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Characteristics of Common Stock Holdings of Insurance Companies

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ABSTRACT

This article investigates the stock market portfolios of insurance company portfolio managers and compares the characteristics of their equity holdings with those of other (noninsurance) institutional equity portfolios. The main finding is that the cross-sectional determinants documented by earlier researchers for aggregate institutional ownership levels in firms do not have the same explanatory power for levels of ownership of insurance companies. On the other hand, these same firm characteristics have significantly high explanatory power regarding the decision of insurance companies to invest in a firm.

INTRODUCTION

At the most fundamental level, an insurance company buys risk from an individual or an institution for which it is paid a premium. These premiums are received from a large number of clients, and claims are paid to a significantly smaller number. In other words, the insurer receives a steady stream of relatively small periodic premiums, and its relatively larger liabilities occur randomly. These contingent liabilities to be paid will come partly from its equity base but primarily from the accumulated premiums. For the company to be in a sound financial position, therefore, these premiums must be invested in a manner such that it is easily able to honor these claims. A significant portion of these premiums is invested by the

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insurer in equity securities. This article presents an analysis of the investment choices of insurance company equity portfolio managers.[1]

In terms of investor classification, insurance companies are commonly classified as institutional investors. Although little research exists on the investment policies of insurance company equity portfolio managers, a large body of literature examines other aspects of institutional investment.

One strand of literature has focused on how the presence of institutional investors in security markets affects the formation of prices. Arbel, Carvell, and Strebel (1983) explain the "neglected firm effect" by arguing that, since small firms are not frequently followed by a sufficiently large number of analysts, the effect may simply reflect a premium to individuals who choose to obtain information about small firms. Hessel and Norman (1992) study why some stocks are favored by institutions while others are not. Utilizing discriminant analysis, they find that institutions prefer to invest in firms that have higher values for return on equity, return on assets, and dividend payout.[2] Badrinath, Kale, and Noe (1995) develop a rational expectations model in which stocks are separated on the basis of whether they are in the subset of institutionally favored stocks or not, and demonstrate the existence of cross-autocorrelation in equity returns.[3] They also present empirical evidence consistent with the predictions of this paradigm.

Jones, Lehn, and Mulherin (1990) address the impact of institutional investors on stock market liquidity. Holthausen, Leftwich, and Mayers (1990) attempt to understand the pricing processes underlying the large block stock transactions that are usually associated with institutional investors. Pound and Shiller (1987, 1989) focus on how investors develop an interest in and process information about firms making investment decisions. Prowse (1990) observes that Japanese institutions are permitted to take stock positions in firms to whom they lend, but some U.S. institutions are either restricted from taking any stock position or restricted from taking a controlling position. He then examines whether this difference in regulatory environment reduces agency conflicts between stockholders and debtholders of firms.

Another aspect of research relating to institutional investment, and one closer to the spirit of the present study, is how institutional investment is affected by regulatory, legal, and other institutional features unique to institutional investors. Cummins et al. (1980) present survey evidence on how the Employee Retirement Income Security Act of 1974 (ERISA) has affected the investment policies of private pension plans and report that it has resulted in these plans adopting written statements of investment policy and guidelines, purchasing fiduciary liability insurance, placing greater emphasis on performance measurement, and seeking an

[1] Given the recent focus on the financial viability of insurance companies by the government and the media, this analysis may be of use to policy-makers in assessing the ability of insurance companies to meet future contingent claims.

[2] These authors also find that both the short-term and the long-term performance of a firm is important to institutional investors.

[3] See Lo and MacKinlay (1990) for a discussion of the cross-autocorrelation in equity returns.

overall decrease in portfolio risk. Cummins and Westerfield (1981) suggest that the observed decline in their portfolio concentration ratios may be due to ERISA, which evaluates prudence in the context of a portfolio, whereas, under common law, each security in the portfolio has to be individually a prudent investment.[4]

Given that approximately 40 percent of corporate equity is institutionally owned (from the *NYSE Fact Book*, 1989-1990), it is important to investigate how investment decisions are made by institutions. Badrinath, Gay, and Kale (1989) (henceforth BGK) investigate patterns in aggregate institutional ownership and focus on the characteristics of firms that institutional investors consider suitable for inclusion in their portfolios. Using aggregate institutional ownership data (including that for insurance company portfolios) as of December 31, 1985, BGK find that, in addition to generally acceptable criteria such as past performance, firm size, and liquidity, aggregate institutional ownership is highly sensitive to the potential for external validation. The authors argue that, because institutional portfolio managers handle client capital, their actions are monitored and evaluated under the aegis of the "prudent man rule." Therefore, in addition to the intrinsic soundness of their investment decisions, institutional portfolio managers pay attention to whether their decisions will be considered reasonable, well-informed, and prudent in case they are asked to defend their investment decisions in a court of law. BGK term this the "safety-net" hypothesis.

Although BGK's article was the first to investigate how institutional investment decisions are made, their analysis is limited on two accounts. First, they study only aggregate institutional ownership, implicitly treating the wide spectrum of investment philosophies of institutional investors as identical. Investment objectives, asset mix decisions, risk tolerances, regulatory constraints, and liquidity requirements all can and do vary widely across institutional types. Therefore, their findings may not accurately describe how an insurance company makes its investment decisions. Second, their analysis covers only one year (1985). Some of their findings (for example, that level of institutional ownership is positively related to the level of the systematic risk of a stock) may very well not be observed in other years, particularly those in which the stock market was less buoyant than it was in 1985.

This article, therefore, attempts to make the following contributions. First, it focuses on the investment decisions made by insurance company portfolio managers. Second, the investigation spans not just one but two years.[5] This study highlights the similarities and differences in the investment practices of insurance company equity portfolio managers and other noninsurance institutional investors. It thus provides a means of validating the implications of the BGK study for in-

[4] See Blair and Heggestad (1978) for a discussion of this issue. The findings of Cummins and Westerfield also lend support to the two-tier market hypothesis (Blume, 1976; Reilly, 1975) that institutional investors invest primarily in the stocks of large firms.

[5] Tests also are conducted on five years of data. Because of space constraints, however, results are presented for only two years.

surance companies. The present study identifies the determinants of the level of ownership by an insurance company in a firm on a cross-sectional basis for two years, 1986 and 1988. The purpose of these tests is to determine whether the firm characteristics that BGK found to be significant determinants of levels of institutional investment in firms perform a similar role for investments by insurance companies.

In their study, BGK attempt to explain the fraction of outstanding shares owned by all institutions. Their results indicate that the vector of safety-net firm characteristics explains a significantly large portion of the level of institutional ownership in U.S. corporations. Results presented in the present article, however, indicate that *none* of the safety-net characteristics are consistently statistically significant determinants of *insurance* company levels of ownership, and, consequently, their overall explanatory power is very low. In order to investigate this finding further, tests are conducted to determine whether any systematic differences exist between the characteristics of firms that have both insurance and noninsurance institutions in their investor base and those firms that attract only noninsurance institutional investors. Findings from these tests indicate that, while safety-net firm characteristics do not explain the level of insurance company investment in a firm, they have good explanatory power regarding a more fundamental investment choice of insurance companies, namely, whether to invest in a firm. Firms in which insurance companies invest appear to be significantly more "prudent" investments than firms in which they do not.

The rest of the article is organized as follows. The next section discusses some unique features relevant to insurance companies and how these features distinguish insurance company portfolios from those of noninsurance institutional investors. The following section describes the data and presents the characteristics of the insurance company portfolios and the firms in which they invest. The next section presents the findings on the characteristics of common stocks in insurance company portfolios. The last section offers concluding remarks and some directions for further research.

EQUITY INVESTMENTS BY INSTITUTIONAL INVESTORS

At the end of 1990, insurance companies (both life and nonlife) held about $178 billion in U.S. corporate equity securities. This represents about 12 percent of all institutionally owned equity. Moreover, in equity markets, insurance companies appear to be the smallest players among their institutional cohort.[6] Equities comprised a steadily smaller fraction of the overall investment portfolios of insurance companies during the 1980s, even though dollar amounts were on the increase.[7]

[6] In 1990, approximately 70 percent of institutional equity was in the hands of pension funds and 16 percent with mutual funds.

[7] Although the dollar volume of insurers' equity holding is substantial, it is important to recognize that this represents approximately 10 percent of their total invested assets. A primary reason for this are state laws which prescribe a maximum (usually 10 percent of capital) that insurance compa-

For life insurers, proportions of admitted assets in common stock investments were 4.1 percent in 1983, 3.8 percent in 1988, 3.7 percent in 1992, and 2.3 percent in 1993 (A. M. Best, 1994). For property-liability insurers, these numbers were as high as 35 percent in 1973 and declined to 16.7 percent during the 1980s (Insurance Information Institute, 1990).[8] This deemphasis on equity investment is in direct contrast to trends in the mutual fund industry.

