Determinants of Claims Recovery Among Writers of Auto Physical Damage Coverage: Empirical Evidence

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Abstract: In an increasingly competitive environment, the successful auto insurer is one that manages its cost in an efficient manner. While the auto insurance claims area does not generate revenue for the firm, it is one that provides the opportunity for cost reductions through its recovery efforts. We examine claims recoveries and identify the determinants associated with higher relative recovery levels. With regression analysis, we find that the more aggressive recovery efforts are exhibited by larger firms, stock insurers, non-affiliated auto insurers, firms that devote greater resources to claims recovery efforts, and firms that have a greater average claim size.

INTRODUCTION

Numerous authors (e.g., Gilbert, 1995; Ryan, 1996; and Esters, 1997) have suggested that auto insurers operate in an environment that is characterized by an increasing degree of competition. Today, this competition comes from several different sources, including insurers that traditionally have been active in the auto insurance sector, insurers that have

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been active in other segments of the insurance industry (e.g., Lutheran Brotherhood), and financial institutions that recently have entered the auto insurance marketplace. Additionally, insurers are faced with the potential loss of business to companies that self-insure their auto insurance exposures rather than purchase insurance. All of these factors place additional pressure on auto insurers to price their products competitively.

One of the results of this increased level of competition is that controlling costs has become increasingly important. Porter (1980, p. 35) states that the firm that effectively controls costs to the point where it holds a low-cost position is able to enjoy "above average returns in its industry despite the presence of strong competitive forces." In this case, the low-cost firm can earn a profit as price competition eliminates profits for higher-cost firms. Thus, the ability to manage costs provides the necessary flexibility to successfully meet the challenges of the marketplace.

In an examination of competition and technological change in the automobile insurance industry, Hecht (1995) found that a significant long-term shift in market share towards the low-cost carriers has occurred in the auto insurance market. While the auto insurance claims area does not generate revenue for the firm, it is one that provides the opportunity for cost reductions through its recovery efforts. As such, this area is crucial to the firm's efforts to reduce its overall loss payments through appropriate recovery strategies.

As part of a study on factors influencing insurance costs and prices, Witt and Hogan (1993) found that repair and labor costs for auto physical damage claims rose more than 45 percent from 1982 to 1991. This indicates that significant claims cost inflation exists in the auto physical damage coverage area and highlights the need for auto insurers to more effectively manage costs. In view of an environment that exhibits both inflationary costs and escalating competition, an examination of the factors that are associated with successful recovery efforts is particularly timely and useful.

In their article entitled "Digging for Gold in Claims Departments," Carris and Bartlett (1995) state that "only a small percentage of insurers are getting close to striking gold in their [salvage and subrogation] prospecting efforts" (p. 74). They state that there are many companies that are not maximizing their opportunities in the salvage and subrogation area. Carris and Bartlett first suggest that companies establish benchmarks against which to measure their salvage and subrogation efforts and they then offer many helpful suggestions as to how a company might move toward these benchmarks. The suggestion is that there are many firms that are behaving irrationally by not pursuing claims recoveries more aggressively. An implicit question in their study is "Why are some companies (or agents within the companies) not inclined to take advantage of these salvage and

subrogation opportunities if they so obviously exist?" The focus of this paper is to address the issue of disparity between different insurers' salvage and subrogation efforts by analyzing the determinants that characterize higher levels of auto physical damage claims recovery.

The results of this study should be useful at several levels. First, previous studies have examined the relation between cost structure and organizational form with somewhat mixed results. Since auto physical damage coverage (private passenger and commercial auto) represents over 17 percent of net premium written, it is one of the primary coverages offered by both stock and mutual property-liability insurers. As such, this analysis provides an opportunity to further explore the relation between cost control and organizational form. Additionally, this research provides the opportunity to further examine an aspect of the insurer's operation that is likely to have some impact on firm competition, pricing, and market share in the auto physical damage insurance market…

Finally, the results should be of interest to the management of property-liability insurers writing auto physical damage coverage. Claims processing performance might, on its face, be a less pressing concern to managers when compared with regulatory and solvency requirements, underwriting concerns and technological issues. However, if the claims area is indeed the potential "gold mine" that both Carris and Bartlett (1995) and Gebhardt (1996) suggest, then an aggressive pursuit of recoveries and operational efficiencies becomes increasingly important in the insurer's efforts to control its costs and, as a result, its pricing and competitive position in the marketplace. However, a proper evaluation of a firm's claims recovery efforts can only be conducted with an understanding of why disparities in insurer recovery efforts exist.

