Market Timing with Aggregate Accruals*

Qiang Kang[1], Qiao Liu[2], Rong Qi[3]

* We gratefully acknowledge the financial support from the University Grant Committee of the Hong Kong Special Administrative Region, China (Project No. HKU 7472/06H). All errors remain our own.

[1] Finance Department, University of Miami, P.O.Box 248094, Coral Gables, FL 33124-6552. Phone: (305) 284-8286. Fax: (305) 284-4800. Email: q.kang@miami.edu.
[2] School of Economics and Finance, University of Hong Kong, Polfulam, Hong Kong. Phone: (852) 2859 – 1059. Fax: (852) 2548-1152. Email: qliu@hku.hk.
[3] Peter J. Tobin College of Business, St. John's University, Jamaica, NY 11439. Phone: (718) 990-7320. Email: qir@stjohns.edu.

Market Timing with Aggregate Accruals

Abstract

We propose market timing strategies aiming to exploit the aggregate accruals' return forecasting power. We examine several performance metrics of the aggregate accruals based market timing strategy such as excess portfolio return, Sharpe ratio, and Jensen's alpha. We provide robust evidence that, relative to the passive investment strategy of buying and holding the stock market, the market timing strategy delivers superior performance that is both statistically and economically significant. Specifically, the market timing strategy on average beats the S&P500 Index by 6 to 22 percentage points (annualized) after controlling for transaction costs over the 1980-2004 period.

Keywords: Stock return predictability, Value-weighted aggregate accruals, Market-timing strategy

JEL Classification: G1

1. Introduction

The empirical asset pricing literature has documented strong evidence that aggregate stock market returns are time-varying and predictable with variables such as dividend yield, term premium, aggregate book-to-market ratio, default premium, short-term interest rate, consumption-wealth ratio (*cay*), etc. Recent studies, e.g., Hirshleifer, Hou, and Teoh (2006) and Kang, Liu, and Qi (2006), have shown that aggregate accruals significantly predict one-year-ahead excess stock market returns. Particularly, Kang, Liu, and Qi demonstrate that the accruals' return forecasting power is limited to the value-weighted aggregate accruals and mainly driven by the discretionary component of accruals. They document that value-weighted aggregate accruals (value-weighted aggregate discretionary accruals) alone explain about 12 (18) percent of time-series variations in excess stock market returns for the period from 1965 to 2004, and that the value-weighted accruals' return forecasting power is robust to the inclusion of other well-known return predictors.

What accounts for the value-weighted aggregate accruals' return forecasting power remains an unsolved puzzle. The evidence is intriguing in the following sense: while firm-level and portfolio level accruals *negatively* predict one-year-ahead stock returns (see e.g., Sloan 1996; Xie 2001, among others), value-weighted aggregate (discretionary) accruals *positively* predict one-year-ahead excess stock market returns. The evidence, however, could be consistent with the famous Samuelson's dictum, as documented in Jung and Shiller (2005), that the stock market is "micro efficient" but "macro inefficient". That is, the efficient market hypothesis works much better for individual stocks than it does for the aggregate stock market. Although the literature has yet to offer a unified framework to reconcile the two qualitatively different accrual-return relations at the disaggregate level versus at the aggregate level, extant studies point to managerial market timing as one potential explanation, that is, firm managers time the equity markets to level up or level down accrual components in earnings (see Kang, Liu, and Qi (2006) for detailed discussions).

In this paper, we set aside the debate on what accounts for aggregate accruals' return forecasting power; instead, we focus on exploiting the robust empirical evidence that the (value-weighted) aggregate accruals positively predict one-year-ahead excess stock market returns to develop a market timing investment strategy. Specifically, we examine whether a hypothetical mean-variance portfolio manager can take advantage of the return forecasting power of aggregate accruals and whether the accordingly designed market timing strategy can deliver statistically and economically superior performance to a passive investment strategy of buying and holding the stock market.

We construct the market timing strategy as follows. At the end of each April, the mean-variance portfolio manager forecasts *out-of-sample* both the mean and variance of excess stock market returns in the coming year using the historical value-weighted aggregate accruals as a predictive variable, and she decides the weight of her investment in the stock market in proportion to the forecasted mean-variance ratio of stock returns, then she holds the portfolio for twelve months until she rebalances her portfolios at the end of April of next year. We evaluate the performance of this market-timing investment strategy with several commonly used metrics, and we quantify the statistical and economic magnitude of the strategy from the perspective of a portfolio manager. Specifically, besides the excess portfolio returns, we compute Sharpe ratios and Jensen's alphas of the strategy's payoffs by controlling for the Fama-French four factors (market risk premium, SMB, HML, and momentum). Our analysis indicates that the value-weighted aggregate accruals indeed have both statistically and economically significant market-timing ability which a portfolio manager can exploit to make significant profits. As shown in Panel A of Table 2, over the period from 1980 to 2004, if using the value-weighted aggregate accruals as the sole predictive variable, the market timing strategy generates a return that is 10.58 percentage points higher than the return on the S&P 500 Index; the strategy's Sharpe ratio is 60 percent, compared to 56.5 percent for the strategy of buying and holding the S&P 500 Index; more importantly, the Jensen's alpha, after controlling for the Fama-French four factors, is 10.8 percent and statistically significant. The market timing strategy delivers even more superior performance to the simple buy-and-hold investment strategy if the manager augments the value-weighted aggregate accruals with other return predictors. For example, if she also includes the term premium into the return forecasting equation, the Sharpe ratio of this market timing investment strategy improves to 73 percent with the Jensen's alpha of 9.6 percent. Clearly, the economic magnitude of the aggregate accruals in predicting excess stock market returns is significant.