Equity portfolio characteristics of insurance companies may differ from those of other institutional investors for several reasons. First, insurance company investment policy appears to be dominated by a need for stable principal and steady, predictable cash flows; over 50 percent of their assets are in investment-grade bonds and government agency bonds. By definition, equity securities do not exhibit these properties and, therefore, as the decline in the fraction of corporate equity in insurance portfolios evidences, the investment objectives of insurers and equity investment may be incompatible. Other institutional investors, such as mutual funds and pension funds, on the other hand, are well known to exhibit a distinct preference for equity investments.

More importantly, insurance company portfolio managers work under a different, and possibly more restrictive, set of regulatory constraints than other institutional investors. Since, 1991, the National Association of Insurance Commissioners (NAIC) has been working toward establishing a "model investment law" (Ward, 1994). An early proposal that attempted to micro-manage insurance investment portfolios by prescribing detailed limitations on insurer investment was met with opposition from both property and life insurers. Regulators appear to have felt that even the "prudent man rule" gives insurers too much latitude and opens the door to potentially imprudent investment, especially for those in poor financial condition. For the purposes of the present study, these differential regulatory constraints have several implications.

First, insurance companies in many states are restricted from investing more than a prescribed fraction of their admitted assets into corporate equity. Additionally, they are restricted from owning more than a specified fraction of a firm's outstanding shares. These restrictions, along with the need to diversify, limit the ability of insurance companies to invest large fractions of their portfolios in any one firm.[9] These restrictions are not applicable to most other institutions.

Another difference between insurance and noninsurance investors arises from the notion of "general" and "separate" accounts for life insurance companies.[10]

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nies are allowed to invest in equity securities. However, insurers appear to be moving away from equity investments. NAIC proposals and the experience of insurers during the high interest periods of the late 1970s and 1980s suggest that insurance companies find common stock investment less palatable than they used to.

[8] Insurers, after experiencing the cash flow variability inherent in equities, retreated toward investments that offered the promise of level payments despite high risks. For example, they were active in junk bond and mortgage securities markets.

[9] See, for example, *New York Insurance Laws,* Article 1, Section 1405, Subsection (a) Paragraph (6).

[10] Property-liability companies, on the other hand, maintain only one account.

Until 1962, an insurance company, be it life or property-liability, used a single portfolio of investments for all its businesses. After 1962, for life insurance companies, this primary portfolio, used for guaranteed fixed-dollar contracts, became the general account. A segregated portion, starting with special contracts for pension plan annuities, became the separate account.

A key difference between general and separate accounts is that a substantially larger portfolio investment in common stocks is permitted in separate accounts than in general accounts. It is, however, noteworthy that, while quantitatively larger common stock investments are permitted with separate account funds, qualitatively, the state laws governing the two accounts are essentially the same. Put simply, while separate accounts are more free to invest in equity at the portfolio level, they may be unable to do so at the level of the individual firm because, for an equity security to qualify for inclusion in a separate account portfolio, it should qualify for inclusion in the general portfolio. Another factor that may make investments in general and separate accounts similar is that, in a typical life insurance firm, the same investment committee is responsible for stock selection decisions in both general and separate accounts.

For their investments in equity from "separate accounts," unlike most of the noninsurance institutions in the sample, insurance companies are not required to comply with the "full disclosure" requirement of the Investment Company Act of 1940.[11] This implies that they do not have to register with the Securities Exchange Commission, issue prospectuses, and disclose risks and fees. Noninsurance institutional investors, with the exception of bank trusts, on the other hand, must comply with these requirements.

Finally, at the regulatory level, another factor that may contribute to differences in the characteristics of equity portfolios of insurance and noninsurance institutional investors is that, unlike other types of institutional investors—such as mutual funds, banks, and pension funds—insurance company portfolio managers usually manage assets owned by the firms that employ them rather than clients and, thus, do not have the sort of fiduciary obligation that other institutional portfolio managers have. It is, therefore, conceivable that the characteristics of insurance company portfolio stocks differ from those of other institutional investors such as pension funds.

In view of the above discussion, it is clear that developing hypotheses for common stock characteristics of insurance company portfolios is less straightforward than for institutional investors in general (as in BGK). The primary reason for this is the fact that, even though insurance companies may follow the same criteria as other institutions in determining the suitability of a particular stock for investment, the regulations governing insurers mentioned above may make it harder to discern these criteria with the available data.

The general guidelines that should be relevant for institutional investors, in-

[11] It should be recognized here that this may change as insurance companies offer more investment products.

cluding insurers, used in designing this study's hypotheses are similar to those in BGK. First, similar to other institutional investors, it is likely that insurance companies will prefer stocks of firms with relatively large capitalization. The reason for this hypothesis is that, even though insurance company portfolio managers may be evaluated under (possibly) different standards than the prudent man rule (such as the business judgment principle), their portfolios are quite large and, consequently, so is the size of their trades. Thus, according to the price-pressure hypothesis, a trade by the manager in the stock of a small company will affect the stock price to the detriment of the manager. For example, if the manager tries to sell a small-company stock from his or her portfolio even for purely liquidity reasons, the lesser-informed market will perceive it as a trade possibly motivated by unfavorable information, thereby driving the price of the stock lower. In addition to the standard risk and return characteristics, "safety-net" characteristics other than firm size should be important also for insurance company portfolio managers. These include stock liquidity, firm leverage, dividend yield, age of the firm, and outside certification such as the Standard & Poor's stock ranking.

However, discerning the significance of these characteristics in cross-sectional regression analysis of the type in BGK may be made harder because of the unique nature of laws governing insurance company equity investments. Recall that the BGK study documented that the safety-net characteristics of a stock were statistically significantly related to the fraction of the outstanding shares of that stock owned by institutions. However, because state laws prescribe the maximum level that an insurer can own of a firm's stock, levels of insurance company ownership in a firm are bounded from above. Thus, even if insurance companies utilized the same criteria for determining the attractiveness of an equity investment, because of the regulatory upper bound on the level of investment in common stock by insurers, the equity portfolios of insurance and noninsurance companies will be different.

For example, suppose that insurance and noninsurance companies use identical criteria for determining the attractiveness of an equity investment. Now suppose that the stock of a particular firm fits these criteria so well that, within the constraints of diversification, the institutional investor should invest an amount that will give it 20 percent ownership in the firm. While the noninsurance investor can implement this, the insurance company cannot because it cannot own more than 5 percent (or 10 percent) in any one firm. Thus, even though the two institutions follow the same guidelines, their levels of ownership in the firm will be different. The inability to own more than a certain prescribed percent in any one firm can have another effect: the insurer may be forced to own a larger-than-optimal fraction in firms that do not fit the criteria very well. In other words, the insurer may invest less than optimal in firms that are "good" investments and more than optimal in firms that are "bad" investments.

The net effect of this on the portfolio composition of the insurance company will be to bring portfolio weights closer. In the BGK study, the dependent variable in the cross-sectional regression for the determinants of levels of institutional ownership is the fraction of outstanding shares in a firm owned by institutions. How-

ever, for ownership by only insurance companies, because of the effects of regulation mentioned above, there may be an upper bound on this variable. As a consequence, it may be difficult to detect statistically significant relationships between the safety-net firm characteristics and levels of ownership even if the portfolio managers considered them important. In other words, it may not be possible to extend the inferences regarding the patterns of institutional investment made in the BGK study to insurance company portfolios. Therefore, we must use a different testing methodology than cross-sectional regressions to discern the impact of safety-net characteristics on the actions of insurance company portfolio managers.

The discussion regarding separate and general accounts has further implications for the present study. First, because a significant portion of the insurance company portfolios is from separate accounts that are not required to comply with the Investment Company Act of 1940, the characteristics of insurance company portfolios may be qualitatively different from noninsurance institutional investors. Second, the data used in the present study are from 13(f) filings and, as discussed in the next section, do not distinguish between the two types of accounts. In other words, for life insurance company equity investments, the portfolio studied is the combined one for general and separate accounts. However, since the qualitative aspects of investment choice are similar for general and separate accounts, the fact that the data used in the present study do not distinguish between general and separate accounts is unlikely to affect our ability to make inferences.

DATA SOURCES AND SAMPLE DESCRIPTION

Data Sources

The source of institutional ownership data for this analysis is Spectrum 3 data files provided by CDA Investment Technologies. These files contain data on the common stock holdings and transactions of all institutional money managers required to file 13(f) reports with the Securities and Exchange Commission (SEC). Typically, all managers of portfolios with assets in excess of $100 million are required to file this report.[12] Managers must report holdings in all classes of securities except positions of fewer than 10,000 shares and less than $200,000 in aggregate fair market value.