RESEARCH DESIGN AND PROXIES

Research Design

As seen in the following model, the level of claims recovery of writers of auto physical damage coverage is hypothesized to be related to several firm characteristics.

Claims recovery = f(size, market concentration, leverage, organizational form, auto physical damage specialization, auto physical damage loss expense, group affiliation, average claim size)

The study employs ordinary least squares regression to determine the effects of these firm characteristics on an insurer's auto physical damage claims recovery.

Measures of Claims Recovery

Schedule P of the statutory annual statement of property/liability insurers reports, among other things, the amounts received from salvage and subrogation for the various lines of insurance written. More specifically, Schedule P—Part 1J—Auto Physical Damage reports the salvage and subrogation recoveries received to offset auto physical damage loss payments. The proxy for claims recovery with regard to auto physical damage coverage that we employ is the ratio of salvage and subrogation recoveries to the total number of auto physical damage claims (henceforth referred to as the recovery ratio).

Independent Variables

The following are the independent variables hypothesized to have an effect on an insurer's auto physical damage claims recovery. Table 1 provides a listing of these variables and their definitions.

Size. The measure of the size of the insurer (LASSET) is the natural log of the insurer's total assets. Previous research on scale economies provides mixed results regarding the relation between firm size and performance. For example, Cummins and Weiss (1993), in a study on the property-liability insurance industry, found that mild scale diseconomies exist for large insurers and scale economies exist for medium and small insurers. Doherty (1981) used a claims-based instead of a premium-based output measure and found significant economies of scale for Canadian property-liability insurers. Skogh (1982), in a study of Swedish property-liability insurers, used claims paid as an output measure and found that scale economies exist in that industry. Similar economies of scale have been observed in the life insurance claims area (Colquitt and Hoyt, 1997a). Conversely, Joskow (1973) and Quirin et al. (1974) did not find consistent support for the existence of scale economies. If scale economies exist, then this supports a positive relation between size and an insurer's claims recoveries. That is, the larger the firm, the lower the cost of recovery per dollar of loss and the higher the claims recovery.

A competing hypothesis potentially accounts for the relation between size and claims recovery. In the event that the data reported for salvage and subrogation are predominantly driven by subrogation, we would expect a negative relation between size and claims recovery. A larger firm is likely to have a greater market presence and would not be expected to subrogate as frequently, given that a greater percentage of its losses likely would be generated by claims where both parties involved are insureds with the same insurer. For example, given State Farm's size, it is less likely that a claim filed with State Farm would result in a subrogation recovery

Table 1. Variables and Their Definitions

Dependent Variable	Definition
CLAIMREC	Ratio of auto physical damage salvage/subrogation to number of auto physical damage claims

Independent Variables	Definition
LASSET	The natural log of total assets
CONCEN	Summation of the percent of state j's auto physical damage premium written by insurer i times the percent of insurer i's auto physical damage premium written in state j
LEV	Ratio of total liabilities to surplus
ORGFORM	Dummy variable of 1 if a stock (not wholly owned by a mutual), 0 if a mutual or a stock company wholly owned by a mutual
SPECIALIZE	Ratio of total auto physical damage net premiums written to total net premiums written
LOSSEXP	Ratio of net allocated auto physical damage loss expense payments and unallocated auto physical damage loss expense payments to auto physical damage loss payments
GROUP	Dummy variable of 1 if a member of a group, 0 if not a member of a group
AVGCLAIM	Ratio of net auto physical damage loss payments* to total number of auto physical damage claims

*Net auto physical damage loss payments = direct and assumed auto physical damage loss payments—ceded auto physical damage loss payments

because there is a greater possibility that the potentially liable party (the third party) is a State Farm insured as well.

Carris and Bartlett (1995, p. 76) also provide some anecdotal evidence that there are "informal agreements between claims examiners of different companies to not subrogate against one another." Carris later confirmed in an interview that he has observed that these "agreements" are most common between larger insurers. These agreements may make intuitive sense in that significant legal costs may be avoided by an agreement between two insurers to not subrogate against one another. The existence of such agreements also would suggest a negative relation between size and claims recovery. However, a study by Gebhardt (1996) suggests that the industry average for subrogation recoveries is approximately 2%–3% of paid losses. Using our data, the industry average for salvage and

subrogation recoveries together is calculated to be approximately 15%. These findings, taken together, suggest that auto physical damage claims recoveries are not predominantly driven by subrogation.

