

Logistic Regression Modelling of the Influence of Expert Evidence in Criminal Proceedings

KUHL, ANDREA*

ABSTRACT *The increasing reliance on forensic expertise in criminal proceedings is attributed to the inherent characteristics of scientific evidence, such as neutrality, objectivity and universality, which provide judges with greater certainty in their decisions. However, Act XXIX of 2016 restricts the role of forensic experts, emphasising that judges must assess cases independently, rather than simply adopting the conclusions of experts. This paper examines the delicate balance between the roles of judges and experts, highlighting the importance of distinguishing between issues of fact and law, and addressing concerns that judges may lose their discretion when faced complex technical issues. The evolving nature of expertise raises questions about its regulation and the implications for judicial decision-making. The relationship between judges and experts in legal proceedings is complex, as experts should provide objective assessments that complement but do not replace judges' authority. Expert opinions, which combine scientific and subjective elements, can significantly influence judicial decisions, especially in bankruptcy cases. This study uses logistic regression modelling to show how judges tend to favour expert opinions over raw financial data, reflecting a reliance on qualitative factors in their decisions. Two models are proposed to analyze the influence of expert opinions on judicial decisions, with the second model incorporating the expert's opinion leading to a higher predictive power regarding the judge's decisions. The findings suggest that judges may place more trust in expert opinions than in raw financial data, indicating a preference for qualitative assessments over quantitative indicators. The paper concludes by emphasizing the need for a clear distinction between the roles of the expert and the judge.*

KEYWORDS *Forensic expertise, scientific evidence, influence, judicial decisions, economic crimes*

Introduction

The inherent characteristics of scientific evidence, namely “neutrality, objectivity and universality” undoubtedly provide the judge with additional certainty in his decision.¹ It is for this reason that forensic expertise is gradually gaining ground

* PhD student, University of Debrecen Marton Géza Doctoral School of Legal Studies.

¹ Jean-Raphaël Demarchi, “Les preuves scientifiques et le procès pénal,” *Lextenso, LGDJ.fr: Bibliothèque des sciences criminelles* 55, (2012): 93.

in criminal proceedings.² It does so in such a way that the judge cannot delegate their powers and must assess the circumstances of the case to form their own opinion. The Hungarian Act XXIX of 2016 on forensic experts limits the role of the forensic expert in criminal cases. The forensic expert is playing an increasingly important role in criminal proceedings, as shown by the large number of studies on the subject.³ This change is not without risk, however, in so far as the expert sometimes surpasses the judge, who is overburdened with technical questions and who adopts the expert's conclusions "word for word" or certain elements of the expert's opinion in his judgement and in his reasoning. The paper explores the specific position of the expert and the judge in the context of the free exercise of judicial discretion and their role in criminal proceedings, in order to distinguish the questions that may be directed to the expert from those that fall within the scope of the judiciary's power. The study presents the expert opinion as a specific professional query and addresses the corresponding answer. It also highlights the judge's conviction and role, the scientific requirements for expert opinions, and certain aspects of using such opinions in relation to the distinction between questions of fact and questions of law.

The trend in expertise is evolving, which explains the growing number of texts on the subject. Although the expert's remit is broad, case law does not accept all forms of expertise. An expert opinion is a normatively neutral technical act, like the translation of an obscure text or the interpretation of a complex contract. Expert assessment does not include technical operations which are limited to establishing a clear fact and for which the expertise required is not in understanding and evaluating the facts but simply in handling technical tools. The practical growth in the use of expertise is not free from questions and doubts. Namely, will the judge retain his or her discretion to decide and interpret? Be that as it may, the growth of expertise is not only regulated by law but also encouraged by it.

1. The opinion as a specific response

The legal limitations of the expert's mandate dictate that the expert's task is limited to answering a technical question set by the judge, which immediately limits the interpretation of the expert's opinion. The expert must advise the judge on a technical matter determined by the judge. From the perspective of criminal procedure, the defining characteristic of a technical or professional question is that it lies beyond the judge's competence. If the judge is confronted with a technical question in the course of assessing the facts of the case which is beyond his or her competence, they may appoint a forensic expert. The purpose of the expert opinion is therefore to shed light on an issue which the judge cannot resolve personally because it is "outside his competence or beyond

² Laurence Leturmy, "De l'enquête de police à la phase exécutoire du procès: quelques remarques générales sur l'expertise pénale," *Actualité Juridique Pénal*, (2006): 58.

³ Tony Moussa and Serge Guinchard, *Expertise: matière civile et pénale* (Paris: Dalloz, 1983), 335.

his knowledge”⁴ (medical, psychological, psychiatric and accounting expert opinions). In order to be considered as an expert opinion it must contain an interpretation of the expert’s findings in a very specific area; otherwise it is merely a commentary.

