Determinants of the decision to appeal against motor bodily injury settlements awarded by Spanish trial courts

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Abstract: Automobile bodily injury disputes represent one of the main causes of litigation faced by Spanish Courts. In this paper a multinomial model is implemented to analyse which factors determine the decision to appeal against the verdicts of trial courts. Use of a dataset of motor insurance claims revealed differences between the determinants of a claimant's decision to appeal and those of insurers. Among other results it is shown that discrepancies regarding the permanent disability sustained affect the insurer's decision to appeal. In contrast, the claimant pays more attention to differences in the stated temporary disability. Conclusions are drawn regarding which factors could reduce the percentage of appealed cases.

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Key words: Traffic accidents, litigation, legislative compensation system, multinomial logit.

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JEL codes: D81, G22, K41.

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1. Introduction

As a general rule, parties involved in judicial disputes have the right to appeal against any sentence imposed by trial courts and to bring the case to a higher court for review. The present study examines empirical, appealed, motor bodily injury (BI) sentences as regards their duration, the awards, the appeal court outcome and other descriptive statistics. The goal was to analyse the factors that influence the decision to appeal, differentiating between those factors that act upon the insurer's decision to appeal and those that affect the claimant's decision.

The appeal procedure strongly influences the functioning of the judicial system. Appeals prolong the length of proceedings and affect the time that parties will have to wait for the judicial decision. In Europe, for instance, the processing time may be more than twice as long in appealed cases (CEPEJ, 2005). Furthermore, appeals have consequences in terms of public expenditure. An excessive number of appeals could reflect an inefficient performance of trial courts and, therefore, more resources than are strictly necessary would be required by the system. Indeed, the appeal rate (annual number of appealed cases divided by cases settled in trial courts) is interpreted by practitioners as a measure of the level of dissatisfaction of citizens with trial court resolutions. This ratio ranges between 15 and 20% in countries such as the US, Sweden, Germany, Spain and Italy, among others (CEPEJ, 2005; DOJ, 2006).

This paper covers judgements made by Spanish Courts which were then appealed against by one of the parties involved. In Spain the number of cases heard in trial courts has decreased in recent years, although, in contrast, the number of appealed cases has increased. The mean cost borne by Spanish society for each case heard by appeal court is estimated to be between €900 and €1,200 (Pastor-Prieto, 2003). The present study

analyses automobile BI claims. It should be emphasised that motor cases represent 10% of the total litigation faced by Spanish Courts. In addition, most motor disputes taken to court relate to bodily injuries, because material damages are fully refunded according to incurred expenses. The study implements a method to estimate the influence of the trial court's judgement and other claim characteristics on the probability that parties might appeal against the verdict. Conclusions are drawn as to which issues could be regulated to reduce second litigation.

In the literature a great deal of attention has been paid to litigation patterns for resolving motor bodily injury claims. For instance, Bell (2006) pointed out that increasing litigation was due to a change in social attitudes towards bodily injury claims, with claimants testing the boundaries of what a court would accept. Browne and Schmit (2008) analysed the effect of time and tort reforms introduced in the USA on the probability of a legal suit being filed. They found evidence that tort reforms had had dampening effects on litigation, despite the fact that citizens were increasingly litigious. In accordance with these results, Browne and Puelz (1999) demonstrated that caps on non-economic damages were the most effective reform in terms of reducing the likelihood of a suit being filed.

One of the reforms of greater interest for researchers has been the adoption of no-fault systems of compensation. No-fault systems are theoretically associated with lower rates of litigation (Lascher and Powers, 2001), although some empirical evidence shows mixed results due to the variety and complexity of these systems (Schmit and Yeh, 2003; Liao and White, 2002; Browne and Schmit, 2008). The effects of tort reforms in litigation have also been investigated in other insurance markets such as medical practice (AMA, 2008; Black *et al*., 2005; Viscusi and Born, 2005; Hall and Agrawal,

2003; GAO, 2003) or general liability insurance (Schmit *et al*., 1997; Viscusi *et al.*, 1993).

Another branch of research has developed theoretical economic models to explain litigation behaviour. For instance, Shavell (2004) modelled the claimant's decision to initiate litigation as a function of litigation expenditure, risk aversion, information asymmetry and expected returns, among other factors. Osborne (1999a, 1999b) analysed the effect of asymmetric information, showing that BI court awards were highly predictable and affected the decision to litigate. As regards the appeal procedure, Shavell (1995) defined the decision to appeal as a means of error correction. In other words, litigants recognised when an error had occurred at trial and acted accordingly. Other authors have examined the court's performance rather than that of litigants (Daughety and Reinganum, 2000, Spitzer and Talley, 2000; Barnes and Songer, 2006).

