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Determinants of Total Compensation for Auto Bodily Injury Liability Under No-Fault: Investigation, Negotiation and the Suspicion of Fraud

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Aller au sommaire du numéro

Découvrir la revue

Citer cet article

Résumé de l'article

Les paiements des réclamations liées aux blessures corporelles découlant des accidents d'automobile se font principalement sur la base d'un règlement négocié, car moins de 2 % d'entre elles aboutissent devant les tribunaux. Tous les règlements prennent en compte à la fois le paiement pour la perte économique, nommé dommages spéciaux, et celui pour les douleurs et souffrances, appelé dommages généraux. Il a été analysé par divers chercheurs que le montant total de l'indemnisation dépend de facteurs variés, telles la nature et l'ampleur des pertes économiques, des pertes de nature médicale ou de salaire, ainsi que de la nature et de la sévérité d'une blessure. Ceux-ci ont conclu que les pertes de nature médicale ont été primordiales et décisives en vue de déterminer pleinement le montant de l'indemnsion, mais ils ont aussi trouvé que des facteurs variables de sévérité ont aussi un rôle distinct et significatif dans l'établissement de la valeur totale du règlement. De nouvelles recherches ont également abouti aux mêmes résultats dans la détermination de la valeur totale du règlement, notamment sur le plan des éléments d'information recueillis lors de l'enquête et de l'attitude des experts en sinistre vis-à-vis de la qualité de la réclamation, particulièrement lorsqu'on soupçonne une fraude. Il a été démontré récemment que les valeurs du règlement pour des réclamations liées à des blessures ayant un caractère subjectif sont systématiquement plus basses en ce qui concerne les dommages spéciaux, ce qui démontre que les assureurs utilisent leur pouvoir de négociation pour diminuer le montant des règlements sur les réclamations discutables, soit celles qui répondent rationnellement à la présence d'une réclamation frauduleuse ou fabriquée. Le présent article prolonge cette recherche par l'examen de variables supplémentaires concernant spécifiquement les processus d'enquête et de négociation et quantifiant l'effet de ces variables sur l'indemnisation entière et finale. De façon particulière, nous trouvons que les réclamations déformées ou incorrectes forcent à régler sur la base de dommages généraux plus faibles par rapport aux dommages dits spéciaux, même si on ne soupçonne pas une réclamation frauduleuse ou fabriquée, alors que nous trouvons que de telles réclamations peuvent être réduites de 24 % au total, si on soupçonne fortement une réclamation frauduleuse ou fabriquée. Pour la première fois, il est démontré que l'effet de négociation dans les demandes d'un avocat fait partie du modèle quantitatif en plus des frais contingents habituels. Finalement, il est prouvé, par une analyse quantitative, que les assureurs mettent à part les pertes de collision ayant un faible impact et réduisent le montant de l'indemnisation via une négociation.

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by Richard A. Derrig and Herbert I. Weisberg

ABSTRACT

Auto Bodily Injury Liability claim payments are predominantly negotiated settlements, with less than two percent the result of complete litigation and jury trials. All settlements consist of a combination of claimed economic loss, called special damages, and a payment for "pain and suffering", called general damages. The dependence of the total compensation on a variety of factors relating to the type and magnitudes of the economic losses, medical and wage loss, and to the type and severity of injury has been explored by prior researchers who found medical losses to be the primary determinant of total compensation but they also found that other severity variables play a distinct and significant role in the final settlement values. Further research introduced the notion that both the information gathered in the course of investigation and the adjuster's attitude toward the quality of the claim, especially the suspicion of fraud, also played a significant role in the final settlement value. Recently, it has been shown that settlement values for subjective injury claims are systematically lower relative to special damages and indicate that insurers use their negotiating power to obtain lower settlements on questionable claims as a rational response to the presence of fraud and build up claims. The current paper extends that research by examining additional variables specifically related to the investigation and negotiation processes and quantifying the effect of those variables on the final total compensation. In particular, we find that strain and sprain claims command lower general damages relative to specials, even in the absence of suspicion of fraud and build up, but that the intensity of suspicion of fraud and build up can reduce overall payments as much

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as 24 percent. For the first time, the negotiating effect of attorney demands enters the quantitative model in addition to the usual contingency fee. Finally, evidence that insurers are isolating low impact collisions and reducing the compensation through negotiation is explored and quantified.

RÉSUMÉ

Les paiements des réclamations liées aux blessures corporelles découlant des accidents d'automobile se font principalement sur la base d'un règlement négocié, car moins de 2 % d'entre elles aboutissent devant les tribunaux. Tous les règlements prennent en compte à la fois le paiement pour la perte économique, nommé dommages spéciaux, et celui pour les douleurs et souffrances, appelé dommages généraux. Il a été analysé par divers chercheurs que le montant total de l'indemnisation dépend de facteurs variés, telles la nature et l'ampleur des pertes économiques, des pertes de nature médicale ou de salaire, ainsi que de la nature et de la sévérité d'une blessure. Ceux-ci ont conclu que les pertes de nature médicale ont été primordiales et décisives en vue de déterminer pleinement le montant de l'indemnisation, mais ils ont aussi trouvé que des facteurs variables de sévérité ont aussi un rôle distinct et significatif dans l'établissement de la valeur totale du règlement. De nouvelles recherches ont également abouti aux mêmes résultats dans la détermination de la valeur totale du règlement, notamment sur le plan des éléments d'information recueillis lors de l'enquête et de l'attitude des experts en sinistre vis-à-vis de la qualité de la réclamation, particulièrement lorsqu'on soupçonne une fraude. Il a été démontré récemment que les valeurs du règlement pour des réclamations liées à des blessures ayant un caractère subjectif sont systématiquement plus basses en ce qui concerne les dommages spéciaux, ce qui démontre que les assureurs utilisent leur pouvoir de négociation pour diminuer le montant des règlements sur les réclamations discutables, soit celles qui répondent rationnellement à la présence d'une réclamation frauduleuse ou fabriquée. Le présent article prolonge cette recherche par l'examen de variables supplémentaires concernant spécifiquement les processus d'enquête et de négociation et quantifiant l'effet de ces variables sur l'indemnisation entière et finale. De façon particulière, nous trouvons que les réclamations déformées ou incorrectes forcent à régler sur la base de dommages généraux plus faibles par rapport aux dommages dits spéciaux, même si on ne soupçonne pas une réclamation frauduleuse ou fabriquée, alors que nous trouvons que de telles réclamations peuvent être réduites de 24 % au total, si on soupçonne fortement une réclamation frauduleuse ou fabriquée. Pour la première fois, il est démontré que l'effet de négociation dans les demandes d'un avocat fait partie du modèle quantitatif en plus des frais contingents habituels. Finalement, il est prouvé, par une analyse quantitative, que les assureurs mettent à part les pertes de collision ayant un faible impact et réduisent le montant de l'indemnisation via une négociation.

Mots clés : Assurance automobile, dommages généraux, réclamations frauduleuses et fabriquées, règlements négociés.