This also applies to the opinion of a forensic accountant, where the expert must interpret the scientific result in a sufficiently comprehensive way to establish a material fact. The forensic accountant is also there to establish a material fact. The secondment of a forensic accountant may occur during an investigation or inquiry in the course of judicial proceedings. As evidence, an expert opinion sheds light on a fact that is both relevant and material to the case. As regards its probative value, it will be for the judge to determine this in the light of the circumstances of the case. It may be a clue to the case or, on the contrary, it may be irrelevant.⁵

It is essential that the issue is determined by the appointing authority. Above all, the legislature has limited the expert’s response to the question posed by the judge or the investigating authority by requiring the judge, in the decision ordering the expert’s opinion, to specify the technical or scientific matter on which the expert must opine. The legislature has also sought to confine the expert’s response to that specific question. Another important consideration is that the mission or activities of experts in a given case are primarily determined by the decision ordering the expert opinion.

The expert’s answer should be limited to the technical question posed by the judge. Consequently, the expert may not, under any circumstances, take a position on the guilt of the accused or assess the circumstances of the case, As it would exceed the mission and task entrusted to him.⁶ The expert can never directly answer the question posed by the court. He can only comment on the likelihood of observing the clues under certain hypotheses, whereas the court wants to know whether the hypothesis itself is true in the light of the clues observed.⁷

For example, the supplementary forensic accounting opinion No. 13/2019 regarding a situation of imminent insolvency, the expert concluded that, although the member loans are essential for the company's operations, the timing and specific economic events related to the loans warrant further investigation. This should remain essentially a matter for the appointing authority to decide in which direction to pursue additional inquiries. It is not for the expert to direct or influence those inquiries beyond answering strictly technical questions. The expert should not make findings that would determine the legal outcome. The role of the expert can be limited to stating whether something is real, untrue, false, genuine, regular, irregular, etc., but cannot, for example, classify a transaction as

⁴ Demarchi, “Les preuves scientifiques,” 246.

⁵ Tony Moussa, *Droit de l'expertise (édition 2020/2021)* (Paris: Dalloz, 2020), 313.

⁶ Joëlle Vuille and Alex Biedermann, “Une preuve scientifique suffit-elle pour fonder une condamnation pénale? *Revue de droit suisse* (2019): 510, <http://dx.doi.org/10.2139/ssrn.3507807>.

⁷ Vuille, “Une preuve scientifique,” 510.

fictitious, or a management practice as fraudulent (as the Criminal Code states), it is for the relevant competent authorities to decide under the present legislation. Another example is the forensic accounting expert opinion No. 00020/2018 in which the expert's statements regarding the Accounting Act, whether the company has violated the statutory evidentiary rules prescribed by the Accounting Act or whether it has fulfilled its obligation to keep its books and prepare its accounts, fall within the scope of law, as do findings such as whether the company has made errors that materially affect a true and fair view, and whether it has failed to review or audit its financial position in relation to the financial year in question. According to the legislation, the expert may not qualify the facts of the case; it is for the competent authority or court to assess and legally qualify the professionally verifiable findings.

Therefore, the question put to the expert must be clearly defined, considered and relevant to the circumstances of the case. If this is not the case, the limits of expert evidence set by the legislator become porous, leading to a confusion of roles between the expert and the judge.

2. The scope of forensic expertise

To define the scope and limits of expertise, a clear distinction must be made between the probability of the hypothesis and the probability of the cause, since the expert is only required to express an opinion on the latter. In fact, there is a significant difference between, on the one hand, stating the probability of a hypothesis that there is a high probability that "X" was at the crime scene and not "Y", and, on the other hand, assessing the weight of evidence in the light of the hypothesis when stating that there is a high probability that the genetic fingerprint found at the crime scene belongs to "X" and not "Y".

The first hypothesis is based on the facts of the case and the high probability that „X" was probably at the scene of the crime. The second hypothesis expresses an opinion on the evidence interpreted in the context of a hypothetical framework indicating that there is a high probability that the genetic fingerprint found at the crime scene belongs to "X" rather than "Y".

Thus, while the first hypothesis expresses probabilities about a fact, the second one expresses probabilities about the evaluation of a clue in the light of hypotheses put forward by investigators, the judge or the parties. This distinction between the hypotheses advanced by the investigators and those put forward by the expert, which are completely different and falling within the expert's own competence, is important from both a scientific and a legal point of view. According to probability theory, the probability of causes is not equal to the probability of effects. In other words, the probability of hypotheses (causes) is not equal to the probability of evidence (effects) that support or refute them.⁸

An expert cannot comment on the probability of a hypothesis, they must only assess the relevance of the evidence in the light of those hypothesis. Any authority that considers the two to be equivalent would be in breach of its

⁸ Vuille, "Une preuve scientifique," 510.

obligation that “the task of experts should be limited to the examination of technical matters.”⁹

In fact, the expert’s decision must be neutral and objective in answering a technical or scientific question that needs to be interpreted. If the expert expresses an opinion on the facts, for example stating that it is “difficult to rule out fraud”, without any expert basis for what he says, undermines the requirement of neutrality and objectivity. At that point, the expert opinion ceases to address a purely technical question meant to inform the authority. It is not a technical question that is beyond the competence of the judges.