The competing hypotheses mentioned above suggest that a relation between size and salvage and subrogation recoveries might be indeterminate. However, given the previously stated findings that suggest that the salvage and subrogation recoveries are driven largely by salvage, not subrogation, and that previous research on economies of scale in the insurance industry suggest that scale economies do exist, we expect the net effect of the size variable to be positive.

Market concentration. In the above discussion on the relation between size and claims recovery, we suggest that if the data reported are driven by subrogation, then we would expect a negative relation between size and claims recovery. This is due to the increased likelihood that the insurer would provide coverage to both parties to the loss. Given that an insurer cannot subrogate against one of its own insureds, the potential for recovery also would be expected to decrease as an insurer's market share increases.

To account for the effect that an insurer's market concentration has on its claims recovery, the measure CONCEN is calculated as follows:

$$\textbf{CONCEN} = \sum \left(\frac{\text{Auto PD Premium for Insurer } i \text{ in State } j}{\text{Total Industry Auto PD in State } j} \right)$$
$$\times \left(\frac{\text{Auto PD Premium for Insurer } i \text{ in State } j}{\text{Total Auto PD Premium for Insurer } i} \right)$$

Since an insurer with higher premium penetration is more likely to insure both parties to the loss, firms with higher concentration levels have fewer opportunities to pursue subrogation and, as a result, should have lower recoveries. The inclusion of this variable is a further test to determine whether the firms' reported auto physical damage claims recoveries are driven largely by subrogation. A negative relation between this variable and claims recovery would suggest that it is driven largely by subrogation, and no relation between the two would provide some evidence supporting our expectation that it is not. Consistent with our expectation that salvage is the predominant component of the firm's salvage and subrogation efforts, we expect that there will be no relation between this variable and auto physical damage claims recovery.

Leverage. The degree of the insurer's leverage (LEV) is measured by the ratio of total liabilities to surplus. The expected costs of a firm's financial distress increase with an increased probability of the firm's insolvency. As a result, the firm with greater leverage would benefit from increased claims efficiency by not only offsetting loss payments but also reducing the

expected costs of financial distress.[1] Consequently, the insurer with a higher probability of insolvency (higher leverage) likely would benefit more from an increase in claims recoveries than would an insurer with a lower probability of insolvency (lower leverage). Therefore, the higher an insurer's leverage, the more likely it is to engage in a more aggressive pursuit of claims recoveries.

Organizational form. The organizational form of the insurer (ORG-FORM) is measured with a dummy variable of 1 if the insurer is a stock company (not owned by a mutual) and 0 if the insurer is a mutual company or a mutual-owned stock company.[2] Several studies have provided empirical evidence to support the notion that the management of stock firms is more closely monitored than the management of mutual firms (see Boose, 1990; Mayers and Smith, 1990; Wells, Cox, and Gaver, 1995; Colquitt and Hoyt, 1997b; Colquitt, Godwin, and Sommer, 1997; Pottier and Sommer, 1997). Boose (1990, p. 499) states that "agency theory predicts that, all else equal, expenses incurred by less-monitored agents will exceed those incurred by their more-monitored counterparts." She also produced some evidence suggesting that this increased monitoring of stock insurers leads to fewer general insurance expenses for stock insurers than for mutuals. In addition, Colquitt et al. (1997) observe that stock insurers have fewer lobbying expenses than do mutual insurers. The results of these studies collectively support the hypothesis that stock firms are likely to obtain higher claims recoveries than would mutuals because of their ability to operate on a more favorable cost basis.

Auto physical damage specialization. The insurer's auto physical damage specialization is measured by the ratio of total auto physical damage direct premiums written to total direct premiums written. As an insurer devotes more of its resources to a particular line of business, it is expected to give an increased amount of attention to that line and enjoy a comparative advantage over insurers with less focus in that line. Given that a firm writes a significant percentage of its business in auto physical damage coverage, it is likely to manage its claims in this area more aggressively than would a firm writing only a small percentage of its business in that line. As a result, we expect a positive relation between a firm's specialization in auto physical damage coverage and its claims recovery in this area.