All these previous empirical studies have focused on the factors which influence the decision to initiate litigation rather than on subsequent legal actions. In contrast, the decision to appeal has only been studied from a theoretical viewpoint by researchers. The present study attempts to estimate the determinants which affect the decision to pursue a judicial process after the trial court's verdict. In addition, it takes into account the party involved in the decision to appeal, i.e. the insurer or the claimant. This approach has not been previously considered in the literature.

The next section provides an overview of the Spanish BI claim compensation system. Section 3 describes the multinomial model specification, while section 4 defines the data used in the empirical analysis and offers a description of the model regressors. Section 5 gives the estimation results, with special attention being paid to the estimation

of marginal effects. Finally, in Section 6 the main findings are summarised and some concluding remarks are presented.

2. Spanish BI compensation system

Before estimating the factors which influence the decision to appeal, a brief description of BI assessment practices in Spain is required. The automobile liability insurance policy is compulsory, and thus victims are compensated by the insurance company of the responsible driver. The only exception is the payment of medical care expenses, which are met by the own insurer regardless of fault.

The BI liability compensation consists of compensation for both the injuries themselves (general damages) and for the financial losses resulting from them (special damages). The compensation awarded for these damages has to be assessed in compliance with the legislative compensation system that has been in force since 1995[1]. Before this date motor BI compensations were not subject to any scheduled system, and were liberally determined by courts. Reducing uncertainty over the amount of awards, and thus also excessive litigation, was stated by the legislator to be one of the main goals of the incoming system. The compensation system is relatively straightforward. First, a basic compensation for general damages is stipulated, with the compensation amounts being updated and published annually. Later, correction factors are applied to this amount in order to adapt the basic compensation to each particular case.

Three concepts entitle a claimant to receive the basic compensation: death, temporary disability and permanent disability. Compensation in the event of death depends mainly

[1] Law No. 30/95 of 8 January 1995 on third party liability and motor insurance incorporated the Spanish compensation system.

on the victim's age and family characteristics. As regards temporary disability a financial compensation per recovery day is provided, with a distinction being made between days in hospital, days out of hospital but unable to work, and recovery days without incapacity for work. Permanent disability is evaluated by means of a disability scoring scale[2], which provides a range of possible sequelae[3] and fixes a maximum-minimum score for each one. The final score must be determined according to the degree of severity of each sequela. The aggregated score for sequelae is upper-bounded at 100. Once injuries have been evaluated a financial compensation for permanent disability is allocated by the system. The size of the amount depends positively on the stated score for sequelae and inversely on the victim's age. In the event that permanent disability also implies incapacity for work or difficulties in daily living, an additional compensation is awarded.

In the next stage the correction factors are applied to the basic compensation. Basically, an incremental percentage must be allocated in order to correct for loss of earnings[4]. The applicable percentage depends on the annual income of the victim and it is scheduled to increase the basic compensation by up to 75 per cent.

Moreover, the victim is also entitled to receive the interest payable during any delay in the payment. This payment can be avoided by the insurer if the compensation amount is handed over to the court as guarantee of payment before three months have elapsed

[2] Other European states also apply disability scales in the evaluation of bodily injuries (e.g. Italy, Belgium, Portugal or France). In addition, a project is now underway in the European Union to harmonise disability assessment practices, and which involves the application of a European disability rating scale (EC, 2003).

[3] Sequela is the definitive reduction of physical and/or mental potential of a person which can be medically explained.

[4] There are other correction factors for unfavourable family conditions (e.g. losing both parents in the accident, etc.), although they are very infrequent.

since the accident. In the event that the victim would still be recovering from injuries in this period, the judge must decide the suitability of the allocated amount.

3. Model specification

The key determinants of an appeal against BI settlements awarded by trial courts are analysed by applying a multinomial logit model. This methodology enables a distinction to be made between the behaviour of the claimant and that of the insurer as regards the decision to appeal. The dependent variable in the regression covers the three possible outcomes concerning the decision to appeal. Thus, the variable is coded one if no parties appeal against the verdict (*No appeal*), two if the verdict is appealed against by the claimant (*Claimant's appeal*), and three when it is the insurer who appeals against the trial court's verdict (*Insurer's appeal*).