Secondly, the expert opinion may mention a hypothesis without being requested by the contracting authority as part of the expert evaluation. If no analysis is carried out to determine the probability of that hypothesis, then the expert opinion becomes a statement of fact rather than an evaluation of the evidence in the light of the hypotheses put forward by the authority. The expert opinion, however, should only answer the technical question specified by the issuing party, i.e. provide additional information to clarify the case.

Finally, it should be noted that the expert exceeds the mandate of the originally entrusted opinion in all cases where they do not deal exclusively with the question set out in the decision ordering the expert opinion. The same applies if, in addition to answering the scientific question, the expert comments on the circumstances of the case, for example, in the context of economic crimes by referring to the possibility of certain business outcomes.

3. The judge’s sovereign assessment

The judge is free to assess the types of evidence submitted to them and discussed in the adversarial procedure, but this assessment must be based on rational reasoning. The evaluation of evidence can be defined as the act by which the presiding judge assesses the probative value of the available evidence and weighs the various means of proof to determine whether the factual elements necessary for the application of substantive criminal law are present. This assessment, which is reserved to the presiding judge, is of course free, but it must nevertheless be rational.

Forensic examination also makes it possible to establish facts which, depending on the circumstances of the case, may be of clue or of minor value. It is for the judge to decide whether this fact is relevant, taking into account the other evidence in the case, a determining factor, and to make a judgment accordingly. It is therefore the judge’s task to place the material fact in the circumstances of the case in order to assess its relevance to the *corpus delicti*, i.e. to make a sovereign assessment of the facts.

The appellate courts reserve this power, i.e. the sovereign assessment of the facts, exclusively for the trial judge. In France, for example, as the court that regulates

⁹ Ibid, 511.

the law, the “Cour de Cassation” (Court of Cassation)¹⁰ intervenes only in cases of infringement of the law by decisions of last instance taken by courts of first instance.¹¹ Its review is thus limited to assessing the legality of the decision taken, excluding any question of fact.¹²

Unless otherwise provided by law, offences may be established by any means of evidence and the judge will decide on the basis of their own personal conviction. The judge’s freedom to assess the methods of proof is therefore sacrosanct, and the judge may base their decision only on the evidence presented in the course of the discussions and discussed in the adversarial procedure.¹³ The judge is free to assess the evidence, as any type of evidence may be persuasive, provided that it is discussed before them in the presence of both parties and complies with the rules of evidence if it is provided by public authorities. The principle of discretion applies to all types of evidence, in particular scientific evidence. This means, among other things, that there is no minimum amount of evidence that must be submitted to establish a fact, that there is no hierarchy between the evidence presented to the judge, that there is no compulsory evidence the absence of which would prevent a conviction, and that even an innuendo can carry the court’s verdict.¹⁴

In fact, the judge is free to decide to favour one piece of evidence over another one if they consider it more reliable. However, the probative value of the evidence must always be assessed in view of the specific circumstances of the case and the authority cannot prejudge one means of proof over another.¹⁵ The judge must assess the probative value of the expert evidence in the light of the circumstances of the case, placing it in its factual context and in the overall context of the case in order to decide on its probative value.

Although the judge is free to assess the evidence discussed before him, his reasoning must be rational. The evaluation should be based on the rules of formal logic, the laws of reasoning, general life experience and, through the corroboration of expert evidence, technical and scientific rules.¹⁶ Consequently,

¹⁰ The highest court in France, which does not rule on the merits but, if it annuls the contested decision on the grounds of the infringement committed, orders a new trial.

¹¹ Cathrine Labrusse-Riou, *Le droit saisi par la biologie, Des juristes au laboratoire*, coll. *Bibliothèque de droit privé* (Paris: Bibliothèque de droit privé, 1996), 351.

¹² Labrusse, “Le droit saisi par la biologie,” 352.

¹³ Joëlle Vuille, “Pour une redéfinition du principe de libre appréciation des preuves dans le cas des expertises scientifiques,” *Justiz*, (2013): 3. https://www.researchgate.net/publication/277670533_Pour_une_redefinition_du_principe_de_libre_appreciation_des_preuves_dans_le_cas_des_expertises_scientifiques.

¹⁴ Vuille, “Pour une redefinition du principe,” 3.

¹⁵ Ibid.