Auto physical damage loss expense. The loss expense measure is the insurer's auto physical damage net allocated and unallocated loss expense payments divided by its net auto physical damage loss payments (direct and assumed loss payments less ceded loss payments). This variable can only serve as a proxy for expense payments toward claims recovery efforts, given that it cannot be shown that these dollars are used exclusively for that purpose. Firms that expend more per dollar of loss for loss expenses

are expected to be using a portion of this money for the pursuit of salvage and subrogation recoveries. As a result, the greater the loss expense ratio, the greater the expected claims recovery of the firm. In addition to the intuitive appeal of this hypothesis, Colquitt and Hoyt (1997a) provide evidence that supports this notion. In their investigation of the determinants of resisted or disputed life insurance claims by U.S. life insurers, Colquitt and Hoyt (1997a, p. 468) find evidence that "increased expenditures by the insurer to investigate death claims increase the likelihood of the firm detecting cases of life insurance fraud."

Group affiliation. The group affiliation of the firm (GROUP) is measured with a dummy variable of 1 if the insurer is a member of an insurer group and 0 if it is an unaffiliated insurer. If a member of an insurance group is involved in a claim with another member of the same group, it is possible that the subrogation process would be circumvented. This is because subrogation might be considered unprofitable for an insurer group if an insurer within the group were to pursue another group member for compensation. In addition, given that unaffiliated insurers do not have the benefits of access to capital on an intra-group basis, it may be that these insurers are more aggressive in their recovery efforts because of their increased difficulty in raising capital. This is consistent with the results found in a study on cash holdings by insurers (Colquitt et al., 1999) suggesting that firms that are not members of an insurer group hold more cash because of their inability to access capital on an intra-group basis.

Average claim size. The measure of average claim size used in this paper is the insurer's net auto physical damage loss payments (direct and assumed losses less ceded losses) divided by the number of auto physical damage claims.[3] Given that the ratio of time, effort, and expense to dollar of recovery is decreasing with an increase in claim size, firms with greater average claim size are more likely to pursue recovery efforts than those firms with lesser average claim size, because the potential returns per case are greater for firms with greater average claim size. As such, we expect that a positive relation exists between the firm's average claim size and its claims recovery.

DATA

The data set includes annual statement financial data from 1995 for 833 property-liability insurers. The majority of the financial data were collected from the National Association of Insurance Commissioners (NAIC) data tapes. The organizational form data were determined using information found in the 1995 *Best's Insurance Reports—Property/Casualty Edition.* The NAIC population of 3,302 insurers was reduced by deleting

Table 2. Summary Statistics for the Claims Recovery Variable

	Mean	S.D.*
Auto PD Salvage and Subrogation Number of Auto PD Claims	$108.96	$90.08

	Auto PD Salvage and Subrogation Number of Auto PD Claims				
	< $134	$135–$268	$269–$402	$403–$536	> $536
Number of firms	629	167	17	11	9
(Percent of Sample)	(75.51)	(20.05)	(2.04)	(1.32)	(1.08)

* S.D. = Standard Deviation

those insurers that either did not write any auto physical damage coverage or did not meet financial criteria that are consistent with firms operating as "going concerns."[4] The summary statistics for the claims recovery variable and the independent variables of the sample data set are provided in Table 2 and Table 3, respectively.

EMPIRICAL RESULTS

As was stated earlier, ordinary least squares regression was used to provide evidence of the relation between the independent variables and the firm's claims recovery. The results of this regression are found in Table 4. As expected, the result of the variable addressing the relation between size and claims recovery is positive and significant. This provides some evidence that economies of scale exist in the auto physical damage claims recovery area. It also is consistent with the notion that the financial statement data representing auto physical damage claims recovery is more reflective of recoveries from salvage than from subrogation.

The coefficient on the organization form variable is positive and significant, indicating that stock insurers have higher auto physical damage claims recoveries than do mutuals. This result is consistent with the findings suggesting that because of the monitoring of active shareholders, stock insurer management is likely to act more aggressively than mutual insurer management in areas of expense reduction.

