

# **Review of the University of Texas Bureau of Business Research Study on Insurance Credit Scoring**

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## **1. Executive Summary**

The report by the University of Texas Bureau of Business Research on the relationship between credit scoring and expected insurance losses suffers from problems so severe that the authors' conclusions are neither credible nor reliable.

The authors claim to attempt to analyze the relationship of credit history to expected losses independent of other risk factors but rely upon a methodology that cannot isolate the impact of credit. The simple loss ratio method relied upon by the authors was rejected by insurance regulators in 1996 for its inability to determine whether credit was a proxy for some other risk factor used by insurers or for some prohibited factor, such as race. Recent actuarial literature confirms the problems with the loss ratio method for the task attempted by the BBR.

The authors make false statements of dramatic magnitude. Since 1996, the key question about the relationship between credit history and insurance losses has been whether credit is a proxy for other factors. The NAIC and others have called for analyses that simultaneously consider credit history with other risk factors used by insurers, such as age of driver, type of vehicle, type of coverages, driving record, geographic location and various discounts. This type of analysis – which considers multiple variables at the same time – is called a multivariate analysis.

The authors claimed to have performed a multivariate analysis, when they, in fact, did not. By doing so, the authors falsely claimed to have answered the most pressing questions about the credit scoring correlation controversy. Predictably, the insurance industry leaped upon the BBR study to support their efforts around the country to prevent state legislatures from limiting the use of consumer credit history in insurance underwriting and rating. The authors' false statements misinform policymakers across the country about the relationship between credit scoring and insurance losses.

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<sup>1</sup> CEJ is a Texas 501(c)3 non profit organization that advocates on behalf of low income consumers on insurance, credit and utility matters. CEJ seeks to improve the availability and affordability of basic goods and services to low income consumers. Birny Birnbaum, CEJ's Executive Director, has extensive experience with credit scoring, having worked on the issues for 12 years as an insurance regulator (Associate Commissioner for Policy and Research and Chief Economist at the Texas Department of Insurance) and as a consulting economist to consumer organizations and public agencies. A more detailed description of his experience is attached.

The authors ignore key findings that show that credit history is a proxy for other risk factors used by insurers. The authors found that average and median credit scores were much higher in the standard market than in the nonstandard (so-called “high risk”) market. But the scores were taken from policies issued in 1998 – before the insurers were using credit history to underwrite consumers in the standard and nonstandard markets. Consequently, if credit history was unrelated to underwriting risk factors used by insurers, we would expect average scores to be similar in the standard and nonstandard markets. The fact that the scores were so different between the two markets means that insurers were already using some underwriting factor or factors to distinguish risk of consumers that is correlated to credit.

In addition to showing that credit scores are a proxy for other risk factors used by insurers, the difference in credit scores between the standard and nonstandard markets also indicates that credit scores are correlated to race and income of consumers. Just as low credit scores are more prevalent in the nonstandard market, the likelihood of being denied coverage in the standard market and ending up in a high-cost county mutual grows dramatically as the neighborhood becomes less affluent and less white.

The authors’ conclusions are also suspect because they failed to look at any homeowners insurance data. Incredibly, the authors studied only auto insurance data and then drew broad conclusions about credit and insurance losses beyond auto insurance. The authors failed to limit their conclusions to the line of insurance that they actually studied.

In summary, the study by the BBR does not support the author’s conclusions. Rather, the study’s data document the problems and inherent unfairness of insurers’ use of consumer credit information for underwriting and rating homeowners and auto insurance.

## **2. Unreliable, Discredited Methodology**

There has been little dispute that insurers can produce numbers showing that credit scores are correlated to loss ratios. Insurers routinely provide such loss ratio correlations for a variety of risk classification factors for which there is no plausible actual relationship to risk of loss. The question, since at least the mid 1990’s, has been, is this correlation due to credit itself or is it due to some other factor that is correlated to credit history? Is credit history a proxy for other risk factors, including prohibited factors such as race?

The BBR analysis relies upon a simple loss ratio methodology. By “simple loss ratio methodology,” we mean an analysis that simply compares credit score range with loss ratio. The theory behind the simple loss ratio analysis is that insurers have priced their book of business and the various risk classification factors to produce a target loss ratio. The target loss ratio yields the desired profit by the insurer. By comparing the loss ratios of groups of consumers who differ by one risk classification characteristic, the insurer can, in theory, determine if that risk characteristic is priced correctly or if that risk characteristic

is predictive of expected loss. In the BBR study, the authors compared loss ratios<sup>2</sup> of consumers with certain credit scores to the loss ratios of consumers within another range of credit scores. In theory, a difference in loss ratio indicates a difference in expected losses based upon the risk classification characteristic in question – the credit score. And, in theory, the differences in loss ratio can be used develop the rating factor relativities – discounts and surcharges – for the new credit score rating factor.

The simple loss ratio approach to evaluating the relationship between a risk classification characteristic and expected losses is flawed for two major reasons. First, the simple loss ratio approach over-aggregates various coverage and rating factors into, typically, two groups. By failing to break out the customer groupings by other rating characteristics – coverage, limits of liability, rating territory, multi-policy discount and driver classification, among others – the simple loss ratio groupings may simply be reflecting the combination of groupings with different loss ratios.

To illustrate, consider the following hypothetical example. Suppose that high credit scores were correlated with full coverage policies and low credit scores were correlated with liability only policies. The expected loss ratio for physical damage coverages is higher than the expected loss ratio for liability coverages because of greater investment income for liability coverages. Thus, the expected loss ratio for full coverage policies will be higher than the expected loss ratio for liability only policies. Consequently, a difference in loss ratios between groups with high and low credit scores, in this illustration, may simply reflect the correlation between high credit scores and full coverage policies versus low credit scores and liability only policies.

Our review of another manual rule filing further illustrates this problem. A company made a filing for a residential property insurance tenure discount – discounts for certain years with the insurer. In support of the filing, the company provided loss ratios for policies broken out by the number of years the policyholder was insured by the company prior to the policies being analyzed. The data showed that loss ratios declines for policies with two years of tenure compared to policies with only one year of tenure. The pattern continued with tenures of three, four and five years. We then asked the company to provide the tenure experience broken out not just by years of tenure, but also separately for renters and homeowners coverages. We discovered that, when analyzed separately, the homeowners and renters loss ratios were flat over years of tenure. The combined results reflected the combination of the higher loss ratio renters coverage with homeowners coverage and the fact that renters became a smaller and smaller portion of the total with increasing years of tenure.

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<sup>2</sup> In fact, the authors utilized what they term “relative loss ratios” instead of actual loss ratios. They attempt to normalize loss ratios to allow for combination of multiple insurer data. This technique is flawed because the authors assume that the actual loss ratio experienced by insurers is the insurers’ target loss ratio. In fact, insurers experienced very low auto liability loss ratios in 1998 – far below reasonable target loss ratios.

The second, and even greater problem, with the loss ratio approach to evaluating the correlation of consumer credit to risk of loss is that a critical assumption underlying the methodology is invalid. The loss ratio approach assumes that all risk classification factors are already taken into account in the premium – the denominator of the loss ratio. Moreover, the assumption is not only that all other risk classification factors are taken into account, but that those factors are all correctly priced. If the factors are mispriced, then the difference in loss ratio among the two groups may be a result of the factor in question being correlated with another mispriced rating factor.

To illustrate, consider the following hypothetical. Suppose that high credit scores were correlated with drivers aged 30-60 and low scores were correlated to drivers aged 29 and below. Further suppose that, as a group, the younger drivers were underpriced, so they had higher loss ratios than the group of drivers 30-60, who are overpriced. In this instance, a difference in loss ratios by credit score would reflect, perhaps among other things, the mispricing of the coverages by age and may not reflect any difference in expected loss by credit score.

The second problem with the loss ratio methodology renders the methodology unhelpful for examining the correlation of credit scores and risk of loss because insurers routinely depart from actuarial indications when making their pricing decisions. It is not uncommon for insurers to submit a filing with, say, a 20% indicated rate change and then select a 5% change “for competitive reasons.” Further, it is also common for insurers to misprice particular risk factors for marketing reasons, including multi-car discounts, multi-policy discounts, increased limits factors and many others. And for 1998 auto insurance policies in Texas, liability coverages were greatly overpriced and loss ratios were much lower than reasonable expected loss ratios.