¹⁶ Alex Biedermann et al, “Conclusions catégoriques dans les expertises forensiques: obstacles insurmontables ou cibles faciles pour la défense,” *Revue de l’avocat*, (2012): 107.

https://www.researchgate.net/publication/258859434_Conclusions_categoriques_dans_les_expertises_forensiques_obstacles_insurmontables_ou_cibles_faciles_pour_la_defense.

if the judge decides to overrule the expert's opinion, i.e. not to take it into account in his decision, they must give logical reasons for their decision, duly pointing out the uselessness of that opinion in the light of the facts. A genetic opinion, for example, is scientific evidence which, once it has been admitted into evidence, would assist the judge in his or her task of taking evidence. Thus, its rational assessment involves distinguishing between scientific evidence and judicial evidence.

Legal or forensic evidence has some characteristics that distinguish it from scientific evidence.¹⁷ This can be explained by the difference in the purposes for which evidence is used. Unlike scientific evidence, forensic evidence is no longer aimed at the truth of a fact, but at the truth of a proof.¹⁸ Therefore, the legislator has designated the judge as the sole holder of the power of decision and therefore empowered them to.¹⁹ There is only one form of evidence in court, the judicial evidence derived from all the circumstances of the facts. Scientific evidence, by contrast, merely serves as an index value which, once admitted, helps form the judicial evidence that convinces or fails to convince the judge and thus underpins the judge's final decision. The distinction between scientific evidence and judicial evidence also leads to a distinction between the mission of the expert and the role of the judge. The role of the judge is to decide on the law, to settle disputes and to determine the guilt or innocence of the individual. Of course, this cannot be done effectively without a perfect knowledge of the facts²⁰.

This is why a forensic expert intervenes: to enlighten the judge on purely technical matters. The judge cannot therefore establish scientific evidence during the examination of the case, as this is the task of the expert. The judge does not have the necessary skills to give this scientific truth. Where the circumstances demand it, the judge must call upon an expert to interpret the scientific question. Likewise, the expert cannot claim to be in possession of the truth of the matter, since this is the sole task of the judge, who, in assessing the facts, places the scientific evidence in their proper context and, where appropriate, adds them to the evidence to reach a conclusion. If the expert "encroaches" on the role of the judge, there is a risk of delegation of powers.

The legislator has set limits on the mandate of experts in order to preserve the scientific legitimacy of their expertise as much as possible. The limitation to dealing only with technical matters also means that the judge is prohibited from delegating any powers to the expert. The importance of this will be discussed below.

If the judge calls in a legal expert, it is effectively because they admit that they are not competent to answer the technical, financial, medical or other scientific question that might shed light on the case once answered. This answer is

¹⁷ Labrusse, "*Le droit saisi par la biologie*," 351.

¹⁸ Frédéric Chavaud and Laurence Dumoulin, "Experts et expertise judiciaire: France XIXe et XXe siècle," *Presses Universitaires Rennes*, (2003): 230, <https://doi.org/10.4000/books.pur.8444>.

¹⁹ Demarchi, "Les preuves scientifiques," 246.

²⁰ Ibid.

necessary to enable the judge to assess all the evidence. However, the difficulty for the judge in assessing the scientific or purely technical aspect should not extend to other aspects of the facts. It is for the judge to decide on the probative value of the expert opinion and its scope in the light of the circumstances of the case.

Furthermore, the legislator set these limits on the mandate of experts in order to preserve the inherent characteristics of forensic expertise, its neutrality and objectivity. A forensic opinion is the result of a scientific interpretation which requires the contribution of a professional, the expert. For an expert opinion to be neutral and objective, the impartiality of the expert must first be preserved. The expert's task is to give an opinion based solely on purely technical data, and therefore they should not have access to the investigation file. The expert should only be informed of circumstances that are strictly necessary for the proper performance of the assessment. Otherwise, his impartiality may be called into question and the whole opinion may lose its substance because of the risk of bias, partiality or increased risk of bias.

Bias on the part of a researcher or research team is a tendency or bias introducing systematic error into the research process undermines the validity of the resulting work.²¹ The phenomenon of bias includes the case where the researcher subjectively influences the result by favouring the outcome expected by the researcher. It is also a phenomenon of bias when the researcher seeks, interprets or favours information that confirms their preconceived ideas or hypotheses. This has a biasing effect on the interpretation of the results of the analysis.²² In forensic, forensic science, and thus in the case of forensic experts, this risk can be very significant. It is present in scientific research when we evaluate a hypothesis, favouring information or interpreting the results of a study in a manner that confirms our hypothesis. It is in this context that a forensic scientist can fall victim to confirmation bias. This risk is even greater in sensitive areas where the biases are shared by an expert who, after all, also lives and works in a particular society. These biases can be personal, social, political or religious and can affect the interpretation of the results of scientific analysis.²³

This is why it is critical to preserve the distinction between roles. In principle, the reliability of the expert opinion itself is called into question once the experts' statements are no longer neutral and objective, or are not derived from a scientific interpretation of a technical issue based on scientific expertise in accordance with universal standards, nor are presented or included in the grounds of a judgment or on which a judgment is based. Such statements cannot have that scientific legitimacy and would constitute a prohibited delegation of power. The fact that the judges have adopted the expert's reasoning in the grounds of the decision could also constitute an unlawful delegation of powers, since it is for the judge to

²¹Indria Nath et al, IAP – The Global Network of Science Academies, *Doing Global Science, A Guide to Responsible Conduct in the Global Research Enterprise* (Princeton: Princeton University Press, 2016), 6.