We conduct several robustness checks and find that our results are quite robust. In particular, we explicitly take into account the trading costs of implementing the market timing strategy. Because there are only two assets involved, the S&P 500 Index and the 3-month Treasury Bill, and the portfolios are rebalanced only once per year, the transaction costs are relatively small. After we deduct these trading costs, the various aggregate-accrual-based market timing investment strategies still deliver superior performance. As we show in Table 4, the strategies on average beat the market by 6 to 22 percentage points.

We also propose a much simpler market timing investment strategy using the change in aggregate accruals as a trading signal. Specifically, at the end of each April, the portfolio-formation month, we compare the latest available aggregate accruals, i.e., the last year's aggregate accruals, with the past five- to seven-year moving average of the aggregate accruals prior to last year. If last year's aggregate accruals exceed the historical average value, then we invest 100% of our wealth in the S&P500 Index; otherwise, we bet all our wealth on the 3-month T-bill. This strategy does not require any regression analysis and, again, generates economically significantly superior performance to the simple strategy of buying and holding the market (see Table 3).

The rest of paper proceeds as follows. Section 2 discusses the data and variables. Section 3 details our market timing strategies based on aggregate accruals. The main empirical results are offered in Section 4. We carry out several robustness checks and additional analyses in Section 5. Section 6 concludes.

2. Data and Variables

We use returns on the value-weighted S&P500 Index and yields on the 3-month T-Bills as proxies for aggregate stock market returns and risk-free rates, respectively. The excess stock market return is the difference between the stock market return and the risk-free rate. Because accounting information is typically disclosed with a lag of one quarter after the fiscal year-end, in order to ensure that all the information necessary to calculate the aggregate accruals is known when portfolio managers form their portfolios, we align the accruals of year *t-1* with excess market returns from April of year *t* through March of year *t+1*, and we accordingly compute the annualized excess market returns.

Following the literature, we apply the balance sheet method (see, e.g., Sloan 1996; and Xie 2001) to calculate total accruals as follows:

$$Accruals = (\Delta CA - \Delta Cash) - (\Delta CL - \Delta STD - \Delta TP) - Dep, \tag{1}$$

where ΔCA is change in current assets (Compustat #4); $\Delta Cash$ is change in cash/cash equivalents (Compustat #1); ΔCL is change in current liabilities (Compustat #5); ΔSTD is change in current assets (Compustat #4); ΔTP is change in income taxes payable (Compustat #71); and *Dep* refers to depreciation and amortization expenses (Compustat #14). We scale a firm's accruals by its average total assets from the beginning to the end of a fiscal year, and label it *Accruals*. We compute *Accruals* for all component companies in the S&P500 Index and then compute the value-weighted aggregate accruals (*AC_VW*).[1] Figure 1 plots AC_VW over the period from 1980 to 2004.

For comparison, we also include in several specifications of return forecasting equations other well-known return predictors such as the term premium, the default premium, the detrended short-term interest, and the dividend yield. The term premium *(TERM)* is the yield spread of a ten-year Treasury Bond over a one-month Treasury Bill. The default premium (*DEF)* is the yield spread of corporate bonds with Moody's Baa and Aaa ratings. We compute the detrended short-term interest (*SHORT)* by subtracting from this month's short-term interest rate the average short rate over the past year prior to this

[1] We also calculate and use the value-weighted aggregate discretionary accruals in our study, which yields very similar results. Because computing the value-weighted aggregate accruals is much easier for portfolio managers, we choose to focus on the value-weighted aggregate accruals in the text.

month. We calculate the dividend yield *(DP)* as the dividends on the S&P500 Index accumulated over the prior year divided by this year-end's index level.

3. Market Timing Strategies

We investigate whether a hypothetical mean-variance portfolio manager is able to "time the market" to make profitable investments, taking advantage of the robust empirical evidence that the (value-weighted) aggregate accruals positively predict one-year-ahead stock market returns with substantial power (Hirshleifer, Hou, and Teoh (2006); and Kang, Liu, and Qi (2006)). For that purpose, we assume the portfolio manager to adopt a market timing investment strategy as follows. At the end of each April (right after the previous year's accounting information comes out), the portfolio manager first makes *out-of-sample* forecasts of the expected excess returns and expected variance of the S&P500 index for the following year. She then uses the forecasts to make asset allocation decisions across the following two assets: the S&P500 index and the 3-month T-bill. Finally, the manager holds the portfolio for the following twelve months until she rebalances her portfolio in April of next year.

Specifically, the mean-variance portfolio manager chooses the weight of equities in the portfolio as follows:

$$W_{M,t} = \frac{E_t(R_{m,t+1} - R_{f,t+1})}{\gamma E_t(V_{m,t+1})}, \qquad (2)$$

where $E_t(R_{m,t+1}\text{-}R_{f,,t+1})$ is the expected excess stock market return, $E_t(V_{m,t+1})$ is the expected stock market variance, and γ is the investor's relative risk-aversion coefficient. Because there are only two assets involved, the weight of investment in the 3-month T-bill is naturally $(1\text{-}W_{M,t})$.

We assume that the expected stock return is the one-year-ahead forecast based on the following linear regression:[2]

$$E_t(R_{m,t+1}-R_{f,,t+1}) = \beta_0 + \beta_1 AC\_VW_t + \beta_2(\text{ other controls}) + \varepsilon_{t+1} \,. \qquad (3)$$

The forecasted market return variance, $E_t(V_{m,t+1})$, is computed as the fitted value from a regression of the observed market variance on a constant and its one-period-lagged and two-period lagged values.[3] Both $E_t(R_{m,t+1}-R_{f,,t+1})$ and $E_t(V_{m,t+1})$ are estimated out of sample using the past 15 years of data.