The multinomial logit regression is useful when the dependent variable is nominal and the categories are unordered. The multinomial logit model has been widely applied since it was first developed by McFadden (1974) to study the determinants of the mode of travel chosen by commuters. Let us assume that the *i*-th BI claim has a set of observable characteristics $\boldsymbol{x}_i$ (a row vector with k components). The probability of an appeal against the trial court's judgement on the claim settlement i is specified as follows,

$$P_{ij}=\mathrm{P}(y_i = j\,|\,\boldsymbol{x}_i)= \frac{e^{\boldsymbol{\beta}_j'\boldsymbol{x}_i}}{1+\sum_{s=2}^{3} e^{\boldsymbol{\beta}_s'\boldsymbol{x}_i}}, \qquad j=1,2,3 \quad i=1,\ldots,N, \tag{1}$$

where j indicates the appealing party (j=1 if nobody appeals), N is the sample size and $\boldsymbol{\beta}_j(1\times K)$ is the row vector of K unknown parameters associated with the j-th category, while $\boldsymbol{\beta}_1=\mathbf{0}$ because probabilities have to add up to 1. Parameter estimates are obtained

by maximum likelihood. The log-likelihood function of the multinomial logit model is derived as $L = \sum_{i=1}^{N} \sum_{j=1}^{J} d_{ij} \cdot \ln P_{ij}$, where d_{ij} is equal to 1 if the category j is observed for the claim i, and 0 otherwise. To obtain the maximum likelihood estimates, the Newton-Raphson iterative method is used. Statistical inference is based on Wald and likelihood ratio tests.

The multinomial logit model also provides estimates of the factor effects on the probability of an appeal. The marginal effect of a unit variation in a regressor depends not only on its own value but also on the values of other regressors. Thus, the sample means are usually used as representative values in the estimation. Let us suppose that we are interested in estimating the marginal effect on the probability of the j-th category of a unit variation in the explanatory variable k. The marginal effect is obtained by multiplying the estimated parameter $\hat{\beta}_{kj}$ by the density function as follows,

$$\frac{\partial \hat{P}(y = j \,|\, \bar{\boldsymbol{x}})}{\partial x_k} = \hat{\beta}_{kj} \frac{e^{\hat{\boldsymbol{\beta}}_j' \bar{\boldsymbol{x}}}}{\left(1 + \sum_{s=2}^{3} e^{\hat{\boldsymbol{\beta}}_s' \bar{\boldsymbol{x}}}\right)^2}, \tag{2}$$

where $\bar{x}$ is the row vector consisting of the means of the covariates. The previous estimation of marginal effects is adequate for continuous variables. When the variable is dichotomous, however, the marginal effect is estimated as the difference between the probabilities in the two possible values of the variable and the sample means for the remainder.

4. Data

The database consists of 202 automobile BI claim records provided by a Spanish insurance company[5]. All the claims were resolved and closed under judicial decision between the years 2001 to 2003. Each claim record refers to one, and only one, injured or fatal victim. Claims are closed either with the payment or when both parties accept the court's verdict. The judgement of the appeal court was required for a claim closure in 57 cases, which means that almost 30% of the trial court's verdicts were appealed against[6]. As noted above, the appeal rate for the Spanish judicial system is, on average, below 20 per cent. Therefore, motor BI disputes seem to show a higher than average rate of appeal. Table 1 shows the number of appealed sample verdicts according to the appealing party and the outcome of appeals.

TABLE 1. Number of appeals according to the appealing party and outcome

	Outcome of the appeal				
Appealing party	Confirmed verdict	Partial revocation decreasing the compensation	Partial revocation increasing the compensation	Total revocation	Total
Claimant	12	0	12	8	32
Insurance company	13	10	2	0	25
Total	25	10	14	8	57

Descriptive sample statistics relating to the awarded compensations and the processing length for appealed and non-appealed claims are shown in Table 2. Naturally, claims settled by the appeal court took longer to be closed. On average, appealed claims

[5] A constraint of the multinomial logit model is that for each observation only one category of the dependent variable must be observed. In the sample there were four BI claims in which both parties appealed against the trial court's verdict. This number was too small to justify the creation of a new category, and thus these observations were removed from the database for model estimation.

