AN EMPIRICAL TEST FOR SHORT TERMISM IN THE U.S. STOCK MARKET

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ABSTRACT

In this paper we investigate the evidence of short termism (myopic) in the U.S. stock market. A modified empirical method from the present value model is proposed to test short termism and characterize valuation bias by the GMM estimation. Our results find that exists significant short termism in the stock market.

1. INTRODUCTION

This paper addresses the issues of short termism (myopic) and valuation bias in the U.S. stock market. In particular, it develops a modified present value model in which short termism can be assessed and tested by the GMM method. Short termism and valuation bias, may be considered as two forms of bounded rationality, which provides an important alternative approach to explain financial anomalies in modern financial literature. In practice, irrational behaviors of investors, especially in financial panics, are believed as essential components to influence the equity markets, and have received much attention from financial officials, such as the former British Chancellor of the Exchequer Nigel Lawson and Federal Reserve Chairman Alan Greenspan. Short termism may be defined as the lack of discernment or long-range perspective in planning. It shall help to explain how asset prices may deviate from the fundamental since investors seem to be observed

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more short-sighted than ever before in the U.S. stock market over the last two decades, by the fact that the average holding period fells significantly (Law, 1996) and there appear other phenomena of short termism as described in Jacobs (1991).

Despite the importance of short termism, there are limited studies using financial data to deal with rigorous empirical test. Miles (1993) first established a modified present value model to test short termism in the U.K. stock market in 1980s. By the two-stage estimation method, it found significant evidences of short termism. In this paper, by adopting an extended empirical method, it provides a relative study for the U.S. stock market.

Most related literature focuses on the theoretical reasons of short termism and the implied inefficiency of capital in the firms. Among them, the argument of principle-agent problem, which describes the conflict between the different objectives of managers and shareholders (Law, 1986, p. 80), may help to explain the existence of short termism. By the nature of corporation, managers may invest too much in the form of human capital in their company than the shareholders do, since investors (the shareholders) may diversify risk well, suggested by typical modern portfolio theories. As a result, rational investors may benefit from being short-sighted, since the managers often focus only on short term benefits. Moreover, it is observed that most of investors do not hold the stock for a long period of time. The inefficient resource allocations are the main concern of myopia in the theoretical arena. For example, Stein (1988) examines how threats of a take-over can lead managers to sacrifice a company's long-term interests and Narayanan (1985) discusses incentives for managers to be myopic.

This article also parallels with the literature of bounded rationality. The rational expectation hypothesis has received much criticism of various reasons from economists (see Conlisk, 1996). In the stock market this hypothesis is examined and rejected by several approaches. For example, Timmermann (1994) rejected the hypothesis that investors could learn to form rational expectations in the U.K. stock market. In this paper we study two departures from rational expectation, short termism and over-valuation. Both of them have been around in theoretic arenas for a long time, but incipient in empirical arenas. We investigate data in the U.S. stock market during the same period with previous study and the reverse long termism result is obtained by Miles' model because of the dominance of over-valuation. We also provide a generalized framework to measure the effects of short termism and valuation bias. The empirical results suggest that short termism coexists with over-valuation in the U.S. stock market.

We develop a generalized present value model to incorporate the effect of valuation bias. Valuation bias may be observed intuitively sometimes in the stock market. For example, since December 1996 the Fed Chairman Alen Greenspan has warned investors of "irrational exuberance" several times (Shiller, 2000). When valuation bias is considered in the model, some potential ineffectiveness of estimation is shown to exist in the original method. In our generalized modified present value model, we test short termism and valuation bias in the U.S. stock market by the GMM method. As a result, it obtains significant results of short termism in the 1980s. It also finds similar results in 1990s for the robustness.

In Section 2 we develop our generalized empirical models. The evidences of our modified models are presented in Section 3. Then Section 4 concludes.

2. ECONOMETRIC MODELS FOR TESTING SHORT TERMISM AND OVER-VALUATION

Let the stock price, return of the stock, and dividend of the company j in period t be p_t^j, R_t^j, and d_t^j, respectively. Further, let r_t denote the risk-free interest rate and E_t the expectation operator at the beginning of the period t. It is simply implied by many famous financial theories such as CAPM, APT et al. that the expected stock return R_t^j can be described as the expected return of holding when investors buy the stock in the current period and anticipate selling it in the next period:

$$E_t(R_t^j) = E_t\left(\frac{P_{t+1}^j - P_t^j + d_{t+1}^j}{P_t^j}\right) = r_t + \pi_t^j. \tag{1}$$