Spectrum 3 divides institutional managers into five broad classes: banks (trust departments), insurance companies (including both property-liability and life insurance), investment companies, independent investment advisors, and others. The last category includes, among others, institutions such as college endowments and nonprofit foundations. These files provide, for each portfolio manager, the identities of all the firms in the manager's portfolio, the number of shares owned in each firm, and the net transactions (buy and sell) in each firm in the previous quarter.

[12] In some cases, even managers with positions less than $100 million may be required (or may choose) to file a 13(f) form.

Data were obtained for the fourth quarters of 1986 and 1988.[13] In other words, the available data consisted of the end-of-period holdings of the reported insurance company portfolio managers in each firm as of December 31 of each of these two years.

As far as reporting requirements are concerned, insurance companies fall under the purview of 13(f) rules, which require all portfolio managers to file 13(f) if the accounts under their "investment discretion" contain 13(f) securities with an aggregate fair market value of $100 million or more. All institutional investors that satisfy the $100 million threshold file 13(f) forms. SEC rules clearly specify that separate account managers, if they meet the size criterion, must file 13(f) forms. Although general accounts are not mentioned separately, managers of these accounts also must file 13(f) forms if they meet the size criterion. Usually, as mentioned above, even though a life insurer maintains two accounts, general and separate, the investment decision task is conducted by a single committee. Consequently, in their 13(f) filings, life insurers report their combined investments in general and separate accounts.

While data on the constituents of a manager's portfolio are available from CDA Investment Technologies, firm-specific characteristics such as size, liquidity, leverage, etc. are from the COMPUSTAT tapes, and stock price returns required to compute a firm's risk and return characteristics are from the Center for Research on Security Prices (CRSP) tapes.

Sample Description

For the purposes of this study, the sample of institutional portfolios is divided into two categories, insurance and noninsurance institutions. The former consists of life and property-liability insurers, either of which can be stock or mutual companies, and the latter consists of banks, investment companies, individual investment advisors, and others. The breakdown of the 1986 and 1988 samples along these dimensions is presented in Table 1. Panel A of the table gives the breakdown for the sample of insurance companies and panel B for noninsurance institutions. Although the breakdown of the sample between property-liability and life companies appears to be about even, common stock companies form a disproportionately high fraction of the insurance company sample.

The data obtained from CDA Technologies provide the identities of the firms in the equity portfolios of all the institutions. In order to conduct further tests, data on these firms were obtained from CRSP and COMPUSTAT tapes. Only firms with complete (nonmissing) data from both sources are included in the analysis sample. Table 2 provides the information on the number of firms in the original sample and the losses owing to data nonavailability. A perusal of the table indicates that more NASDAQ firms were lost from the sample than NYSE/ASE firms.

[13] The primary reason for obtaining alternate end-of-year data for these two years was the "crash" of 1987. It was hoped that a before- and after-the-crash comparison would highlight some dramatic differences in portfolio selection criteria.

While these losses are not major, it should be kept in mind that future tests are based on a subsample of the portfolios. Additional tests (results not reported) indicated that there were no systematic differences in the proportions of firms lost owing to data nonavailability from insurance and noninsurance portfolios.

Table 1
Types of Institutional Investors in the Sample Subclassified into Insurance Companies and Noninsurance Institutional Investors

Panel A: Insurance Companies

	Year	Stock	Mutual	Total
Property-Liability	1986	30	7	37
	1988	30	6	36
Life	1986	14	16	30
	1988	10	19	29
Total	1986	44	23	67
	1988	40	25	65

Panel B: Noninsurance Institutional Investors

Institution Classification	1986	1988
Bank	227	227
Investment Company	70	62
Independent Investment Advisor	414	499
Other	106	104
Total	817	892

Table 2
Losses in Samples Owing to Data Nonavailability

	Total Number of Firms	Number of Firms Lost	Loss %
1986			
NYSE/ASE	1,151	34	2.95
NASDAQ	814	112	13.76
Total	1,965	146	7.43
1988			
NYSE/ASE	1,588	6	0.38
NASDAQ	1,250	123	9.84
Total	2,838	129	4.55

Note: The portfolios of stocks in which institutions were invested at the end of years 1986 and 1988 were obtained from CDA Technologies. Because of some firms not being on CRSP and/or COMPUSTAT data tapes or because of missing values for variables used in the study, the sample of firms used to represent institutional equity portfolios is a subset of the original sample. The table provides firms lost in the screening process.

Table 3 provides some descriptive characteristics of these institutional equity portfolios. The top panel provides information for 1986 and the lower panel for 1988. For the two years of investigation, after screening for data availability on COMPUSTAT and CRSP, there are a total of 884 institutional manager portfolios in 1986 and 957 in 1988.[14] Of these, 67 and 65 are insurance company portfolios (INS) in the respective years. The rest, 817 in 1986 and 892 in 1988, are classified as noninsurance institutions (NINS). These numbers are reported in the first row of each of the two panels. In addition, Table 3 reports values for the mean, median, minimum, and maximum for three relevant (for institutional ownership) variables for the two institutional classifications. The three variables are: the average (across managers) number of stocks in a manager's portfolio; the average (across managers) size of the portfolio where each manager's portfolio size is computed as the sum of the values of investments in firms in the portfolio; and the average investment by a portfolio manager in a firm, computed as the average across managers of the average investments of each of the managers.

Table 3

Year-End Portfolio Characteristics by Institution Type for 1986 and 1988

	Average Number of Stocks in Manager's Portfolio		Average Portfolio Value (in millions of dollars)[a]		Average Across Portfolios of the Average Investment in a Firm (in millions of dollars)	
Statistic	Insurers	Noninsurers	Insurers	Noninsurers	Insurers	Noninsurers
1986						
Number of Portfolios	67	817	67	817	67	817
Mean	161.5	172.3	1,184.4	1,083.1	6.7	13.9*
Median	95.0	101.0	438.4	297.9	4.0	3.2
Minimum	2.0	1.0	3.0	0.3	0.2	0.0
Maximum	1137.0	2515.0	19,232.6	24,894.6	56.0	1,860.0
1988						
Number of Portfolios	65	892	65	892	65	892
Mean	208.9	201.5	1,443.3	1,208.5	8.4	9.6
Median	93.0	104.0	383.5	301.6	4.3	3.0
Minimum	5.0	1.0	4.0	0.1	0.7	0.0
Maximum	1,336.0	3,338.0	22,690.9	36,880.0	83.7	1,572.6

[a] Calculated as the number of shares held multiplied by stock price.

* Significantly greater than the INS mean value at the 0.05 significance level.

[14] These screens eliminate firms more so than portfolio managers. A portfolio manager would be eliminated by this screen if the manager had invested in only those firms which do not appear on the COMPUSTAT or CRSP tapes. 13(f) filing requirements are, therefore, the main limiting criteria for portfolio manager inclusion into the sample.

A perusal of the values for the average number of stocks in the manager's portfolio shows that, on average, there are 161.5 and 172.3 firms in the portfolio of insurance and noninsurance portfolios, respectively. These numbers for 1988 are 208.9 and 201.5, respectively. It appears that institutional portfolios, regardless of the classification, are usually well-diversified. Standard statistical tests confirm that there are no systematic differences in the average number of stocks in a manager's portfolio among the two classifications. The average sizes of the portfolios in 1986 are over a billion dollars for each classification, and the much smaller median values range between $300 and $439 million. Insurer portfolios appear to be larger than others in terms of both the mean and median values, but the difference is not statistically significant. These observations hold also for 1988. The only statistically significant difference is that the mean of the average investment by a portfolio manager in a firm is lower for the insurance portfolios in 1986; the insurance mean of 6.7 million is less than half of the 13.9 for the noninsurance mean.

Table 4 presents summary statistics for the levels of institutional ownership in firms for each of the two classifications of institutional investors, insurance and noninsurance. Institutional ownership is defined as the fraction of outstanding shares owned by institutions. Institutional ownership is further classified by the exchange of listing of firms into NYSE/ASE and NASDAQ. Panel A describes institutional ownership in firms irrespective of the exchange on which they are listed, panel B for NYSE/ASE firms only, and panel C for NASDAQ firms. The first row of each panel presents the number of firms that have institutional ownership and rows two through five of each panel present the mean, the Pearson correlation coefficient between levels of institutional ownership by insurance and noninsurance portfolios, median, and maximum of the level of institutional ownership, respectively.