We choose γ – the investor's relative risk aversion – using two methods. First, γ is chosen for each strategy such that the average weight of equities over time is equal to 1. This method allows us to directly compare the returns on the managed portfolio with the returns on the S&P500 Index because the two portfolios have the same average leverage ratios. Second, we set γ to be 5, which is very close to the point estimate of 4.93, as reported in Guo and Whitelaw (2006). Actually, the two different γ values do not generate much difference in our results.

We consider four return forecasting specifications for expected stock returns by including (1) the value-weighted aggregate accruals *(AC_VW*) only; (2) *AC_VW* and detrended short rate (*SHORT*); (3) *AC_VW* and the term premium (*TERM*); and (4) *AC_VW, TERM, SHORT*, the dividend yield (*DP*), and the default premium (*DF*). We also consider other model specifications and obtain similar results. For brevity we do not report those results in the text.

---

[2] We do not include in equation (3) other previously identified return predictors such as cay, aggregate book-to-market ratio, aggregate equity issuances, and market sentiments measures. As shown in Kang, Liu, and Qi (2006), the return forecasting power of the value-weighted aggregate accruals is robust to the inclusion of those variables. Including those variables into equation (3) yields qualitatively similar results.
[3] We also recursively compute the expected market return variance as the average of market return variance from the beginning year of our sample, i.e., 1965, up to the year of portfolio formation. The results remain similar.

4. Main Empirical Results

To start, we first estimate various specifications of Equation (3) to illustrate the power of the value-weighted aggregate accruals (*AC_VW*) in forecasting one-year-ahead S&P500 index returns in excess of the risk-free rates. We conduct in-sample estimation of Equation (3) over the 1965-2004 period and report the regression results in Table 1. (For brevity, we do not present results on all specifications in Table 1.) We use as the dependent variable both the calendar-year excess stock market returns and the excess stock market returns from April in year *t* through March in year *t+1*. The latter is more relevant for the portfolio managers and is also the primary excess return measure used in our analysis. As shown in Table 1, in all four regressions, *AC_VW* is a significant predictor of one-year-ahead excess stock market returns: *AC_VW* alone explains 13.9 percent and 15.4 percent of time-series variations in the calendar-year and April-March excess stock market returns, respectively; the return forecasting power of *AC_VW* remains significant after controlling for other well-known return predictors. The finding is consistent with Kang, Liu, and Qi (2006). Figure 2 plots the realized excess market returns and the forecasted excess market returns over the 1980-2004 period.

We proceed to formally assess the performance of the market timing investment strategy implemented by the mean-variance portfolio manager. Table 2 summarizes the various performance measures of the investment strategy when the return forecasts are calculated with the above-mentioned four different model specifications. As we discuss earlier, we consider two sets of γ values. Panel A contains the results based on the γ values that make the average weights of equity investments over time equal 1, and Panel

B presents the results based on the fixed γ value (γ = 5). In each panel, we report the raw portfolio return, standard deviation, excess portfolio return over the 3-month T-Bill rate, excess portfolio return over the S&P500 Index return, the correlation between the portfolio return and the S&P500 Index return, the Sharpe Ratio, and the Jensen's alpha after controlling for the Fama-French four factors (including $r_m - r_f$, SMB, HML, and momentum). For ease of comparison, we also report in Table 2 the same set of performance measures for the investment strategy of buying and holding the S&P500 Index. Note that, because we need 15 years of data for model estimations and the first year with available accounting information sufficient to calculate the aggregate accruals is 1965, we start our reporting period from 1980. For the first reporting year of 1980, we estimate the models with data from 1965 to 1979 and use the out-of-sample forecasts to decide the portfolio weights in April 1980; the reported portfolio return for 1980 spans the twelve-month period from April 1980 through March 1981. We then repeat the estimations and return calculations by rolling over the window for each subsequent year; the last reporting year is 2004.

We first examine the results in Panel A of Table 2. If using the value-weighted aggregate accruals as the sole return predictor, the manager observes the market timing strategy to deliver an average raw return of 25.43 percent per year, which is substantially higher than the raw return of 14.85 percent per year earned from the buy-and-hold strategy. Thus, the market timing strategy on average beats the market by 10.58 percentage points per year. The superior performance of the market timing strategy is not without cost, though. It is significantly more risky than the buy-and-hold strategy; the average standard deviation of the managed portfolio returns is 32.16 percent per year and almost doubles from the standard deviation of the S&P500 index returns, which is 16.42 percent per year. In spite of the more volatile payoffs, the market timing strategy improves in two popular performance metrics relative to the buy-and-hold investment strategy. The average Sharpe ratio of the market timing strategy is 60 percent and that of the buy-and-hold strategy is 56.5 percent; the Jensen's alpha of the market timing strategy is 10.8 percent a year and that of the buy-and-hold strategy is not significantly different from zero.

Similar results, and sometimes even more impressive ones, arise if the portfolio manager augments the value-weighted aggregate accruals with other known return predictors to forecast excess market returns. For example, if combining *AC_VW* and *SHORT*, the market timing strategy beats the market by 12.91 percentage points with a Sharpe ratio of 60 percent and a Jensen's alpha of 14.4 percent; if both *AC_VW* and *TERM* are included as return predictors, the market timing strategy outperforms the market by 10 percentage points with a Sharpe ratio of 73 percent and a Jensen's alpha of 9.6 percent. If the manager incorporates *AC_VW, TERM, SHORT, DF and DP* in forecasting returns, the market timing strategy again surpasses the market performance by 10.83 percentage points with a Sharpe ratio of 59 percent and a Jensen's alpha of 10.8 percent.