■ INTRODUCTION

Auto Bodily Injury Liability claim payments are predominantly negotiated settlements, with less than two percent the result of com-

plete litigation and jury trials (Ross, 1980). All settlements consist of a combination of claimed economic loss, called special damages, and a payment for "pain and suffering", called general damages (IRC, 1999). The dependence of the total compensation on a variety of factors relating to the type and magnitudes of the economic losses, medical and wage loss, and to the type and severity of injury has been explored by prior researchers. Hammitt (1985) and Carroll, et al. (1991) found medical losses to be the primary determinant of total compensation, but contrary to the time-honored but unfounded rule of thumb "three times specials" they found that other severity variables play a distinct and significant role in the final settlement values. Derrig, et al (1994) extended the Carroll result to include an average reduction of 22 percent for claims suspected of buildup, i.e., exaggerated injury and/or treatment. Derrig's result introduced the notion that both the information gathered in the course of investigation and the adjuster's attitude toward the quality of the claim played a significant role in the final settlement value. Crocker and Tennyson (2002) and Loughran (2002) have shown that settlement values for subjective injury claims are systematically lower relative to special damages and indicate that insurers use their negotiating power to obtain lower settlements on questionable claims as a rational response to the presence of fraud and build up claims.

The value of "excess" or questionable claims, usually exaggerated soft tissue strain and sprain claims, correlates significantly to the availability of general damages through the tort system. Abrahamse and Carroll [1999] studied the wide variation in these "excess" claims by state, with California showing the highest excess at 2.5 soft injury claims for each hard injury claim. The key to mitigating the effect of such questionable claims is through identification, investigation and negotiation (Derrig [2002], Tennyson and Salsa-Forn [2002], and Dionne et al. [2003]).

The current paper extends that research by examining additional variables specifically related to the investigation and negotiation processes and quantifying the effect of those variables on the final total compensation. In particular, we find that strain and sprain claims command lower general damages relative to specials, even in the absence of suspicion of fraud and build up, but that the intensity of suspicion of fraud and build up can reduce overall payments as much as 24 percent. For the first time, the negotiating effect of attorney demands enters the quantitative model in addition to the usual contingency fee. Finally, evidence that insurers are isolating low impact collisions and reducing the compensation through negotiation is explored and quantified.

An independent medical examination (IME), is the primary tool used by auto insurers in Massachusetts to probe the veracity of the injury and treatment claimed. Physicians, chosen and paid for by the insurer, conduct an in-depth review of the circumstances surrounding the claimed injury, the then current status of the medical treatment and the prognosis for total recovery under a recommended treatment regime. In our data, we categorize the IME outcomes (from the point of view of the insurer or adjuster) as negative (no change recommended) or positive (no show, refused, treatment curtailed or damages mitigated). In the subsequent modeling effort, we test the significance of conducting an IME on the value of the total compensation by introducing the outcome variables when an IME is conducted at the no-fault (PIP) level, the bodily injury liability level (BI) or both.

The paper proceeds by describing the general approach to auto injury claim settlement modeling and the available claim data characteristics in the next section. Expanded claim evaluation models are then described. The extension of an evaluation model to include variables related to the information used in the settlement negotiation process is discussed in detail in the following section of the article. The last section concludes.

■ BASIC CLAIM SETTLEMENT MODEL

The Automobile Insurers Bureau of Massachusetts (AIB) has been studying personal injury protection (PIP) and bodily injury liability (BI) claims for nearly fifteen years. The initial research involved BI claims related to accidents in 1985 and 1986 (Weisberg and Derrig, [1991]). After the tort-law change effective in 1989, the AIB studied PIP and BI claims from 1989 accidents to understand the impact of the new system (Weisberg and Derrig, [1992]). The next round of data collection and analysis was for 1993 PIP and BI claims. The studies based on the 1993 data focused on the rapid influx of soft-tissue claims, and on investigative activities to help cope with this phenomenon. As part of these studies, several suspicion scores based on various fraud indicators were developed and tested (Weisberg and Derrig [1995], [1998A]).

In our prior studies of 1989 and 1993 auto injury claims[1], we developed a multivariate mathematical model to describe the relationship between the settlement amount and various factors in a no-fault system with a dollar tort threshold[2]. The factors included

in our models represent the main aspects of claims that are usually considered by adjusters in *evaluating* the claim. These characteristics pertain primarily to the nature of the injury and treatment. In the 1993 study, we discovered that the weights corresponding to various critical factors had remained very similar between 1989 and 1993. That is, the predicted general damages for a claim with certain characteristics would be about the same in these two cohorts.

For the current sample of claims from 1996[3], we replicated the analysis to determine if anything had changed. As in previous analyses, the dependent variable in our model was the (log) total compensation, no-fault personal injury protection (PIP) plus bodily injury liability (BI) paid to the claimant. Also, we have taken account of the fact that the amount paid may have been capped by either the individual claim or accident policy limits. To adjust for this "censoring" we have utilized the technique called Tobit regression analysis[4].

Results of the Tobit analysis are displayed in Table 1. In general, the model remains quite similar to those for previous claim cohorts[5]. All the variables but one remain significant at the .05 level, and the values of coefficients (weights) are fairly close to the corresponding 1993 coefficients. The one exception is the variable that represents whether or not there was a "serious visible injury" at the accident scene. The coefficient has been reduced from .57 in 1993 to .25 in 1996, and is no longer significant.

One explanation for the lack of significance of serious visible injury in the 1996 data is that there are fewer such injuries.[6] The data on sprain/strain injuries, as in Figure 1, support this hypothesis as the proportion of strain and sprain claims rose from 51 percent in 1989 to 66 percent in 1996.

One other difference in the models results from the different methods for assessing "suspicion" in the two studies. For the 1993 claims, we simply noted whether or not buildup of medical injury and/or treatment appeared to take place, while in 1996 we employed a 10-point suspicion scale. A typical claim with build-up would have a score of approximately 4 to 6 on the 10-point scale. This claim would have a very similar reduction in terms of average amount paid under either the 1993 or 1996 model. In other words, although measured in different ways, both models are consistent with a similar reduction (about 10%) attributable to the adjuster's perception of buildup.

TABLE I
COMPARISON OF COMPENSATION MODELS
1996 DATA (93 MODEL) EXCLUDING "UNKNOWN DISABILITY CLAIMS" VS. 1993 DATA (93 MODEL)

Variable	With Suspicion 1996 data [1]			With BUILDUP 1993 data		
	Coefficient	Chi-Square	p-Value	Coefficient	Chi-Square	p-Value
Intercept	4.198	148.1	<.0001	4.130		
Log (Total Med + 1)	0.540	183.0	<.0001	0.570	151.3	<.0001
Log (Wages + 1)	0.054	61.4	<.0001	0.045	42.6	<.0001
Log (Fault proportion)	0.546	6.3	0.0120	0.630	41.5	<.0001
Attorney Involved	0.238	4.1	0.0438	0.280	5.9	0.0150
Fracture Involved	0.482	16.5	<.0001	0.420	19.8	<.0001
Log (Disability wks + 1)	0.173	22.9	<.0001	0.120	15.3	<.0001
Serious Visible Injury	0.254	2.0	0.1549	0.570	18.7	<.0001
Suspicion / Buildup [2]	-0.030	9.3	0.0023	-0.100	2.7	0.1000

Variable	Without Suspicion 1996 data [1]			With BUILDUP 1993 data		
	Coefficient	Chi-Square	p-Value	Coefficient	Chi-Square	p-Value
Intercept	3.981	135.3	<.0001	4.130		
Log (Total Med + 1)	0.548	184.7	<.0001	0.570	151.3	<.0001
Log (Wages + 1)	0.055	64.4	<.0001	0.045	42.6	<.0001
Log (Fault proportion)	0.521	5.6	0.0176	0.630	41.5	<.0001
Attorney Involved	0.224	3.5	0.0609	0.280	5.9	0.0150
Fracture Involved	0.594	26.8	<.0001	0.420	19.8	<.0001
Log (Disability wks + 1)	0.174	22.7	<.0001	0.120	15.3	<.0001
Serious Visible Injury	0.343	3.7	0.0549	0.570	18.7	<.0001
Suspicion / Buildup [2]				-0.100	2.7	0.1000

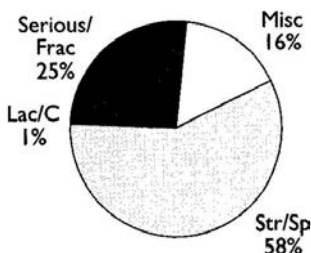1. 1996 data set - excludes 64 "Unknown Disability" claims.
2. The 1993 Model includes the BUILDUP assessed dummy variable;
   The 1996 Model includes suspicion values from a zero to 10 point scale.