The coefficient on the group variable is negative and significant, indicating that unaffiliated companies have higher levels of auto physical damage recovery. This finding supports the hypothesis that an affiliated

Table 3. Summary Statistics for the Independent Variables

	Sample Data Set ($N = 833$)	
Variable	Mean	S.D.*
LASSET	18.4150	1.7421
CONCEN	0.0158	0.0589
LEV	0.6427	0.1425
ORGFORM	0.5726	0.4950
SPECIALIZE	0.2017	0.1485
LOSSEXP	0.1472	0.0940
GROUP	0.7976	0.4021
AVGCLAIM	1306.3601	818.0407

* S.D. = Standard Deviation
LASSET = natural log of total assets; CONCEN = summation of the percent of state *j's* auto physical damage premium written by insurer *i* times the percent of insurer *i's* auto physical damage premium written in state *j*; LEV = ratio of total liabilities to surplus; ORGFORM = dummy variable of 1 if a stock (not wholly owned by a mutual), 0 if a mutual or a stock company wholly owned by a mutual; SPECIALIZE = ratio of total auto physical damage net premiums written to total net premiums written; LOSSEXP = ratio of net allocated auto physical damage loss expense payments and unallocated auto physical damage loss expense payments to auto physical damage loss payments; GROUP = dummy variable of 1 if a member of a group, 0 if not a member of a group; AVGCLAIM = ratio of total auto physical damage claims to total number of auto physical damage claims.

firm is likely to have fewer subrogation opportunities since there is the possibility that the other insurer is a member of the same insurance group. It also supports the hypothesis that unaffiliated firms are more aggressive in recoveries because they cannot rely on an insurance group as a source of capital. The coefficient of the variable representing the insurer's auto physical damage loss expense is positive and significant. This is consistent with the findings of Colquitt and Hoyt (1997a) suggesting that firms committing resources to the processing and settlement of claims are likely to experience greater claims recovery as measured in the study.

The coefficient of the variable measuring the size of the firm's average claim is significant and statistically different from zero. The positive coefficient indicates that the insurer with greater average claim size pursues recovery efforts more aggressively. Finally, the leverage variable and the measures of market and product line concentration were not statistically significant in the model.[5]

Table 4. Ordinary Least Squares Regression Model Results

Variable	Expected Sign	Coefficient (std. error)
INTERCEPT		−91.8939[*]
		(28.4833)
LASSET	+	5.3683[*]
		(1.5661)
CONCEN	?	53.6530
		(39.9591)
LEV	+	4.9464
		(17.4092)
ORGFORM	+	15.3853[*]
		(4.7611)
SPECIALIZE	+	−5.7374
		(16.7350)
LOSSEXP	+	87.0050[*]
		(25.3211)
GROUP	−	−19.1800[*]
		(6.0958)
AVGCLAIM	+	0.0709[*]
		(0.0029)
MODEL Adjusted R^2		0.4516

[*]statistically significant at less than .01.

Dependent variable: auto physical damage salvage and subrogation recovery/total number of auto physical damage claims.

LASSET = natural log of total assets; CONCEN = summation of the percent of state *j*'s auto physical damage premium written by insurer *i* times the percent of insurer *i*'s auto physical damage premium written in state *j*; LEV = ratio of total liabilities to surplus; ORGFORM = dummy variable of 1 if a stock (not wholly owned by a mutual), 0 if a mutual or a stock company wholly owned by a mutual; SPECIALIZE = ratio of total auto physical damage net premiums written to total net premiums written; LOSSEXP = ratio of net allocated auto physical damage loss expense payments and unallocated auto physical damage loss expense payments to auto physical damage loss payments; GROUP = dummy variable of 1 if a member of a group, 0 if not a member of a group; AVGCLAIM = ratio of total auto physical damage claims to total number of auto physical damage claims.

SUMMARY AND CONCLUSIONS

If Porter (1980) is correct, then long-term success in an increasingly competitive auto insurance market will, in all likelihood, belong to the insurer that operates on a low-cost basis. The most significant costs for any

Table 5. Correlation Analysis
Pearson's Correlation Coefficients Across 833 Firms

	CLAIMREC	LASSET	CONCEN	LEV	ORGFORM	SPECIALIZE	LOSSEXP	GROUP	AVGCLAIM
CLAIMREC	1.0000								
	(.0000)								
LASSET	.1463	1.0000							
	(.0001)	(.0000)							
CONCEN	.0188	.1227	1.0000						
	(.5885)	(.0004)	(.0000)						
LEV	.0735	.3229	-.03756	1.0000					
	(.0338)	(.0001)	(.2785)	(.0000)					
ORGFORM	.1859	.0234	-.0374	.0620	1.0000				
	(.0001)	(.4995)	(.2806)	(.0739)	(.0000)				
SPECIALIZE	-.1087	-.2842	.0687	-.2039	.0373	1.0000			
	(.0017)	(.0001)	(.0473)	(.0001)	(.2828)	(.0000)			
LOSSEXP	.0065	-.0838	-.0428	.0135	.0600	-.1071	1.0000		
	(.8523)	(.0156)	(.2177)	(.6971)	(.0889)	(.0020)	(.0000)		
GROUP	-.0316	.3525	.0424	.0435	-.0101	-.1107	-.0873	1.0000	
	(.3620)	(.0001)	(.2219)	(.2094)	(.7586)	(.0014)	(.0117)	(.0000)	
AVGCLAIM	.6526	.1073	-.0281	.0483	.1464	-.1143	-.1356	.0381	1.0000
	(.0001)	(.0029)	(.4211)	(.1961)	(.0001)	(.0010)	(.0001)	(.2723)	(.0000)