The bottom line is that the simple loss ratio analysis used by the companies to support both their use of credit scoring and their multi-policy discount is not a robust enough methodology to have confidence in the results. And, in fact, the simple loss ratio approach used by the BBR was rejected *in 1996* by the NAIC as a meaningful way to examine the correlation of credit histories to risk of loss.

#### NAIC Rejected the BBR Correlation Methodology in 1996

In 1996, the National Association of Insurance Commissioners (NAIC) credit scoring working group dismissed the simple loss ratio analysis – credit scores versus loss ratio – as insufficient to demonstrate a true correlation between credit and risk of loss. Rather, the NAIC group called for a multivariate analysis – an analysis that specifically accounts for all other underwriting and rating factors used by insurers – to determine what credit’s unique contribution to risk of loss might be. The NAIC wanted to know if credit was correlated with some other factor – something already used by insurers but mispriced or something prohibited.

Attachment 1 shows the proposal from Fair, Isaac an “independent review of the correlation between credit histories and risk of loss” presented to the NAIC credit scoring working group in May 1996. This proposal is nearly identical to the analysis performed by the BBR – right down to the use of ten credit score ranges. Phase I of the Fair, Isaac proposal calls for Fair, Isaac to provide premiums and losses in each of ten credit score ranges. The independent consultant would then check to see if there was a correlation between the credit score ranges and loss ratio. Phase II of the 1996 Fair, Isaac proposal calls for the accounting or actuarial firm to look at individual policy credit scores, premium and losses and conduct a correlation analysis.

The BBR study, despite promising the Texas Legislature a multivariate analysis, performed the same analysis as proposed by Fair, Isaac to the NAIC in 1996. The NAIC rejected the proposed Fair, Isaac analysis, stating in a June 26, 1996 letter, “members of the subgroup do not see much value to this proposal. In fact, members of the subgroup may determine any findings to be counterproductive and misleading unless the following questions are answered.” (See Attachment 2)

The letter asked Fair, Isaac to conduct a multivariate analysis:

Would the insurers willing to participate in the phase 2 project be willing to provide additional data elements for each policy to allow for a multi-variate analysis identifying the unique contribution of credit history to explaining risk of loss? The additional data elements would include the key risk factors of the vehicle, property or consumers as well as paid losses and paid claim count. Using automobile insurance as an example, the data elements could include driver age, driving record, age, sex, marital status, driver class, rating territory, ZIP code, multi-car discount, defensive driving discount, vehicle make and model, and vehicle symbol. In addition, the participating insurers would need to provide the independent firm with a complete description of underwriting guidelines, rating rules and the manner in which the credit score is applied. Depending upon the line of insurance (liability versus physical damage) the participating insurer may need to provide accident year experience evaluated over a shorter or longer period of time. Finally, the independent firm would need to review the reliability of the data provided, including at a minimum, reconciliation to annual statement numbers to ensure completeness.

Fair, Isaac declined to perform the multivariate analysis requested by the insurance regulators. (Attachment 3)

The reasonableness of the NAIC working group’s request was later demonstrated in an article by Wayne Holdredge of Tillinghast, who was the principal analyst of the study that Fair, Isaac commissioned and that the NAIC rejected. Mr. Holdredge wrote, in the March 9, 1998 issue of *BestWeek* (Attachment 4):

The NAIC said the research seemed to support the industry's position that credit scoring should remain one of the tools available to insurers for rating and underwriting decisions. But the commissioners also seemed to feel that the research needed to go to the next level of analysis before they could comfortably give credit scoring their whole hearted endorsement. Beneath the broad picture of correlation between credit scoring and loss ratios, there were enough unexplained data to make the commissioners want to know more.

Tillinghast produced the analysis for Fair, Isaac, the firm that provides credit scores to the industry. We understand quite well the NAIC's desire to know more. We believe the arguments for going ahead with the additional research – regardless of who conducts the further analysis – are compelling.

...

The real puzzlement, in light of these arguments, is with the industry's reluctance to take on this additional research.

The BBR analysis of correlation of credit scoring to expected losses relies upon the same loss ratio methodology rejected by the NAIC in 1996. As such, the loss ratio analysis offers nothing new on the correlation controversy.

### **3. False Statements of Dramatic Magnitude**

The BBR report contains several false statements of large magnitude. The BBR report claims to have performed analyses incorporating other risk factors along with credit history to examine the relationship of credit history to risk of loss. In fact, the BBR performed no multivariate analyses.

As described above, the key issue in a study of the correlation of insurance credit scoring to risk of loss is to determine whether credit scoring has a unique relationship to risk of loss or is simply correlated to other risk factors that are already considered by insurers or that are prohibited. The simple loss ratio – univariate – approach cannot provide this type of analysis. Consequently, for several years, consumer advocates and insurance regulators have been calling for the multivariate analysis that can answer the key question.

A univariate analysis (also sometimes called a bivariate analysis) examines the relationship between two items. It is called univariate because the analysis tests the relationship between one item and another item. It is testing the impact of one item, taken alone, on another item. In contrast, a multivariate analysis tests the relationship of two or more explanatory factors to another item, also known as the dependent variable. A multivariate analysis, as described in the NAIC letter cited above, examines the simultaneous impacts of several explanatory factors in explaining loss ratio.

The difference between univariate and multivariate analysis is significant. The univariate analyses of credit scoring have failed to answer the correlation question for many years. The need for a multivariate analysis is obvious and is one of the core premises of the BBR study proposal. See attachment 5 which is a copy of the BBR project statement.

### No Multivariate Analysis

But there is a major problem. The BBR analysis did not contain a multivariate analysis. Despite several statements in its report claiming to have performed a multivariate analysis, the BBR performed no such analysis. Their analysis consisted of the following:

- Univariate (or bivariate) correlation of credit score range midpoints to “relative loss ratio.”
- Univariate (or bivariate) ordinary least squares regression of credit score range midpoints to “relative loss ratio;
- Univariate (or bivariate) logistic regression of individual credit score to individual loss ratio, with zero for loss ratio less than 1.0 and one for loss ratio greater than 1.0.
- Univariate (or bivariate) average incurred losses and claim frequency by credit score ranges.

The BBR analysis included no multivariate analysis. Yet, the BBR report states, on at least four occasions, that they performed such a multivariate analysis. These gross misrepresentations include:

Statement:

“Using logistic and multiple regression analysis, the research team tested whether the credit score for the named insured on a policy was significantly related to incurred losses for that policy” (Executive Summary)

Fact:

*No multiple regression analysis was performed.*

Statement:

“Next, logistic and multiple regression analyses examined whether the revealed relationship between credit score and incurred losses were explaining by existing underwriting variables, or whether the credit score added new information about losses not contained in the existing underwriting variables. It was determined that credit score did yield new information not contained in the existing underwriting variables” (Executive Summary)

Fact:

*No multiple regressions were performed and no logistic regressions were performed that included any independent variables other than credit score.*

Statement:

“To effect this assessment, a random sample of automobile insurance policies, including loss histories, premiums, and other variables, were obtained from several of the largest companies writing automobile insurance coverage in Texas. These policies were then matched with the credit history of the named insured on the policy to create a database including both policy information and credit information . . . (Page 1)

Fact:

*No database was created and no analysis was performed that included policy variables other than premiums, losses and credit score. No other rating variables were included in the BBR analyses.*

Statement:

“Thus, the analyses show that both the likelihood of a positive claim, and the size of the claim should it occur, are significantly related to credit score, even accounting for other underwriting variables and differences in individual company target loss ratios.” (Page 10)

Fact:

*No analysis was performed that incorporated other underwriting variables. The analyses referenced were all univariate analyses relating credit score to only one data element.*

A recent paper prepared for the 2003 Winter Forum of the Casualty Actuarial Society explains in detail the differences between univariate and multivariate analyses and the limitations of multivariate analysis when risk factors are correlated with one another. The paper, “Does Credit Score Really Explain Insurance Losses? Multivariate Analysis from a Data Mining Point of View,” was authored by Cheng-Sheng Peter Wu and James C. Guszczka and is available on the CAS website at <http://casact.org/pubs/forum/03wforum/03wf113.pdf>.