FIGURE 1
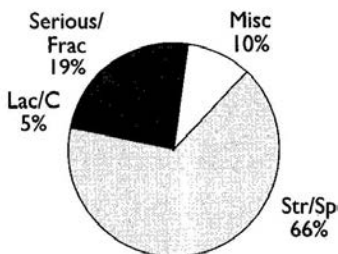## TOTAL CLAIMED MEDICAL CHARGES BY INJURY CATEGORY

BI 1989

- Serious/Frac 35%
- Misc 10%
- Lac/C 4%
- Str/Sp 51%

BI 1993

- Serious/Frac 25%
- Misc 16%
- Lac/C 1%
- Str/Sp 58%

BI 1996
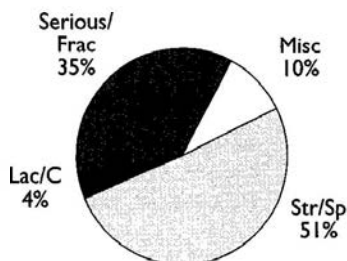
- Serious/Frac 19%
- Misc 10%
- Lac/C 5%
- Str/Sp 66%

When we originally derived the suspicion score, we thought of suspicion as the degree or extent of fraud. More recently, we have begun to conceptualize suspicion more generally as reflecting weakness in the evidence supporting the claim, inclusive of fraud and build-up. Thus, suspicion can be deemed to represent the potential for reduction of payment based on investigation and negotiation. While the other factors in our model pertain to a pure *evaluation* of the claim, based on the presented evidence, the suspicion is a measure of the adjuster's skepticism regarding the evidence.

We mentioned above that "serious visible injury" is no longer significant in the presence of a suspicion score. We have therefore excluded the suspicion variable from the "base model" for 1996 (lower panel of Table 1), with the result that "serious visible injury" is significant but with a reduced effect. This base model will be modified later to consider the effects of other factors related to further evaluation, investigation and negotiation.

Finally, we note that as in the analyses for 1989 and 1993, we have removed claims with unknown disability (no information in the claim file). However, in 1996 there was a higher proportion of these than in previous years. The implications of this finding will be discussed below.

■ EXPANDED EVALUATION MODELS

We mentioned above that the basic settlement model focuses primarily on the *evaluation* of the claim information. The basic model includes those variables pertaining mainly to the injury and treatment that play a large role in all claims. However, our recent research has revealed that certain additional factors also appear to play a significant role in the adjuster evaluation.

☐ Same versus Different Company

One especially interesting factor is whether the BI and PIP carriers are the same or different. Some model versions suggested that after adjusting for all the basic model variables, the effect of this variable was statistically significant. Our working hypothesis was that having both PIP and BI handled by the same company reduced the impact of information asymmetries between claimant and insurer. In particular, PIP IMEs would prove to be more valuable for BI payments from the same insurer. Such a finding would have a significant operational impact on claims handling operations in no-fault regimes. It also turned out that claims in which the BI carrier was the same as the PIP insurer, the average settlement (BI +PIP) was about 12% lower[7].

Further analysis showed that the explanation was rather complex, and had little to do with information flow. There are actually four distinct scenarios in which the BI and PIP insurers will coincide[8]:

- claimant is a passenger in at-fault vehicle;
- claimant is a pedestrian struck by at-fault vehicle;
- claimant files against driver uninsured coverage;
- "cross-claim" in which both cars happen to have same carrier.

Before estimating these effects in a multivariate model, it is interesting to compare these situations in terms of some key descriptive characteristics. Table 2 shows how the groups compare with each other and with the more typical claims that involve vehicles insured by different companies.

TABLE 2
BREAKDOWN OF SAME/DIFFERENT COMPANY CLAIMS

| | Count | Mean | | | | % Injuries |
		Total Pay	BI Paid (less subro)	PIP Paid	Total Med	Serious/ Frac
All Claims	429	$13,346	$ 9,790	$3,717	$4,770	5.8%
Same Company Claims	118	$13,246	$ 9,263	$4,101	$4,969	9.3%
Same Co./Same Policy-Clmt is Pass	41	$11,029	$ 7,434	$3,894	$5,269	14.6%
Same Co./Same Policy-Clmt is Pedestrian	22	$17,862	$13,847	$4,015	$5,224	13.6%
Same Co./Same Policy-Uninsured Claim	16	$ 9,416	$ 6,448	$3,023	$3,931	0.0%
Same Co./Different Policy	39	$14,542	$ 9,754	$4,810	$4,936	5.1%
Different Company Claims	311	$13,383	$ 9,990	$3,571	$4,695	4.5%

Overall, the same-company claims (unadjusted for claim characteristics) are very similar to the different-company claims in terms of total settlement, BI paid, PIP paid, total medicals, and the percentage of serious injuries. However, the sub-types of the same-company claims vary dramatically. Note that passenger and pedestrian claims seem to involve somewhat more serious injuries, with higher medical expenses. Uninsured motorist claims appear less serious and costly. Particularly interesting is the fact that, although passenger and pedestrian claims are similar in terms of injury severity, the passenger claims have much lower average BI settlements ($7,434 versus $13,847).

We tested several other evaluation factors to learn which claim characteristics affected the settlement. In addition to the "same-company" variable and its sub-components, other significant variables were:

- presence of low-impact collision;
- presence of strain/sprain injury;
- presence of 3 or more claimants in vehicle;
- claimant received a non-emergency CT-scan or MRI.

Table 3 shows the coefficients and p-values for these factors. These values were obtained by adding these variables to those in our basic model (Table 1) and re-running the model, once for each variable. In effect, the coefficients represent the marginal impact, after adjustment for the basic variables.

TABLE 3
MARGINAL EFFECTS – EVALUATION VARIABLES USING NEW 1996 BASE MODEL WITHOUT SUSPICION (429 CLAIMS IN DATA SET)

Description	Frequency		Coefficient	p-value
	No	Yes		
Low Collision Impact	252	177	-0.141	0.00
Sprain/Strain Injury Only	169	260	-0.197	<.0001
3 or more claimants in vehicle	323	106	-0.189	<.0001
3 or more Medical Providers	203	226	0.129	0.00
Claimant received non-emergency CT Scan/MRI	381	48	0.301	<.0001
PIP & BI Same Company	311	118	-0.116	0.01
Same Co./Same Policy – CLMT is Passenger	388	41	-0.282	<.0001
Same Co./Same Policy – CLMT is Pedestrian	407	22	0.085	0.37
Same Co./Same Policy – Uninsured Claim	413	16	-0.116	0.30
Same Co./Different Policy - Cross Claim	390	39	0.016	0.82

Each of these is highly significant. For the same-company variables, only the passenger variable is significant. The coefficient for passenger versus non-passenger claims translates into a reduction of 25 percent.[9] The insignificant differences in cross claims casts doubt on our asymmetric information reduction hypothesis above. Rather, there may be a "familiarity effect", i.e. when passengers pursue claims against the insured vehicle, they are most likely familiar with the driver, may even be a family member, and may not be as prone to building up claim medicals or apparently pursuing higher settlements.