Clearly, the market timing investment strategy exploiting the return forecasting power of the value-weighted aggregate accruals yields both statistically and economically significant performance relative to the passive strategy of buying and holding the market. A plot of the two strategies' payoffs over time further conveys interesting comparisons between the two strategies. As shown in Panel A of Figure 3, the market timing strategy approximates and outperforms the market performance in most of the 25-year period except in 1984, 1989, and 2000. The outperformance of this market timing strategy is particularly significant during the 1994-1999 subperiod and 2001-2004 subperiod. Moreover, the market timing strategy does not generate losses in any two consecutive years during the period, even during the market crash period of 1987 or 2000-2002. It is particularly interesting that this market timing strategy actually delivers significantly positive returns in 2001 when the market experienced the internet bubble burst and a significant loss; this strategy also generates slightly positive profits in 1987 when the stock market ended up with a loss. The dominance of the market timing strategy over the buy-and-hold strategy over time is pronounced in Figure 4, which demonstrates the accumulations of wealth if a hypothetical investor invests US$1 in the 3-month T-bill, the S&P500 Index, or the managed portfolio constructed on the basis of the market timing strategy. The market timing strategy generates similar income to the market index up to 1988, slightly underperforms the market index afterwards until 1995, and overtakes and totally dominates the market index since 1996 and on.

When we fix the risk aversion coefficient γ at 5 we obtain similar results. Specifically, as reported in Panel B of Table 2, the market timing strategies using return forecasts based on *AC_VW*, *AC_VW+SHORT*, *AC_VW+TERM*, and *AC_VW+SHORT+TERM+DF+DP* respectively outperform the market index by 6.4, 21.87, 19.15, and 22.42 percent over the 25-year period. Not surprisingly, the two performance metrics of the market timing strategies are similar to the corresponding metrics as shown in Panel A: the Sharpe ratios are respectively 60, 60, 73, and 59 percent, and the Jensen's alphas are respectively 10.8, 16.8, 12, and 14.4 percent. Again, if we plot the payoffs of the market timing strategy and the buy-and-hold strategy over time for γ fixed at 5 (Panel B of Figure 3), we observe a similar pattern of comparison between the two strategies to the one from Panel A of Figure 3. The market timing strategy approximates and outperforms the market index in most of the 25-year period and does not generate losses in any two consecutive years; in the two stock market crashes of 1987 and 2001, this market timing strategy manages to deliver significantly positive returns.

5. Additional Analysis and Robustness Check

5.1. An Even Simpler Market Timing Strategy

The market timing strategy as discussed above hinges on the parameter estimations of various specifications of Equation (3). As a result, we lose 15 years of data in measuring the performance of the strategy, which might generate noise in the relatively small sample. Plus, the robustness of the results depends on how precise Equation (3) captures the relation between expected excess stock market returns and return predictors such as *AC_VW, TERM, and SHORT*. To circumvent the issues arising from the parameter estimations, we propose an even simpler market timing investment strategy using the change in aggregate accruals as a trading signal.

The simple market timing strategy works as follows. Specifically, at the end of each April, i.e., the portfolio-formation month, a portfolio manager compares the latest available aggregate accruals, i.e., the last year's aggregate accruals, with the past five- to seven-year moving average of the aggregate accruals prior to last year. If last year's aggregate accruals exceed the historical average value, then the manager invests 100% of her wealth in the S&P500 Index; otherwise, she bets all her wealth on the 3-month T-bill. This strategy clearly enjoys some advantage over the above-mentioned market timing strategy implemented by a mean-variance portfolio manager: this simple strategy does not require any regression analysis and is easier to implement. Table 3 reports the summary performance measures of this simple market timing investment strategy when the historical averages are respectively calculated as the moving averages over the past five years (Column A) and the past seven years (Column B) prior to last year.

As shown in Table 3, when the five-year moving average of *AC_VW* is used as the benchmark, such a simple market timing strategy outperforms the stock market by 1.99 percent per year with a Sharpe ratio of 67.6 percent and a Jensen's alpha of 6.8 percent. If the seven-year moving average of *AC_VW* is used as the benchmark, this simple market timing strategy even does better by beating the market index by 2.2 percent a year; the strategy's Sharpe ratio is 62.5 percent and its Jensen's alpha equals 6.9 percent. Clearly, the simple market timing strategy based on the comparison of the aggregate accruals level with its historical average levels outperforms the passive strategy of buying and holding the market index in both statistically and economically significant magnitude.

5.2. Robustness Checks

One may wonder whether the accrual-based market timing strategy is profitable and superior to the passive buy-and-hold investment strategy after controlling for the transaction costs. Because the market timing strategy involves only two assets, namely the S&P500 Index and the 3-month T-bill, the transaction costs of implementing the strategy are relatively small.

For a robustness check, we gauge the transaction costs of implementing the market timing strategy from the viewpoint of a portfolio manager. We assume that investors have to pay a trading cost which is proportional to the absolute value of the change in the weight of stocks in the managed portfolio. According to Balduzzi and Lynch(1999), a 25 basis point proportional transaction cost (per roundtrip) is the upper range of transaction costs for trading the S&P 500 Index. Therefore, we set the proportion to be 0.25 percent in our analysis.

Taking into account the transaction costs, we replicate the analysis in Table 2 and report the results in Table 4. For brevity, we only consider the case in which γ is fixed at 5. As shown in Table 4, after we control for the transaction costs of implementing the market timing strategy, the portfolios formed on the basis of aggregate accruals still generate significant abnormal returns, beating the S&P500 index by a significant margin ranging from 6.22 percent to 21.83 percent a year. The Sharpe ratios of the market timing strategy also improve dramatically relative to the passive buy-and-hold strategy. Again, the Jensen's alphas of the market timing strategy are all significantly positive, exceeding 10 percent a year. Clearly, the market timing strategy designed to exploit the aggregate accruals' return forecasting power yields both statistically and economically significant profits in real world.

We also carry out several other robustness checks. For example, we use the CRSP value-weighted stock market return instead of the S&P500 index return as a proxy for the market return and find essentially the same results. Rather than focusing on the S&P500 Index companies, we also apply the method to all the CRSP/Compustat firms and again find that the market timing investment strategy based on the aggregate accruals works pretty well.