CLAIMREC = auto physical damage salvage and subrogation/total number of auto physical damage claims; LASSET = natural log of total assets; CONCEN = sum of the percent of state j's auto physical damage premium written by insurer i times the percent of insurer i's auto physical damage premium written in state j; LEV = ratio of total liabilities to surplus; ORGFORM = dummy variable of 1 if a stock (not wholly owned by a mutual), 0 if a mutual or a stock company wholly owned by a mutual; SPECIALIZE = ratio of total auto physical damage net premiums written to total net premiums written; LOSSEXP = ratio of net allocated auto physical damage loss expense payments and unallocated auto physical damage loss expense payments to auto physical damage loss payments; GROUP = dummy variable of 1 if a member of a group, 0 if not a member of a group; AVGCLAIM = ratio of total auto physical damage claims to total number of auto physical damage claims.

insurer are losses paid and reserves created for future losses. As such, claims recovery has a direct and favorable impact on these costs. The results of this paper demonstrate that auto insurers exhibit varying levels of recovery in their auto physical damage coverage. We identify size, organizational form, group membership, resources devoted to auto physical damage claims recovery, and average claim size as significant determinants of claims recovery with regard to auto physical damage coverage.

The regression results provide some evidence that economies of scale exist in the auto physical damage claims area. They also may suggest that the financial statement data may be more reflective of recoveries from salvage than from subrogation. The hypothesis that significant subrogation opportunities currently are being bypassed because of informal agreements is not supported by the results.

Additionally, the results support the hypothesis that an increased commitment of resources to the processing and settlement of claims results in greater recoveries. Successful use of these resources suggests that profitable opportunities may exist for insurers to reduce net losses by increasing the resources devoted to claims recovery efforts.

Support was found for the hypothesis that firms with greater average claim size tend to exhibit greater recoveries. This result indicates that recovery efforts may be particularly rewarding for the firm with greater average claim costs. This, then, is an additional factor for insurance managers to consider as they develop strategies to meet the demands of an increasingly competitive auto insurance marketplace.

NOTES

[1] In addition to the increased cost of bankruptcy that accompanies higher leverage, Myers (1977) and Mayers and Smith (1987) suggest that increased leverage also leads to an increase in the underinvestment problem of the firm. Also, Garvin and Pottier (1995) examine the asset substitution problem within the insurer context and provide further support for a positive relation between leverage and claims recovery of the firm.

[2] Mayers and Smith (1981), in a study of life insurance executives' compensation, find support for the hypothesis that subsidiary stock companies demonstrate the characteristics of their parent with regard to organizational form. This hypothesis also is supported by the findings of Wells, Cox, and Gaver (1995) and Colquitt and Hoyt (1997b). Other studies employing the organizational form variable used in this study include Cummins, Harrington, and Klein (1995), Pottier (1997), Colquitt, Godwin, and Sommer (1997), Colquitt and Cox (1999), Dumm and Hoyt (1999), and Carson and Dumm (1999).

[3] While in practice the terms "claims" and "losses" are often used interchangeably, the measure used in determining average claim size in this paper is the insurer's net auto physical damage loss payments.

[4] The information reported in Schedule P, Part 1J is on an earned premium basis. The calculations made for geographic concentration were taken from the Exhibit of Premiums and Losses and are on a direct premium basis. Firms with total surplus or net premium written ≤ 0 were

eliminated. Also, statistical outliers such as firms with operating ratios ≤ –1 or with average claims or claim recoveries below the 1st and 99th percentiles were eliminated.

[5] An additional regression was run that included a variable interacting size and market concentration. The interaction variable was not statistically significant, and the coefficients of the other variables remained qualitatively unchanged.

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