As a final step we have included all of the significant variables in a final evaluation model. This model includes simultaneously all the marginally significant factors related to the adjuster's evaluation. All of the additional variables included with the basic variables remain

very significant in this more inclusive model. The serious visible injury variable, however, is negatively correlated with the strain and sprain injury variable. Thus only one of the variables belongs in a final evaluation. For practical purposes and consistency with the basic model, we choose to include the serious injury variable and exclude the strain/sprain variable. Likewise, for practical purposes we chose to show the (slightly) non-significant attorney variable from the base model to absorb the contingency fee effect. The results are displayed in Table 4. The negotiation model to follow in the next section will not use the attorney variable since all claimants in that dataset are represented.

TABLE 4
COMPARISON OF EVALUATION AND BASIC MODELS

Variable	Final Evaluation Model 1996 data [1] (429 Claims in Data Set)			Base Model 1996 data [1] (429 Claims in Data Set)		
	Coefficient	Chi-Square	p-Value	Coefficient	Chi-Square	p-Value
Intercept	4.521	186.4	<.0001	3.981	135.3	<.0001
Log (Total Med + 1)	0.508	168.7	<.0001	0.548	184.7	<.0001
Log (Wages + 1)	0.054	66.6	<.0001	0.055	64.4	<.0001
Log (Fault proportion)	0.554	7.1	0.0078	0.521	5.6	0.0176
Attorney Involved	0.167	2.2	0.1415	0.224	3.5	0.0609
Fracture Involved	0.598	28.7	<.0001	0.594	26.8	<.0001
Log (Disability wks + 1)	0.153	19.6	<.0001	0.174	22.7	<.0001
Serious Visible Injury[2]	0.311	3.4	0.0648	0.343	3.7	0.0549
Three or more claimants in vehicle	-0.132	8.0	0.0048			
Claimant received non emergency CT Scan or MRI	0.270	16.1	<.0001			
Low Collision Impact	-0.153	13.8	0.0002			
Same Co/Same Policy – Claimant is passenger	-0.246	12.4	0.0004			

1. 1996 data set - excludes 64 "Unknown Disability" claims.
2. Sprain/Strain variable not used, negatively correlated with Serious Visible Injury.

■ NEGOTIATION MODEL

If the settlement of bodily injury liability claims were a mechanical process based upon observable features, then our evaluation model might be fully descriptive of the settlement and its factors. On the contrary, the settlement process for third party liability claims, complete with disputed interpretations of fact and perceptions of the value of non-economic "pain and suffering' damages, has long been known to involve one or more steps of negotiation. According to Ross (1980, p. 87):

> "The separation of investigation and evaluation from negotiation is analytical and is to a considerable degree artificial. The same activities are often relevant to all of these aspects of settlement."

The evaluation of a claim is based upon what we have described as routine claim handling. This consists of gathering the facts pertaining to the insured, claimant, accident, injury, treatment and lost wages[10]. The sources of information are the first notice of claim, statements from the insured and claimant (if possible), police report, medical bills and treatment notes (if any), an evaluation of liability coverage (who was at fault and in what percentage), and an estimation of the claim value (reserve) based upon these facts. Analytically, an average evaluation based on facts gathered in the routine adjusting stage would have components much like our evaluation model with upward adjustments for serious injuries[11], diagnostic tests, and disability in terms of duration. Attorney representation is clear at the evaluation stage and generally adds about fifty-percent (one-third the overall settlement) for the attorney's fee (Ross 1980, p. 116-117; Derrig, Weisberg and Chen, 1994, p. 266).

Once the insurer has the necessary information to evaluate the claim, negotiation for the final settlement must take place. According to Ross (1980, p.136):

> "The investigation and evaluation of bodily injury liability claims proceeds with the expectation that these claims will terminate not in court but in a negotiated settlement. In fact, better than 19 in 20 claims are disposed of informally through negotiation. The spirit of negotiation thus pervades the entire claims-handling process, and its tactics are empirically intertwined with the tasks of investigation and evaluation."

Negotiation typically involves the exchange of offers to settle at a specified amount. While such an exchange can take place within the set of "facts" obtained in the evaluation stage, the insurer will often decide to obtain more detailed information, at a cost, through

investigative techniques such as IMEs, special investigation, examination under oath, and accident reconstruction[12]. The end result of an "unsuccessful" negotiation process is the outcome of a jury trial. This occurs in less than one percent of the claims and, most often, concerns major and serious injuries to claimants when policyholders have high limits of coverage.

Recently, academic research has highlighted the ability of the insurer to affect differential outcomes depending on the risk of fraud and build-up in pure tort states. Specifically, Crocker and Tennyson (2002), using 12,866 auto injury liability claims closed countrywide in 1987, show that insurers negotiate lower payments for total damages for the riskier strain and sprain claims than for other, more objective and verifiable injuries[13]. In their phraseology, the total damage payment schedules are flatter (lower) relative to claimed economic damages for strain claims than for non-strain claims. This flatter payment schedule is realized through negotiation with the claimants and/or their attorneys. Likewise, Loughran (2002) finds a similar differential in a more recent national dataset of 20,403 claims closed in 1997. He also finds that sprain claims have lower general damages in relation to special damages than most other injury claims (Loughran 2002, Table 5, p. 29). His modeling structures the negotiating process as one in which all claimed special damages are paid and the amount of general damages is negotiated, proportionately lower for non-objective strain and sprain claims. Quantitatively, both academic studies show lower settlements for non-verifiable strain and sprain claims than for other injuries with the same medical special amounts. The means of reaching these lower total claim payments is negotiation. The key factors that affect the negotiation outcome are discussed next.

☐ **Factors Related to Negotiation**

The differential results observed nationally by Crocker and Tennyson (2002) and Loughran (2002) cannot be imposed unilaterally by the insurer in the tort context. First party payments, such as our PIP payment, are subject to the contractual limitations of the insurance policy. Insurers deal directly with their insured and can subject claims for medical, lost wage and other out-of-pocket cost claims to a reasonability check, paying only those expenses commensurate with the injury and treatment. In third party situations, insurers have much less control over claim payments and must negotiate a settlement that in total covers both (reasonable) economic and non-economic damages. At a basic level, this negotiation process involves two functions: (1) an exchange of settlement offers until

agreement or a trial outcome and (2) the insurer's decision to investigate the claim (spend money) to illuminate further the true facts of the claim. Both functions may be repeated several times in the course of a complicated claim.

We model the principal features of this negotiation process by introducing variables indicative of the two functions: settlement offers and investigation. The settlement negotiation will be potentially characterized by first and second demands proffered by attorneys, the filing of a suit and subsequent trial, and the sending of a 93A letter[14] by the claimant's attorney. Claim investigation will be potentially characterized by independent medical examinations (IMEs), referrals to a special investigation unit (SIU), and examinations under oath. The suspicion score will indicate some overall assessment by the insurer of the veracity of all claimed facts.