We cite extensively from the paper in Attachment 6 to confirm the failure of the BBR authors to perform a multivariate analysis and the problems with the simple loss ratio methodology used by the BBR authors. The paper references the Tillinghast study, discussed above, and states that the Tillinghast study, which utilized a nearly identical methodology to that employed by the BBR authors, was a univariate – and not a multivariate – analysis. Cogent points from the CAS paper include:

This issue -- that non-orthogonal rating variables call for multivariate statistical analyses -- lies at the heart of the debate over credit. In addition, this issue is perhaps the key theme in the *methodological* development of classification ratemaking since the 1960's.

....

Non-Independent Rating Variables: We believe that this is the key issue of the debate over the explanatory power of credit score. Intuitively, independence means that knowing the probability distribution of one variable tells you absolutely nothing about the other variable. Non-independence is common in insurance data. For example, youthful drivers have more accidents and violations than do mature



drivers; mature drivers have more cars on their policies than do youthful drivers; number of drivers are correlated with number of vehicles. We can therefore expect that credit score will exhibit dependences with other insurance variables, such as driver age, gender, rating territory, auto symbol, and so on.

Univariate v. Multivariate Analyses: In the case of independent random variables, univariate analyses of each variable are entirely sufficient -- a multivariate analysis would add nothing in this case. Failure of independence, on the other hand, demands multivariate analysis. Furthermore, the results of multivariate analyses can be surprising. Below, we will give a hypothetical example in which an apparently strong relationship between credit and loss disappears entirely in a multivariate context.

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Clearly, the information provided to Tillinghast only allowed for a univariate study, and this is all Tillinghast set out to perform.

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This is a very simple example of what can go wrong when one's data does not contain all relevant variables: *an apparent correlation between two variables can disappear when a third variable is introduced.*

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These considerations make it clear that a multivariate analysis is needed to assess whether credit history bears a *true* relation with insurance loss experience. A univariate analysis might produce a statistical illusion, not true insight.

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In other words, to the extent that all possible confounding variables are perfectly accounted for in premium, Tillinghast's "univariate" analysis *is* implicitly a multivariate analysis, and is therefore convincing. But realistically, this may not be the case. For example, in our work we regularly regress loss ratio on such zip code-based variables as population density and median population age. If territory were entirely accounted for in premium, such variables would never appear statistically significant. But in fact they sometimes do. Therefore a true multivariate study is desirable even if loss ratio is used as the target variable.

### False Claims by BBR Have Major Impact

Many policymakers across the country have been looking for an independent multivariate analysis of credit scoring. The numerous univariate analyses offered over the years have not answered the insurance credit scoring correlation question. Consequently, when the BBR study claims to have found a correlation using multivariate analysis, such a finding would have – and has had – a major impact on the credit scoring debate across the country. By claiming to perform a multivariate analysis, the BBR represents its study as answering a question long asked but never answered. And by stating that its conclusion of a correlation of credit scores to losses is based on a multivariate analysis, the BBR is

placing its study at the very forefront of the debate – with a conclusion that supports industry assertions.

The insurance industry wasted no time in trumpeting the results of the BBR study. At the March 9, 2003 meeting of the NAIC credit scoring working group – less than 24 hours after the study was released! – the insurance industry was touting the BBR study.

The misuse and misinterpretation of the BBR study is evidenced by how one industry actuary, at a meeting of actuaries, described the BBR study. The *Insurance Journal* reported that Roosevelt Mosely, “said something that could assist the industry are the results of a University of Texas-Austin study – a true multivariate study that concludes that credit has strong predictive power.” (Attachment 7)

Even some insurance commissioners have come to rely upon the BBR study. According to *BestDay*, “Mike Pickens, Arkansas insurance commissioner and NAIC president, said insurance scoring is valid and credible, pointing to a recently released University of Texas study showing a high correlation between credit scores and frequency, probability and degree of loss. The study ‘was the first one not bought and paid for by an insurance company,’ Pickens said. ‘It basically legitimizes everything we heard. Why it works, I don't know, but it does work.’ ” (Attachment 8)

#### **4. Key Findings Ignored: Credit Score is a Proxy for Other Risk Factors and Race, Income**

The BBR report reveals an important result – the average credit scores for non-standard business are significantly lower than the average credit scores for standard business. Since the scores were taken from policies issued in the beginning of 1998 – specifically chosen because the insurers were not using credit at the time – we would expect a random distribution of credit scores between the two groups. In other words, because the scores were taken before insurers were using credit, we expect the average or median scores in the two markets to be about the same. But the scores differed dramatically between the standard and nonstandard markets. This means that insurers were already using some underwriting factor or factors to distinguish risk of consumers that is correlated to credit.

The median credit scores for the nonstandard and standard markets were 645 and 733, respectively. A difference of 88 points in a credit score will typically make a large difference in rates charged a consumer. On one of its web sites, ChoicePoint, the credit scoring vendor which provided the credit scores for the BBR study shows four categories of ranges. Table 1 shows the distribution of credit scores by these ranges. A higher score

is a better (lower risk) score. Table 1 shows that over 50% of the nonstandard policyholders were in the bottom two score ranges, while less than 22% of the standard policyholders were in these ranges. If we were to assume, for illustration, that insurers relied on driving record to place consumers in standard or nonstandard markets, then the credit score distributions would indicate that credit score is highly correlated with – and duplicative of – driving record.

**Table 1**  
**Nonstandard versus Standard Market Credit Scores**

Choice Point	Non Standard		Standard	
<u>Ranges</u>	<u>Number</u>	<u>Share</u>	<u>Number</u>	<u>Share</u>
<= 500	218	0.75%	332	0.27%
501 – 650	14,733	50.78%	27,024	21.77%
651 – 750	9,493	32.72%	43,512	35.05%
>= 751	4,570	15.75%	53,267	42.91%
Total	29,014		124,135	

For a study purporting to determine whether “credit score yield(s) new information not contained in existing underwriting variables,” the finding of different credit scores for standard and non-standard markets should yield an important conclusion – that credit scores, to at least some extent, duplicate other variables insurers are using. However, the BBR report concluded something entirely different from this finding – that the absence of rate regulation in the non-standard market was a virtue. At best, this conclusion by the BBR authors is irrelevant editorializing.<sup>3</sup> At worst, it is a failure to report important information to policymakers.

What makes the BBR authors’ failure to explain the important of the standard / nonstandard credit score split even more egregious is the presence of a powerful correlation between a consumer’s rejection by the standard market for insurance and the race and income of the consumer. Earlier studies of the Texas automobile insurance market showed that in high minority ZIP codes, over 50% of the consumers purchasing auto insurance were denied coverage by standard insurers and were forced to purchase higher-priced nonstandard insurance coverage compared to less than 10% in low minority ZIP codes. In Table 2, the auto rejection rate is the percentage of insured drivers in non-

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<sup>3</sup> Despite repeated requests, the authors failed to provide a copy of the working paper describing the “safety valve” role of county mutual insurance companies. We understand the authors’ statement to reflect their belief that an absence of rate regulation for county mutuals is a good thing because it gives the county mutuals flexibility to price so-called “high risk” drivers. This conclusion is, of course, irrelevant in a study purporting to examine the relationship between credit history and risk of loss. However, the statement also reveals the authors’ bias towards the insurance industry desire for deregulating insurance rates. There is, in fact, no evidence that a failure to have regulatory oversight over the reasonableness of rates charged by nonstandard insurers promotes insurance availability. There are literally dozens of states where rates charged by nonstandard insurers, such as Progressive, are subject to regulatory oversight through prior approval or file and use systems. And nonstandard insurers have been able to successfully conduct business in most or all of those states.

standard insurers or the assigned risk plan. Consequently, the finding of different credit scores for standard and nonstandard markets reveals not only the duplication of credit history with some other underwriting factors already used by insurers, but also the likely correlation of credit with prohibited factors, such as race.

In the table below<sup>4</sup>, the auto rejection rate is the percentage of insured drivers in non-standard insurers or the assigned risk plan. Consequently, the finding of different credit scores for standard and nonstandard markets reveals not only the duplication of credit history with some other underwriting factors already used by insurers, but also the likely correlation of credit with prohibited factors, such as race.