6. Conclusion

Previous literature has identified that the value-weighted aggregate accruals have substantial power in forecasting one-year-ahead excess stock market returns. Building on this finding, we design market timing strategies in order to exploit the aggregate accruals' return forecasting power in this paper. We provide robust evidence that, relative to the passive investment strategy of buying and holding the stock market, the aggregate accruals based market timing strategies deliver superior performance that is both statistically and economically significant. The superior performance of the market timing strategy is robust to controlling for transaction costs involved in implementation; moreover, the market timing strategy is also quite easy to implement from a portfolio manager's viewpoint.

7. Reference

Balduzzi, Pierluigi, Anthony Lynch, 1999. Transaction costs and predictability: Some utility cost calculations. *Journal of Financial Economics*, 52, 47-78.

Guo, Hui, Robert Whitelaw, 2006. Uncovering the risk-return relation in the stock market. *Journal of Finance*, *61*, 1433-1463.

Hirshleifer, David, Kewei Hou, Siew Hong Teoh, 2006, Accruals and aggregate stock market returns. Working paper, Ohio State University.

Jung, Jeeman, Robert J. Shiller, 2005. Samuelson's dictum and the stock market, *Economic Inquiry*, 43 (2), 221-228.

Kang, Qiang, Qiao Liu, Rong Qi, 2006. Predicting stock market returns with aggregate (discretionary) accruals. Working paper, University of Hong Kong.

Sloan, Richard. 1996. Do stock prices fully reflect information in accruals and cash flows about future earnings? *Accounting Review,* 71, 289-315.

Xie, Hong, 2001. The mispricing of abnormal accruals. *Accounting Review*, 76, 357-373.

Table 1 Forecasting Excess Stock Market Returns with Aggregate Accruals
This table reports the regression results of using excess stock market returns as the dependent variables. In Columns (1) and (2), we use the excess returns, which are defined as the return on S&P 500 Index over the rate of return of the 3-month T-bill (from January to December); in Columns (3) and (4), we construct annualized excess stock market return from April in year to to March in year t+1. *AC_VW* is the value-weighted aggregate accruals for the firms in the S&P 500 Index. *SHORT* is the detrented short-term interest. *TERM* is the term premium of ten-year T-bond yields over one-month T-bill yield. *DF* is the default spread of Baa-rated corporate bond yield over Aaa-rated corporate yield. *DP* is the dividend yield on the S&P 500 Index. We calculate the t-statistics based on robust standard errors and report them in parentheses.

Dependent Variable	Excess Return (Jan. – Dec.)	Excess Return (Jan. – Dec.)	Excess Return (Apr. – Mar)	Excess Return (Apr. – Mar)
Constant	25.519	28.177	28.836	21.122
	(2.94)	(2.10)	(3.90)	(1.63)
AC_VW	**3.789**	**4.891**	**4.353**	**4.545**
	(2.32)	**(2.53)**	**(3.25)**	**(2.88)**
SHORT		32.652		33.092
		(0.67)		(0.82)
TERM		5.875		5.052
		(2.63)		(2.11)
DP		-1.648		0.143
		(-0.58)		(0.04)
DF		0.293		0.975
		(0.04)		(0.12)
Adj. R square	0.139	0.292	0.154	0.239

Table 2 Performance Measures of Aggregate-Accrual-Based Market Timing Strategies

This table reports returns on aggregate accruals based market timing strategies as well as the buy and hold strategy. Investors allocate a fraction of total wealth, $W_{m,t}=(1/\gamma)*(E_t(R_{m,t+1}-R_{f,t+1})/E_t(V_{m,t+1}))$, in stock, $1-W_{m,t}$ in 3-month Treasury bill. γ measures the investor's relative risk aversion. In Panel A, γ is chose to make the average of $W_{m,t}$ equal to 1. In Panel B, γ is fixed at 5. $E_t(R_{m,t+1}-R_{f,t+1})$ is the predicated value from the excess return forecasting regression in each column; and $E_t(V_{m,t+1})$ is the forecasted market return volatility which is the fitted value from a regression of observed market volatility on a constant and its two lags. The sample period is 1980 – 2005. We start with 1980 since we need at least 15 annual data points to estimate the coefficients of the excess return predictive equation. We report the t-statistics (for returns) and p-values (for correlations) in parentheses and brackets, respectively. *, **, *** denote significance at the 10%, 5%, and 1% levels, respectively.

	Buy and Hold	AC_VW Only	AC_VW+ SHORT	AC_VW+ TERM	AC_VW+TERM+ SHORT+ DF+DP
Panel A: γ chosen such that the average weight is 1					
Raw Return	0.1485***	0.2543***	0.2776***	0.2485***	0.2549***
Std. Dev.	0.1642	0.3216	0.3578	0.2545	0.3348
Return net of r_f	0.0867***	0.1925***	0.2158***	0.1867***	0.195***
	(2.59)	(2.85)	(3.01)	(3.64)	(2.91)
Return net of r_m	0	0.1058**	0.1291**	0.1**	0.1083*
		(2.05)	(2.13)	(2.40)	(1.93)
Correlation	1	0.449	0.584	0.459	0.516
		[0.03]	[<0.01]	[0.02]	[<0.01]
Sharpe Ratio	0.565	0.60	0.60	0.73	0.59
Jensen's α	-0.003	0.108**	0.144***	0.096**	0.108**
	(-1.20)	(2.02)	(2.80)	(2.30)	(2.55)
Panel B: γ fixed at 5					
Raw Return	0.1485***	0.2125***	0.3672***	0.3399***	0.3727***
Std. Dev.	0.1642	0.2503	0.5030	0.3770	0.5295
Return net of r_f	0.0867***	0.1507***	0.3054***	0.2782***	0.3109***
	(2.59)	(2.85)	(3.01)	(3.64)	(2.91)
Return net of r_m	0	0.064	0.2187**	0.1915***	0.2242***
		(1.62)	(2.49)	(3.05)	(2.41)
Correlation	1	0.449	0.584	0.459	0.516
		[0.03]	[<0.01]	[0.02]	[<0.01]
Sharpe Ratio	0.565	0.60	0.60	0.73	0.59
Jensen's α	-0.003	0.108**	0.168**	0.120*	0.144**
	(-1.20)	(2.30)	(2.46)	(1.84)	(2.06)