While our modeling effort involves the objective negotiation steps described above, those steps do not take place in a vacuum. Each side, claimant/attorney and insurance adjuster, negotiates within parameters that are defined by statutes, past practices, and economic considerations. Table 5 lists some advantages that accrue to experienced claim adjusters. Most advantages flow from the fact that the insurer (eventually) will pay some settlement amount and that good faith investigation may delay that settlement.[15]

TABLE 5
BI NEGOTIATION LEVERAGE POINTS
ADJUSTER ADVANTAGES

Adjuster has ability to go to trial

Company has the settlement funds

Attorney, provider, or claimant needs money

Adjuster knows history of prior settlements

Adjuster can delay settlement by investigation

Settlement authorization process in company

Initial Determination of Liability

The claimant or attorney, on the other hand, has several advantages that flow from the insurer's obligation to engage in fair settlement practices. Table 6 lists some of those advantages, topped by the ability to continue medical treatment which may not be medically necessary.

> ## TABLE 6
> ## BI NEGOTIATION LEVERAGE POINTS
> ## ATTORNEY/CLAIMANT ADVANTAGES
>
> Attorney/Claimant can build-up specials
>
> Asymmetric information (Accident, Injury, Treatment)
>
> Attorney/Claimant can fail to cooperate
>
> Attorney has experience with company
>
> Investigation costs the company money
>
> Attorney can allege unfair claim practices (93A)
>
> Adjuster under pressure to close files

Of course, both sides have the ability to pursue the jury trial option. Neither side, however, has the inclination to go to trial in most instances because of increased costs and the uncertainty of jury outcomes.

☐ Attorney Demands

Conventional wisdom holds that representation by attorney increases the settlement amount. Previous research by ourselves and others appears to support this hypothesis as discussed above. What is less clear is exactly how the presence and actions of an attorney influence the negotiation and settlement of BI claims. Our purpose here is to explore this issue.

The negotiation process, when there is an attorney, generally proceeds in several steps. Usually the first step is a demand presented by the attorney, often justified by a somewhat selective summary of the accident, injury and treatment facts. After some investigation and possible interaction with the attorney, the adjuster typically proposes a counter-offer. At this point, the attorney will generally have three options:

- accept the adjuster's offer;
- file a lawsuit;
- present a second demand.

In most cases, a negotiated settlement will ultimately be achieved, although further stages of negotiation may be needed. In rare instances, the settlement will not occur until the eve of trial, and

in even rarer, a trial will actually occur. Of course, in reality there are many variations on this simplified template, which is intended to cover the basic elements of the process.

To gain some quantitative insight, we have summarized in Figure 2 the relationship between the attorney demand and the final BI settlement. For an average claim, the first demand is over twice the settlement. The second demand (when there is one) is only slightly higher than the actual settlement amount. Note that the second demand is conditional on the adjuster's response, including a possible offer and whatever investigation and other interactions have taken place.

FIGURE 2
BI 1996 NEGOTIATIONS
1ST AND 2ND DEMANDS VERSUS SETTLEMENTS
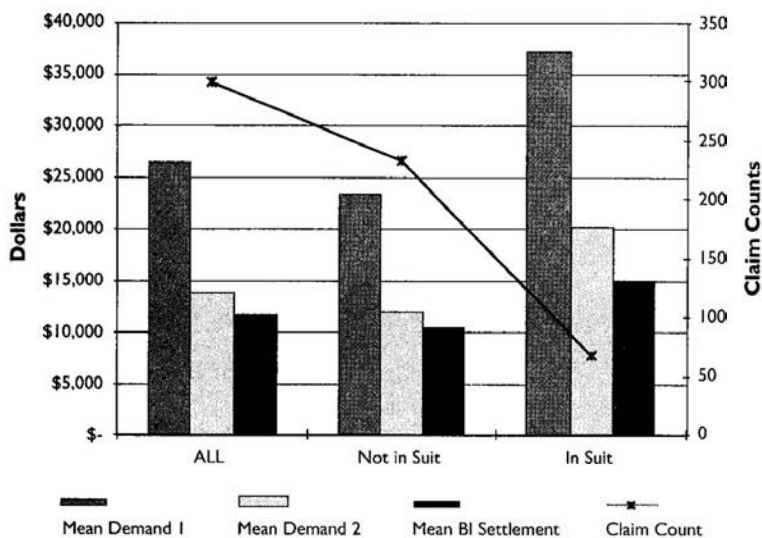
Note: 1st & 2nd Demand amount must be >$0; Joint Tort claims excluded.

We have also broken down the statistics according to whether or not the claim is in suit. The initial and second demands are much higher for claims in suit. Moreover, the gap between the second demand and the ultimate settlement is also larger.

The descriptive statistics displayed in Figure 2 do not reveal the relationship between the demands and the settlements on an

individual claim basis. That is, if an attorney feels justified in making a higher demand on a given claim, to what degree does this increase appear to translate into a higher ultimate settlement? We begin to address this question in Figure 3.
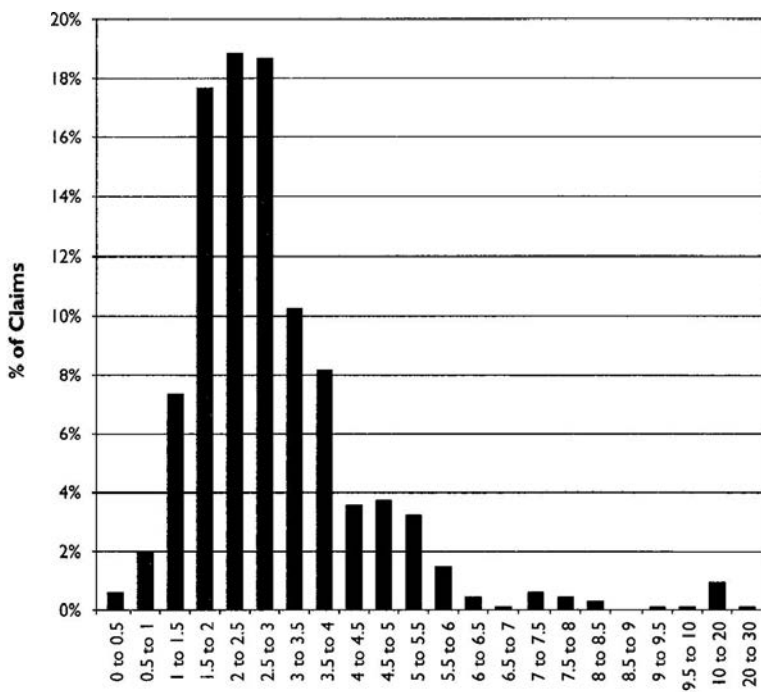
FIGURE 3
CSE: FIRST & SECOND DEMAND RATIO TO BI SETTLEMENT RATIO LIMITED TO 2ND DEMAND >$0, (315 BI CLAIMS) NO PIP PAYMENT IN DEMAND & SETTLEMENT, OUTLIER REMOVED 3860
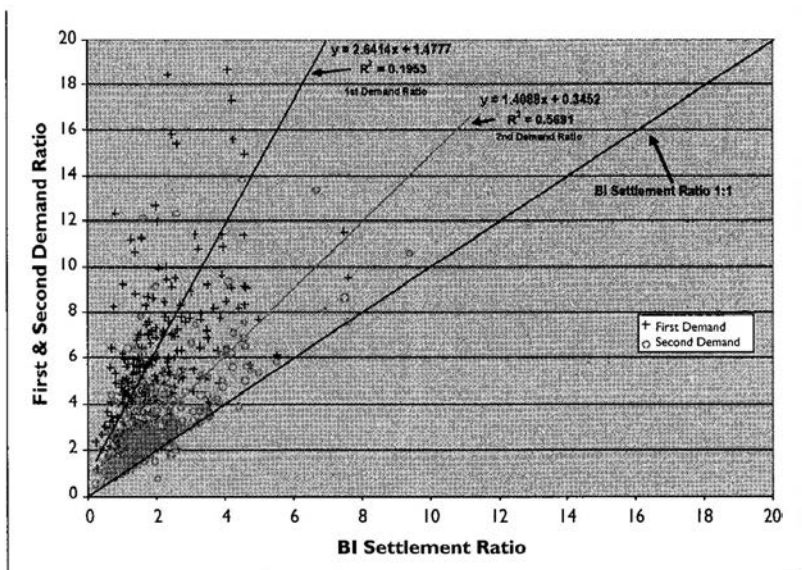
The graphs in Figure 3 show a scatter diagram and the fitted regression (least-squares) lines for the first and second demands. This chart is based on all claims for which there were at least two demands presented by the claimant's attorney. Furthermore, preliminary analysis indicated that the relationships were clearer when we "normalized" the settlement amount. That is, instead of the BI settlement itself, we have calculated the ratio of the settlement to the special damages (medical plus lost wages). Instead of the demand, we have used the ratio of the demand to specials. So, our dependent variables are the First Demand Ratio and the Second Demand Ratio.

