is our benchmark specification.

In specifications (4) and (5), we try using different column widths in our definition of NEWS, using either greater than or equal to one columns, or greater than our equal to three columns. As shown in the table, this did not change the qualitative results: the elasticity of prices to NAV is higher in news weeks. Although the coefficient on NEWS*R_n is not significantly different across these different definitions of NEWS, the coefficients do increase monotonically with the column width of the news articles. The bigger the news, the greater the adjustment of prices to asset values.

Should one trust the OLS standard errors? We answer this question for column (3) in Table 6 in two ways. First, we estimated Newey-West robust standard errors (using two weeks of lags). The qualitative results were unchanged, since the robust-standard error was 0.14 instead of 0.10.

Second, we simulated the distribution of the parameter estimates under the null hypothesis that the presence of news is not a determinant of the speed of adjustment to fundamentals. We used the following Monte Carlo procedure. First, we set NEWS=1 for 97 random fund-weeks within the total sample of 9917 fund-weeks (ninety-seven is the number of fund-weeks in which actual news events occur). Second, we re-estimated column (3) of Table 6 using the simulated NEWS variable and actual data on fund and NAV returns. We repeated this process 250 times to derive a two-sided p-value for the coefficient on NEWS*R_n. Based on the Monte Carlo frequency distribution, the probability of getting a coefficient on NEWS*R_n that has absolute value of greater than or equal to 0.37 is 0.04. It thus appears that the Monte Carlo standard errors of the estimates under the null are somewhat larger than the OLS standard errors. This procedure is surely not perfect (since we already know from Table 4 that R_n and R_p are unusually volatile in actual news weeks) but it at least provides some reassurance.

V.3 *Large changes in NAV vs. NEWS*

A leading practical concern with our baseline specification is that "NEWS" is just a proxy for large movements in securities prices. It could well be that large changes in R_n have a greater effect on R_p for reasons unrelated to cognitive error. For example, it could be that large changes in NAV are more easily observable to market participants who set prices. Therefore, in Table 7 we test to make sure that it is the prominent nature of news, and not magnitude of NAV returns, which is responsible for our results.

We start by including, in addition to the NEWS(t)*R_n(t) term, a second-order polynomial term in R_n(t). Since R_n(t) can be either negative or positive, we use $R_n(t)*|R_n(t)|$ instead of $(R_n(t))^2$. We also tried using a dummy variable, BIGR_n(t), which was set equal to one if the absolute value of R_n(t) was large and zero otherwise, and interacting this term with R_n(t). If NEWS is just a proxy for BIGR_n, then controlling for BIGR_n should eliminate the NEWS term in the regression. We tried two cutoff points for large absolute values of NAV returns, corresponding to magnitudes that were one or two standard deviations higher than the mean. As shown in Table 2, these cutoffs was $|R_n(t)|>4.93$ (which contained 11% of sample observations) and $|R_n(t)|>7.48$ (4% of sample).

Table 7 shows the results. Large movements in NAV result in a (statistically significantly) *smaller* proportional response in price returns, not a bigger response. So it does not appear that this effect could be driving our results. Controlling for the magnitude of NAV returns, the response of prices in news weeks is still significantly larger than for non-news weeks.[14]

In summary, we find the evidence to be consistent with the hypothesis that investors underreact to the mundane changes in NAV that take place every week, but change their behavior when they observe dramatic news. In weeks where news events occur, they respond much more to the change in fundamentals. Do investors "overreact" to exciting news? In our simplest specification (column (1) of Table 6), the point estimate of the elasticity of price with respect to NAV in news weeks is still lower than one, although we cannot reject that it is equal to or slightly higher than one. In our more complicated specifications, its hard to say whether prices react more than one-for-one to NAV, because we allow different funds to have different levels of reaction. Thus we can only say with confidence that the degree of reaction is much higher in news weeks.

VI. Conclusion

The hypothesis that the relative salience of news plays a role in the magnitude of investors' reaction to changes in economic fundamentals has not been extensively tested outside of a laboratory setting. We used closed-end country funds to test this hypothesis because they provided both an obvious measure of fundamentals (the NAV) and an obvious measure of salient

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[14] Another possible explanation for our results, suggested to us by Sheridan Titman, is that foreign markets are illiquid and that much of R_n reflects temporary liquidity shocks. Thus in a typical week the US market sets R_p to rationally underreact to R_n. In news weeks, R_n primarily reflects not liquidity shocks but rather fundamentals; thus R_p rationally reacts more to R_n.

