IV. The portfolio of the industry index

A. Collecting samples

Our sample consists of all multi-lines insurers that were traded in NYSE during the period between July 1994 and July 2002. We omit the foreign firms with ADR forms. Since many publicly traded insurers have low trading volumes, many samples have missing values. We use the data on both COMPUSTAT and CRSP to make our sample as comprehensive as possible.

The raw financial variables collected include monthly earning per share, monthly P/E ratio, monthly P/B ratio, monthly market value, monthly price, quarterly book value, and yearly dividend payout. We adjust all variables to monthly using accounting rules and the clean surplus relation. Monthly book value is re-calculated by using quarterly book value plus net monthly earning. Then we adjust monthly P/B ratio by the monthly book value. The information about dividends is applied only to the clean surplus relation to reflect the variation of the book value on January. We drop out the P/D ratio due to numerous negative or zero dividend payouts.

The information used to forecast earnings is the average of I/B/E/S one-year growth rate (FY1) and the predicted value generated by an ARIMA model. I/B/E/S forecasts provide only FY1 growth rate for large firms. Therefore, we further fit

abnormal earnings with ARIMA models. The fitted model is a ARIMA (3, 1, 0)[2]:

$$\tilde{x}_t^{\,a} = 0.07601 + 1.4719 x_{t-1}^{\,a} - 0.3245 x_{t-2}^{\,a} + 0.4959 x_{t-3}^{\,a} - 0.3485 x_{t-4}^{\,a} + \tilde{e}_t . \quad (12)$$

B. Forming the portfolio of the industry index

The number of firms in our sample varies from 14 to 16 during the sampling period. We construct the insurance industry index as the weighted average price using the market values as the weights. The industry index is re-calculated every six month. Specifically, the market value weighted index is constructed in July 1994, Jan 1995, and so on. The weights of each firm during the sampling period are presented in the appendix. We also calculate the industry index using the book values and earnings. The clean surplus relation is reflected on every Jan 1 during our analysis period for the yearly dividend payouts. Figure 1 depicts the time series plots of the industry index and S & P 500 index. Both indices display a demarcation in 2001. It presents an upward tendency before 2001 but a downward tendency after 2001. The industry index appears to coincide with the S & P 500 index, even the industry index is composed of few firms.

[Insert Figure 1 Here]

[2] ARIMA (3, 1, 0) model is also superior to the AR (1) and ARIMA (1, 1, 0) models for the stationary property, ACF, and PACF.

C. Choosing the discount rate

We select the short rate and the three-month T-bill rate as the short-term rates and choose the ten-year and thirty-year T-bond rate as the long-term ones. The historical interest rate data are applied to equation (5) and result in

$$V_t^* = y_t + \sum_{t=1}^{\infty} R_{ft}^{-t} E_t[\tilde{x}_{t+t}^a], \tag{13}$$

where R_{ft} is the time-varying discount factor.

D. Implementing the residual income valuation model

The success of equation (11) depends on the abnormal earnings' forecasting. For practical reasons, we restrict the predictable future earnings to six months in order to be consistent with our index adjustment per half a year. The estimation formula is adjusted as

$$\hat{V}_t = y_t + \sum_{t=1}^{6} R_{ft}^{-t} E_t[\tilde{x}_{t+t}^a]. \tag{14}$$

We denote the estimation using the four interest rates as $VS1$, $VS2$, $VL1$, and $VL2$ respectively. Figure 2 depicts their time series plots. As Figure 2 shows, the alternative discount rates cause minor differences. Comparing Figure 1 with Figure 2, we can find an obviously divergence between stock price and the real value

estimations.

[Insert Figure 2 Here]