In the above equation π_t^j describes the risk premium for investment in stock as the difference between the expected return and the risk-free interest rate r_t. By rearranging the equation it becomes to the following representation:

$$P_t^j = \frac{E_t(d_{t+1}^j + P_{t+1}^j)}{1 + r_t + \pi_t^j}. \tag{2}$$

For simplicity, we assume that investors expect the interest rate r_{t+j} and the risk premium π_{t+j}^j perfectly in the next i period. Then the equation of the market fundamental is derived by iterating Eq. (2) as

$$P_t^j = \sum_{i=1}^{N} \frac{E_t(d_{t+i}^j)}{\prod_{k=0}^{i-1}(1 + r_{t+k} + \pi_{t+k}^j)} + \frac{E_t(P_{t+N}^j)}{\prod_{k=0}^{N-1}(1 + r_{t+k} + \pi_{t+k}^j)}. \tag{3}$$

In the case with tax consideration, we ignore the transaction tax and assume that investors expect the capital gain tax to be a constant τ. The market fundamental value of the stock, which should be equal to the stock price in the efficient market, has a similar representation as

$$P_t^j = (1-\tau)\sum_{i=1}^{N}\frac{E_t(d_{t+i}^j)}{\prod_{k=0}^{i-1}(1+r_{t+k}+\pi_{t+k}^j)} + \frac{E_t(P_{t+N}^j)}{\prod_{k=0}^{N-1}(1+r_{t+k}+\pi_{t+k}^j)}. \tag{4}$$

It is mentioned that the above market fundamental representation is the benchmark case of rational expectation. From now we shall investigate how short termism and valuation bias of investors may cause the market prices to deviate from the case of rational expectation in (4).

Before developing further empirical models, we should recognize the definitions of two possible forms of bounded rationality: short termism and over-valuation, and how to incorporate them into the empirical models. Then we will develop the modified present value model from the representation of the market fundamental in (4). Start from the definitions. Short termism, is by definition intuitively lacking of any perspective for the future. Marsh (1993) suggests how short termism may affect the stock price (p. 447):

> If stock markets are short-termist, this implies that share prices place too much weight on short-term profits and dividends.

From Marsh's characterization, if short termism is considered, the stock price should reflects different weights across periods for future dividends, i.e. the weight in the short future should be higher relative to the weight in the long future. From this implication we shall incorporate the hypothesis of "too much weight" into the econometric models for testing short termism.

In this paper we provide modified empirical models, which are generalized from Miles (1993) and consistent with Marsh's characterization, to test the short termism and valuation bias in the stock market. In contrast to Miles' model, our framework provides a technique to characterize the effect of valuation bias. Over-valuation is defined as the situation in which stock prices are higher than market fundamentals. It occurs when the left side of the equality in Eqs (3) and (4) is higher than the right side. For simplicity, we assume that investors expect the risk premium in the future to be constant,[1] then the representation of the market fundamental in Eq. (4) become

$$P_t^j = (1-\tau)\sum_{i=1}^{N}\frac{E_t(d_{t+i}^j)}{1+r_{t,t+i}+\pi^j} + \frac{E_t(P_{t+N}^j)}{(1+r_{t,t+N}+\pi^j)^N}, \tag{5}$$

where $r_{t,k}$ is the annual yield of the risk-free bond from current period t to maturity in $t+i$ period.

Short termism, in the concept of too much weight on short-run dividends, can be presented in general as three possible representations in our paper. They are simply implied and generalized by Miles (1993), which can be described as different descriptions of weighting specification of discounted future cash flows. We begin with the first case, which is implied by multiplying a function $f(i)$ over different periods $t+i$, as

$$P_t^j = (1-\tau)\sum_{i=1}^{N}\frac{f(i)\cdot d_{t+i}^j}{(1+r_{t,t+i}+\pi^j)^i} + \frac{f(N)\cdot P_{t+N}^j}{(1+r_{t,t+N}+\pi^j)^N} + \varepsilon_t. \qquad (6)$$

In the above representation, the weighting function $f(i)$ is incorporated to describe each weight of the future cash flows by a multiplication term. By this setting, we can easily characterize the property of the weighting function to find the evidence of short termism in a general approach. A possible reverse result, long termism, may also be considered in this approach. By comparing the above equation with (5), it is implied by nature that $f(i)$ may be described as the "relative weight" on dividends in period $t+i$. Therefore, from Marsh's suggestion mentioned before it is suggested that there exists short termism if $f(i) \geq f(i+1)$ for $i = 1$ to N in which at least one strict inequality holds. We describe short termism in this model as the decreasing property of $f(i)$. A decreasing weighting function in this model suggests that the relative weight in the short run is larger than in the long run. To allowing a wider range of discussion, we describe short termism as the case when the weighting function is non-increasing over all periods and decreasing for some period. Our model also allows the possibility of long termism, the revere result of short termism, when the share prices place too much weight on long-term profits and dividends if the weighting function is found to be increasing.