Table 3 Performance Measures of A Simple Market Timing Strategy

This table reports summary statistics on the performance of a simple market timing investment strategy based on the comparison of last year's AC_VW versus the historical moving average of AC_VW prior to last year. If last year's AC_VW exceeds its historical average, then the portfolio manager invests 100% of her wealth in the S&P500 Index; otherwise, the portfolio manager puts all her wealth on the 3-month T-bill. Strategy A (B) designates the past five- (seven-) year moving average of AC_VW as the historical average. Portfolios are formed and re-balanced at the end of each April and held till the end of March of next year. We report t-statistics in parentheses.
*, **, *** denote significance at the 10%, 5%, and 1% levels, respectively.

Strategy	A	B
Raw Return	0.1372*** (7.00)	0.1399*** (7.01)
Std. Dev.	0.1299	0.1309
Return net of r_f	0.0800*** (4.22)	0.0818*** (4.23)
Return net of r_m	0.0199 (1.46)	0.022* (1.66)
Sharpe ratio	0.676	0.625
Jensen's α	0.068*** (6.48)	0.069*** (7.01)

Table 4 Performance Measures of Aggregate-Accrual-Based Market Timing Strategies Incorporating Transaction Costs

We assume that investors have to pay a transaction cost, which equals 0.25 percent of the absolute value of the change in weights of stocks in the managed portfolio every time they re-allocate their wealth. We report the summary statistics of the returns of the portfolios based on various accruals-based market timing strategies. In this table, we fix γ at 5. The sample period is 1980 – 2005. We start with 1980 since we need at least 15 annual data points to estimate the coefficients of the excess return predictive equation. We report the t-statistics (for returns) and p-values (for correlation) in parentheses and brackets, respectively. *, **, *** denote significance at the 10%, 5%, and 1% levels, respectively.

	Buy and Hold	AC_VW Only	AC_VW+ SHORT	AC_VW+ TERM	AC_VW+TERM+ SHORT+ DF+DP
			γ is fixed at 5		
Raw Return	0.1485***	0.2077***	0.3615***	0.3356***	0.3668***
SD	0.1642	0.2548	0.5004	0.3758	0.5261
Return net	0.0867***	0.1483***	0.2997***	0.2738***	0.305***
of r_f	(2.59)	(2.69)	(3.97)	(3.59)	(2.87)
Return net	0	0.0622	0.2130**	0.1871***	0.2183**
of r_m		(1.51)	(2.44)	(3.00)	(2.37)
Correlation	1	0.449	0.584	0.459	0.516
		[0.03]	[<0.01]	[0.02]	[<0.01]
Sharpe ratio	0.565	0.58	0.59	0.72	0.57
Jensen's α	-0.003	0.100**	0.160**	0.106*	0.140**
	(-1.20)	(2.24)	(2.41)	(1.74)	(1.99)

Figure 1 Aggregate Accruals (Value-weighted Average Accruals) of Stocks in S&P 500 Index

The figure plots the value-weighted aggregate accruals calculated on the basis of component stocks in the S&P 500 Index over the period from 1980 to 2004.