**Table 2**  
**Standard Auto Insurance Market Rejection Rates in Texas versus Race and Income**

Automobile Rejection Rate	1996 Average of Non-Anglo Population Percentage	1996 Average of Median Household Income	1996 Number of ZIP Codes
0.0% to 5.2%	4.7%	\$22,414	1
5.3% to 10.4%	12.1%	\$44,042	74
10.5% to 15.6%	13.6%	\$30,565	317
15.7% to 20.8%	20.7%	\$24,871	413
20.9% to 26.0%	29.4%	\$24,523	280
26.1% to 31.1%	43.0%	\$23,456	142
31.2% to 36.3%	54.6%	\$21,549	79
36.4% to 41.5%	68.5%	\$19,954	65
41.6% to 46.7%	82.7%	\$17,682	45
46.8% to 51.9%	83.7%	\$16,441	38
Over 51.9%	92.3%	\$14,015	26

<sup>4</sup> Table reproduced from a 1997 report by the Center for Economic Justice, *Auto Insurance Redlining in Texas: Availability Worsens While Consumers Lose Affordable Coverage Options*.

## **5. No Analysis of Homeowners Insurance**

Despite a project workplan that pledged an examination of the relationship between consumer credit history and expected losses for auto and homeowners insurance, the BBR authors only collected and analyzed personal auto data. This is not only a major failing of the report – the homeowners line has been the subject of the most controversy in Texas in recent years – but yet another example of the authors’ errant analysis. Although they examined only auto insurance data, the BBR authors made no effort to limit their conclusions to auto insurance. The authors stated general conclusions with no caveat that the conclusions may only apply to auto insurance. Since the nature of claims for homeowners insurance is different from those for auto insurance – a much greater percentage of homeowners claims are catastrophe weather-related claims than for auto – there is no basis to conclude that consumer credit history is related to expected losses for homeowners insurance from a study of auto insurance.

## **Qualifications of Birny Birnbaum**

Birny Birnbaum is a consulting economist whose work focuses on community development, economic development and insurance issues. Birny has served as an expert witness on a variety of economic and actuarial insurance issues in California, New York, Texas and other states. Birny serves as an economic adviser to and Executive Director for the Center for Economic Justice, a Texas non-profit organization, whose mission is to advocate on behalf of low-income consumers on issues of availability, affordability, accessibility of basic goods and services, such as utilities, credit and insurance. Birny has authored reports on insurance markets, insurance credit scoring, insurance redlining and credit insurance abuses for CEJ and other organizations. Birny serves on the NAIC Consumer Board of Trustees.

Birny has worked on insurance credit scoring issues for 12 years as both an insurance regulator and consumer advocate. Birny has recently authored a report on insurance credit scoring for the Ohio Civil Rights Commission and served on the Florida Insurance Commissioner's Task Force on Credit Scoring.

Birny served for three years as Associate Commissioner for Policy and Research and the Chief Economist at the Texas Department of Insurance. At the Department, Birny provided technical and policy advice to the Commissioner of Insurance and performed policy research and analysis for the Department on a variety of topics. His particular areas of insurance expertise include:

- Homeowners and Automobile Insurance Availability and Affordability
- Evaluation of Underwriting and Rating Factors
- Data Strategy, Collection and Analysis
- Analysis of Insurance Markets and Availability
- Review of Rate Filings and Rate Analysis
- Loss Prevention/Cost Drivers
- Regulatory Policy and Implementation

Prior to coming to the Department, Birny was the Chief Economist at the Office of Public Insurance Counsel (OPIC), working on a variety of insurance issues. OPIC is a Texas State agency whose mission is to advocate on behalf of insurance consumers. Prior to OPIC, Birny was a consulting economist working on community and economic development projects. Birny also worked as business and financial analyst for the Port Authority of New York and New Jersey. Birny was educated at Bowdoin College and the Massachusetts Institute of Technology.

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**Attachment 1  
May 1996 Credit Scoring Research Proposal from Fair, Isaac to the NAIC**

**OUTLINE FOR AN INDEPENDENT REVIEW  
OF THE CORRELATION BETWEEN  
CREDIT HISTORIES AND RISK OF LOSS**

1. During the subgroup's review of the use of consumer credit information to underwrite insurance risks, consumer representatives and regulators have raised concerns about the correlation between consumer credit histories and loss ratio used to establish a predictive scoring system model.
2. Although Fair, Isaac has provided information to the subgroup illustrating its predictive scoring process and the types of data used in making this analysis, the subgroup has determined that this level of data is not sufficient to address regulatory concerns.
3. In response to these concerns, Fair, Isaac has stated that the data required to address the subgroup's concerns is not its property to disseminate. Equally important, Fair, Isaac wants to ensure that its intellectual property is protected.
4. To address the concerns of the subgroup, Fair, Isaac has suggested an independent review of the correlation between certain consumer credit information and loss ratio. However, this agreement is conditioned on the subgroup clearly specifying the data to be reviewed and/or the outcomes sought, and underlying data being made available by credit information companies and insurance companies. Necessarily, the participation of credit information companies and insurers will depend on the type of data being requested, the protection accorded proprietary information and the costs.
5. Based on recent discussions with Fair, Isaac, it appears that we can address the concerns of the subgroup in a two-phase independent review process. Assuming we structure the independent review to evaluate the correlation between consumer credit histories and loss ratio, the independent review would go, as follows:

**Phase I - Independent Opinion on Current Validation Results**

An accounting or actuarial firm will be engaged by Fair, Isaac to statistically analyze the loss ratio to score results up to 10 insurer validations to confirm the statistical correlation between consumer credit histories and personal lines automobile and homeowner policy loss ratio. For each validation, the data for Phase I analysis would be supplied in matrix form with approximately 10 score ranges, and premiums and losses for each range. A non-disclosure agreement will be executed among all parties before the Phase I analysis begins.

The firm's report would be made to Fair, Isaac and state an independent opinion as to the correlation of score and loss ratio. Unless a credit information company or an insurer elects to do so, the report would not disclose the names or descriptions of entities



participating in the independent review. The report will be made available to the subgroup, Equifax and Trans Union and insurance companies to justify the use of consumer credit information and insurance bureau scores in the underwriting process.

Providing cooperation can be obtained from insurance and credit information companies soon, the Phase I report would be presented at the NAIC September meeting.

### **Phase II - Validation and Correlation Analysis**

Fair, Isaac will arrange for the accounting or actuarial firm to conduct an independent validation of the correlation. Data will be provided on individual risk scores to the firm by expanding the work done in Phase I. The data supplied will be a score, earned premium and incurred losses for each policy. The firm will obtain insurance bureau scores from Equifax or Trans Union and conduct its own correlation analysis and independent validation of the score.

The firm's expanded report would be made to Fair, Isaac and state an independent opinion as to the correlation of score and loss ratio. The expanded report will be made available as outlined in Phase I and all non-disclosure agreements will remain in place.

Since Phase II will require the independent firm to receive data from insurers as well as Equifax or Trans Union, the timetable is not under Fair, Isaac's control. The sooner an agreement is reached, the sooner work can get started. Hopefully, the timetable will allow time to incorporate these results in the final white paper prior to year end.

We understand that either a Big Six accounting firm or a recognized actuarial consulting firm will conduct the independent view.

**Review of the University of Texas Bureau of Business Research  
Study on Insurance Credit Scoring**

**Birny Birnbaum  
Center for Economic Justice**

**June 2003**

**Attachment 2  
June 1996 Response from NAIC to Fair, Isaac Credit Scoring Research Proposal**



120 West 12th Street  
Suite 1100  
Kansas City, Missouri 64105-1925  
816-842-3600

816-471-7004 Main Fax

816-842-9185 Financial Services & Research Fax

National  
Association  
of Insurance  
Commissioners

June 26, 1996

Mr. Lamont Boyd  
Senior Marketing Representative  
Fair, Isaac and Company  
120 North Redwood Drive  
San Rafael, CA 94903 1996

Dear Lamont:

The Credit Reports Subgroup has reviewed the elements of the Fair, Isaac proposal to contract with an accounting or actuarial firm to conduct a review of Fair, Isaac's credit reports scoring. I have attached a copy of the document which was discussed at the Credit Reports Subgroup meeting on June 3, 1996, 'Outline for an independent review of the correlation between credit histories and risk of loss.' At this meeting, the Credit Reports Subgroup agreed to present questions to Fair, Isaac that it feels any independent analysis should address. If in fact Fair, Isaac decides to proceed with a study it will have to consider the following questions:

Phase I, Question 1: Do we understand correctly that your phase 1 proposal would involve an independent firm calculating loss ratios for credit score ranges based upon data provided by Fair, Isaac? Do we understand correctly that the data provided by Fair, Isaac will be earned premium and incurred losses summed for various credit score ranges and that these results have already been publicly presented by Fair, Isaac as loss ratios associated with credit score ranges? Do we understand correctly that phase 1 essentially consists of an independent firm checking Fair, Isaac's ability to divide incurred losses by earned premium?