We also present an alternative model in which there is a different specification for "relative weight" as the equation below,

$$P_t^j = (1-\tau)\sum_{i=1}^{N}\frac{d_{t+i}^j}{(g(i)\cdot 1+r_{t,t+i}+\pi^j)^i} + \frac{P_{t+N}^j}{(g(N)\cdot 1+r_{t,t+N}+\pi^j)^N} + \varepsilon_t. \qquad (7)$$

Because the weighting function $g(i)$ appears in the denominator of the weight in period i, the increasing property of $g(i)$, in contrast to the increasing property in the previous model, represents short termism because the relative weight in the short run is larger than the long run. In this model there exists short termism if $g(i) \leq g(i+1)$ for $i = 1$ to N, whereby at least one inequality strictly holds. The main results in this paper are based on the above two equations which generalize the models in Miles (1993).

Most of Miles' models are special cases of the above two equations. However, a third alternative representation of relative weight is also studied. In this alternative the weighting function is considered to appear in the exponential part as the following representation,

$$P_t^j = (1-\tau)\sum_{i=1}^{N}\frac{d_{t+i}^j}{(1+r_{t,t+i}+\pi^j)^{i\cdot h(i)}} + \frac{P_{t+N}^j}{(1+r_{t,t+N}+\pi^j)^{N\cdot h(N)}} + \varepsilon_t \quad (8)$$

With the same reason there then exists short termism in the above representation (8) if $h(i) \leq h(i+1)$ for $i = 1$ to N, whereby at least one inequality strictly holds. Note that in this paper we have studied the above three approaches. However, the third model as (8) is estimated to find similar results with the previous two models as (6) and (7). The only difference is that there appear more convergence problems in (8). Therefore, in our paper we do not presented the estimated results of the third model.

The above three generalized models include all empirical models in Miles (1993) except that a constant term is not added in these equations. The problem of the addition of a constant term is left to discuss later. The main results in Miles' (1993) are estimated by the Eqs (8) and (9) in his paper (p. 1383), which are special cases of Eqs (8) and (6) in our paper with $h(i) = b$ and $f(i) = x^i$.[2]

There might appear some potential inefficiency in Miles' empirical models when valuation bias is considered. It can be illustrated by the following three reasons. First, from the present value model there appears no solid theoretical foundation to add the constant term α in the empirical models. It could lead to some ambiguity when the ex-post return is investigated as too high with the result $\alpha < 0$ in Miles' study (p. 1388), since there appears mixed effects between under-valuation caused by $\alpha < 0$ and short termism. For example, in Eq. (8), if the weighting function $g(i)$ is found less than 1, as in Miles' study, by comparing with the case of REE in (5) it implies that short termism leads to under-valuation. That is, in Miles' specification short termism shall implicitly imply under-valuation. We shall discuss further later for this point. Moreover, although a constant term is added in most simple regression, however, it is not well satisfied in the present model, since the equity prices are not allowed to be negative. When the constant term is estimated to be negative, for some equities with lower prices, it implies that the expected value for those equities shall be negative. It leads to a contradiction. It is also remarked that even if there exists valuation bias in the market, for example, during a bull market or bear market, the difference between the market price and the fundamental value (rational expectation) may not be just a constant like α across different equities. For example, it is not plausible that the stock market was generally under-valued by £13.5 (the estimated value $-\alpha_0$ in Miles' paper) for both the stock with price £100 and the stock with price £5.

Second, the two major Eqs (8) and (9) in Miles (1993), which are represented as special cases in Eqs (8) and (6) in our paper, have an implicit assumption that short termism comes together with under-valuation. Consider Eq. (9) in Miles (1993) as following:

$$P_t^j = \alpha_0 + (1-\tau)\sum_{i=1}^{N}\frac{x^i \cdot d_{t+i}^j}{(1+r_{t,t+i}+\pi^j)^i} + \frac{x^N \cdot P_{t+N}^j}{(1+r_{t,t+N}+\pi^j)^N} + \varepsilon_t \quad (9)$$

Miles claimed that $x < 1$ in this equation shall indicate the existence of short termism. The argument may leads to a potential ineffectiveness when the influence of over-valuation is presented. If we ignore the outside constant term α_0 in Eq. (12), in the case when short termism appears with $x < 1$, it just implies that the market prices are strictly greater than market fundamentals. There exists the same problem in another major Eq. (13). From this point of view, it is more proper for us to adopt a generalized modified model allowing the consideration of valuation bias.