[6] Exactly 30% of sample trial court verdicts were appealed against when the four removed observations are included.

remained open for more than three years (1,119 days). In contrast, non-appealed claims took just over two years (776 days) to be settled. Moreover, claims settled in appeal courts received higher compensation amounts. Note that the mean compensation for non-appealed claims was €10,108, which increased to €13,994 when claims were appealed against.

TABLE 2. Compensation settlement and claims duration

	Appeal	*Minimum*	*Maximum*	*Mean*	*Std. deviation*
Time from claim submission to closure (in days)	No	185	3280	775.91	453.71
	Yes	326	2720	1118.91	548.80
	Total	185	3280	872.70	505.31
Compensation awarded by courts (in euros)	No	108.24	159746.64	10107.36	19451.91
	Yes	188.63	193311.63	13993.14	32045.17
	Total	108.24	193311.63	11203.84	23669.58

As regards appealed claims, Figure 1 shows a comparison of compensations awarded by appeal courts with those previously awarded by trial courts. The sample means and standard deviations are provided in Table 3. The aim here is to examine whether claims receive higher compensations in appeal, or if claims with higher compensations are more likely to be appealed against. According to the results, settlements in appeal courts were, on average, larger than those previously awarded by trial courts, even when the appealing party was the insurer. The comparison with non-appealed claims (Table 2) shows that appealed claims were assessed by trial courts with a lower mean compensation.

FIGURE 1. Compensations awarded by trial courts and appeal courts (for appealed claims only)

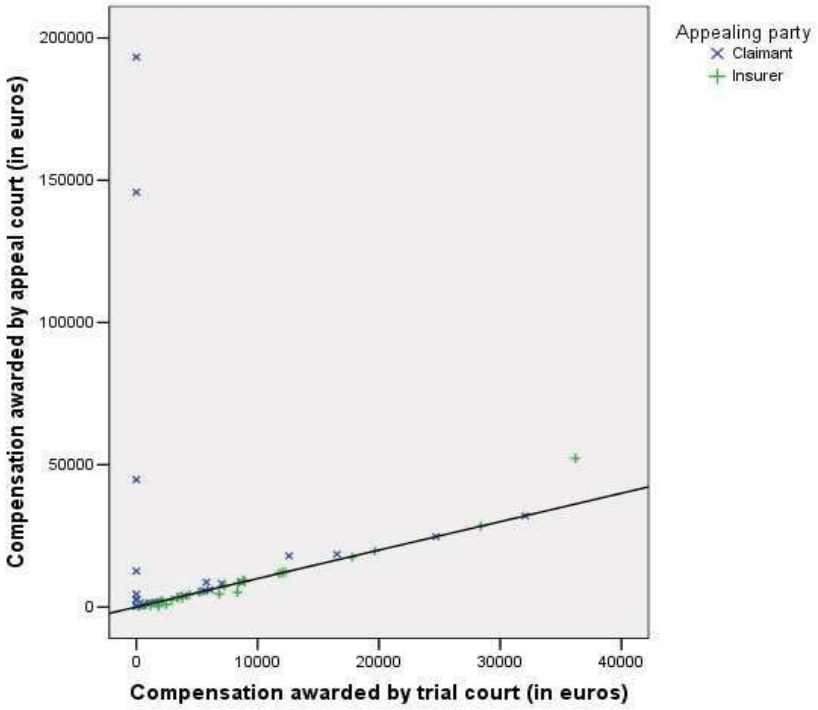

TABLE 3. Mean compensation awarded by trial courts and appeal courts (for appealed claims only)

	Trial court verdicts		Appeal court verdicts	
Appealing party	*Mean compensation (in euros)*	*Std. deviation*	*Mean compensation (in euros)*	*Std. deviation*
Claimant	4660.63	7505.35	17874.48	41481.27
Insurance company	8791.53	8741.48	9025.03	11301.41
Total	6472.43	8258.82	13993.14	32045.17

4.1 Description of variables

Table 4 shows the explanatory variables and some descriptive measures. The dichotomous variable *fault* reflects the internal evaluation made by the insurer's staff regarding fault for the accident. This variable is coded one for claims in which the insurance company does not accept the full responsibility of the insured driver for the accident. As indicated by others (Shavell, 2004; Browne and Schmit, 2008), if the disputes include the liability issue as well as the size of damages, then the likelihood of

taking legal action increases due to the uncertainty added by the need to attribute liability. Similarly, one would expect a larger number of appealed cases if there is disagreement about the fault of the accident.