²² Nath et al, *Doing Global Science*, 6.

²³ Ibid.

assess the evidence submitted to them in the light of the circumstances of the case and should in principle decide on the basis of his own personal conviction. The expert's task is limited to dealing with a technical question which requires the expert's interpretation in the light of the specific hypotheses put forward by the judge or the defence.

The liability system imposed on experts also helps to ensure that "the expert involved in the proceedings is not seen as the outstretched arm of the authority and not as a person bound by the presumed impartiality of the accused and the defence, but as a person acting according to the rules of the profession, who is objective to the best of his or her ability, and in whom even a judge without expertise can have reason to trust".²⁴

It is questionable whether and to what extent a judge can delegate legal - judicial tasks to a legal expert. Experts cannot exercise the functions of a judge: the power conferred on them is intended to inform the judge's decision, not formulate it. They add the knowledge necessary to reach a decision, the judgment; but but they do not themselves deliver that judgement.²⁵

It follows that the judge cannot instruct the expert to give a legal opinion or to take over their role, nor may the judge pose legal questions to the expert. It is essential to distinguish between the power of the judge and the mission of the expert. Thus, if the expert's opinion is to have probative value, it must meet the established scientific criteria and the judge must assess it appropriately in the light of the circumstances of the case.

4. The expert's influence in criminal proceedings

The relationship between the judge and the expert is complex. Although it may sometimes seem that the expert merely acts as a judge in technical matters, he cannot replace the judicial role, nor can the judge transfer their judgement to the expert. Expert assessment is essentially objective. However, it may also have a subjective aspect. Interpretation of the results is also a crucial element of expert evaluation. It would be highly beneficial if second opinions were systematically made admissible, going beyond the requirements of Article 6 of the European Convention on Human Rights (ECHR) and the decisions of the European Court of Human Rights (ECtHR). In this way, peer review would be fully adversarial. I mentioned that peer review is essentially objective but it can also have a subjective aspect. This has a particularly important role in the assessment of the fact-finding process. This is illustrated below through a theoretical scheme and a practical example. In my opinion, the starting point for an examination in this area can also be the content, current regulation and structure of the opinion. In criminal proceedings, the expert opinion includes information on the subject of

²⁴ Balázs Elek, "A büntetőügyekben eljáró szakértők felelősségének rendszere," *Büntetőjogi Szemle*, no. 1 (2022): 57, <https://ujbtk.hu/elek-balazs-a-buntetougyekben-eljaro-szakertok-felelossegenek-rendszere/>.

²⁵ Andrea Kuhl, "Az ítéleti bizonyosság és a szakvélemények értéke," *Miskolci Jogi Szemle* 18, no. 1, (2023): 97, <https://doi.org/10.32980/MJSz.2023.1.90>.

the investigation, the investigation procedures and instruments, changes in the subject of the investigation (findings), a brief description of the investigation method, a summary of the professional findings (professional statement of facts), the conclusions drawn from the professional statement of facts, and, in this context, the answers to the questions asked (opinion).²⁶

The scientific, objective part of the expert opinion is the professional statement of facts, the findings given and supported by the examination method, while the subjective part is the expert's opinion, his/her opinion on questions, which is also based on their professional knowledge and experience. If we assume that the scientific part of the expert opinion is included in the reasoning part of the judgments, the evidence will meet, or at least, to put it cautiously, better meet the criteria of scientificity and credibility that the Act sets for expert opinions, so that the judgment will be based on evidence that is also scientifically sound.

If, however, we assume that the expert's subjective view appears in the reasoning of the judgement, we can still say that the judgment is based on a less scientific basis, taking the free system of evidence and the requirement of free discretion into consideration. Although, although this is the primary expectation of an expert opinion.

The above can be easily modelled by examining the expert as a qualitative variable. As I have indicated in my previous writing, probabilistic expert opinions - although not categorical, i.e. not equal to probabilities 0 and 1 (no or yes) - are nevertheless considered and preferred in the application of the courts in the evidence, given their scientific nature. The use of co-sciences, therefore, gives judges greater certainty in their personal convictions, provides greater certainty in the procedure and in judicial decision-making and has and can have an impact on the way it is perceived by society.