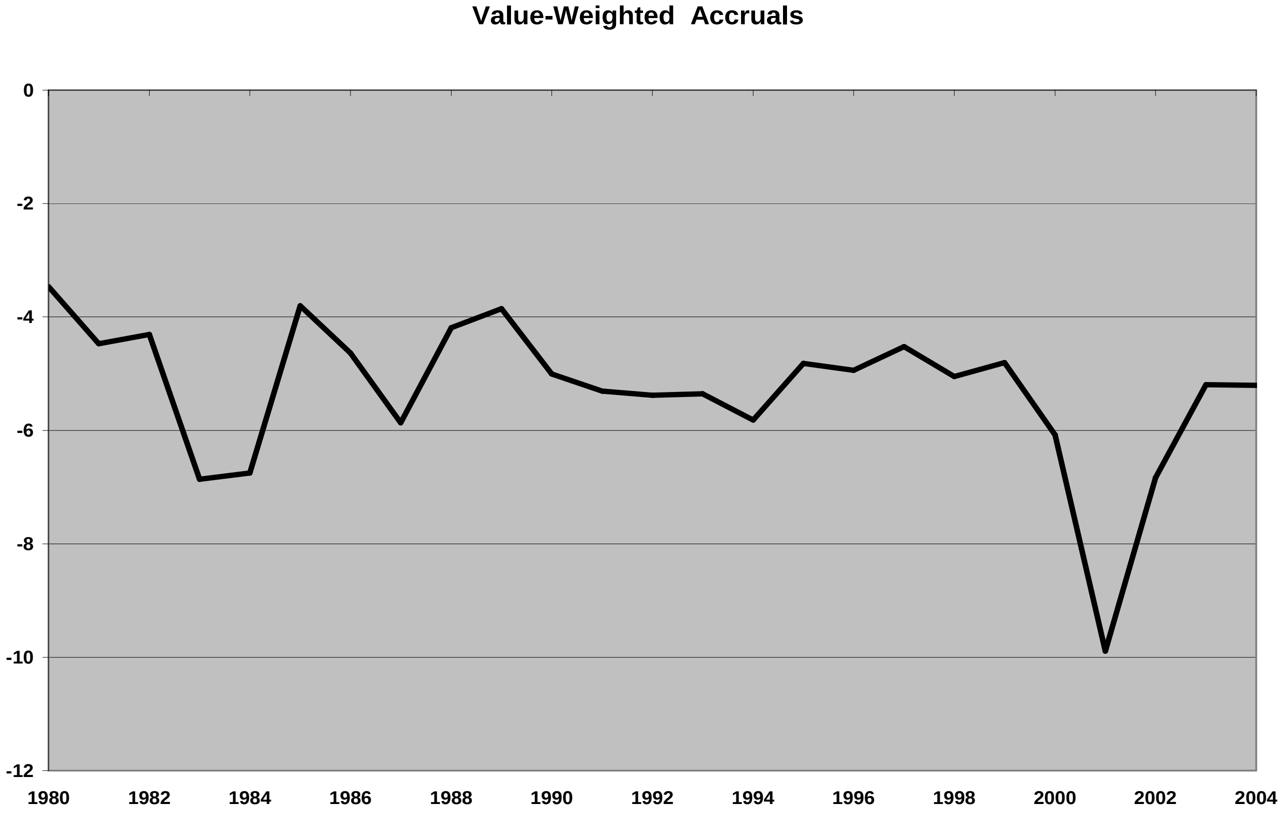


Figure 2 Realized Excess Market Returns versus Predicted Excess Market Returns
This figure plots respectively the time-series of the realized returns (in solid line) on the S&P 500 Index in excess of the 3-month T-bill returns, **Rm-Rf**, and the predicted excess market returns (in dashed line) using the value-weighted aggregate accruals as the sole return predictor, **E(Rm-Rf)**. The reported period is 1980 – 2004.

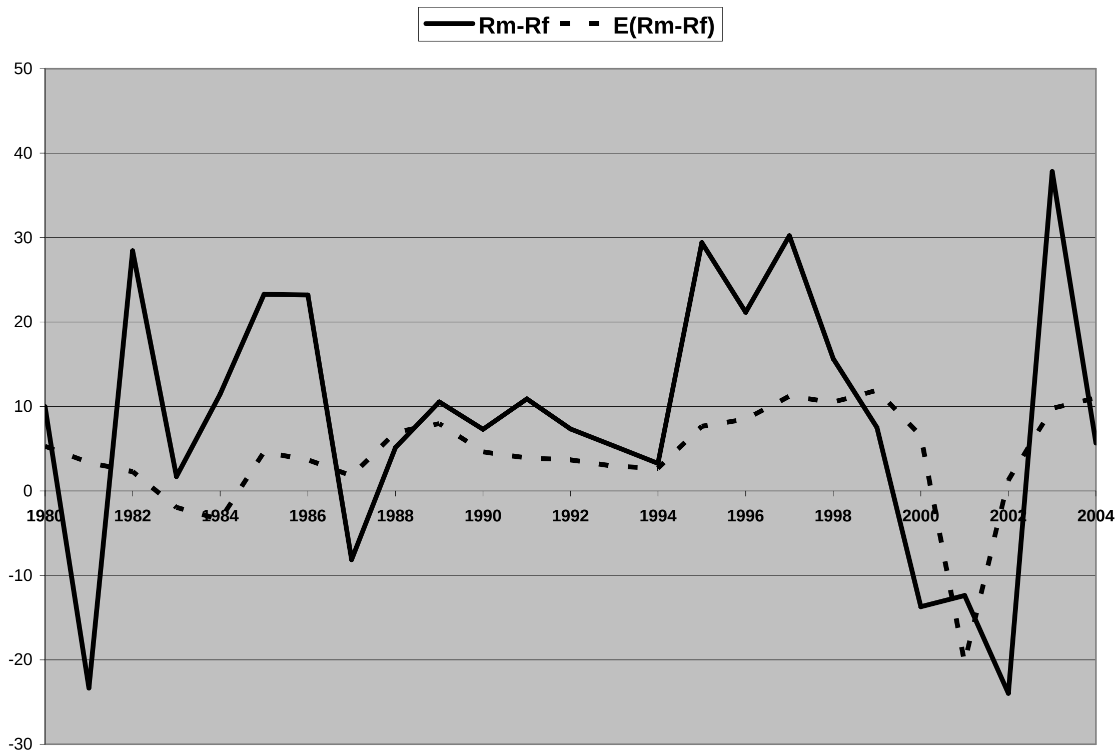
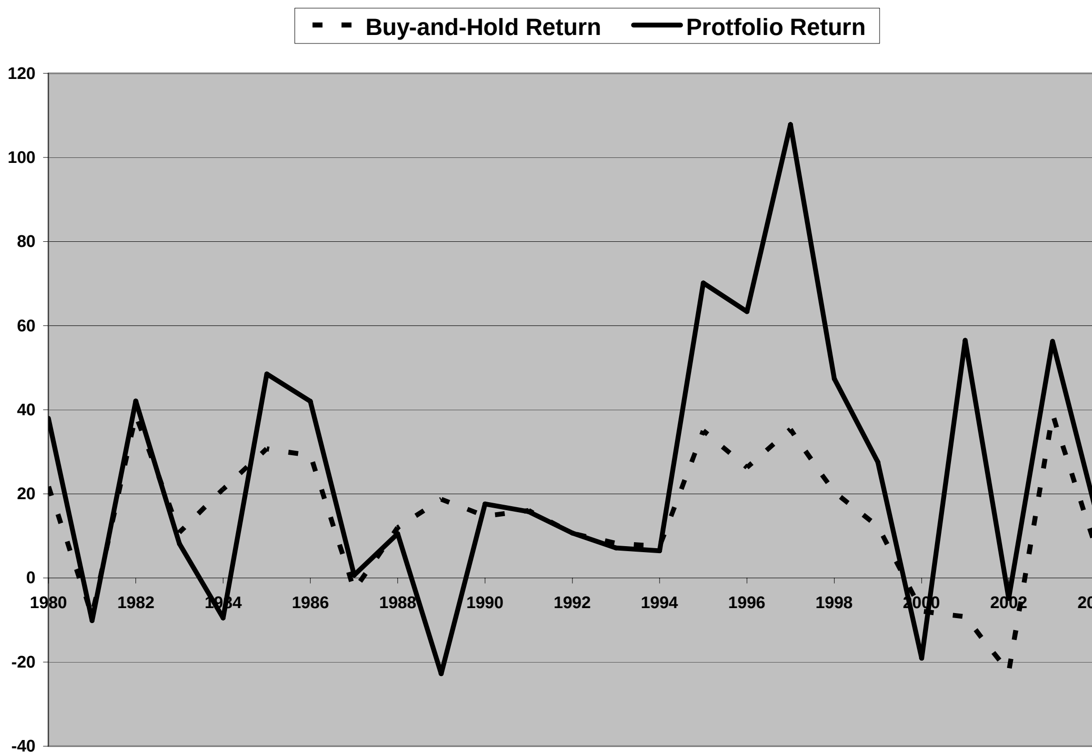