Characteristics of the accident and the victim are also included in the regression. The victim's vehicle is covered by the variable *car*, which indicates whether the victim was travelling by car at the time of the accident, as opposed to those travelling by motorbike or pedestrians. The victim's age is also considered. Mixed results regarding the effect of the victim's age can be found in the literature. Smith and Yeh (2003) demonstrated that the probability of hiring an attorney decreases with the victim's age. In contrast, Brown and Puelz (1999) showed that the decision to file a legal suit depends positively on the victim's age. In the present study the victim's age in years and years squared are included as model regressors in *age* and *age2*, respectively.

As regards the medical information available, two dichotomous variables are considered: *ins_rep* and *for_rep*. The former shows whether medical experts appointed by the insurance company examined the injury severity of the victim during the recovery period. These follow-up examinations may be considered as asymmetric information since it is private information of the defendant (insurance company) about the level of damage incurred (Daughety and Reinganum, 1994; Osborne, 1999b). The existence of asymmetric information is expected to increase litigation (see Shavell, 2004). The variable *for_rep* covers claims in which the criminal procedure[7] is followed and, therefore, the victim is assessed by a forensic doctor. The effect of the forensic

[7] Victims must initiate legal action to be entitled to the compensation. They may request either financial compensation for the damages sustained, filing a tort suit, or also the punishment of the criminal offence committed by the driver, in which case a criminal suit is required. Unlike tort procedure, in criminal proceedings the forensic doctor has to examine the victim.

examination on litigation is not easy to predict. As the forensic examination is not a party-biased evaluation of the level of severity, it is expected to reduce the probability of legal action being taken. Once legal action is initiated, however, the likelihood of appealing against the trial court's verdict can increase as parties disagree with the severity stated in the forensic report.

So far we have considered claim information known before the trial. The remaining variables relate to information derived from the trial court's judgement. First, the duration of the judicial procedure is considered. Brown and Puelz (1999) argued that claims which remain open for longer periods of time were larger, and also that large claims are more likely to entail a legal claim. This idea no longer seems valid as regards the decision to appeal, since parties will prefer to resolve the claim as quickly as possible. Thus, the duration of the proceedings is expected to have an inverse effect on the probability of an appeal. Here the regression includes the variable *durat*, which reflects the time elapsed between the date of the accident and the trial court's verdict.

The next four variables compare the injury severity awarded by the judge with that previously stated by medical experts during the recovery period. The dichotomous variables *rd* and *scor* indicate whether the judge awarded a larger number of recovery days and higher sequelae score, respectively, than those stated by the insurer's medical expert in the last examination. The variables *varrd* and *varscor* compute the difference between the number of recovery days and sequelae score awarded by the judge and those allocated by the forensic doctor. These four variables take a null value when medical reports were not issued. It should be emphasised that these four variables capture discrepancies in the evaluated severity of the injury rather than offering a direct assessment of severity. Other authors have directly used measures of injury severity to

link positively the degree of severity with the probability of initiating litigation (see Brown and Schmit, 2008; Brown and Puelz, 1999). Here the variable *incap* is included as a direct measure of bodily injury severity, and indicates whether the judge considered that the sequelae sustained caused permanent incapacity for work. Positive values in any of these variables are expected to reduce the claimant's probability of appeal and to enlarge the insurer's one.

The remaining variables relate to the financial assessment of the BI compensation. The variable *system* indicates the legislative system applied in the event that the accident year and the trial year are not the same[8]. In particular, it reflects those claims in which the judge assessed the BI compensation according to the legislative system in force at the time of the accident rather than at the trial date. The correction factor allocated by the judge to compensate for loss of earnings is covered by the variable *loss*. The variable *no_int* indicates claims in which the judge stated that the amount handed over as guarantee of payment was adequate, and thus the insurer was not charged interest for the delay. Claims in which court costs were paid by the losing party[9] are covered by the variable *costs*.

[8] Because of the time required to recover and the length of the judicial process itself, the year of the accident and the settlement year often don't match. In these cases there are two approaches concerning the applicable compensation system. Some practitioners consider the compensation as a debt of wealth and, therefore, the system in force at the time of the trial should be applied in order to maintain the equivalent wealth over the time. Others suggest that the compensation is a debt of money and that the system already provides techniques to update the value of money; therefore, the system in force at the time of the accident should be employed. This discussion is of relevance because the choice of approach determines huge differences in the amounts obtained.