Phase 2, Question 1: Do we understand correctly that your phase 2 proposal would involve an independent firm analyzing new data supplied by up to ten insurers? Do we understand correctly that the insurers willing to participate would, according to the proposal, provide three data elements for each policy written over a specified period of time—the credit score produced through the application of one of Fair, Isaac's decision-making algorithms based upon credit history at inception or renewal date of policy, the earned premium over the exposure period and the incurred losses over the exposure period?

Comment: First, it would appear the analysis would simply associate the ratio of incurred losses to earned premium with credit scores and would not answer the key question of whether credit history provides a unique contribution to explaining risk of loss. Second, because the participating insurers

would be volunteers, it is unlikely that insurers whose experience did not show higher loss ratios associated with higher credit scores would participate. Third, because incurred losses include reserves established by companies for individual claims, company reserving practices could skew the results.

If the answer to the above questions is yes, members of the subgroup do not see much value to this proposal. In fact, members of the subgroup may determine any findings to be counterproductive and misleading unless the following questions are answered:

Phase 2, Question 2: Would the insurers willing to participate in the phase 2 project be willing to provide additional data elements for each policy to allow for a multi-variate analysis identifying the unique contribution of credit history to explaining risk of loss? The additional data elements would include the key risk factors of the vehicle, property or consumer as well as paid losses and paid claim count. Using automobile insurance as an example, the data elements could include driver age, driving record, age, sex, marital status, driver class, rating territory, ZIP code, multi-car policy, defensive driving discount, vehicle make and model, and vehicle symbol. In addition, the participating insurers would need to provide the independent firm with a complete description of underwriting guidelines, rating rules and the manner in which the credit score is applied. Depending upon the line of insurance (liability versus physical damage) the participating insurer may need to provide accident year experience evaluated over a shorter or longer period of time. Finally, the independent firm would need to review the reliability of the data provided, including at a minimum, reconciliations to annual statement numbers to ensure completeness.

Comment: The information provided above would allow for an analysis which answers two of the subgroup's questions. First, assuming the necessary data elements and data are available and reliable, a multi-variate analysis of these data could better identify any unique contribution of credit history to explaining risk of loss. Second, the information provided by participating insurers could be used to review and evaluate the specific application of credit scores provided by Fair, Isaac. The analysis described in Phase 2, Question 2 would be very valuable to the working group.

Phase 2, Question 3: Would Fair, Isaac and participating insurers be willing to allow a few members of the working group to review and comment upon the study design and analysis performed by the independent firm in Phase 2, Question 2?

Comment: Because Fair, Isaac and insurers have an interest in the outcome of the study and because the degree of a consulting firm's independence may be viewed differently by Fair, Isaac, insurers, regulators and consumers, the ability of some working group members to review and evaluate study design, implementation and analysis would add credibility to the results.

The subgroup is neither endorsing or requiring that this analysis be conducted; however, if it is conducted the subgroup would be interested in reviewing the results. Please be aware that the Credit Reports Subgroup

is committed to its timetable for release of the white paper *Credit Reports and Insurance Underwriting* at the NAIC Fall National meeting which will be held September 29, 1996 to October 2, 1996.

Sincerely,

A handwritten signature in cursive script that reads "Dudley B. Ewen" followed by a small flourish.

Dudley B. Ewen, Maryland Insurance Administration  
Chair, Credit Reports Subgroup

cc: Credit Reports Subgroup  
Cathy Gussow

**Review of the University of Texas Bureau of Business Research  
Study on Insurance Credit Scoring**

**Birny Birnbaum  
Center for Economic Justice**

**June 2003**

**Attachment 3  
June 1996 Letter from Fair, Isaac to NAIC**

## LAW OFFICES

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ROBERT M. WILLIS  
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 TELEFAX 501-873-0527

July 19, 1996

**VIA FACSIMILE**

Mr. Dudley Ewen  
 Chair, Credit Reports Subgroup  
 National Association of Insurance Commissioners  
 120 West 12th Street, Suite 1100  
 Kansas City, MO 64105-1925

**RE: Questions Posed for Independent Analysis**

Dear Chairperson Ewen:

This correspondence is with reference to your letter dated June 26, 1996. The letter presents a series of questions the Credit Reports Subgroup (Subgroup) believes should be addressed in an independent review of the correlation between consumer credit information and loss ratio.

After a careful review of the Subgroup's letter, we conclude that several questions are clearly beyond the purpose of Fair, Isaac showing the correlation between consumer credit information and loss ratio. As we clearly stated before both the Subgroup and Market Conduct and Consumer Affairs (EX3) Committee meetings in New York, Fair, Isaac will not respond to regulatory questions beyond the scope of showing the correlation.

In an effort to provide the independent evaluation of the correlation, the Company is currently discussing these questions with its business partners and insurance company customers to decide an appropriate response, if any. I want to say again that Fair, Isaac's ability to respond to all the Subgroup's questions is limited because the Company does not own the data necessary for review.

The scope of this evaluation will be similar to the proposal outlined at the NAIC New York meeting. Although this evaluation may not meet all of the concerns expressed by the Subgroup, we believe that this report is critically relevant to the lack of a correlation allegation raised in the draft white paper. It is our expectation that this evaluation will be available prior to year end as we continue to work with our business partners and insurance company customers. We respectfully request that the Subgroup include this document as a part of the final white paper.

We also note, with strong concern, the suggestion that Fair, Isaac should show "whether credit history provides a unique contribution to explaining risk of loss." To our knowledge, "unique

MITCHELL, WILLIAMS, SELIG, GATES & WOODYARD, P.L.L.C.

Mr. Dudley Ewen

- 2 -

July 19, 1996

contribution" is not a standard recognized by any state for evaluating an underwriting guideline, and has never been measured by anyone at any time for any underwriting variable. Historically, states have retained the authority to supervise the use of underwriting guidelines. Moreover, we seriously question the authority and regulatory soundness of the NAIC seeking to establish any standard for underwriting guidelines.

As you know, only a few states have enacted legislation regarding underwriting guidelines. In our discussions with industry trade associations and insurance companies regarding the suggested application of a unique contribution standard, each expressed the opinion that insurance regulators have never applied such a standard to any other underwriting guideline. We question, again, why the use of a FCRA-approved underwriting variable, that has been used for decades, is now being subjected to unprecedented scrutiny.

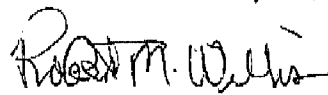
We have pointed out to the Subgroup, several times, that Fair, Isaac's approach uses existing data and its intellectual property to develop predictive scoring models based on consumer credit information and insurer experience for client use. The fact that the Company's approach enables an insurer to make a better underwriting decision should not require a showing of unique contribution. The only relevant consideration should be showing the correlation.

If you have questions or comments about this correspondence, please feel free to contact me or Lamont Boyd.

Sincerely,

MITCHELL, WILLIAMS, SELIG,  
GATES & WOODYARD, P.L.L.C.

By



Robert M. Willis

RMW:cl

cc: The Honorable George M. Reider, Chair, NAIC Market Conduct Affairs (EX3) Committee  
Cathy Gussow, NAIC Staff  
Lamont Boyd, Fair, Isaac



**Review of the University of Texas Bureau of Business Research  
Study on Insurance Credit Scoring**

**Birny Birnbaum  
Center for Economic Justice**

**June 2003**

**Attachment 4  
*BestWeek* Article by Author of Tillinghast/Fair, Isaac Study**

## EXECUTIVES—continued

producers, marketing and operations. She also led the integration between Acton Retirement Services and Financial Network Investment Corp. **John Strangfeld** has been promoted to executive vice president of **Prudential Insurance Co. of America**, in charge of all private investment activity. Strangfeld has headed the company's \$62 billion Private Asset Management Group since 1996, most recently as president. He oversees investments in private equity, real estate and private fixed income in North America, Europe and Asia.