Figure 4 displays the distribution of this ratio. Unlike the settlement amounts, which vary widely, the ratio of settlement to specials is concentrated primarily in a fairly narrow range, between approximately 1.5 and 4.

FIGURE 4
1996 SETTLEMENT / SPECIALS RATIO DISTRIBUTION

Returning now to Figure 2, we observe that the first demand tends to be much higher than the final settlement and the amount tends to be related to the specials. However, the strength of this relationship is modest, with an R^2 of 0.195, corresponding to a correlation coefficient of 0.44. So, the attorney's first attempt may fluctuate wildly and is not tied too closely to the specials.

One reason for this variability may be the fact that the complete specials may not be available at the time of initial demand (e.g., ongoing medical treatment). In particular, we mentioned above the lawyer's ability to build up the claim. Another possibility is that the attorney and adjuster, with little or no communication prior to the first demand, may have widely diverging views of the accident (e.g., degree of fault) and its consequences.

The second demand tends to have a very different character. As expected, the magnitude of the second demand is typically much reduced from the first demand. In addition, however, we find that the

correlation with the final settlement is much higher ($R^2 = 0.569$ and correlation = 0.75). By the time of the second demand, the negotiation process has brought the parties much closer together.

Our analyses in this section have clarified and quantified the relationship between attorney demands and BI settlements. However, we have not yet answered a critical question of interest. All else being equal, how much impact does the first demand have on the negotiations? In particular, does the well-known strategy of "anchoring" the negotiation by making a relatively high, but plausible, initial demand in fact work in this context? In order to answer this question we must control for all of the important factors besides the demand that can influence the settlement. An attempt along these lines will be described below.

☐ Level of Suspicion

In earlier research, we tended to regard claim suspicion in terms of a probability of fraud. The problem with this perspective is that suspicion is much broader than fraud in the legal sense. Suspicion relates to those aspects of the claim that tend to reduce the credibility or value of the alleged damages. Such factors include exaggeration of the injury and excessive treatment as well as staged accidents. From the adjuster's point of view, the more suspicion, the lower the payment that is justified, all else being equal.

In a real sense, adjuster assessment of suspicion is the counterpoise to the attorney's assessment of the strength of his/her case. The attorney attempts to exploit the evidence in the claimant's favor through a more aggressive negotiating position, largely reflected in the demands. The adjuster tries to resist by noting and signaling to the attorney an awareness of the suspicious elements of the claim.

We observed that an independent medical examination (IME) can be an effective method for limiting BI settlements, especially when there is moderate suspicion present. The impact of an IME may be either direct or indirect. A direct effect occurs if the IME on the BI claim raises suspicion and leads to a reduced settlement. An indirect effect can result from curtailment of the medical treatment process or reduction of the medical payments. Under the Massachusetts no-fault system, these cost reductions would lower the PIP payment, rather than the BI settlement. While the amount of the resulting BI settlement may also be reduced because of the lower medical expenses, it is difficult to tease out this indirect effect with the Tobit analysis below[16].

The level of suspicion is also correlated with several of the evaluation factors mentioned above[17]:

- three or more claimants in vehicle (positive);
- claimant is a passenger (negative);
- non-emergency CT-scan or MRI (negative);
- low-impact collision (positive).

However, even after controlling for these "objective" suspicion factors, there may be many other characteristics that affect the adjuster's suspicion rating. The other factors are incorporated in the suspicion measure mentioned above that we have used[18]. We will include this suspicion variable in our multivariate model to estimate the impact of suspicion on the average claim settlement, after adjusting for other factors.

Table 7 provides summary data for BI settlements for two categories of suspicion. We divide claims into one group with little or no suspicion (score zero to three) and the remainder with moderate or high levels. Note that the average settlement/specials ratios are quite a bit higher for non-strain claims (3.77 versus 2.82), as the academic research predicts without explicit consideration of suspicion.[19] Those differences, however, appear more dependent on the difference in suspicion levels within the injury types than across injury types. For example, low suspicion strain/sprain claim settlement ratios average 3.01 compared to 2.58 for more suspicious strain and sprain claims. The reduction for suspicion in settlement ratios holds true for the remaining injury types as well, although the reductions are not as severe. This finding relies ultimately on the totality of the information gathered in each claim, as represented by the suspicion score, for the degree of falsification rather than simply the type of injury. The difference in settlement/specials ratios *within* the suspicion categories may simply reflect a lower valuation of general damages for strains and sprains (3.01 and 2.58) than for other injuries (3.81 and 3.61). This finding also supports our using the suspicion variable, rather than the strain/sprain variable, to characterize claims in terms of their settlement levels.

TABLE 7

Variable	PIP Suspicion Score = Low (0-3)		PIP Suspicion Score = Mod to High (4-10)		PIP Suspicion Score = All	
	1996 (N-336)		1996 (N-216)		1996 (N-552)	
	Str/SP	All Other	Str/SP	All Other	Str/SP	All Other
Injury Type	Settlement		Settlement		Settlement	
	81%	19%	94%	6%	86%	14%
Avg. Total Medical Expenses	$4,421	$12,397	$4,113	$11,517	$4,290	$12,239
Avg. Special Damages	$4,662	$21,831	$4,508	$14,670	$4,596	$20,546
Avg. BI Settlement Amount	$8,804	$21,841	$7,534	$21,761	$8,263	$21,827
Avg. PIP Paid Amount	$3,438	$4,296	$3,282	$4,907	$3,372	$4,406
Avg. Total Paid (BI+PIP)	$12,242	$26,137	$10,816	$26,668	$11,634	$26,233
Avg. Settlement/ Specials Ratio	3.01	3.81	2.58	3.61	2.82	3.77
Median Settlement/ Specials Ratio	2.69	2.89	2.40	2.57	2.55	2.89

☐ Unknown Disability

As mentioned above, the length of alleged disability has an important influence on the settlement. Intuitively, a long disability tends to indicate considerable "pain and suffering" or at least inability to enjoy normal daily activities. In previous studies, we found that in nearly all claim files reviewed, there was a clear indication of whether or not disability was being claimed, and the extent of disability. However, in the current sample, we found a substantial subset (approximately 13%) of claims in which there was simply no information about disability in the file.