Our generalized models provide a deeper investigation for short termism and valuation bias. To illustrate how it can be derived, we start from Miles' major estimating Eq. (8) as

$$P_t^j = \alpha_0 + (1-\tau)\sum_{i=1}^{N}\frac{d_{t+i}^j}{(1+r_{t,t+i}+\pi^j)^{i\cdot b}} + \frac{P_{t+N}^j}{(1+r_{t,t+N}+\pi^j)^{N\cdot b}} + \varepsilon_t. \quad (10)$$

While it is claimed that $b > 1$ implies short termism in Miles (1993), in this paper we replace it by a linear function to characterize the difference between short termism and valuation bias by the following modified hypothesis. Short termism is characterized as the increasing property for the weighting function $h(i)$, while over-valuation is implied when the increasing function is less than 1, easily obtained by comparing (5) and (10).

In order to distinguish the mixing effects of short termism and under-valuation, we also adopt generalized empirical models from Eqs (6) and (7). Over-valuation is defined as that when the stock price is higher than the market fundamental value, that is, the left side in Eq. (5) is higher than the right side. It is simply implied if $f(i) \geq 1$ in (6) with at least one equality strictly holding for some period i. In Eq. (7), over-valuation is obtained if $g(i) \leq 1$ with at least one strictly inequality holding for some i.[3] Certainly it may be the case that we cannot conclude whether there appears over-valuation or under-valuation. For example, if $f(i)$, $i = 1$ to N are not always greater or less than 1, we cannot obtain any conclusion about over-valuation or under-valuation. We parameterize the functions $f(i)$ and $g(i)$ in Eqs (6) and (7) as simple functions[4] $f(i) = a + (b/i)$ and $g(i) = p + (q/i)$.

The two major equations that we estimate in our paper are the following,

$$P_t^j = (1-\tau)\sum_{i=1}^{N}\frac{(a+(b/i))\cdot d_{t+i}^j}{(1+r_{t,t+i}+\pi^j)^i} + \frac{(a+(b/N))\cdot P_{t+N}^j}{(1+r_{t,t+N}+\pi^j)^N} + \varepsilon_t \quad (11)$$

$$P_t^j = (1-\tau)\sum_{i=1}^{N}\frac{d_{t+i}^j}{((p+(q/i))+r_{t,t+i}+\pi^j)^i} + \frac{P_{t+N}^j}{((p+(q/i))+r_{t,t+N}+\pi^j)^N} + \varepsilon_t \quad (12)$$

In Eq. (11), short termism is implied when $b > 0$ holds because the relative weight $a+(b/i)$ is decreasing across period i, and the reverse result of long termism shall be concluded when $b < 0$. Over-valuation can be obtained in this model if $a+(b/i)$ is larger than 1 for all periods i. However, if the weight $a+(b/i)$ is not smaller than 1 in some period, then we cannot conclude about the property of valuation bias. We characterize six cases of Eq. (11) by the following cases:

- Case 1: If $b > 0$, $a+(b/i) \geq 1$ for all i, and $a+(b/i) \geq 1$ for some i, it implies short termism and over-valuation.
- Case 2: If $b > 0$ but $a+(b/i) > 1$ for some i, and $a+(b/i) < 1$ for some i, it implies short termism, but it cannot lead to any conclusion of over-valuation or under-valuation.
- Case 3: If $b > 0$, $a+(b/i) \leq 1$ for all i, and $a+(b/i) < 1$ for some i, it implies short termism and under-valuation.
- Case 4: If $b < 0$, $a+(b/i) \geq 1$ for all i, and $a+(b/i) > 1$ for some i, it implies long termism and over-valuation.
- Case 5: If $b < 0$ but $a+(b/i) > 1$ for some i, and $a+(b/i) < 1$ for some i, it implies long termism, but it cannot lead to any conclusion of over-valuation or under-valuation.
- Case 6: If $b > 0$, $a+(b/i) \leq 1$ for all i, and $a+(b/i) < 1$ for some i, it implies long termism and under-valuation.

In Eq. (12) the property of short termism and valuation bias is similar with Eq. (11). However, since the relative weight $p+(q/i)$ is placed in the part of the denominator. In this case $q > 0$ implies short termism and $p+(q/i) < 1$ for all period i implies over-valuation of the stock prices, respectively.

3. DATA AND RESULTS

All non-financial firms available of the New York Stock Exchange over the period 1975–1999 were used. We start to estimate the sample period of 1980s, which is comparable to that of Miles' study. It includes 735 sample observations of firms in 1980s and accounts for almost 65% of the total market value of the New York Stock Exchange. To analyze the robustness, we also estimate the data in 1990s, where 955 same observations of firms are included. The resource of data is the COMPUSTAT database. Share prices are the closing prices at the companies' fiscal year-end. Dividends are measured as total cash dividends paid in the accounting year. Leverage is calculated by the level of debt of the firm divided by its market value. Beta values of firms are calculated using end-closing prices over the past 60 months. The risk-free return $r_{t,t+i}$ is assumed to be equal to the annual return of U.S. Treasure notes and bonds with maturity period $t+i$ at period t. The tax rate τ_t was calculated as the weighted average of the marginal tax rates of households,

Table 1. Result I in Miles' Models.