**Thomas R. Strubbe** has been appointed president of **Guarantee Reserve Life Insurance Co.**, a unit of **Irish Life of North America**, the U.S. holding company for **Irish Life plc**, headquartered in Dublin, Ireland. The appointment was effected mid-February. Since 1990 Strubbe has been president and chief executive officer of Osborn laboratories, an underwriting laboratory serving the insurance industry. From 1984 to 1990, Strubbe served as president of **Washington National Corp.**, a life and health company in the Chicago area.

**Chris James** has been named head of the Global HealthCare business group of **Cigna International**, a unit of **Cigna Corp.**, Philadelphia. James is responsible for developing and managing the company's strategy for establishing Cigna health care businesses

in selected countries. He also is responsible for managing its existing health care operations outside the United States. Previously, James was vice president, health care and group benefits, for **Cigna Insurance Co. of Europe S.A.-N.V.**, with responsibility for businesses in the United Kingdom and Spain and the development of new health care businesses in other European countries.

**Everest Reinsurance Holdings Inc.**, Liberty Corner, N.J., has promoted three of its executives to senior vice president. **Larry A. Frakes**, who has been with the company since 1996, manages Everest Re's direct reinsurance unit and is president of two subsidiaries, **Everest National Insurance Co.** and **Everest Indemnity Insurance Co.** **Mark de Saram** heads the company's European operations and is based in London. He has been with Everest Re since 1994. **David A. Schmidt**, who has been with Everest Re since 1988, manages the company's International-USA unit, which underwrites reinsurance in Latin America, the Middle East and Africa, as well as foreign exposures of U.S.-based ceding companies.

**Robert H. Rich** has been named president and chief executive officer of **Ranger Insurance Co.**, Houston. Rich has worked in the insurance industry for 26 years, beginning in underwriting at **Hartford Insurance**

**Group**. He was a senior vice president at **Fireman's Fund Insurance Co.**, Novato, Calif., before joining Ranger in November. **Stephen B. Bonner** has been named executive vice president in charge of retirement income market initiatives at **Keyport Life Insurance Co.**, Boston. In his new position, he will also be responsible for distribution and client services for all Keyport products.

**Edward G. Johnson** has been named executive vice president of **Willis Faber North America**, New York. Johnson has been senior vice president since 1993 and is currently manager of the company's Atlanta office, which handles both treaty and facultative reinsurance. Johnson joined R/A Inc. in 1979 and held several senior officer positions before Willis Faber acquired the company in 1990.

**Michael B. Tine**, 52, a senior vice president at **Cologne Life Re**, died Feb. 21 at Stamford Hospital in Stamford, Conn. Tine, who spent the past eight years as head of Cologne's individual life division, had cancer. He previously worked for **Travelers Insurance Co.** in Hartford. Michael F. Magsig, chairman, president and chief executive officer at Cologne, said in a statement, "As a legacy to Mike, we hope to retain his positive spirit, disciplined analytical approach and his strong sense of team play."

## ONE ANALYST'S VIEW

### Befriending the Camel: The NAIC and Credit Scoring

WAYNE HOLDREDGE  
TILLINGHAST, TOWERS PERRIN

*Wayne Holdredge is a principal at Tillinghast-Towers Perrin, an international firm of independent management consultants and actuaries. He is the author of the study "Insurance Burial Scores vs. Loss Ratio Relativities," commissioned by Fair, Issue and appended to the NAIC white paper on credit scoring.*

**F**riends of the insurance industry today are watching with puzzlement an odd circumstance. Insurers, whose livelihood depends on weighing risks and rewards, are passing up the opportunity for a great reward from fear of a small risk.

The industry is acting out of character because it is reluctant to comply

with regulators' request for stronger, more detailed analysis of the relationship between credit scoring and loss experience. The request came after the National Association of Insurance Commissioners issued its white paper on credit scoring in September.

The NAIC said the research seemed to support the industry's position that credit scoring should remain

## ANALYST—continued

one of the tools available to insurers for rating and underwriting decisions. But the commissioners also seemed to feel that the research needed to go to the next level of analysis before they could comfortably give credit scoring their whole-hearted endorsement. Beneath the broad picture of correlation between credit scoring and loss ratios, there was enough unexplained data to make the commissioners want to know more.

Tillinghast produced the analysis for Fair, Isaac, the firm that provides credit scores to the industry. We understand quite well the NAIC's desire to know more. We believe the arguments for going ahead with that additional research—regardless of who conducts the further analysis—are compelling:

- The initial analysis to test the statistical validity of the relationship between credit scores and loss ratios shows a strong correlation; we have every reason to believe further analysis will only deepen our confidence in that relationship.

- This tool can lead to better results for the industry and its customers—including customers who traditionally have been underserved by the industry.

- If the further analysis reveals that the relationship between credit scoring and loss risk isn't as strong as we initially found, that information will be extraordinarily useful in keeping insurers from making bad decisions.

A deeper look at each of these arguments will show why we believe the industry must go forward with the additional analysis—as a matter of sheer self-interest.

### *Strong Initial Analysis*

In our initial analysis, we tested the likelihood of a correlation between Insurance Bureau Scores, produced by Fair, Isaac for its clients, and what we called "loss ratio relativities" at nine property/casualty companies or busi-

ness units. That is, we wanted to see whether there was a relationship between credit scores for a given company's customers and their loss ratios compared with the average for that company.

For instance, did the group of customers with, say, credit scores at a given company in the 830 to 845 range—which would be at the top of the scale for "good" credit risks—have a greater or lesser relative loss ratio experience than the norm for that company? And, to the larger point, if the relative loss ratios differed among credit score "classes," was the difference random, or did it fall into a larger pattern that would show a significant relationship between credit score and relative loss ratio?

The short answer is that our analysis (a "P-Value" calculation) showed a statistically highly significant relationship between Insurance Bureau Scores and relative loss ratios. For all but one of those companies, there is a 99% probability for that relationship. For the one other company, there is a 92% probability of the relationship.

The connections aren't an accident. Moreover, it seems clear in our overall analysis that higher relative loss ratios generally are associated with lower Insurance Bureau Scores.

That overall pattern makes a strong case for the use of credit scoring by insurers—a point that the commissioners don't dispute. But what provoked their desire for more analysis is a concern that the strong correlation between credit scores and relative loss ratios may actually be driven by, and disguise, some other variable that accounts for loss experience.

Their thinking goes something like this: We know that loss ratios express the relationship between premium and actual loss experience. Premiums, in theory, take into account such known risk factors as age, gender, marital sta-

tus and geographic location. In theory, premiums across covered groups should account for these differences. A difference in relative loss ratio among the groups should express a real difference in loss experience.

But if premiums aren't equally adequate for all groups, then a difference in loss ratio may mean that the premium for a given group—city dwellers, for instance— isn't high enough to cover potential losses. Furthermore, regulators reasoned, that group may also be a greater credit risk. In that case, the correlation between loss ratio and credit risk is somewhat repetitive: it has already been accounted for by some other demographic variable. Using credit scoring, then, doesn't tell underwriters and raters anything new. It may actually create a kind of double jeopardy for some groups.

Regulators would like the industry to conduct additional multivariate analysis that would "neutralize" the difference in losses that might be accounted for by the usual rating variables. If there was still variability in loss after this "neutralization," they reason, then credit scoring might convincingly account for it.

We believe that additional research would show such an outcome. Therefore, we think that additional analysis can only make credit scoring a better, more finely discerning tool. It might even come close to satisfying the regulators' understandable desire to find a causal tie between the components of rating variables, such as credit scores, and losses.

### *Better Results for All*

A better tool is good for both the industry and its customers, including those who believe the industry has underserved them in the past.

We believe additional analysis may actually help answer the "social" objec-

## ANALYST—continued

tions to credit scoring. These frequently are based on the assumption that groups who often face discrimination—racial minorities, women, city dwellers, those with lower incomes—are also necessarily poor credit risks who would have low credit scores.

But that may not be true. Recent studies suggest, for instance, that upper-income people as a class may be a higher credit risk than lower-income people. They may be more likely, for instance, to miss or be late with payments or even to enter bankruptcy because they believe that at their income, somebody will continue to offer them credit. Those with lower incomes, on the other hand, can't afford to treat credit so cavalierly. They may be much more likely to work hard to preserve their good credit standing.

If that's the case, then credit scoring may actually be a powerful tool to make "fairer" judgments that don't harm whole ethnic or racial classes of people, neighborhoods and social groups. It would allow insurers to fairly and justly assess risk that ultimately affects the other people insured, as well as the insurer. But we won't know that without additional research.