Two sets of facts contradict this explanation. First, as documented in HLW, country-fund discounts help predict future price returns but in general do not help predict NAV returns. So there is little evidence that prices are a better measure of fundamentals than NAV. Second, as shown in Table 2, NAV returns are positively autocorrelated, not negatively autocorrelated. We also examined the autocorrelation of weekly price and NAV returns in the week subsequent to a news event, and found that the autocorrelation of both price and NAV returns was not significantly different in these weeks compared to the average week. Again, this contradicts the proposed explanation.

news (front-page *New York Times* articles.)

We derived a model of investor misperception, which nests the noise trader model of De Long, Shleifer, Summers and Waldmann [1990], in order to provide a heuristic representation of return-generating equations under a framework in which a group of investors incorrectly weight current fundamental signals in generating expectations of next period's fundamental signal. A reduced-form expression for price suggested that under this specification of cognitive error, price would depend on both current and lagged NAV and that the coefficients on these terms would change in a systematic way as the weight given to present versus past changed. This framework was consistent with the simple hypothesis that the extent of the stickiness of noise traders' perception of changing fundamentals is lesser after important and well-publicized news events focus attention on the host country.

Our empirical results were consistent with this hypothesis. First, the results from estimating simple return-generating equations indicate that price returns are in fact sticky, in that they display dependence on past changes in fundamentals in addition to current changes in fundamentals. That is, noise traders are normally slow to react to changes in fundamentals. Second, using the country-specific news events to construct a measure of prominent news, regression results also suggest that the reaction to changes in fundamentals is quicker after important and well-publicized news events focus attention on the host country. Prominent news leads investors who normally underreact to do this to a lesser extent, so that the short-run elasticity of prices to fundamentals temporarily rises.

Table 1: Sample of Closed-End Country Funds

Date of Initial Public Offering (IPO)

	Country Fund	IPO
1	Argentina	10/11/91
2	Austria	09/21/89
3	Brazil	03/31/88
4	Brazil Equity	04/03/92
5	Chile	09/26/89
6	Emerging Germany	03/29/90
7	Emerging Mexico	10/02/90
8	First Australia	12/12/85
9	First Iberian	4/13/88
10	First Israel	10/22/92
11	First Philippine	11/08/89
12	France Fund	05/30/86
13	France Growth	05/10/90
14	Future Germany	02/27/90
15	Germany Fund	07/18/86
16	Growth Spain	02/14/90
17	Helvetia	08/19/87
18	India Growth	08/12/88
19	Indonesia	3/1/90
20	Irish Investment	3/30/90
21	Italy	02/26/86
22	Jakarta Growth	04/16/90
23	Japan OTC Eqty	03/14/90
24	Japan	04/12/62
25	Korea	08/22/84
26	Korean Investment	2/13/92
27	Malaysia	05/08/87
28	Mexico Eq. & Inc.	08/14/90
29	Mexico	06/03/81
30	New Germany	01/24/90
31	Portugal	11/01/89
32	ROC Taiwan	05/19/89
33	Singapore	07/24/90
34	Spain	06/21/88
35	Taiwan	12/23/86
36	Thai Capital	05/22/90
37	Thai	02/17/88
38	Turkish Investment	12/15/89
39	United Kingdom	08/06/87

Table 2: Summary Statistics
Prices and NAVs
Weekly Data, 1985-1994

Variable	N	Mean	Std Dev	Min	Max	ρ
R_p	9845	0.17	5.48	-39.9	36.2	-6.7
R_n	9846	0.22	3.48	-38.1	28.8	8.5
$\|R_p\|$	9845	3.81	3.93	0	39.9	22.2
$\|R_n\|$	9846	2.38	2.55	0	38.1	29.5
(P(t)-N(t))/N(t)	9911	-1.15	22	-56.3	205	96.3
ln(P(t)/N(t))	9911	-3.20	19	-82.3	112	96.2

Notes

P(t) is the price of the fund. N(t) is the Net Asset Value of the fund. D(t) is the dividend and capital gain distributions paid by the fund during week t. $R_p = 100*[\ln(P(t)+D(t))-\ln(P(t-1))]$, $R_n = 100*[\ln(N(t)+D(t))-\ln(N(t-1))]$. $|R_n|$ is the absolute value of R_n and ln is natural log. ρ is the first-order autocorrelation coefficient.