In 1986, noninsurance institutions owned shares in a total of 3,337 firms. Insurance companies, on the other hand, owned shares in 1,819 firms. Further checking revealed that at least one noninsurance institution invested in all the firms in which insurance companies invested. Thus, insurers invested in a subsample of 54.5 percent of the firms in the noninsurance portfolios. The numbers for 1988 are significantly higher. In 1988, insurance companies invested in 2,709 (62.7 percent) of the 4,323 firms in which noninsurance institutions owned shares. The first rows of panels B and C indicate that, in 1986, while insurance companies invested in 71.2 percent of the NYSE/ASE firms attracting institutional capital (1,117 of 1,570), this figure for NASDAQ firms is only 39.7 percent (702 of 1,767). The corresponding numbers for 1988 are 79.8 percent (1,582 of 1,982) and 48.1 percent (1,127 of 2,341). Viewed another way, in 1986, 61.4 percent (1,117 of 1,819) of the firms in insurance company portfolios are NYSE/ASE firms, whereas only 47.1 percent (1,570 out of 3,337) of the firms in noninsurance portfolios are NYSE/ASE firms. In 1988, these percentages were 58.4 percent and 45.9 percent, respectively. These findings point to the following characteristics: the number of firms attracting institutional interest increased over the two-year period; insurance

portfolio, managers tend to concentrate their holdings in NYSE/ASE firms more than other institutions; and insurance portfolios exhibit a pattern of increasing investment in NASDAQ firms over the period.

In 1986, the average ownership by insurers was 3.5 percent and by noninsurance institutions 22.2 percent. Percentage ownership in NYSE/ASE firms by noninsurers was 28.9 percent, which is considerably greater than the 16.3 percent in NASDAQ firms. Viewed another way, NASDAQ ownership at 16.3 percent was 56.4 percent of the average ownership in NYSE/ASE firms at 28.9 percent. Insurance companies, on the other hand, discriminated against NASDAQ firms to a much smaller extent; average NASDAQ ownership at 3.1 percent was 81.3 percent of the average ownership of 3.8 percent in NYSE/ASE firms. The inferences for 1988 are similar though somewhat less striking. This finding may be attributable to the regulatory constraints on insurance managers. Recall the earlier discussion that an insurance company, because it cannot invest at its optimum in "good" securities, may be forced to invest more than an optimum amount in "bad" securities. The fact that they invest in fewer NASDAQ firms lends further support to this con-

Table 4
Summary Statistics of Institutional Ownership Levels (the Fraction of Outstanding Shares Owned by Institutional Investors) by Exchange of Listing: Year-End Portfolio Holdings for 1986 and 1988

	1986		1988	
	Insurance	Noninsurance	Insurance	Noninsurance
Panel A: All Firms (NYSE, ASE, and NASDAQ)				
N[a]	1,819	3,337	2,709	4,323
Mean	0.0351	0.2223*	0.0287	0.2159*
Correlation Coefficient[b]	0.2162		0.2040	
Median	0.0253	0.1816	0.0162	0.1651
Maximum	0.4405	0.9337	0.8259	0.9255
Panel B: NYSE and ASE Firms				
N[a]	1,117	1,570	1,582	1,982
Mean	0.0379	0.2890*	0.0326	0.2815*
Correlation Coefficient[b]	0.2656		0.2080	
Median	0.0304	0.2654	0.0221	0.2468
Maximum	0.4405	0.9337	0.8259	0.9255
Panel C: NASDAQ Firms				
N[a]	702	1,767	1,127	2,341
Mean	0.0308	0.1630*	0.0233	0.1604*
Correlation Coefficient[b]	0.0876		0.1561	
Median	0.0180	0.1202	0.0097	0.1093
Maximum	0.3574	0.8426	0.6039	0.8728

[a] N is the number of firms in the sample in which institutions have equity ownership.
[b] Pearson's coefficient of correlation between Y_{INS} and Y_{NINS}.
* Significantly greater than in the insurance sample mean value at the 0.05 significance level.

jecture. Thus, insurance companies may place importance on exchange of listing in determining whether to invest in a firm, but once that decision is made, the level of investment is less affected by the exchange of listing.

In order to investigate whether insurance company portfolio managers follow investment practices of other institutions, Pearson correlation coefficients are calculated between levels of institutional ownership by insurance and noninsurance portfolios. These values are reported in the last row of Table 4. Although all correlation coefficients are significantly greater than zero, the correlation coefficient between the holdings by insurers and noninsurers in 1986 is only 0.22. In other words, insurance portfolio holdings are differently distributed than those of noninsurance portfolios. This disparity is more evident for NASDAQ firms (panel C), where the coefficient is only 0.09 in 1986. The coefficients and their relative magnitudes are similar for 1988.

PATTERNS OF INVESTMENT

Determinants of Levels of Stock Holdings

This section presents results on the cross-sectional determinants of the level of institutional holdings. The tests are conducted on the year-end levels of ownership by insurance companies and noninsurance companies in 1986 and 1988 using the sample of all those firms that have some ownership by insurance companies (TOT).[15] Note that this sample does not include all those firms that have some institutional ownership. In order to facilitate comparison, only those firms that attracted insurance company equity capital are included.[16] Therefore, the sample is more restricted than that used in the earlier analysis as well as that in BGK. This sample is further classified into two subsamples: firms listed either on the NYSE or ASE and firms listed on the NASDAQ.

The choice of variables used in the cross-sectional regressions is, largely, in keeping with that in BGK. To reiterate, the analysis in this section differs from that in BGK in three respects: First, the investigation is concentrated not on the ownership levels of institutions as a whole (as in BGK) but on the differences between insurance and noninsurance institutions. Second, unlike BGK, whose investigation spans only one year (1985), the analysis here is conducted for two years. Third, NASDAQ firms are included in the sample.

The following regression is estimated for 1986 and 1988 for insurance institutions as well as for noninsurance companies:

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[15] BGK did not find significant relationships for utilities and financial companies. The present study had similar findings, and, therefore, these types of firms were dropped from the sample.

[16] All relevant tests were conducted on the sample of all firms in which an institution had invested, and the inferences were identical. In fact, the significance levels in many cases were stronger. In these tests, those firms in which insurance companies did not invest—that is, the firms excluded from the sample for which tests are reported—were assigned a value of zero for the fractional ownership by insurance companies.

$$Y_i = \beta_0 + \beta_1 (\alpha_i) + \beta_2 (BETA_i) + \beta_3 (STD_i) + \beta_4 (SIZE_i) + \beta_5 (LIQ_i) + \beta_6 (LEV_i) + \beta_7 (DY_i) + \beta_8 (ML_i) + \beta_9 (D_i) + \pi_i, \quad (1)$$

where Y_i = the fractional ownership by institutions in firm i computed by dividing the number of shares in firm i owned by institutions by the total number of shares outstanding for that firm,

α_i = the Jensen's weekly performance measure for firm i defined as the intercept from the regression of firm i's excess (over the risk-free interest rate) weekly return on the market's excess weekly return,[17]

$BETA_i$ = the market model beta for firm i and is the coefficient on the excess market return from the regression used to compute α_I,

STD_i = the standard deviation of weekly stock returns of firm i,

$SIZE_i$ = the logarithm of total assets of firm i obtained from COMPUSTAT,

LIQ_i = annual share trading volume divided by shares outstanding for firm i,

LEV_i = ratio of debt to total assets of firm i,

DY_i = the dividend yield of firm i,

ML_i = the number of months the stock of firm i has been listed on the NYSE, ASE, or NASDAQ, and

D_i = a dummy variable that takes the value one if the stock has a Standard & Poor's rank of C or higher in the COMPUSTAT tapes and zero otherwise.

Table 5 presents the mean values of all the above variables for the sample of firms without classification by exchange listing (TOT), for the subsample of NYSE/ASE firms, and for NASDAQ firms. The first panel reports means using 1986 values and the second using 1988 values. The 1986 sample consists of a total of 1,620 firms, of which 936 are listed on either the NYSE or ASE and the remaining 684 are on the NASDAQ. The 1988 sample consists of a total of 2,422 firms, of which 1,306 are listed on either the NYSE or ASE and 1,116 are on the NASDAQ.

The sample in the BGK study utilized values for the year 1985 and included only NYSE/ASE firms. For purposes of comparison, therefore, consider the second row of Panel A of Table 5, which offers mean values for NYSE/ASE firms for 1986. The average ownership by institutions in NYSE/ASE firms in the current sample is 0.3963, which is a little higher than 0.307 reported by BGK. This higher value could be because, from 1985 to 1986, institutional activity increased, and/or only those firms that received insurance company capital are included in

[17] In order to compute α_i for, say, 1986, the weekly excess returns for the 52-week period prior to December 31, 1986, are computed. If a firm did not have at least 30 weeks of consecutive returns available, it was excluded. The risk-free interest rate is the rate implied by weekly 90-day Treasury Bill auction discount rates obtained through the Dow Jones News Retrieval Service.