In the judgment, the subjective and objective parts of the expert opinion can be easily identified. The appearance of the objective, scientific segment can be seen as a qualitative variable, in contrast to the expert's subjective interpretation of the scientific evidence i.e., the entire opinion itself. Yet, it is possible to examine which part of the expert's opinion is more likely to underpin or contribute to - if you like, influence - the judge's judgment.

Does the value of the objective element always contribute more to the certainty of the judgment than the subjective element, which might otherwise be helpful to minimise the formation of the judge's conviction, for example in view of the scientific criteria against the expert's opinion. The importance of this issue is also highlighted in the context of current trends, when we talk about big data, deep learning and similar concepts in connection with certain new evidence, even based on Artificial Intelligence, with the quantity and quality of the data underlying the algorithms fed in and the results that can be drawn from them as an important demarcation criterion. It certainly matters what kind of judgments are contained in the database on which the algorithms are based or what the value of the opinions is, whether they represent weak or strong probabilities, and in

²⁶ Ervin Belovics and Éva Tóth, *A büntetőeljárás segédtudományai II.* (Budapest: Pázmány Press, 2017), 419.

which legal system they are used, although we are talking about free evaluation of evidence.

Consider, for example, whether one seeks objective, material truth and prefers categorical opinions or whether it is sufficient to use an opinion representing a probability other than 0 without requiring an approximation to 1.²⁷ This has a major impact on the usability of this evidence and the usability of some AI or electronic data as evidence.

5. The weight of the forensic accountant in bankruptcy proceedings

Let us consider the idea introduced above in relation to the role of the expert in influencing the models set up in an example from the bankruptcy field²⁸. This can be done along the lines of a logistic analysis, a probabilistic classification method that allows to take the combined effect of the financial determinants of the company into account to determine the degree of significance of the explanatory variables and to estimate the explanatory and predictive power of the model.

Let us illustrate the judges' decision in two models, one introducing the expert or opinion as a qualitative variable in the analysis of the bankruptcy situation of companies. The models are based on the deterioration of the financial situation of companies as the culmination of a series of progressive difficulties, the risk of insolvency based on financial statements and the techniques and indicators used in the financial literature.²⁹

Following the line of reasoning of the previous section, the question is how the financial elements of forensic accountants' opinions affect the judges' decision³⁰ where i denotes individuals, α_0 is the coefficient associated with the constant, $\alpha_1, \dots, \alpha_6$: the coefficient associated with each variable in the model, ε_i is the error.

Model 1:

$$\text{Judgement}_i = \alpha_0 + \alpha_1 \text{Debt ratio}_i + \alpha_2 \text{Nature of debt}_i + \alpha_3 \text{Sector of activity}_i + \alpha_4 \text{Age}_i + \alpha_5 \text{Size}_i + \alpha_6 \text{Accumulated losses/equity}_i + \varepsilon_i$$

In the second model (see below), we therefore integrate the forensic accountant's opinion while taking the elements on which their opinion is based into account, in addition to integrating the characteristics of the companies.

²⁷ Kuhl, "Az ítéleti bizonyosság," 98.

²⁸ Hamadi Mohamed Taieb et al. "Le manager face au juge lors du redressement judiciaire d'entreprise: un risque de manipulation à travers l'expert-comptable judiciaire," *Question(s) de management* 14, (2016): 28, DOI: [10.3917/qdm.163.0027](https://doi.org/10.3917/qdm.163.0027).

²⁹ Meir Tamari, "Financial Ratios as Means of Forecasting Bankruptcy," *Economic Review* (1964): 15, <http://www.jstor.org/stable/40226072>.

³⁰ Multivariate discriminant analysis based on logit/probit model. Logistic regression analysis.

Model 2:

$$\text{Judgement}_i = \alpha_0 + \alpha_1 \text{Expert opinion}_i + \alpha_2 A + \alpha_3 \text{Debt ratio } i + \alpha_4 \text{Business sector or activity sector}_i + \alpha_5 \text{Age}_i + \alpha_6 \text{Size}_i + \alpha_7 \text{Accumulated losses/equity} + \varepsilon_i$$

The measurement variables are set up based on empirical research and forensic expert opinions. In the models, the judge's decision or ruling and the expert opinion are binary variables representing 0 and 1.

For the judge, the variable is 1 if they initiate liquidation proceedings or 0 if they initiate bankruptcy proceedings.

The impact of a forensic accountant's opinion on a judicial decision can be seen as a dichotomous variable. If it is 1, then the expert believes that the company should be liquidated, and if it is 0, then the expert believes that the company could remedy its situation without court intervention, i.e. (steers the judge's decision towards a settlement).

The role of the sector of activity is considered to have a negative impact on the decision to file for bankruptcy, i.e. firms in the industrial sector are more likely to be resolved on their own rather than to be subject to liquidation proceedings. The activity sector is 1 if the firm is in the industrial sector and 0 if it is not in the model.