With a proven tool, insurers could then provide coverage to urban customers, for instance, in ways that make social sense and good business sense. By not moving forward, we believe that the industry is passing up the rewards of the expanded markets and better-served customers that can come from using this tool.

The industry has a well-known, rational need to expand its traditional markets to nontraditional customers. It's the right thing to do. And it opens new opportunities for growth at a time when traditional markets are essentially

maturing, as their population growth slows and their range of options for risk management increases. They can choose from various financial products offered by many different financial institutions.

For insurers, pursuing nontraditional markets is a necessary survival strategy. But equally necessary are tools to make good judgments about how to serve these new markets. Insurers need to make good underwriting and rate decisions as they enter what, for many of them, is uncharted territory. A better understanding of the relationship between credit scores and losses will help them make those decisions. If they only operate on the current understanding of a broad relationship between creditworthiness and loss, most insurers will both miss opportunities and assume unnecessary risks.

And the opportunities are clearly there. We've already seen individual insurers, such as Allstate, successfully enter neighborhoods that would otherwise be uninsured—or insured at prohibitively high rates. More companies should and would be willing to serve this market, we believe, if the industry acceded to the regulators' quite reasonable request for additional analysis.

*What if We're Wrong?*

All this said, it's still possible that further analysis might show the relationship between creditworthiness and relative loss ratio to be somehow spurious. We don't think it will, or we wouldn't have gotten the results we did in the first analysis. But suppose it did. Then what?

Then the industry ought to celebrate and embrace that knowledge, as should its customers. We would know not to use the relationship, and we

would be saved from making bad decisions based on a faulty understanding and a faulty tool.

As it is, we are left in a kind of limbo. The overall results seem to confirm our confidence in this tool. But the regulators raise legitimate questions about what might underlie the relationships we've demonstrated between credit scoring and loss ratios.

For some customers, the industry's reluctance to address those questions can lead to flat-out distrust, which they will be quite likely to voice to the commissioners.

*Why Not Further Research?*

The real puzzlement, in light of these arguments, is the industry's reluctance to take on this additional research.

We've heard the industry's position, as articulated by its spokespersons. First, they seem to fear that no amount of analysis will satisfy the NAIC—that the commissioners are making their judgment on "social," not analytic grounds. Second, they seem to fear the mythical camel's nose under the tent. They worry that if the industry complies with this request, the NAIC will make unreasonable demands for more validation of other underwriting and rating measures.

Those may sound like reasonable fears, and in many cases they are. But not in this case. Rather than fighting the request, the industry ought to act on it as quickly as possible. In our business, we should never fear knowledge.

The industry ought to be conducting that kind of detailed analysis whether regulators ask for it or not. It makes prudent business sense. It's the right way to manage risk and reward for the entire industry. It is in the industry's best interests to do so. ■

*The "Our Analyst's View" column is presented with the intent of giving insurance executives and others a critical view of how actuaries, analysts and other industry observers measure and regard the insurance industry, including public, held insurers. The information conveyed and opinions expressed in this column are not necessarily those of the A.M. Best Co. So-called analysis occasionally may mention specific companies in which their products make a market.*

**Review of the University of Texas Bureau of Business Research  
Study on Insurance Credit Scoring**

**Birny Birnbaum  
Center for Economic Justice**

**June 2003**

**Attachment 5  
Bureau of Business Research Credit Scoring Project Statement**

# Correlation Between Credit Risk and Insurance Loss

Project Proposal

Bureau of Business Research  
McCombs School of Business  
The University of Texas at Austin

August 27, 2002

## Correlation Between Credit Risk and Insurance Loss

### Project Summary

At the request of Lieutenant Governor Ratliff's office, The Bureau of Business Research (BBR) will undertake a study to examine whether a correlation exists between credit scores and insurance risk. The contract for the study, which will run from September 1, 2002 through December 31, 2002, is between the BBR and the Texas Legislative Council.

The final report, to be delivered by December 15, 2002, will consist of an executive summary, a detailed statistical analysis of the data, and a conclusion.

### Statement of Services to be Performed

Using multivariate regression analyses, the BBR will correlate variables taken from insurance applications and loss histories on auto and homeowners' lines of insurance with the corresponding credit histories of the same insurance customers over a four-year period. All non-pertinent information in the databases obtained for use in the study from credit reporting agencies and insurance companies will be stripped out of the database, and strict confidentiality of individual financial or insurance information will be maintained and secured throughout the study.

The study is contingent on the availability of data to be obtained from industry sources. In particular, the cost of credit histories from credit agencies is not included in this proposal but is crucial to the successful completion of the project, as is the availability of 4 years of insurance application and loss history information from Texas insurance companies.

The BBR reserves the right to publish findings from the study in professional journals or on its website upon completion of the study.

### Research Personnel

Dr. Bruce Kellison, Associate Director of the BBR, is the principal investigator on the study. Dr. Patrick Brockett (MSIS Department, McCombs School of Business, UT, Austin) will advise the research team. Dr. Brockett is widely recognized for his work on insurance risk analysis and has published extensively in the field. Two graduate research assistants will be hired to run the correlations and handle the databases.

**Review of the University of Texas Bureau of Business Research  
Study on Insurance Credit Scoring**

**Birny Birnbaum  
Center for Economic Justice**

**June 2003**

**Attachment 6**

**Extended Excerpts from “Does Credit Score Really Explain Insurance Losses?  
Multivariate Analysis from a Data Mining Point of View”  
by Cheng-Sheng Peter Wu and James C. Guszcza**



Extended Excerpts from “Does Credit Score Really Explain Insurance Losses?  
Multivariate Analysis from a Data Mining Point of View”  
by Cheng-Sheng Peter Wu and James C. Guszczka

Personal auto ratemaking came a long way in the 20<sup>th</sup> century [6]. Prior to World War II, auto ratemaking involved only three classes: adult, youthful operator, and business use. The three decades after the war saw a proliferation of new class categories such as vehicle characteristics (symbol, model year) and refined driver classifications. Today, a typical personal auto rating plan contains hundreds, if not thousands of classes involving the following variables:

*Territorial Characteristics:* insurers define intra-state rating territories that reflect such relevant aspects of the physical environment as population density and traffic conditions.  
*Vehicle Use:* examples include business use, pleasure use, and driving more or less than a certain number of miles per year.

*Driver characteristics:* examples are age, gender, marital status, and good student status

*Driving Record:* this is reflected by a point system based on accidents and violations.

*Vehicle Characteristics:* this typically includes a vehicle symbol system as well as a model year rating structure.

*Miscellaneous surcharges~discounts:* this is where rating plans vary the most from company to company. Special surcharges or discounts are used to reflect policy characteristics or advances in motor vehicle technology. Commonly seen discounts include multi-car discounts, homeowner discounts, safe driver discounts, anti-lock brake discounts, anti-theft discounts, affinity group factors, and so on.

In addition to the above class variables, a typical rating plan is not complete without a *tier rating structure*. A tier structure is designed to address rating inadequacies that an insurer believes exists in a class plan. For example, an insurer might create three companies for its preferred, standard, and high-risk books, and the rate differential for such companies can range from -20% to 20%. Such differentials are typically applied at the policy level, across all coverages. Tier rating factors can include characteristics that are not used in the class plan, such as how long an insured has been with the insurer. They can also include certain interactions of class factors, such as youthful drivers with poor driving records.

As class plan structures have become more complex, the problem of estimating rates for each combination of class variables has become more difficult. This is because many of the variables used to define rating factors are not statistically independent. For this reason, factors based on univariate analyses of the variables are not necessarily appropriate for a multi-dimensional rating structure. Some form of multivariate analysis is called for.

To take a concrete example, suppose that an existing rating plan charges youthful drivers 3 times that of mature drivers. Furthermore, we analyzed loss (pure premium) relativities by driver age group, and noticed that the youthful driver group has losses per exposure 4 times that of the mature driver group. But it does not follow that the youthful driver rating factor should be raised to 4. This is because other variables used in the class plan might be correlated with age group variable. For example, youthful drivers have more accidents and violations; they are more likely to drive sports cars; they are more likely to be unmarried, and so on. They are therefore likely to be surcharged along these other dimensions of the rating plan. To give them a driver age rating factor of 4 would possibly be to over-rate them.