Table 5
Mean Values of the Cross-Sectional Determinants of Institutional Ownership
(the Fraction of Outstanding Shares Owned by Institutions)

Statistic	Fraction Owned by ALL	Fraction Owned by Insurers	Fraction Owned by Noninsurers	Jensen's Monthly Performance Measure	CAPM Beta	Standard Deviaion of Stock Returns	Total Assets (in millions of dollars)	Liquidity Measure	Debt/Total Assets	Dividend Yield	Months Exchange Listed	Proportion of Firms with Rank
Panel A: 1986—1,620 Firms in Sample (TOT); 936 NYSE and ASE (N&A), and 684 NASDAQ (NDQ)												
TOT	0.3511	0.0349	0.3161	-0.0001	1.1197	0.0647	2,331	0.8298	0.2314	0.0179	162.90	0.6519
N&A	0.3963	0.0381	0.3582	-0.0019	1.1196	0.0577	3,428	0.6980	0.2510	0.0227	211.40	0.7831
NDQ	0.2892	0.0306	0.2586	-0.0007	1.1199	0.0742	830	1.0103	0.2045	0.0113	96.53	0.4722
t-statistic	11.90[a]	3.92[a]	11.75[a]	-2.12[b]	0.01	-10.57[b]	7.12[a]	-9.39[b]	4.98[a]	11.17[a]	30.45[a]	13.30[a]
Panel B: 1988—2,422 in Sample (TOT), 1,306 in N&A, and 1,116 in NDQ												
TOT	0.3253	0.0279	0.2973	-0.0008	1.1288	0.0667	2,336	0.6627	0.2636	0.0189	153.43	0.5433
N&A	0.3659	0.0318	0.3341	-0.0017	1.0972	0.0598	3,693	0.5379	0.2885	0.0251	199.88	0.6539
NDQ	0.2777	0.0234	0.2544	0.0002	1.1659	0.0747	750	0.8087	0.2345	0.0116	99.08	0.4140
t-statistic	11.15[a]	4.91[a]	10.82[a]	-4.28[b]	-2.56[b]	-12.59[b]	8.17[a]	-9.83[b]	6.42[a]	12.35[a]	27.59[a]	12.13[a]

Note: ALL = the total sample of institutional portfolios. Jensen's performance measure is the intercept of the regression of monthly excess returns of a stock on the CRSP value weighted index for the most recent 60-month period; CAPM beta is the coefficient from this regression; standard deviation of returns is estimated over the same period; the liquidity measure is the most recent year's trading volume divided by the number of shares outstanding; and the rank refers to whether the firm has a Standard & Poor's ranking.

[a] Variable mean for NYSE and ASE (N&A) sample significantly greater than that for NASDAQ (NDQ) sample.

[b] Variable mean for NYSE and ASE (N&A) sample significantly smaller than that for NASDAQ (NDQ) sample.

the current sample. Values for Jensen's performance measure, the CAPM beta, leverage, dividend yield, and months exchange listed are reasonably close to those reported by BGK. The fraction of firms that receive a ranking of C or higher in the BGK sample is 89.4 percent, which is higher than the 78.3 percent found here. The standard deviation of stock returns is considerably lower, 0.058 versus 0.11 reported in BGK. The liquidity measure, on the other hand, is higher, 0.698 compared to 0.54 in the BGK sample. Firm size is also significantly larger.[18] The 1988 sample, however, contains some additional differences. Note from the second row of Panel B that the average fraction owned is smaller at 0.366, the liquidity measure is also much smaller, and the fraction of firms with a ranking of C or better is significantly lower at 65.4 percent.

The proportion of NASDAQ firms in the sample increased from 42.2 percent (684 of 1,620) in 1986 to 46.1 percent in 1988. The observation made above that insurance companies tend to discriminate less against NASDAQ firms is borne out by the values reported in the second column of Panels A (1986) and B (1988). The last row in each panel presents the t-statistics for the differences in variable means between NYSE/ASE and NASDAQ subsamples. As expected, the fraction of shares owned by institutions, total assets, months listed, and the proportion of firms with ranking are significantly lower in the NASDAQ sample. Jensen's performance measure is significantly less negative for NASDAQ firms. The average CAPM beta is significantly different only in 1988, when NASDAQ firms have a higher beta. The standard deviation of returns of NASDAQ stocks in the sample, however, is higher than the NYSE/ASE firms in both years of study. The liquidity measure is higher for NASDAQ firms than for NYSE/ASE firms in both years. Finally, NASDAQ firms in the sample have lower debt levels and dividend yields than NYSE/ASE firms.

Table 6 reports the results from estimating the cross-sectional regression model (1) on the subsamples. Panel A reports results for holdings in the 1986 institutional portfolios and Panel B for the 1988 portfolios. The regression equation (1) is estimated separately for equity ownership levels for insurance (Y_{INS}) and noninsurance (Y_{NINS}) portfolios. These two regressions are estimated for the total sample of firms as well as separately for NYSE/ASE firms and NASDAQ firms. Thus, each panel reports three sets of estimated regression coefficients.[19]

Comparing patterns in the investments by insurance portfolios and noninsurance portfolios, several significant differences are immediately apparent. First, the vector of safety-net variables that could explain significant proportions of the cross-sectional variation in noninsurer ownership level explains only minuscule

[18] In all probability, the BGK article contains a typographical error for this variable. The average size of 139 million dollars reported in their study appears to be too low. It is possible that the reported values in their article are in tens of millions rather than millions of dollars.

[19] Initial ordinary least squares estimation resulted in highly nonspherical disturbance terms, indicating heteroskedasticity of an unknown form. Heteroskedasticity is corrected by using White (1980) asymptotically consistent standard error estimates.

Table 6
Cross-Sectional Determinants of Institutional Ownership
by Institutional Type and Exchange for 1986 and 1988

Dependent Variable in Regression	Intercept	Jensen's Monthly Perormance Measure	CAPM Beta	Standard Deviation of Returns	Logarithm of Total Assets	Liquidity Measure	Debt/Total Assets	Dividend Yield	Months Exchange Listed	Rank Dummy Variable	Adjusted R^2
Panel A: 1986—1,620 Firms in Full Sample; 936 NYSE and ASE, and 684 NASDAQ											
					Full Sample						
Y_{INS}	0.0246	-0.1423	-0.0017	0.0002	-0.0002	0.0050	-0.0009	0.0073	0.0000	0.0083	0.0196
	(4.03)**	(-1.68)*	(-0.91)	(0.00)	(-0.34)	(3.06)**	(-0.13)	(0.15)	(1.97)**	(2.92)**	
Y_{NINS}	0.1377	-0.2775	0.0504	-1.8796	0.0201	0.0845	-0.0849	-0.5825	0.0003	0.0602	0.4133
	(5.12)**	(-0.78)	(7.98)**	(-6.41)**	(7.09)**	(9.83)**	(-3.81)**	(-3.07)**	(5.69)**	(5.59)**	
t-Statistic for Slope Difference	-4.10[a]	0.37	-7.90[a]	6.28[b]	-6.97[a]	-9.09[a]	3.62[b]	3.02[b]	-5.05[a]	-4.66[a]	
					NYSE and ASE						
Y_{INS}	0.0351	-0.1615	0.0026	-0.2182	-0.0002	0.0108	0.0045	-0.0155	-0.0000	0.0092	0.0357
	(3.77)**	(-1.35)	(1.06)	(-2.73)**	(-0.30)	(3.53)**	(0.47)	(-0.25)	(-0.53)	(2.24)**	
Y_{NINS}	0.2190	-0.2327	0.0695	-3.1778	0.0142	0.0996	-0.0625	-0.5261	0.0002	0.0738	0.4088
	(6.33)**	(-0.38)	(7.14)**	(-8.17)**	(4.09)**	(5.36)**	(-1.73)*	(-2.36)**	(3.99)**	(4.98)**	
t-Statistic for Slope Difference	-5.14[a]	0.11	-6.67[a]	7.46[b]	-4.06[a]	-4.71[a]	1.79[b]	2.21[b]	-4.00[a]	-4.62[a]	
					NASDAQ						
Y_{INS}	0.0306	-0.1645	-0.0056	0.0786	-0.0015	0.0030	-0.0085	-0.0283	0.0001	0.0039	0.0171
	(3.86)**	(-1.48)	(-2.13)**	(1.08)	(-1.39)	(1.41)	(-0.96)	(-0.32)	(1.34)	(0.80)	
Y_{NINS}	0.1267	-0.5653	0.0248	-1.2253	0.0259	0.0794	-0.1085	-1.0405	-0.0001	0.0580	0.3709
	(4.41)**	(1.40)	(3.30)**	(-4.60)**	(6.47)**	(8.62)**	(-4.24)**	(-3.25)**	(0.51)	(3.63)**	
t-Statistic for Slope Difference	-3.23[a]	0.96	-3.82[a]	4.72[b]	-6.60[a]	-8.09[a]	3.70[b]	3.05[b]	0.91	-3.24[a]	