[9] Court costs are the expenses incurred by the court, including attorney's fees. In Spain, the losing party is only responsible for both parties' costs if this is ordered by the judge. Otherwise, each party will pay its own incurred court costs.

As regards the effect of these four variables on the decision to appeal, they all relate to different options in the financial assessment and thus increase the complexity of the case. Other authors have argued that greater complexity leads to an increased likelihood of litigation (Shavell, 2004; Brown and Schmit, 2008), although these studies considered the claimant as the only litigating party who might take legal action. However, the decision to appeal may be taken by both parties involved: the claimant and the insurer. Here, complexity means that there is more than one option among the assessment practices, and the chosen one depends greatly on the judge's criterion. Normally, the chosen option will be more favourable toward one party than to the other. Therefore, it is expected that these variables will influence in opposite directions the appeal probability of the two parties involved.

Finally, the regressor *comp* covers the financial compensation awarded by the trial court. As shown by other authors (Viscusi, 1986; Browne and Schmit, 2008), higher expected claim values increase the likelihood of legal action being taken. Thus, for the claimant the expected increase in the claim value resulting from an appeal is lower as the compensation already awarded by the trial court is larger. Therefore, the claimant's probability of appeal will be negatively associated with the compensation awarded by verdict. The opposite holds for the insurer. The likelihood that the insurer will appeal increases in line with the size of the compensation award.

TABLE 4. Explanatory variables and some descriptive statistics

		Mean	Std. Dev.
fault	1 if insurer has doubts about responsibility for the accident; 0 = otherwise.	0.163	0.371
car	1 if the victim's vehicle is a car; 0 = otherwise.	0.644	0.480
age	Victim's age in years.	33.431	15.202
age2	Victim's age in years squared (divided by 100).	13.476	12.508
ins_rep	1 if insurer's medical experts examined the victim; 0= otherwise.	0.584	0.494
for_rep	1 if the forensic doctor examined the victim; 0= otherwise.	0.876	0.330
durat	Years squared since the accident date to the trial court's verdict.	3.475	6.192
rd	1 if recovery days awarded by verdict are higher that those stated by insurer's medical experts; 0= otherwise.	0.252	0.436
scor	1 if the sequelae score awarded by verdict is higher that that stated by insurer's medical experts; 0= otherwise.	0.450	0.499
varrd	Recovery days awarded by verdict minus those stated by the forensic doctor.	-6.777	54.584
varscor	Sequelae score awarded by verdict minus that stated by the forensic doctor.	-1.389	8.367
incap	1 if permanent incapacity was awarded by judge; 0= otherwise.	0.020	0.140
system	1 if the compensation system applied was that in force at the time of the accident; 0= otherwise.	0.480	0.501
loss	Factor correction for loss of earnings (in %).	5.260	5.086
no_int	1 if interest for delay in payment was not applicable; 0= otherwise.	0.158	0.366
costs	1 if court costs are charged to the losing party; 0= otherwise.	0.223	0.417
comp	Financial compensation awarded (in thousand euros).	8.936	17.037

N=202.

5. Empirical results

This section describes the estimated coefficients of the factors that influence the probability of appealing against the trial court's verdict. The base category is *No appeal,* and thus the parameter estimates provided determine the probability that the trial court's verdict is appealed against by either the claimant or the insurer. The model was estimated with the maximum likelihood method by using the SAS procedure PROC

LOGISTIC. Parameter estimates and Wald confidence limits with a 95% confidence level are presented in Table 5.

TABLE 5. Estimation results (95% confidence level)