Equation (9)

$$P_t^j = \alpha_0 + (1-\tau)\sum_{i=1}^{N} \frac{d_{t+i}^j}{(1+r_{t,t+i}+\pi^j)^i} + \frac{P_{t+N}^j}{(1+r_{t,t+N}+\pi^j+\alpha_0)^N} + \varepsilon_t$$

$$\pi^i = c_b\beta^j + c_l L^j$$

Short termism if $a_0 > 0$

	$\hat{a}_0$	$\hat{\alpha}_0$	$\hat{c}_b$	$\hat{c}_l$	$\bar{\hat{\alpha}}_0$	$\hat{a}_0$
	−0.0876	−1.0838	0.0405	0.0913	0.0876	−0.0876
t-Value	−2.72	−1.06	1.12	3.57		−2.72

Equation (8)

$$P_t^j = \alpha_0 + (1-\tau)\sum_{i=1}^{N} \frac{d_{t+i}^j}{(1+r_{t,t+i}+\pi^j)^i} + \frac{P_{t+N}^j}{(1+r_{t,t+N}+\pi^j)^{N\cdot\alpha}} + \varepsilon_t$$

$$\pi^i = c_b\beta^j + c_l L^j$$

Short termism if $\alpha - 1 > 0$

	$\hat{a}$	$\hat{\alpha}_0$	$\hat{c}_b$	$\hat{c}_l$	$\bar{\hat{\alpha}}_0$	$\hat{a}-1$
	0.1046	−0.7704	1.0481	1.1374	1.5913	−0.8954
t-Value	4.61	−0.71	5.53	1.65		−39.50

Equation (6)

$$P_t^j = \alpha_0 + (1-\tau)\sum_{i=1}^{N} \frac{d_{t+i}^j}{(1+r_{t,t+i}+\pi^j)^i} + \frac{\lambda \cdot P_{t+N}^j}{(1+r_{t,t+N}+\pi^j)^N} + \varepsilon_t$$

$$\pi^i = c_b\beta^j + c_l L^j$$

Short termism if $\lambda - 1 < 0$

	$\hat{\lambda}$	$\hat{\alpha}_0$	$\hat{c}_b$	$\hat{c}_l$	$\bar{\hat{\alpha}}_0$	$\hat{\lambda}-1$
	1.0178	−2.6387	−0.0468	0.0455	−0.0181	0.0178
t-Value	6.25	−2.63	−1.63	1.31		0.11

Note: The dependent variables are P_{84}, the stock price in year 1984.

pension funds and insurance companies, with the marginal tax rate for households being calculated as the weighted average of the marginal tax rates of individual investors classified among five different income brackets. Data of tax rates comes from International Revenue Code and New York Exchange Fact Book. We estimate all the models from Eq. (9) to Eq. (12). The assumption of risk premium is adopted from Miles (1993) to be

$$\pi^i = c_b \beta^j + c_l L^j, \tag{13}$$

which is suggested by applying the result of Merton (1973).

We use the GMM (Generalized Method of Moments, ref. Hansen, 1994; McCallum, 1976; Wickens, 1982) estimation method and it is more robust and efficient than the two-stage non-linear least-square method used by Miles (1993). The covariance structure of the disturbance terms may be quite different from the i.i.d. assumption that is required in the two-stage non-linear least-square method.

Table 2. Testing for Short Termism and Over-Valuation – Model I in 1980s.

Equation (11)

$$P_t^j = (1-\tau)\sum_{i=1}^{N} \frac{(a+(b/i))\cdot d_{t+i}^j}{(1+r_{t,t+i}+\pi^j)^i} + \frac{(a+(b/N))\cdot P_{t+N}^j}{(1+r_{t,t+N}+\pi^j)^N} + \varepsilon_t$$