Table 6 (continued)

Panel B: 1988—2,422 in Full Sample; 1,306 in NYSE and ASE, and 1,116 in NASDAQ

						Full Sample					
Y_{INS}	0.0216 (3.85)**	-0.1869 (-2.94)**	0.0037 (2.50)**	-0.1705 (-4.19)**	0.0010 (1.66)*	0.0054 (3.44)**	-0.0042 (-0.76)	-0.0270 (-0.77)	0.0000 (2.99)**	0.0024 (1.09)	0.0388
Y_{NINS}	0.1712 (10.70)**	-0.0270 (-0.09)	0.0535 (8.88)**	-2.1214 (-12.79)**	0.0206 (9.02)**	0.0885 (5.60)**	-0.0821 (-5.43)**	-0.7000 (-6.44)**	0.0002 (5.64)**	0.0637 (8.03)**	0.4218
t-Statistic for Slope Difference	-8.45[a]	-0.51	-8.02[a]	11.42[b]	-8.32[a]	-5.59[a]	-4.84[a]	5.90[b]	-4.70[a]	-7.46[a]	
						NYSE and ASE					
Y_{INS}	0.0501 (4.47)**	-0.1787 (-1.79)*	0.0003 (0.12)	-0.3862 (-5.58)**	-0.0004 (-0.47)	0.0156 (6.97)**	-0.0108 (-1.57)	-0.0677 (-1.52)	0.0000 (0.27)	0.0037 (1.13)	0.0666
Y_{NINS}	0.2534 (9.75)**	-0.6150 (-1.29)	0.0676 (7.29)**	-3.360 (-13.48)**	0.0154 (5.19)**	0.1560 (12.75)**	-0.0839 (-3.93)**	-0.7824 (-6.11)**	0.0001 (2.60)**	0.0671 (6.38)**	0.4740
t-Statistic for Slope Difference	-7.18[a]	0.90	-7.04[a]	11.50[b]	-5.13[a]	-11.29[a]	3.26[b]	5.27[b]	-2.45[a]	-5.77[a]	
						NASDAQ					
Y_{INS}	0.0073 (1.04)	-0.2000 (-2.36)**	0.0049 (2.42)**	-0.0630 (-1.34)	0.0015 (1.42)	0.0029 (1.62)	0.0034 (0.36)	-0.0747 (-1.30)	0.0001 (2.24)**	-0.0004 (-0.14)	0.0206
Y_{NINS}	0.1735 (8.06)**	0.3813 (1.00)	0.0393 (5.47)**	-1.5253 (-8.66)**	0.0184 (5.52)**	0.0707 (4.26)**	-0.0838 (-3.79)**	-0.7983 (-3.63)**	0.0000 (0.60)	0.0679 (5.38)**	0.3411
t-Statistic for Slope Difference	-7.34[a]	-1.49	-4.61[a]	8.02[b]	-4.83[a]	-4.06[a]	3.63[b]	3.19[b]	0.12	-5.27[a]	

Note: The dependent variable is Y_i, the fraction of outstanding shares owned by institutions in sample i, which can be either insurance companies (INS) or noninsurance companies (NINS). The dependent variables are Jensen's performance measure measured as the intercept of the regression of monthly excess returns of a stock on the CRSP value weighted index for the most recent 60-month period; CAPM beta is the coefficient from this regression; standard deviation of returns is estimated over the same period; the liquidity measure is the most recent year's trading volume divided by the number of shares outstanding; and the rank dummy variable takes the value one if the firm has a Standard & Poor's ranking and zero otherwise. The sample excludes utilities and financial companies (heteroscedasticity adjusted t-statistics are in parentheses).

[a] The slope coefficient in the Y_{INS} regression is significantly smaller.

[b] The slope coefficient in the Y_{INS} regression is significantly greater.

** Significantly different from zero at the 0.05 significance level.

* Significantly different from zero at the 0.10 significance level.

amounts of the cross-sectional variation in levels of insurance company ownership. The adjusted R^2 for noninsurance regressions for all samples ranges from 34.1 percent (NASDAQ in 1988) to 47.4 percent (NYSE/ASE in 1988), whereas, for insurance regressions, the adjusted R^2 ranges from 1.7 percent (for the 1986 NASDAQ sample) to 6.7 percent (for the 1988 NYSE/ASE sample).

Consequently, none of the independent variables exhibits consistently significant relations with Y_{INS}. The variables that demonstrate a generally consistent relation with Y_{INS} are leverage and dividend yield, in that their coefficients are never significant in any of the samples. The significant relations of note are as follows. The coefficient on the CAPM beta, the measure of market risk, is significantly negative for the NASDAQ sample in 1986 but significantly positive in 1988.[20] In the NYSE sample, Y_{INS} is significantly negatively related to the total risk measure, standard deviation of stock returns, in both years. Surprisingly, the size of the firm, measured as the logarithm of total assets, appears to play only a small role in determining insurance company equity investments. It is significant (at 10 percent) in only one case, on the full sample in 1988. Liquidity is a significant determinant of Y_{INS} only in the case of NYSE firms.[21] The more liquid the stock, the higher the ownership by insurance companies. Based on the above findings, the vector of safety-net variables does not explain the levels of insurance company portfolio holdings very effectively.

In contrast, we document significant relations for most safety-net variables with Y_{NINS}. In addition to significance, the directions of these relations are generally consistent with the safety-net hypothesis. Thus, the findings for noninsurance firms support those documented in the BGK study. The stock price performance is significant only for the entire sample in 1986 and for all samples in 1988. The inference is that noninsurance holdings are negatively related to the performance of the stock in prior years. As in BGK, market risk is a significantly positive determinant of noninsurance ownership in firms in both years and for all samples; the higher the beta, the higher the Y_{NINS}. Total risk, on the other hand, is significantly negatively correlated to ownership levels of noninsurance portfolios. As in BGK, firm size is positively related to Y_{NINS} in all samples, implying that, in keeping with the safety-net hypothesis, the larger the firm, the higher the ownership by noninsurance institutions. The same inference can be made for liquidity and the rank dummy variable; both are always significantly positively related to

[20] It should be noted here that finding a positive, a negative, or no relation is consistent with the safety-net hypothesis. As elaborated in BGK, beta may influence a manager's decision in two opposite ways, and the final relation will depend on the relative magnitudes of these two effects.

[21] The significance of the liquidity variable may have the following explanation. On several different occasions in the last 20 years, inflation and high interest rates have forced life insurance companies to accommodate extraordinary cash outflows. As interest rates reached record levels in the 1980s, policyholders took advantage of the option to borrow some or all of the cash value in their policies at below-market loan rates as permissible in the policy contract. This, coupled with the surrender of policies for cash value, may have heightened the preoccupation of insurance company portfolio managers with steady cash flow sources, even though they are, in theory, long-term investors.

Y_{NINS}. Contrary to the BGK finding, but in keeping with the safety-net hypothesis, noninsurance institutions invest less the higher is the leverage ratio. BGK did not document any relation between dividend yield and institutional ownership, but their hypothesis was that this variable should be positively related to institutional ownership. In this study, dividend yield is a significant determinant of Y_{NINS}. The direction of the relationship, however, is consistently negative. Finally, the age of the firm on the exchange is, except in the 1986 NASDAQ sample, significantly positively related to Y_{NINS}. Thus, the findings generally support the hypothesis that safety-net variables have a significantly high level of power in explaining ownership levels by noninsurance investors.

In sum, the influence of the "prudent man" rule apparently extends, at best, to a very small extent to insurance company managers. This lack of explanatory power of the safety-net variables for equity investments by insurance investors has two possible explanations. First, the model suffers from an errors-in-variables problem, in that the chosen set of predictor variables is not appropriate. This problem would be consistent with the low observed R^2 values for the insurance regressions, which drive the regression coefficients to zero.

The other explanation for the substantially lower explanatory power of the safety-net variables for insurance company samples is based on the institutional characteristics present in the insurance company investment environment. Insurance companies in many states are restricted from investing more than a prescribed fraction of their admitted assets into corporate equity. This restriction, along with the need to diversify, restricts the ability of insurance companies to invest large fractions of their portfolios in any one firm. This restriction is not applicable to most other institutions. Therefore, in many cases, levels of insurance company ownership are bounded from above, and, thus, while safety-net variables are important in determining the investment patterns, they are unable to explain a large portion of the variation in cross-sectional regressions. A possible explanation for the low observed R^2 values could be that our analysis omits certain relevant decision criteria. Since equity investment comprises only about 10 percent of the total portfolio of insurance companies, one relevant decision variable is clearly the contribution of the equity portfolio's risk to the risk of the overall portfolio. Such an analysis is beyond the scope of this article, but it could also be a possible explanation for the low explanatory power observed in this study. Another omitted decision variable is that in recent years insurers have received regulatory approval to segment their portfolios—that is, they have been permitted to allocate the return from invested assets to different lines of business.[22] Accordingly, some insurance companies may maintain several segmented portfolios, each with its own return objectives, risk parameters and liquidity characteristics.