At first, we hypothesized that no mention of disability meant there really was no disability. However, a careful review of these claims made clear that such an assumption could not be made. Rather, it appeared that the attorneys in these claims were simply choosing to omit any explicit statements regarding the issue.

Besides this qualitative impression, we performed a statistical comparison of the claims with unknown disability versus those with disability information known. If claims with unknown disability had no disability, then we might expect these claims to be generally less severe and less costly than average. The results shown in Table 8 indicate that, on the contrary, these claims tend to involve greater medical expenses, larger demands, and larger total settlements.

TABLE 8
COMPARISON OF KNOWN DISABILITY CLAIMS VS. UNKNOWN DISABILITY CLAIMS

	No. / Percent of Claims		Mean*	
	Unknown	Known	Unknown	Known
Total Paid	63	429	$16,765	$13,346
Medical Settlement	64	429	$6,387	$4,546
Wage Settlement	0	102	$0	$3,578
First Demand	46	376	$26,298	$23,924
Second Demand	19	240	$22,342	$12,745
Average Weekly Wage	11	116	$455	$569
Sprain/Strain Only	58%	61%		
Primary Provider				
CH	14%	46%		
PT	31%	22%		
MD	53%	31%		
BI Suspicion Score	64	429	4.2	5.2
PIP Suspicion Score	60	405	2.2	2.9
* mean calculation of non-zero entries				

Other substantial differences pertain to lost wages and types of providers. None of the unknown-disability claims had a lost wages claim, compared with nearly a quarter of the known-disability claims. This makes sense because a claimant suffering lost wages will almost certainly be disabled to some extent, although the reverse is not necessarily true. Unknown disability claims are also much more likely to utilize an MD and much less likely to use a chiropractor.

What emerges is a typical scenario in which there is a fairly serious (apparent) injury to an unemployed person. In such a situation, it may now be more common than previously for the attorney to sidestep the issue of disability rather than deal directly with it. Our hypothesis is that the attorney expects the adjuster to impute a disability based on the other information that will yield the claimant a more favorable outcome. In the next section, we will obtain some quantitative insight into the effectiveness of this negotiating approach.

☐ Final Model: Evaluation plus Negotiation

In Table 4 we presented a Tobit regression model that included all variables which were found to impact the adjuster's evaluation of the claim. This model represented our best summary of how the adjuster evaluates the claim based on reasonably objective claim characteristics.

Based on the preliminary analyses described above, we have added several additional variables. These new variables reflect the more subjective elements that go into the negotiation process. Of course, the "objective" factors may also have a "negotiable" aspect, to the extent that the parties disagree about their interpretation. For example, the lawyer and adjuster may argue about the claimant's degree of fault, or the validity of the accident report. For the most part, though, the model developed in Table 4 describes the evaluation process.

The variables we have added related to the negotiation are:

- the first demand ratio;
- whether there was a BI IME no-show;
- whether there was no BI IME requested;
- whether there was a "positive" BI IME outcome;
- whether there is unknown disability;
- the suspicion score.

Table 9 provides the final evaluation and negotiation models, reflecting the impact of suspicion scores. Of particular interest is the percentage increase or decrease attributable to each of the negotiation variables. This number represents the average effect of the particular factor after controlling for all other factors included in the model. Thus, the statistical significance of these factors tells us that each makes a real contribution independently. In other words, the negotiation process *per se* makes a difference.

TABLE 9

Variable	Final Negotiation Model 1996 data [1] (422 Claims in Data Set)			Final Evaluation Model 1996 data [2] (429 Claims in Data Set)		
	Coeffi-cient	Chi-Square	p-Value	Coeffi-cient	Chi-Square	p-Value
Intercept	4.577	161.5	<.0001	4.521	186.4	<.0001
Log (Total Med + 1)	0.552	182.7	<.0001	0.508	168.7	<.0001
Log (Wages + 1)	0.055	61.4	<.0001	0.054	66.6	<.0001
Log (Fault proportion)	0.584	8.2	0.0041	0.554	7.1	0.0078
Attorney Involved				0.167	2.2	0.1415
Fracture Involved	0.568	16.8	<.0001	0.598	28.7	<.0001
Log (Disability wks + 1)	0.129	11.7	0.0006	0.153	19.6	<.0001
Serious Visible Injury	0.192	1.6	0.2014	0.311	3.4	0.0648
Three or more claimants in vehicle	-0.154	10.3	0.0013	-0.132	8.0	0.0048
Claimant received non emergency CT Scan or MRI	0.295	19.7	<.0001	0.270	16.1	<.0001
Low Collision Impact	-0.093	4.2	0.0404	-0.153	13.8	0.0002
Same Co/Same Policy – Claimant is passenger	-0.240	9.1	0.0025	-0.246	12.4	0.0004
Disability Unknown	0.431	10.7	0.0010			
1st Demand Ratio	0.013	9.8	0.0017			
BI IME No Show	-0.384	6.3	0.0118			
BI IME Not Requested	-0.152	6.1	0.0135			
BI IME Performed with positive outcome	-0.168	5.1	0.0245			
Suspicion	-0.027	7.0	0.0080			

1. 1996 data set - includes "Unknown Disability" claims and claims with a 1st Demand Amount.
2. 1996 data set - excludes 64 "Unknown Disability" claims.

Recall that the First Demand Ratio (FDR) is the ratio of the demand to the specials. For example, an FDR of 5.0 would occur if the total special damages were $10,000 and the demand was $50,000. The impact of the FDR can be appreciated by considering a couple of typical values. For example, the model implies that the difference between an FDR of 5.0 and an FDR of 8.0 would be 4%. That is, all

else being equal, the claimant will receive a total payment that is 4%[20] higher, simply by virtue of negotiation achieved by the more aggressive demand[21].

An IME or peer review are most common as ways to impugn the medical expenses. Other investigative techniques are recorded statements, examinations under oath, site investigations, surveillance and activity checks. These types of investigation may be applied by the adjuster, or by a special investigation unit (SIU), depending on the level and type of suspicion and on the company operational procedures. We have shown in past studies that claim payments are reduced, all else equal, when these investigative techniques are employed (Derrig, Weisberg and Chen, 1994, Table 8, p. 269).

There are three variables that relate to the outcome of a BI IME. Each of these allows a comparison between the base categories (IME requested but negative outcome). The difference is that through our model, we have attempted to adjust for all the other factors that enter into the claim settlement. Once again, we regard the interactions around the IME request as part of the negotiation process between the attorney and adjuster.

The measured impact of an IME request on the part of the adjuster is significant after adjustment for other relevant factors. First, if the claimant fails to appear for the IME, then the payment is reduced by an average of 32%. Since a claimant is not legally required to participate in an IME, this decrement occurs purely through the negotiation advantage that accrues to the company.

If the IME takes place and results in a positive outcome (from the adjuster's standpoint), then there is an average decrease of 15%. That is, on average, a positive outcome versus a negative outcome is "worth" about 15% in terms of the negotiation process. This effect is similar to that when an IME is not requested at all (12%), which might at first seem odd. Our interpretation is that claims with no IME request are less suspicious in terms of the medical expenses. So, a positive IME essentially brings the settlement in line with that for a claim with little or no suspicion.

We also examine the situation mentioned above in which the disability is unknown. We speculated that these claims were deliberately vague about disability as a tactic to maximize the settlement. The model implies that, all else equal, the payment increases by 54% for these claims in comparison to claims with the same characteristics but zero disability. Equivalently, we find that absence of any explicit statement about disability appears to translate into imputed disability of approximately 27 weeks.