$$\pi^i = c_b\beta^j + c_l L^j$$

Short termism if $b > 0$

Over-valuation if $a + (b/i) - 1 \geq 0$ for all period i

Year	$\hat{a}$	$\hat{c}_b$	$\hat{c}_l$	$\hat{b}$	$\hat{a}+\hat{b}-1$	$\hat{a}+(\hat{b}/(N-1))-1$	$\hat{a}+(\hat{b}/N)-1$
1980	2.1567	0.1181	0.2419	7.1181	8.2748	2.0464	1.9476
t-Value	2.95	3.93	2.89	2.17	2.94	3.87	3.61
1981	1.4383	0.0766	0.1863	5.6967	6.1350	1.2521	1.1503
t-Value	2.05	2.19	3.44	2.09	2.84	2.95	2.56
1982	0.2078	4.4849	−0.0371	4.8494	4.0571	0.0160	−0.0995
t-Value	0.41	2.57	−0.92	2.57	2.89	0.07	−0.39
1983	0.1250	−0.0253	0.2225	5.9061	5.0311	0.3063	0.1094
t-Value	0.1608	−0.49	3.50	1.98	2.25	1.23	0.34
1984	−0.3667	0.0050	0.3032	7.7966	6.4299	0.5824	0.1926
t-Value	−0.45	0.10	3.41	2.50	2.75	2.63	0.6973
1985	−0.2910	0.0604	0.3568	8.1586	6.8676	1.4285	0.7486
t-Value	−0.32	1.97	3.39	2.35	2.66	4.25	3.50
1986	−0.6156	0.0120	0.1515	4.9280	3.3124	0.8484	0.0271
t-Value	−0.62	0.30	2.59	1.80	1.89	2.17	0.24
1987	−2.7968	0.0283	0.5646	7.9922	4.1954	4.1954	0.1993
t-Value	−1.14	0.46	3.99	1.67	1.79	1.79	1.60

Note: The period $t + N$ in all the above estimating equations refers to year 1989.
We do not present the estimation of the year 1988 because of the identification problem.

Table 3. Testing for Short Termism and Over-Valuation – Model II in 1980s.

Equation (12)

$$P_t^j = (1-\tau)\sum_{i=1}^{N} \frac{d_{t+i}^j}{((p+(q/i))+r_{t,t+i}+\pi^j)^i} + \frac{P_{t+N}^j}{((p+(q/i))+r_{t,t+N}+\pi^j)^N} + \varepsilon_t$$

$$\pi^i = c_b\beta^j + c_l L^j$$

Short termism if $q < 0$

Over-valuation if $p + (q/i) < 1$ for all period i

Year	$\hat{p}$	$\hat{c}_b$	$\hat{c}_l$	$\hat{q}$	$\hat{p}+(\hat{q}/1) -1$	$\hat{p}+(\hat{q}/(N-1))-1$	$\hat{p}+(\hat{q}/N)-1$
1980	1.1004	0.0455	0.1208	−1.2111	−1.1108	−0.1510	−0.0342
t-Value	22.48	2.33	5.18	−23.02	−279.02	−0.20	−0.79
1981	1.0951	0.0474	0.1229	−1.2157	−1.1206	−0.0786	−0.0569
t-Value	31.42	2.64	8.45	−25.71	−62.27	−2.75	−1.94
1982	1.1964	−0.0369	0.0874	−1.1701	−0.9737	0.0014	0.0293
t-Value	30.43	−1.52	6.03	−18.70	−26.21	0.04	0.90
1983	1.2070	−0.0198	0.1764	−1.2221	−1.0152	−0.0374	0.0033
t-Value	24.50	−0.71	8.66	−19.54	−33.32	−0.97	0.08
1984	1.2991	0.0088	0.1928	−1.3790	−1.0799	−0.0456	0.0233
t-Value	25.74	0.44	9.19	−27.20	−81.35	−1.19	0.57
1985	1.8594	0.0296	0.2483	−3.5745	−2.7151	−0.3321	−0.0342
t-Value	21.59	1.50	9.31	−17.10	−21.69	−0.48	−0.95
1986	1.5631	−0.0035	0.1903	−1.5650	−1.0019	−0.2197	0.0414
t-Value	24.16	−0.1683	7.62	−18.79	−35.54	−7.97	1.06

Note: The period $t + N$ refers to the final period 1989 in all estimations.
There are identification problems in the years 1987 and 1988 due to not enough dependent variables.

For example, it is widely known that the industry factor may cause the stock prices of firms in the same industry to move together. Hence, the disturbance terms may not be independent across firms. Furthermore, heteroskedasticity may be present due to the large differences in the level of stock prices. As a result, we argue that the GMM method is more suitable for the estimation of this model. For details of the GMM estimator, see Hansen (1982). The instrumental variables were stock price, dividend per share, and earnings per share for five lag periods. All estimations are executed by TSP 4.3 program.