[22] In other words, gains from one type of investment can go to fund reserves for whole life, another to variable life, and so on.

Determinants of the Inclusion of Stocks in the Portfolio

Although the above factors may account for the inability of safety-net firm characteristics to explain levels of insurance company corporate ownership, it is difficult to investigate them empirically. However, it is possible to measure the impact of the safety-net considerations on equity investment by insurers another way. Note that the dependent variable used in the regressions measures the *level* of ownership. Thus, it may be the case that, while safety-net considerations are unable to account for the dispersion in levels of ownership, they may still be an important factor in determining whether an insurance company invests in a firm. The next series of tests investigates this issue, and the finding is that this is indeed the case.

The previous cross-sectional tests were conducted on the sample of firms in which at least one insurance company owned some shares. The following tests utilize the larger sample comprising all the firms in which at least one institution owns shares. This larger sample is classified on the basis of a dummy variable Ψ, which takes on the value zero if the firm is owned by only noninsurance companies, and takes the value one if the firm is owned by both noninsurance and insurance firms. In other words, $\Psi = 0$ if $Y_{NINS} > 0$ and $Y_{INS} = 0$, and $\Psi = 1$ if $Y_{NINS} > 0$ and $Y_{INS} > 0$. The mean values for all the safety-net variables in each of the subsamples, by exchange of listing as well as by year, are computed and tests for differences in mean are conducted. Results from the analysis are reported in Table 7.

Panel A and B of Table 7 present the results for the two exchange subsamples for 1986 and 1988, respectively. The earlier cross-sectional tests do not indicate a significant role for safety-net variables in explaining corporate ownership levels in insurance portfolios. The findings reported in Table 7, however, indicate that these variables distinguish quite well the firms in which insurance companies do not invest. Except for Jensen's performance measure and dividend yield, the differences in the means of the variables in the subsample are significant on all exchanges as well as in both years. The average CAPM beta is always lower in the sample of firms in which insurance companies do not invest. The standard deviation of stock returns, on the other hand, is always higher. The difference in firm size is significant. In the 1986 sample, the average size of NYSE/ASE firms in which insurance portfolios did not invest is $203 million, whereas the average size of firms in which they did invest is more than 17 times this number. The sample of firms in which insurance companies do not invest are consistently less liquid, more leveraged, younger on the exchange, and less likely to be ranked.

The above results indicate that, while safety-net characteristics may not explain the cross-sectional dispersion in the levels of insurance company ownership (Y_{INS}), they may be better able to determine the set of companies in which to invest. In order to investigate this issue further, logit models are estimated where the "dependent" variable is Ψ and the predictor variables are the safety-net firm characteristics. These models are estimated for both 1986 and 1988 samples as well as their respective subsamples formed on the basis of the exchange of listing. Results from the estimation of the logit model are presented in Table 8.

Table 7

Firm Characteristic Differences Between Firms in Insurance Company Portfolios and Those in Only Noninsurance Institutional Portfolios for 1986 and 1988 by Exchange Listing

	NYSE and ASE			NASDAQ		
Variable	Firms in which $Y_{INS} = 0$ and $Y_{NINS} > 0$	Firms in which $Y_{INS} > 0$ and $Y_{NINS} > 0$	t-Value for Differences in Means	Firms in which $Y_{INS} = 0$ and $Y_{NINS} > 0$	Firms in which $Y_{INS} > 0$ and $Y_{NINS} > 0$	t-value for Differences in Means
Panel A: 1986—In NYSE and ASE (NASDAQ) Sample, 411 (1,053) Firms in which Insurance Companies Do Not Invest and 936 (684) Firms in which They Do						
Y_{NINS}	0.1348	0.3582	-26.21**	0.0981	0.2585	-22.77**
Jensen's Performance Measure	-0.0008	-0.0019	1.66*	-0.0001	-0.0007	0.89
CAPM Beta	0.9601	1.1196	-3.56**	0.7396	1.1199	-9.85**
Standard Deviation of Returns	0.0785	0.0577	8.49**	0.0928	0.0742	8.55**
Assets (in millions of dollars)	203	3,428	-9.10**	158	830	-6.57**
Liquidity Measure	0.4376	0.6980	-10.06**	0.5984	1.0103	-11.59**
Debt/Assets	0.3077	0.2510	4.47**	0.2616	0.2045	5.52**
Dividend Yield	0.0219	0.0227	-0.38	0.0093	0.0113	-1.80*
Months Exchange Listed	174	211	-6.89**	83	97	-4.24**
Proportion with Rank	0.4842	0.7831	-10.63**	0.2384	0.4722	-10.09**
Panel B: 1988—In NYSE and ASE (NASDAQ) Sample, 359 (1,210) Firms in which Insurance Companies Do Not Invest and 1,306 (1,116) Firms in which They Do						
Y_{NINS}	0.1069	0.3341	-30.17**	0.0726	0.2543	-31.59*
Jensen's Performance Measure	-0.0018	-0.0017	-0.15	-0.0000	0.0002	-0.25
CAPM Beta	0.8995	1.0972	-5.00**	0.9077	1.1659	-6.96*
Standard Deviation of Returns	0.0823	0.0598	8.96**	0.1075	0.0747	17.12*
Assets (in millions of dollars)	260	3,693	-9.65**	97	750	-7.88*
Liquidity Measure	0.2566	0.5379	-17.50**	0.4134	0.8087	-14.06*
Debt/Assets	0.3266	0.2885	2.29**	0.2781	0.2345	4.53*
Dividend Yield	0.0301	0.0251	1.69*	0.0069	0.0116	-4.18*
Months Exchange Listed	168	200	-5.00**	83	99	-5.62*
Proportion with Rank	0.3538	0.6539	-10.57**	0.1545	0.4140	-14.38*

Note: The sample is classified into those firms in which level of insurance company investment (Y_{INS}) is zero but other institutions own stock ($Y_{NINS} > 0$) and into those firms where both Y_{INS} and Y_{NINS} are greater than zero. Jensen's performance measure is measured as the intercept of the regression of monthly excess returns of a stock on the CRSP value weighted index for the most recent 60-month period; CAPM beta is the coefficient from this regression; standard deviation of returns is estimated over the same period; the liquidity measure is the most recent year's trading volume divided by the number of shares outstanding; and the rank refers to whether the firm has a Standard & Poor's ranking.

** Significantly different from zero at the 0.05 significance level.

* Significantly different from zero at the 0.10 significance level.

Table 8
Determinants of Insurance Company Investment
by Exchange Listing for 1986 and 1988

Predictor Variable	1986 All Firms: Ψ = 1, 1,464 Firms; Ψ = 0, 1,620 Firms	1986 NYSE and ASE Firms: Ψ = 1, 936 Firms; Ψ = 0, 411 Firms	1986 NASDAQ Firms: Ψ = 1, 684 Firms; Ψ = 0, 1,053 Firms	1988 All Firms: Ψ = 1, 2,422 Firms, Ψ = 0, 1,569 Firms	1988 NYSE and ASE Firms: Ψ = 1, 1,306 Firms; Ψ = 0, 359 Firms	1988 NASDAQ Firms: Ψ = 1, 1,116 Firms; Ψ = 0, 1,210 Firms
Intercept	-4.1020 (275.86)**	-4.1702 (70.82)**	-3.6457 (145.99)**	-3.1949 (198.38)**	-2.8488 (40.29)**	-3.0708 (120.10)**
Jensen's Performance Measure	-2.7675 (0.46)	-13.5077 (2.85)*	2.2458 (0.22)	3.1250 (0.67)	3.6588 (0.22)	2.6850 (0.37)
CAPM Beta	0.2656 (11.99)**	0.0719 (0.28)	0.3248 (11.61)**	0.6939 (86.62)**	0.8761 (29.65)**	0.6000 (51.12)**
Standard Deviation of Returns	-1.8270 (1.05)	-7.9586 (4.38)**	-1.1120 (0.28)	-14.8207 (72.12)**	-21.3006 (35.25)**	-12.6764 (40.64)**
Logarithm of Assets	0.9259 450.37)**	1.0924 (200.40)**	0.8038 (215.05)**	0.9821 (519.51)**	0.9540 (179.05)**	0.9504 (283.40)**
Liquidity Measure	0.8211 (66.95)**	1.0175 (19.65)**	0.7686 (44.92)**	1.2867 (115.21)**	2.0769 (31.32)**	1.2157 (90.93)**
Debt/Assets	-2.4365 (87.49)**	-2.6804 (36.70)**	-2.1577 (43.41)**	-1.3795 (37.07)**	-0.7808 (4.39)**	-1.7447 (37.43)**
Dividend Yield	-6.8376 (10.64)**	-7.1491 (6.35)**	-11.3342 (9.19)**	-6.6060 (20.68)**	-8.6331 (18.40)**	-6.6236 (5.72)**
Months Exchange Listed	-0.0009 (1.63)	-0.0015 (2.21)	-0.0035 (6.98)**	-0.0014 (5.03)**	-0.0025 (8.12)**	-0.0021 (4.06)**
Rank Dummy Variable	0.4749 (14.84)**	0.6077 (9.54)**	0.5903 (11.24)**	0.2824 (5.56)**	0.4090 (4.47)**	0.2450 (2.33)
Concordant	88.1%	90.4%	86.0%	91.4%	91.2%	90.0%