			95% Wald-confidence interval	
	Coeff.	Std. Dev.	Lower bound	Upper bound
Claimant's appeal				
intercept	-2.843	1.394**	-5.576	-0.110
fault	-1.647	0.845*	-3.303	0.010
car	2.524	0.666***	1.218	3.829
age	-0.097	0.056*	-0.207	0.013
age2	0.154	0.067**	0.022	0.286
ins_rep	0.712	0.484	-0.236	1.661
for_rep	0.403	0.851	-1.265	2.072
durat	-0.228	0.098**	-0.420	-0.036
rd	-1.685	0.625***	-2.910	-0.459
scor	0.803	0.490	-0.157	1.763
varrd	-0.024	0.009***	-0.041	-0.007
varscor	-0.222	0.078***	-0.375	-0.070
incap	3.411	2.627	-1.738	8.559
system	-0.074	0.445	-0.946	0.798
loss	-0.078	0.047*	-0.170	0.014
no_int	3.732	0.700***	2.359	5.104
costs	0.653	0.504	-0.336	1.641
comp	-0.083	0.041**	-0.163	-0.003
Insurer's appeal				
intercept	-4.840	1.456***	-7.695	-1.986
fault	1.341	0.532**	0.297	2.384
car	2.054	0.546***	0.984	3.124
age	-0.167	0.055***	-0.275	-0.059
age2	0.211	0.066***	0.081	0.342
ins_rep	0.746	0.460	-0.156	1.649
for_rep	3.434	1.121***	1.237	5.631
durat	0.018	0.042	-0.064	0.101
rd	-0.430	0.505	-1.421	0.560
scor	1.529	0.476***	0.596	2.462
varrd	0.011	0.012	-0.013	0.034
varscor	0.141	0.066**	0.012	0.271
incap	2.546	1.436*	-0.268	5.360
system	-1.037	0.429**	-1.877	-0.196
loss	-0.010	0.043	-0.095	0.076
no_int	-0.187	0.732	-1.623	1.248
costs	0.051	0.463	-0.857	0.959

comp	0.011	0.025	-0.039	0.060

Base category: *No appeal*

N=202; χ^2= 201.076 (sig. 0.000); ***indicates 1% significance level; **indicates 5% significance level; *indicates 10% significance level.

The chi-square statistic was computed as minus two times the difference between the log restricted-likelihood for the model and the log restricted-likelihood for a model with only the intercept. Thus, the significance of the statistic indicates that the explanatory capacity of the model improves when regressors are included.

Eleven coefficients are significant at the 1% level, seven at the 5% level and four at the 10% level. Only those variables that indicate whether the insurer examined the victim during recovery (*ins_rep*) or whether the payment of court costs was charged to the losing party (*costs*) fail to show significant parameters for any outcome category. Furthermore, the sign of the parameter estimates is as expected. It should be emphasised that the variable *fault* has a significant coefficient for both categories, although their sign is opposite. Therefore, claims in which the insurer is doubtful about the fault of the insured driver are more likely to lead to an appeal against the trial court's verdict by the insurance company. In contrast, these claims are less likely to be appealed against by the claimant. The variable *car* has a significant and positive-sign coefficient for both categories. Thus, the probability of an appeal against the trial court's verdict increases if the victim was travelling by car at the time of the accident.

The statistical significance of the variable parameters related to the victim's age (*age*, *age2*) indicates that the relationship between the probability of appeal and age has a quadratic structure. The sign and value of the parameters show that the probability of an appeal decreases with the victim's age, but only until a certain age is reached, after

which point the appeal probability increases. This inflexion point occurs in middle age, around 30 years old for the *Claimant's appeal* category and 40 for the *Insurer's appeal*.

Previous variables show significant coefficients for both categories, although most of them have only one significant parameter estimate. For instance, if the forensic doctor examined the victim (*for_rep*), then the insurer is more likely to appeal against the trial court's verdict, although such an examination does not seem to influence the claimant's probability of doing so. In contrast, the length of time until a judicial resolution is reached (*durat*) discourages the victim from appealing, but shows no effect on the insurer's decision.

It should be emphasised that the variables *rd*, *varrd* and *varscor* have an explanatory capacity as regards the claimant's decision to appeal. In particular, it is less likely that the verdict will be appealed against by the claimant if the number of recovery days awarded by the trial court is more than that stated by the insurer's medical experts. Similarly, the claimant's probability of appeal is reduced if the level of disability awarded (temporary or permanent) is higher than that previously stated by the forensic doctor. In contrast, the insurer's probability of appeal varies with discrepancies in the permanent disability sustained. In particular, the probability of the insurer appealing increases if the judge awarded the victim a higher sequelae score than that stated by either the insurer's expert (*scor*) or the forensic doctor (*varscor*). In short, the insurer pays more attention to variations in the stated sequelae score, while the claimant seems to be mainly focused on discrepancies with respect to temporary disability.

Other variables with an explanatory capacity as regards the claimant's decision to appeal are *loss*, *comp* and *no_int*. The claimant is less likely to appeal against the

verdict if either the allocated factor correction for loss of earnings or the financial compensation awarded is higher. In contrast, the probability of a claimant appeal increases if the insurer is not charged interest for a delay in payment. The remaining variables which influence the insurer's decision to appeal are *incap* and *system*. In particular, the verdict is more likely to be appealed against by the insurer if the judge awarded permanent incapacity to the victim for the sequelae sustained. However, the insurer's probability of appeal decreases when the judge stated that the compensation was a debt of money and, therefore, assessed it in accordance with the legislative system in force at the time of the accident.