Table 1 presents estimation results for Miles' first three models. They are estimated only in year 1984, as in Miles (1993). The dependent variable P_{84} is the stock price in year 1984. Short termism is suggested by Miles (1993) if $a_0 > 0$ holds in Eq. (9). However, in our study on the U.S. stock market, the estimation value $\hat{a}_0$ is −0.0876, with significant *t*-value −2.72. Therefore, based on Miles' hypothesis, the evidence of reverse long termism is found in Eq. (9). The estimation of Eq. (7) as in Miles' approach is also presented in Table 1. In this case short termism is implied if α is greater than 1. However, the estimation value $\hat{\alpha}$ is found as 0.1046. It implies the reverse long termism result, since $\hat{\alpha} - 1$ is significantly less than zero. The relative model in Eq. (6) by Miles' approach is also reported in Table 1. While short termism shall be implied if $\lambda < 1$, the estimation value $\hat{\lambda}$ is 1.0178 cannot be significantly less than 1. Therefore, there appears thus no significant evidence of short termism by Miles' approach. The other two major models in Miles' approach are also estimated in our studies, however, for the reason of saving space, we do not present them here.

In our generalized framework the effects of over-valuation and short termism are separated. The main results are from the estimation of Eqs (11) and (12) and are presented in Tables 2 and 3. In Eq. (11) short termism happens when b is greater than zero and over-valuation is suggested if $a + (b/i) \geq 1$ holds for each period i, with at least one inequality strictly holding. In each year, period i indicates the next i year, and the final period N refers to year 1989. We thus

Table 4. Testing for Short Termism and Over-Valuation – Model I in 1990s.

Equation (11)

$$P_t^j = (1-\tau)\sum_{i=1}^{N} \frac{(a+(b/i))\cdot d_{t+i}^j}{(1+r_{t,t+i}+\pi^j)^i} + \frac{(a+(b/N))\cdot P_{t+N}^j}{(1+r_{t,t+N}+\pi^j)^N} + \varepsilon_t$$

$$\pi^i = c_b\beta^j + c_l L^j$$

Short termism if $b > 0$

Over-valuation if $a + (b/i) - 1 \geq 0$ for all period i

Year	$\hat{a}$	$\hat{c}_b$	$\hat{c}_l$	$\hat{b}$	$\hat{a}+\hat{b}-1$	$\hat{a}+(\hat{b}/(N-1))-1$	$\hat{a}+(\hat{b}/N)-1$
1990	−0.528	−0.0016	0.0014	7.293	5.765	−0.617	−0.72
t-Value	−6.72	−0.19	0.39	14.03	12.9	−21	−22.7
1991	−0.635	−0.0046	0.007	7.758	6.12	−0.342	−0.527
t-Value	−12	−2.52	2.65	24.24	22.69	−26.3	−42.6
1992	−0.513	−0.0036	0.0024	6.398	4.89	−0.447	−0.599
t-Value	−9.13	−1.35	0.192	20.02	18.4	−33.8	−37.6
1993	−1.29	0.0016	0.0016	10.12	7.83	−0.268	−0.605
t-Value	−15.9	3.72	3.72	24.18	23.09	−18.7	−35.4
1994	−1.873	0.0007	0.0007	11.17	8.299	−0.08	−0.64
t-Value	−19.3	1.18	1.18	25.58	24.4	−4.47	−41.6
1995	−3.143	0.006	0.006	14.32	10.18	0.63	−0.562
t-Value	−19.3	3.25	3.25	23.45	22.72	14.9	−36.9
1996	−4.96	0.0059	0.0059	16.28	10.32	2.18	−0.53
t-Value	−16.4	2.19	2.19	18.74	18.17	16.1	−19.1
1997	−12.4	0.0013	0.0013	26.24	12.84	12.84	−0.28
t-Value	−14.8	3.13	3.13	15.97	15.89	15.9	−8.17

Note: The period $t + N$ in all the above estimating equations refers to year 1999.
We do not present the estimation of the year 1998 because of the identification problem.

Table 5. Testing for Short Termism and Over-Valuation – Model II in 1990s.

Equation (12)

$$P_t^j = (1-\tau)\sum_{i=1}^{N} \frac{d_{t+i}^j}{((p+(q/i))+r_{t,t+i}+\pi^j)^i} + \frac{P_{t+N}^j}{((p+(q/i))+r_{t,t+N}+\pi^j)^N} + \varepsilon_t$$