Table 3
Illustrative List of All News Events Associated with the First Israel Fund

Dateline	Column Width	Headline
6/24/92	3	Israel's Labor Party Wins Clear Victory in Election; Ready to Form Coalition
12/18/92	3	Israel Expels 400 From Occupied lands; Lebanese Deploy to Bar Entry of Palestinians
8/29/93	3	Israeli Reports Agreement Toward Palestinian Rule in Gaza and Jericho
8/30/93	1	In Draft Accord, Israelis and PLO Near Recognition
8/31/93	2	Mideast Accord: The First Step; More Realism Will Be Needed Before pact Between Israelis and PLO is a Done Deal
9/1/93	1	Mideast Accord: Israel and PLO Ready to Declare Joint Recognition
9/14/93	6	Mideast Accord: The Overview; Rabin and Arafat Seal Their Accord as Clinton Applauds 'Brave gamble'
9/15/93	2	Mideast Accord: Gaza; Dedicated Extremists Present Twin Threat to Mideast Peace
2/26/94	4	West bank massacre: The Overview; At Least 40 Slain in West Bank as Israeli Fires into Mosque

Table 4: News and the Volatility of R_p and R_n

Dependent Variable: $|R_p|$ and $|R_n|$

	$\|R_p\|$	$\|R_p\|$	$\|R_n\|$	$\|R_n\|$
	(1)	(2)	(3)	(4)
Constant	3.80	*	2.37	*
	(0.04)		(0.03)	
NEWS	1.55	1.48	0.93	0.78
	(0.40)	(0.37)	(0.26)	(0.23)
Fund and Week dummies?	N	Y	N	Y
R^2	0.00	0.25	0.00	0.26

Notes: '*' indicates that the regression allows this coefficient to take on different values for different funds.

Table 5: Underreaction of R_p to R_n

Dependent Variable: $R_p(t)$

	(1)	(2)	(3)	(4)
R_n (t)	0.64	0.62	0.66	0.50
	(0.01)	(0.01)	(0.01)	(0.01)
R_n (t-1)		0.12	0.21	0.19
		(0.01)	(0.02)	(0.02)
R_n (t-2)		0.06	0.08	0.05
		(0.01)	(0.01)	(0.01)
ln(P(t-1)/N(t-1))			-0.05	-0.05
			(0.004)	(0.004)
R_p (t-1)			-0.15	-0.22
			(0.01)	(0.01)
Adj. R^2	0.16	0.17	0.22	0.39
Week Dummies?	N	N	N	Y

All regressions include a constant term and 38 fund-specific intercept dummies, not shown.
Standard errors in parenthesis.

Table 6
News and the Reaction of R_p to R_n

Dependent Variable: $R_p(t)$

	(1) Simple	(2) Column Width 2	(3) Column Width 2	(4) Column Width 1	(5) Column Width 3
NEWS(t)*R_n(t)	0.35	0.37	0.37	0.20	0.39
	(0.11)	(0.10)	(0.10)	(0.08)	(0.14)
NEWS(t)*R_n (t-1)	-0.28	-0.15			
	(0.14)	(0.13)			
NEWS(t)*R_n (t-2)	0.12	0.07			
	(0.16)	(0.15)			
R_n(t)	0.47	*	*	*	*
	(0.01)				
R_n (t-1)	0.10	*	*	*	*
	(0.01)				
R_n (t-2)	0.03	*	*	*	*
	(0.01)				
Adj. R^2	0.37	0.40	0.40	0.40	0.40

Notes: '*' indicates that the regression allows this coefficient to take on different values for different funds. All regressions include 39 fund dummies and 482 week dummies. Columns (2)-(5) contain, in addition to the variables shown, all the variables in Table 5 column 4, each allowed to vary across the 39 funds.

Table 7
Large Changes in NAV vs. News, and the Reaction of R_p to R_n

Dependent Variable: $R_p(t)$

	(1)	(2)	(3)
		$BIGR_n(t) \equiv \|R_n(t)\|>4.93$	$BIGR_n(t) \equiv \|R_n(t)\|>7.48$
$NEWS(t)*R_n(t)$	0.37	0.39	0.38
	(0.10)	(0.10)	(0.10)
$R_n(t)*\|R_n(t)\|$	-0.01		
	(0.002)		
$R_n(t)*BIGR_n(t)$		-0.13	-0.09
		(0.03)	(0.03)
Adj. R^2	0.41	0.41	0.41

Notes: In addition to the variables shown, all regressions include 39 fund dummies and 482 week dummies and all the variables in Table 5 column 4, each allowed to vary across the 39 funds.

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