There is a negative relationship between the debt ratio and a company's ability to pay its debts.³¹ Therefore, it can be argued that the debt ratio has a positive effect on the decision to seek redress by companies in economic difficulties.

$$\text{Debt ratio} = \frac{\text{Total debt}}{\text{Total assets}}$$

The type of debt, the nature of indebtedness, is a variable that expresses the trend in the indebtedness of the enterprise. This variable can be calculated as follows:

$$\text{Debt type} = \frac{\text{Short-term liabilities}}{\text{Long-term passives}}$$

This variable suggests that a firm with a ratio greater than 1 is more likely to be insolvent than a firm with a ratio less than or equal to 1.

The age and seniority of the company has a positive impact on its restructuring potential. Size has a negative impact on the decision to seek redress for companies in economic difficulties.

By examining the models, the results will show whether the judge has more confidence in the accounting data than in the internal characteristics of the bankrupt firms. Whether or not they trusts the judgment of the professional accountant or forensic accountant more than the accounting data. Some

³¹ James A. Ohlson, "Financial ratios and the probabilistic prediction of bankruptcy," *Journal of accounting research*, no. 18. (1980):109–131, <https://doi.org/10.2307/2490395>.

significant explanatory variables are also tested at a given level of significance in the first model, which, for example, does not include the opinion of the European Court of Justice (think of the preliminary decision procedure). However, this variable, if it is considered in the second model, which incorporates the forensic accountant's opinion, becomes completely insignificant, meaning that the forensic accountant's opinion is the more decisive factor in the decision making.

The logistic regression of the models allows to identify the most significant determinants of judicial decisions. In the first model, most of the explanatory variables, except for sector of activity and firm size, have a positive and significant effect on the bankruptcy decision of distressed firms. However, these variables have different levels of significance. It should be noted, however, that even if there are variables that have a significant impact on the judge's decision, they explained only close to 40% of the variability of the bankruptcy decision in a given sample, i.e. this first model, even when taking the significant variables into account, remains weak as it cannot explain more than 60% of the variability of the judge's decision.

The results of the second model's logistic regression allowed the identification of explanatory variables that have a significant impact on the decision of distressed firms to enter liquidation proceedings. As in the results of the first regression, the debt ratio and the nature of the debt are variables that have a significant impact on the decision of the judge. In this sample and the related results, it is also found that the judge does not take the variables of sector of activity, ranking, size and the ratio of accumulated losses to equity into account when deciding whether to place a distressed firm into liquidation or bankruptcy. The introduction of the forensic accountant's decision variable (a variable that has a positive and significant effect on the judge's decision at the 1% level) in the second model allowed for an explanation of almost 80% of the variability in the judge's decision, while in the first model, this rate was only close to 40%.

To determine the predictive power of the two models, it is necessary to define a probability threshold that facilitates estimating the probability of an error event. The observations are then classified according to whether they exceed a critical value set by the decision-maker. In this sample, the test associates each firm with a liquidation or an out-of-court settlement (bankruptcy arrangement) as follows. If the probability associated with each firm in the sample is greater than the arbitrarily set threshold, the firm is classified as a liquidation beneficiary (+), if not, it is classified as a settlement beneficiary (-). Thus, there will be correctly and incorrectly classified firms for a given Ranking, R_+ (or-) and observed Decision (D). The predictive ratio of the model is equal to the ratio of the sum of correctly predicted firms to the total number of observations. The quality of the two models is therefore different in terms of predictive certainty.

The relatively high level of misclassification rates for companies suggests that the financial and non-financial factors used to justify an opinion are effective indicators to diagnose the financial situation of a company, but still not sufficient to predict the judge's decision, confirming that an opinion is only as good as the

judge understands it.³² The increase in the prediction rate of the judge's decision in the second model only indicates the importance of the forensic accountant's opinion in the judge's decision making process. The judge's decision gives greater weight to the expert's analysis of the financial factors underlying that opinion.³³

Obviously, there are countless qualitative variables to be evaluated in this concept. In some countries, such as France for example, legislation has chosen the "accumulated losses/equity ratio" as an indicator of the degree of recovery or difficulty of the situation of the business on which the judge must base his decision. While the judge does trust numerical data (i.e., figures appearing in expert opinions), he appears to place even more reliance on the expert's judgement.

The concrete example of the observed Decision or Decision and the predictive power results of the second model show that the judge relies more on case law than on accounting data, i.e. they trust the assessment of the situation by another court (CJEU, ECtHR) more than the financial data reflecting it. These results also show that the use of parts of an expert opinion can lead to a judgment of greater or lesser "scientific" value, if the parts are included in an identifiable way in the reasoning part of the judgment.