As mentioned above, we have come to interpret the suspicion score as a measure of the claim's weakness in a negotiation context. Our hypothesis has been that increased suspicion leads to a lower settlement, after adjusting for other factors. The final negotiation model, shown in Table 9, appears to confirm this hypothesis. All variables except serious visible injury remain significant when the suspicion variable is added[22]. The coefficient for the suspicion score indicates that for each additional point, the total payment is reduced by approximately 2.6%. For example, a suspicion level of 6 would translate into a reduction of about 15%. Clearly, the level of suspicion plays an important role in the negotiations. In the extreme, a highly suspicious claim may be referred for special investigation and possibly denied entirely. More commonly, the claim is "compromised" and paid at a substantial discount. A moderately suspicious claim typically undergoes some level of "ordinary investigation," as discussed in our prior reports (Weisberg and Derrig, 1995 and 1998A).

☐ Other Variables

It is worth noting why some variables that were considered do not appear in the final negotiation model in Table 9. Referral to an SIU is acknowledged as an effective means of dealing with extraordinary amounts of build-up and outright fraud. Our marginal effect of SIU referral to the valuation model was a coefficient of -0.065, or about a 6.6% decrease. This decrease, however, was not statistically significant, most likely due to the small number (26) of SIU referrals in our sample. Likewise, conducting examinations under oath (EUO) showed a very small negative, but insignificant, effect with only nine claims in the sample.

Setting a trial date for in-suit claims or sending 93A letters both appear to raise settlement values by four to six percent. Both variables have low frequency in the sample and are not significantly different from zero in settlement value. Finally, the more frequent in-suit variable (74 of 422 claims) showed an effect indistinguishable from zero.

■ CONCLUSION

In this latest study, we identified and collected data on the BI claims that evolved from the PIP claims in a claim screen experiment (Weisberg and Derrig [1998B]). The main goal of this effort has

been to understand in more detail how IMEs and other investigative and negotiation techniques influence claim settlements and to what extent the use of those techniques reduces claim payments.

In each of the two prior studies (1989 and 1993 samples) we derived a statistical model to represent the claim settlement process. That Tobit regression model reflected the relationship between various independent factors and the total payment (PIP plus BI). The model indicated the relative importance of different factors to an adjuster seeking to *evaluate* the claim. In the current study, we attempted to extend this model in two ways. First, we tested several other potential evaluation factors for possible inclusion in the model. Second, we also examined the impact of variables pertaining to the *negotiation* process. This explicit focus on negotiation in addition to evaluation as joint determinants of the settlement was a new development in our research efforts.

We began by deriving a basic model including the core evaluation factors in the 1989 and 1993 models. The resulting model based on the 1996 CSE data was quite similar to its counterparts from previous years. In other words, the basic evaluation process has remained quite stable.

Finally, we developed an expanded settlement model, first adding other primarily evaluation variables, followed by negotiation variables. We found that claims brought by passengers in a vehicle against the driver of the vehicle tended to have significantly lower settlements after adjustment for other factors. Other factors that decreased the magnitude of the PIP and BI compensation were a low-impact collision, a strain/sprain injury or presence of three or more claimants. Tending to increase the settlement was the use in treatment of a non-emergency CT-scan or MRI.

The negotiation model was restricted to claims with at least one demand made by the attorney. We found that both adjuster and attorney have negotiating advantages simply due to the insurance tort system. Specific facts about each claim, however, influence the size of the final settlement within this negotiating framework. We found a wide dispersion of settlement to specials ratios, indicating differential negotiated valuations of general damages relative to economic specials. The first and second BI settlement demands from attorneys appear to affect the final settlements; the more aggressive the demand (relative to specials) the higher the negotiated settlement. On the other hand, when the BI carrier conducts an IME that produces an outcome favorable to the insurer, the settlement is reduced by about fifteen percent on average. We have recast the role of the suspicion

score as a measure of the strength of the claimant's case. Claims with elements of fraud or build-up are apparent to both sides (e.g. excessive treatment) and, therefore, are susceptible to negotiations that produce lesser general damages relative to the medicals involved. We find settlement/specials ratios reduced by fourteen percent for moderate and highly suspicious strain and sprain claims compared to valid or low suspicion strain and sprain claims. All else being equal, the total payment is reduced by approximately 2.6% for each additional point of suspicion.

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☐ **Notes**

1. Derrig et al., [1994], for 1989 claims and Weisberg and Derrig [1995] for 1993 claims.

2. For 1986 claims, the dollar threshold was $500 of medical bills. (Weisberg and Derrig, 1991). For 1989 and subsequent claims, the dollar threshold has been $2,000.

3. Derrig and Weisberg, [1998], describe the data collection process for PIP claims. The data used here matches subsequent BI claims for those 1996 accidents.

4. Specifically, we use the SAS v8.0 Lifereg procedure. See also Little and Rubin, [1987], p. 223-225.

5. Compare the Tobit model results for 1989 data, Table 7 in Derrig et al., [1994], p. 265. It shows results quite similar to the 1993 model with buildup.

6. Serious visible injury at the scene of the accident is highly negatively correlated with sprain and strain claims which in turn are correlated with non-zero suspicion scores. See evaluation and negotiation model components below.

7. After adjusting for the variables in the Basic model, Table 3 shows a marginal coefficient -0.116 or about 11%.

8. See also Tables 1 and 2 in Derrig et al., [1994], for potential combinations of PIP and BI carriers due to liability percentage and position in the accidents.

9. Since the log total compensation is modeled in our Tobit analysis, the percentage difference is calculated as
$[Exp(-0.282) - 1] = -0.25$ or 25%.

10. These six categories are precisely the same as the categories of fraud or suspicion indicators we examined in prior studies (Weisberg and Derrig, 1991, 1992, 1994, 1998).

11. Our serious visible injury variable most likely captures the additional damages in claims where scarring occurs.

12. See Derrig, Weisberg, and Chen, [1994], Table 8, p. 269.

13. See Crocker and Tennyson, [2002], Tables 4-6. They interpret riskier claims to be those with lower falsification costs and, specifically, they test strain and sprain and wage claims for systematic lower claims payments.

14. 93A refers to the Massachusetts statute (MA G. L.c. 93A) that allows for damages in those instances where the insurer negotiates or settles in bad faith. Attorneys will also cite the specific unfair and deceptive insurance claim practices statute, MA G. L.c. 176D.

15. The principal investigative tool in Massachusetts auto injury claims is the independent medical examination with a unit cost of about $350 for a completed IME and $75 for a no show.

16. The Tobit analysis describes the total compensation outcome given the amount of claimed medical and wage specials.

17. The suspicion level is also correlated with the strain and sprain variable we chose not to include in the evaluation model (see Table 1 above).

18. The actual suspicion model used was proprietary. It was similar in nature to the regression models in Weisberg and Derrig, [1998], but with a more sophisticated statistical model and somewhat different fraud indicators.

19. See Crocker and Tennyson, [2002], p. 22 and Loughran, 2003, Table 5, p. 27.

20. Since the log total compensation is modeled in our Tobit analysis, the percentage difference is calculated as
$[Exp (.013 \times (8.0 - 5.0)) - 1] = 0.04$ or 4%.

21. A separate negotiation model was fit for the 259 claims with a second demand with similar results.

22. The p-value of 0.2014 for serious visible injury reflects its correlation with valid claims (suspicion equal zero). We choose to keep this variable in our final model for practical reasons.