Figure 3 Aggregate-Accrual-Based Market Timing Strategy versus Buying-and-Holding the Market

The solid line is the return of the managed portfolio formed on the basis of predicted market returns with the aggregate accruals as the return predictor. The managed portfolio is formed by allocating $W_{m,t}$ =(1/γ)*($E_t(R_{t+1}$-$R_{f,t+1})/E_t(V_{m,t+1})$), in stocks, and 1- $W_{m,t}$ in the 3-month T-bills, where γ is a measure of the investor's relative risk aversion, $E_t(R_{t+1}$-$R_{f,t+1})$ is the predicted value from the excess return forecasting regression (the model in Column 2 of Panel A, Table 2), and $E_t(V_{m,t+1})$ is the forecasted market return volatility which is the fitted value from a regression of the observed market volatility on a constant and its two lags. Both $E_t(R_{t+1}$-$R_{f,t+1})$ and $E_t(V_{m,t+1})$ are estimated out of sample at the end of each April. The risk aversion coefficient γ is chosen so that the average weight on stocks across time is equal to one (Panel A) and is fixed at 5 (Panel B). The dashed line is the return on the S&P 500 Index. The reported period is 1980 – 2004.

Panel A. γ is chosen so that the average weight on stocks across time is equal to one



Panel B. γ is fixed at 5

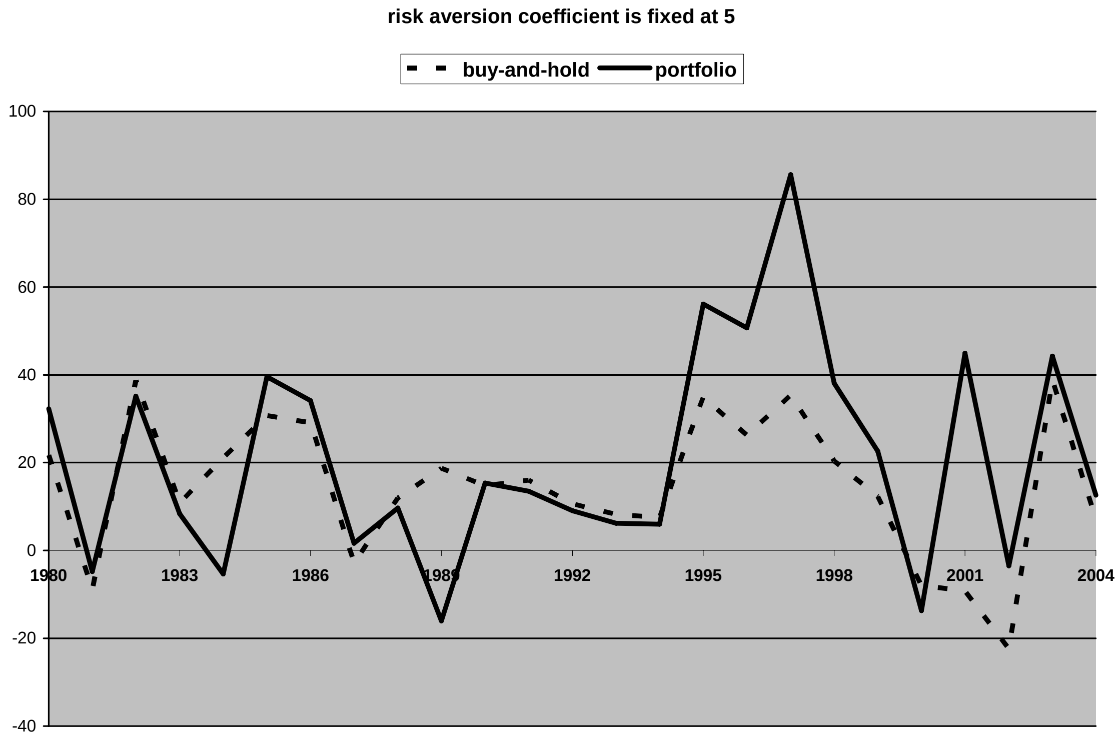


Figure 4 Accumulated Wealth of $1 Starting from 1980

In 1980, a hypothetical investor makes $1 investment in the 3-month T-bill, or the S&P 500 Index, or the managed portfolio constructed on the basis of the aggregate-accrual-based market timing strategy, respectively. The figure depicts the accumulation of wealth over time for the three different investment strategies up to 2004.