$$\pi^i = c_b\beta^j + c_l L^j$$

Short termism if $q < 0$

Over-valuation if $p + (q/i) < 1$ for all period i

Year	$\hat{p}$	$\hat{c}_b$	$\hat{c}_l$	$\hat{q}$	$\hat{p} + (\hat{q}/1) - 1$	$\hat{p} + (\hat{q}/(N-1)) - 1$	$\hat{p} + (\hat{q}/N) - 1$
1990	0.408	−0.11	0.0048	−1.29	−1.89	−0.754	−0.736
t-Value	32.7	−14.1	2.54	−68	−144	−69	−66
1991	0.39	−0.7	0.011	−1.305	−1.91	−0.792	−0.769
t-Value	56.6	−23	6.63	−119	−305	−139	−131
1992	0.39	−0.0065	−0.065	−1.24	−1.85	−0.816	−0.787
t-Value	31.9	−5.16	−7.4	−87	−222	−78	−74
1993	0.389	−0.007	−0.0014	−1.32	−1.93	−0.875	−0.831
t-Value	40.9	−3.95	−1.58	−103	−398	−123	−110
1994	0.538	−0.008	0.0047	−1.51	−1.97	−0.84	−0.76
t-Value	44	−3.01	0.76	−103	−492	−97	−81
1995	0.64	−0.0014	0.0052	−1.62	−1.98	−0.899	−0.76
t-Value	42	−1.42	2.42	−89	−460	−96	−70
1996	−6.59	−0.0052	0.0056	20.2	12.6	2.50	−0.86
t-Value	−0.15	−0.33	1.8	0.16	0.15	0.12	−47

Note: The period $t + N$ refers to the final period 1999 in all estimations.
There are identification problems in the years 1997 and 1998 due to not enough dependent variables.

have a different number of independent variables. The result in year 1988 is not presented in Table 2 since there is the identification problem. Estimation value $\hat{b}$ is significantly greater than zero in each year, so short termism is suggested for each year.

In Tables 2 and 3 we only present the initial period $a + b$ and the final two periods $a + (b/(N-1))$, $a + (b/N)$ for simplicity. If they are not less than 1 and at least one of them is strictly greater than 1, then we conclude the existence of over-valuation because of the monotone property of $a + (b/i)$. Over-valuation is suggested for each year from Table 3 because the estimation values $\hat{a} + (\hat{b}/i)$ for each period i are less than 1, with at least one inequality strictly holding. From the above discussion both short termism and over-valuation are found by the result in Table 2. In Eq. (12) short termism happens when $q < 0$ holds and over-valuation is suggested if $p + (q/i) - 1 \leq 0$ holds for each period i. From Table 3 the estimation value $\hat{q}$ is significantly less than zero and $\hat{p} + (\hat{q}/i) - 1 \leq 0$ holds for each period i with at least one inequality strictly holding significantly.

Next present the result for the U.S. stock market in 1990s. Short termism is concluded in Tables 4 and 5, with Model I and II, respectively. Whether the stock market is over-valuation or under-valuation could not determined by Model I, as shown in Table 4. However, we have obtained significant evidence of over-valuation by Model II, as in Table 5.

All results in our generalized framework suggest both short termism and over-valuations in the U.S. stock market during the 1980s. In contrast, reverse long termism results are obtained by Miles' method in the U.S. stock market, since there appears the effect of over-valuation, which is ignored but dominates the effect of short termism.

4. CONCLUDING REMARKS

The hypothesis of rational expectations has been challenged in many theoretical studies, but there is still limited empirical models for testing short termism. In this paper we adopt Miles' (1993) approach to provide a modified empirical methodology to investigate short termism and valuation bias in the U.S. stock market with a GMM method. We suggest that Miles' method may lead to ineffective estimations when the influence of over-valuation is considered. Miles' ignorance of over-valuation for testing for short termism leads to the reverse conclusion of a significant long termism result in the U.S. stock market during 1980s, the same period with his study, and 1990s as well. Empirical evidences suggest the existences of short termism and over-valuation in the U.S. stock market in our generalized models.

NOTES

1. Miles (1995) has provided robustness of this assumption, while Satchell and Damant (1995) have presented a comment of it. However, our results are robust when we replace this constant assumption with an alternative one whereby the risk premium is dependent on the value of beta and leverage. However, in this case with a time-dependent risk premium there are more convergence problems.

2. Equations (11)–(13) in Miles' paper could be considered as three special cases of Eqs (7), (12), and (8), respectively. The first one is considered as the case with $g(N) = 1 + \alpha_0$ and $g(i) = 1$ for all $i < N$, and the second one corresponds to the case with $h(N) = \alpha$ and $h(i) = 1$ for $i < N$, and the last one is equal to the case with $f(N) = \lambda$ and $f(i) = 1$ for all $i < N$.

3. Equation (8) has a similar result but is more likely to have a convergence problem. We discuss this third alternative representation of relative weight just to include all the models in Miles for comparison. In fact, we do not suggest the method estimated by this equation because there appear more convergence problems to estimate the parameter in the exponent.

4. We have similar results if functions $f(i)$ and $g(i)$ are replaced by exponential function e^{A+Bi}. The results in this approach with exponential function specification have not been presented in our paper because there are more converging problems.

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