When using regression modelling, it is also important to emphasise that this method has its limitations and that the results may be affected by, for example, sample size and representativeness. The timeliness of the data may also affect the validity of the results in terms of their added value for judicial practice. For example, if the data analysed is old, it may be less relevant to the judicial practice in today's world (laws, technological inventions, etc.) Also, of course, there may be different variables, some of which may not be that significant, but usually judicial experience, precedents have a huge impact on decisions. This selection of explanatory variables allows a schematic representation of the practice. However, the results indicate that the second model explains a greater percentage of the variability in judicial decisions, highlighting the weight of expert opinion in the decision-making process. The methodology suggests the need for a clear distinction between the roles of judges and experts and argues for the integrity and objectivity of expert opinions to ensure that they contribute effectively to judicial outcomes.

The judge may lose sight of the "objective" indicator, which may often seem meaningless to him due to its numerical complexity. He may, for example, place more trust in a legal assessment of the situation using the example of a preliminary ruling mechanism or previous case-law than in financial figures reflecting the situation. It is not difficult to see that as lawyers, they prefer the interpretation of case law to financial figures. Indeed, the expert's subjective opinion may also be preferred to the figures in judicial decision.

³² Kuhl, "Az ítéleti bizonyosság," 108.

³³ Hamadi, "The Manager," 25.

Concluding thoughts

It is important to respect the distinction between the expert's role and the judge's role. In principle, the reliability of the expert opinion itself is called into question as soon as the experts' statements are no longer neutral and objective or fail to result from a scientific interpretation of a technical issue regardless of its technical nature in accordance with universal standards and cannot be presented or included in a judgement. Such statements cannot have the scientific legitimacy that would naturally be required in case of the expert opinion as scientific evidence and its result, and which would provide the judge with additional certainty in his decision.

The judge's job is to assess the evidence presented to them in the light of the circumstances of the case and, in principle, they should decide based on their own personal conviction. The forensic expert's findings should then be assessed in the light of the circumstances of the case to decide what probative value they have and whether they should subsequently be admitted into evidence. This power is reserved to the judge. The expert's task is limited to dealing with a technical issue which requires the expert's interpretation in the light of specific hypotheses put forward by the judge or the defence.

A forensic auditor's „decision” or opinion is a document prepared ideally by an independent and competent professional. However, the opinion is not understood as a monolithic block but as a whole made up of several units, occupies an important place in the decision-making process carried out by all of the partners of the company, in particular the judge. The judge can dissect, reorganise and reuse the information contained in the opinion in order to incorporate it into his decision-making process. The question arises as to which part of the expert opinion the judge uses for this purpose. In criminal proceedings, the expert opinion includes information on the subject of the investigation, the investigative procedures and means, changes in the subject of the investigation (findings), a brief description of the investigation method, a summary of the professional findings (professional findings), the conclusions drawn from the professional findings and, in this context, the answers to the questions asked (opinion).³⁴

This is also important because, increasingly, the requirement of procedural fairness and compliance with Article 6 ECHR in expert evidence also raises the need for the use of adversarial, so-called counter-expert, forensic experts but the adjudicative certainty of expert opinions in such a system may be different in a procedure, not to mention the development and proliferation of new types of evidence (thinking of the quality of the data used as a basis for the input), in violation of the principle of equality of arms.

It can be seen that rather complex expert methods, such as multivariate discriminant analysis³⁵ or logistic regression analysis³⁶, recursive partitioning

³⁴ Ervin Belovics, “A büntetőeljárás segéd tudományai,” 419.

³⁵ Miklós Virág et al, “*Pénzügyi elemzés, csődelőrejelzés, válságkezelés*,” (Budapest: Kossuth Kiadó, 2013): 288.

³⁶ Virág, “*Pénzügyi elemzés*,” 288.

algorithm³⁷, or neural networks are used in economic crime cases. Their appearance in the judgment is unlikely so the judge departs from objective “indicators” relying on the expert’s opinion instead, which they understand and prefer using existing case law in relation to an appropriate financial situation.

However, the presence of variables such as the quality of management of the company or certain external and internal factors that may affect the company’s ability to continue as a going concern could improve significance, shedding light on the reality of the relationship between judicial practice (previous case law) and judicial judgments. The problems and functioning of company management (given the diversity of bankruptcy and related models and their rapid development), the judge and the forensic accountant should also be discussed. Such a study could provide more sophisticated information on the legal mechanisms that should be put in place to circumvent certain manipulations and to focus efforts on the effective recovery of companies.³⁸

³⁷ Ibid.

³⁸ Hamadi Mohamed Taieb et al, “The manager before the judge during a company’s receivership: a risk of manipulation through the forensic accountant,” *Management issue(s)*, (2016): 29, [DOI: 10.3917/qdm.163.0027](https://doi.org/10.3917/qdm.163.0027).