To date, empirical studies have dealt with the litigation behaviour of the claimant, whereas here the probability of appeal is estimated for the two parties involved in litigation. Table 6 shows the confusion matrix. It should be noted that the multinomial logit provides estimated probabilities of the output categories as shown in Eq. (1). However, the output categories have non-similar frequencies in the database. Indeed, the number of claims which are not appealed against is much larger than appealed ones. As indicated in the previous section, only 30% of sample verdicts were appealed against. Therefore, the probability cut-off point between appeal and no appeal is fixed in 0.3. This means that in order to classify the claim as appealed, the sum of the estimated probabilities of the categories *Claimant's appeal* and *Insurer's appeal* has to be equal to or higher than 0.3. Otherwise, it is classified as *No appeal*. Once the claim is classified as appealed, it is subsequently sorted into either *Claimant's appeal* or *Insurer's appeal* according to the category with a larger estimated probability. Claims correctly classified are shown in the main diagonal of Table 6.

TABLE 6. Confusion matrix

	Actual			
Predicted*	*No Appeal*	*Claimant's Appeal*	*Insurer's Appeal*	Total
No Appeal	114	6	8	128
Claimant's Appeal	14	23	1	38
Insurer's Appeal	17	3	16	36
Total	145	32	25	202

* Cut-off point for probability of appeal is 0.3

To conclude, marginal effects are estimated for a unit variation in the variable *varscor*, as an example of a continuous regressor, and in the variable *fault*, as an example of a dichotomous variable. The sample means shown in Table 4 are taken as representative values of regressors. According to Eq. (2), the insurer's probability of appeal is increased by 0.8 for each point of difference between the sequelae score awarded by the court and that considered by the forensic doctor. In contrast, the probability of a claimant appeal decreases by 0.1% per point. Since the sum of marginal effects is equal to zero, then the probability that nobody appeals decreases by 0.7%.

As regards the variable *fault* the marginal effect is computed as the difference in the appeal probabilities for the two possible values of the variable. In particular, the probability that the insurer appeals against the trial court's verdict rises by 12.7% if the insurer's staff classified the BI claim as doubtful fault of the insured driver. This increase in the insurer's probability is counterbalanced by a decrease of 6.6% in the probability of a claimant appeal and of 6.1% in the probability that nobody appeals.

Political implications may be drawn to reduce second litigation in motor legal disputes. For instance, if it is stipulated by law that the fault issue cannot be used to avoid payment of BI compensation, then the effects of this rule on appeal probabilities of the two parties could be estimated. Another rule from which the effects on appeal

probabilities could be assessed is that the court would be forced to abide by the injury severity of the victim stated by the forensic report (if it exists). Therefore, discrepancies over the severity sustained would no longer affect the decision to appeal. The legal consideration of the financial compensation is another issue which could be regulated. In particular, it should be decided whether the compensation is a debt of money or of wealth and, therefore, which legislative system is applicable in those cases where the accident and settlement year do not match. Finally, more precise rules about when the insurer should not be charged with the payment of interest could also reduce the number of appealed cases.

5. Conclusions

Since the mid 1990s in Spain, BI compensations have had to be assessed by means of an established compensation system aimed at reducing litigation in courts. However, it has been shown that the number of cases brought before appeal courts is still large. This could be due to the fact that the legislative system enables parties to make consistent expectations about the claim settlement and, therefore, it encourages them to bring disputes before the appeal court when these expectations are not fulfilled in the trial court.

Although previous empirical research on motor litigation has studied the determinants of litigation patterns, the focus has been exclusively on the claimant as the key player in any disputes. The methodology developed here is able to analyse the litigation behaviour of both parties involved in motor disputes, the claimant and the insurer, and considers the factors that influence their decision to take legal action. Large differences are found between the factors that affect the claimant's decision to appeal and those that influence the insurer's behaviour. These results may have implications in terms of

improving the efficiency of the judicial system since policymakers are provided with guidelines that could help them to decide where to act in order to reduce the number of motor disputes coming before the appeal court. In addition, policymakers may assess the effectiveness of these measures, and then order them in terms of the expected reduction in the appeal probability by means of the marginal effects estimation.

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