Note: The table presents results from the estimation of a logit regression in which the dependent variable, Ψ, takes the value one when insurance companies as well as noninsurance companies own stock in the firm (Y_{INS} and $Y_{NINS} > 0$) and zero if only noninsurance companies own stock in the firm ($Y_{INS} = 0$ and $Y_{NINS} > 0$). The predictor variables are Jensen's performance measure, measured as the intercept of the regression of monthly excess returns of a stock on the CRSP value weighted index for the most recent 60-month period; CAPM beta is the coefficient from this regression; standard deviation of returns is estimated over the same period; the liquidity measure is the most recent year's trading volume divided by the number of shares outstanding; and the rank dummy variable takes the value one if the firm has a Standard & Poor's ranking and zero otherwise. Wald Chi-square values are in parentheses.

** Significantly different from zero at the 0.05 significance level.

* Significantly different from zero at the 0.10 significance level.

The results of the logit estimation in Table 8, with one notable exception, confirm the implications of the differences in means test results presented above. The coefficients of the safety-net variables indicate that firms with higher CAPM betas, lower standard deviation, larger total assets, more liquidity, lower leverage, and Standard & Poor's ranking are more likely to be chosen for investment by insurance companies. This finding is consistent with the relation documented in the cross-sectional regression and differences in means tests above. The negative effect of the age of the firm on the exchange is, on the other hand, not only contrary to *a priori* expectations but also to earlier findings in cross-sectional and differences in means tests. A likely explanation for this contrary finding is that the listing age of a firm may not enter into the decision process. However, all the other qualities sought by insurance company portfolio managers, such as larger size and lower standard deviation of returns, etc., are more likely to be found in older firms. Thus, cross-sectionally, firms appearing in insurance company portfolios are older even though insurance company portfolio managers may have no preference or even a negative preference for older firms.[23]

In order to test the predictive power of the logit model estimates, the estimated models from the 1986 sample are fitted to the 1988 data and probabilities are calculated for each of the 1988 firms. If the predicted probability is greater than or equal to 0.50 and, in fact, insurance companies own some of the outstanding shares of the firm, then the firm is denoted as a "hit." The so-computed "hits" and "misses" for 1988 are as follows:

Sample	Number of Firms	Hits (%)	Misses (%)
NYSE/ASE Firms	1,665	82.64	17.36
NASDAQ Firms	2,326	76.40	23.60

Further, the analysis of whether the 1986 estimated logit model is better at predicting the firms that are chosen by insurance investors in 1988 or the ones that are rejected indicates the following:

Sample	Number of Stocks Chosen in 1988	Hits (%)	Misses (%)	Number of Stocks Rejected in 1988	Hits (%)	Misses (%)
NYSE/ASE	1,306	81.39	18.61	359	87.19	12.81
NASDAQ	1,116	56.99	43.01	1,210	94.30	5.70

[23] A colleague provided an interesting analogy for this finding. Mr. Smith may prefer young fine wines. However, in the market, fine wines are always older wines. Therefore, Mr. Smith ends up buying older wines even though, *ceteris paribus*, he may prefer younger wines.

It appears, therefore, that the logit model better predicts the stocks that will not be chosen than those that will. In fact, the hit rate for NASDAQ firms actually selected is low, only 57 percent. On the other hand, the model correctly predicted 94.3 of the stocks that were not selected by insurance investors. Thus, the model is conservative in the sense that it is more likely to reject a stock that is actually selected than to select a stock that is actually rejected.

Finally, tests were conducted to determine how well the cross-sectional regression models estimated earlier predict ownership levels of both insurance and noninsurance investors. In these tests, the coefficients estimated by the cross-sectional regression models in equation (1) for 1986 were used to predict the levels of ownership by insurance and noninsurance investors for 1988. These predicted values for Y_{INS} and Y_{NINS} were regressed on the actual values for the two variables. More formally, the following regressions were estimated:

$$Y_{(INS,88)} = \beta_0 + \beta_1 \text{ (predicted } Y_{(INS,86)}) + e, \text{ and}$$

$$Y_{(NINS,88)} = \beta_0 + \beta_1 \text{ (predicted } Y_{(NINS,86)}) + u,$$

where the predictor on the right-hand side is the value for Y_i, i = INS, NINS, predicted using the coefficients from the 1986 cross-sectional regression model. The hypothesis is that the estimated β_1 in both regressions is equal to one.

Results from estimating the above regression models are presented in Table 9. Panel A presents the results for the NYSE/ASE sample and Panel B for the NASDAQ sample. In the case of insurance portfolios, the hypothesis that $\beta_1 = 1$ is rejected for both exchanges. The estimated value of the coefficient is significantly less than one. On the other hand, for the noninsurance portfolios, the hypothesis cannot be rejected for the NASDAQ sample and is rejected at only the 10 percent level for the NYSE/ASE sample. The model, therefore, works better for noninsurance portfolios. It is, however, easy to see why the estimated coefficient for insurance portfolios would be less than one. Suppose there is a firm that, on the basis of the 1986 estimated coefficients, suggests that the level of ownership by insurers be 15 percent. However, because of industry regulations discussed above, insurers are restricted from owning more than a certain percentage in any one firm, and this percentage is usually less than 10 percent. Thus, even if the firm warranted a higher investment by insurers, the actual level of ownership in the firm would be bounded from above. Thus, the estimated β_1 coefficient would be less than one. This restriction does not apply to noninsurance investors and, hence, the model does a significantly better job of predicting the ownership levels by noninsurance investors.

Table 9
Intertemporal Stability of the Determinants of
Insurance Company Equity Investment

	β_0	β_1	Adjusted R^2	Statistic for H_0: $\beta_1 = 1$
Panel A: NYSE and ASE Sample of 1,306 Firms				
Y_{INS}	0.0129	0.6834		
	(3.87)**	(7.12)**	0.0434	3.30**
Y_{NINS}	0.0165	1.0517		
	(1.78)*	(36.50)**	0.4341	1.79*
Panel B: NASDAQ Sample of 1,116 Firms				
Y_{INS}	0.0129	0.6604		
	(4.33)**	(3.93)**	0.0137	2.02**
Y_{NINS}	0.0231	1.1000		
	(1.53)	(14.43)**	0.3078	1.31

Note: The estimated cross-sectional regression models for levels of insurance company investment levels from Table 6 are used to predict investment levels in 1988. The predicted levels are then compared to the actual levels of investment in 1988 by estimating the following regression:

$$Y_{(INS,88)} = \beta_0\beta_1 (\text{predicted } Y_{(INS,86)}) + \tilde{e}, \text{ and}$$
$$Y_{(NINS,88)} = \beta_0 + \beta_0 (\text{predicted } Y_{(NINS,86)}) + \tilde{u},$$

where Y is the fraction of equity owned by an institution, insurance (INS) or noninsurance (NINS), in a firm. T-statistics are in parentheses.
** Significant at the 5 percent level. * Significant at the 10 percent level.

CONCLUSION

This article examines the investment policies of insurance company equity portfolio managers. Despite the significant role that insurance companies play as stock market participants, researchers have paid scant attention to this aspect of insurance company operations. There exists some research that documents patterns in the investment behavior of institutional investors as a whole. Findings in this literature support the conjecture that institutional investors are governed by the requirements of the prudent man rule and, thus, seek to invest in stocks that offer significant safety-net potential. This hypothesis translates into the significantly positive relations between levels of institutional ownership in firms and firm characteristics such as size, liquidity, age, stock ranking, and previous stock performance; and negative relation with total risk of the stock.

Our analysis of insurance company equity portfolios, however, indicates that, while safety-net considerations are important in selecting a firm for investment, they explain only a small portion of the cross-sectional dispersion of levels of ownership by insurance companies.

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