This issue -- that non-orthogonal rating variables call for multivariate statistical analyses -- lies at the heart of the debate over credit. In addition, this issue is perhaps the key theme in the *methodological* development of classification ratemaking since the 1960's.

McClenahan's ratemaking chapter [7] in *The Foundations of Casualty Actuarial Science* outlines the univariate approach to ratemaking, an approach still employed by many insurance companies. Appealing to examples, like the one just given, Bailey and Simon [8,9] pointed out that the univariate approach could lead to biased rates if the individual rating factors are non-orthogonal. Their proposed solution to this problem, the *minimum bias* procedure, involves assuming a mathematical relationship between the rating factors and pure premium.

....

Non-Independent Rating Variables: We believe that this is the key issue of the debate over the explanatory power of credit score. Intuitively, independence means that knowing the probability distribution of one variable tells you absolutely nothing about the other variable. Non-independence is common in insurance data. For example, youthful drivers have more accidents and violations than do mature drivers; mature drivers have more cars on their policies than do youthful drivers; number of drivers are correlated with number of vehicles. We can therefore expect that credit score will exhibit dependences with other insurance variables, such as driver age, gender, rating territory, auto symbol, and so on.

Univariate v. Multivariate Analyses: In the case of independent random variables, univariate analyses of each variable are entirely sufficient -- a multivariate analysis would add nothing in this case. Failure of independence, on the other hand, demands multivariate analysis. Furthermore, the results of multivariate analyses can be surprising. Below, we will give a hypothetical example in which an apparently strong relationship between credit and loss disappears entirely in a multivariate context.

...

### **Tillinghast's Study**

Tillinghast's credit study was undertaken on behalf of the Fair, Isaac Company for use in its discussions with the National Association of Insurance Commissioners (NAIC). The purpose of the study was to establish a relationship between Insurance Bureau credit scores with personal auto and homeowners insurance. Tillinghast received the following information for each of nine personal lines insurance companies:

Credit score interval  
Interval midpoint  
Earned premium  
Loss ratio relativity

For the most part, the credit score intervals were constructed to contain roughly equal amounts of premium. The results for these 9 companies are given in Exhibit 1. Clearly, the information provided to Tillinghast only allowed for a univariate study, and this is all Tillinghast set out to perform.

...

### **Simpson's Paradox and the Perils of Univariate Analyses**

This is reasonable as far as it goes. Unfortunately, univariate statistical studies such as Tillinghast's do not always tell the whole story. A statistical phenomenon known as *Simpson's Paradox* [14,15] illustrates what can go wrong. A famous example of Simpson's Paradox is the 1973 study of possible gender bias in graduate school admissions at the University of California at Berkeley [16]. We will stylize the numbers for ease of presentation, but the point will remain the same.

Suppose it was reported 1100 men and 1100 women applied for admission to Berkeley in 1973. Of these people, 210 men were accepted for admission, while only 120 women were accepted. Based on this data, 19% of the men were accepted, while only 11% of the women were accepted. This is a univariate analysis (somewhat) analogous to Tillinghast's, and it seems to prove decisively that there was serious gender bias in Berkeley's 1973 graduate admissions.

But in fact this univariate analysis does not tell the whole story. When the admissions were broken down by division (suppose for simplicity that there were only two divisions: Arts & Sciences and Engineering) the data looked more like this:

	Applicants			# Accepted			% Accepted		
	<u>Arts</u>	<u>Eng.</u>	<u>Total</u>	<u>Arts</u>	<u>Eng.</u>	<u>Total</u>	<u>Arts</u>	<u>Eng.</u>	<u>Total</u>
Women	1000	100	1100	100	20	120	10%	20%	11%
Men	100	1000	1100	10	200	210	10%	20%	19%

Now our analysis is multivariate, by virtue of the fact that we are including *division applied to*, in addition to gender. The multivariate analysis quite clearly shows that the acceptance rate for men and women *within each division* was identical. But because a greater proportion of women applied to the division with the lower admission rate (Arts & Sciences), fewer women overall were accepted.

This is a very simple example of what can go wrong when one's data does not contain all relevant variables: *an apparent correlation between two variables can disappear when a third variable is introduced.*

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Returning to the Tillinghast study, consider the following scenario: suppose our credit variable has two levels (good/bad). Rather than academic division, suppose that the "true" confounding variable is urban/rural (territory). Thus good/bad correspond to male/female in the Berkeley example, and urban/rural corresponds to arts/engineering. Rather than acceptance into school, the target variable is now having a personal auto claim. Now our data is:

	Exposures			# Claims			Claim Freq		
	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban	Total
Good credit	1000	100	1100	100	20	120	10%	20%	11%
Poor credit	100	1000	1100	10	200	210	10%	20%	19%

If we similarly re-label the terms of our regressions, we will again see that (in this purely hypothetical example) the GOOD\_CREDIT indicator loses its apparent significance once the URBAN indicator is introduced.

These considerations make it clear that a multivariate analysis is needed to assess whether credit history bears a *true* relation with insurance loss experience. A univariate analysis might produce a statistical illusion, not true insight.

Of course, given our discussion of the difference between a pure premium study and a loss ratio study, it is not entirely fair to call the Tillinghast study "univariate". Recall that Tillinghast's target variable was *loss ratio relativity*, not claim frequency. In the above example, suppose all claims have a uniform size of \$1000, and further suppose that the territorial rates are \$2000 for urban territories, and \$1000 for rural territories. Now the loss ratio relativity in each cell will be exactly 1.0. In this (again, purely hypothetical) case, Tillinghast's methodology would (correctly) show no relationship between credit and loss ratio relativity.

In other words, to the extent that all possible confounding variables are perfectly accounted for in premium, Tillinghast's "univariate" analysis *is* implicitly a multivariate analysis, and is therefore convincing. But realistically, this may not be the case. For example, in our work we regularly regress loss ratio on such zip code-based variables as population density and median population age. If territory were entirely accounted for in premium, such variables would never appear statistically significant. But in fact they sometimes do. Therefore a true multivariate study is desirable even if loss ratio is used as the target variable.

**Review of the University of Texas Bureau of Business Research  
Study on Insurance Credit Scoring**

**Birny Birnbaum  
Center for Economic Justice**

**June 2003**

**Attachment 7**

**April 15, 2003 Article from *Insurance Journal*  
“CAS Members Hear Direction of Credit Scoring”**



## CAS Members Hear Direction of Credit Scoring

April 15, 2003

The increasing use of credit scoring by insurers in underwriting and rating personal lines of insurance has reportedly brought on increased interest, oversight and even some action by insurance regulators and state legislatures to ensure the practice is being used fairly and in compliance with existing and new regulations, panel members on the subject told a recent session at the Casualty Actuarial Society's Seminar on Ratemaking.

Comprehensive legislation limiting how credit scoring can be used was passed last year in the state of Washington, modeled, in large part, on guidance issued from the Connecticut Insurance Department, which they seem to enforce like a rule or law, said Lisa Smego, senior policy analyst for the Washington Department of Insurance.

"We decided to adopt that particular approach because there are a number of us in the department who believe the attributes in the (Conn.) model are very important and are things that perhaps should be reviewed and analyzed more than they have been in terms of who they impact," she said.

"While there have been allegations that credit scoring has an impact on certain classes of people, I'm not sure it has an impact overall, but I think there are certain attributes in the models which are worse than others, Smego noted. "We eliminated insurers' ability to use some of these attributes, including the number of credit inquiries because of a number of consumer complaints that it caused them problems. There was no hard, statistical evidence there, but that issue resonated with a number of lawmakers and they agreed that should be eliminated."

Unexpected medical expenses were eliminated, Smego noted, after a number of people testified at public hearings that these had made their insurance rate score go down and they ended up paying more for insurance at a time when they could least afford it. The impact of the type of credit card used by consumers also was eliminated, as well as use of the total line of credit because we felt that this may have an effect on lower income people, the Washington insurance official pointed out.

"The most important element of the law, from our stand point, was the restriction on insurers' ability to cancel or nonrenew based upon credit and our law is stronger than most in that it does have the standard where an insurer cannot cancel or nonrenew when credit is solely the reason for that," she continued. "In Washington, it has to be a significant factor and it cannot be just a single incident where they (the insurer) are not going to take action against every single policyholder in that particular case," Smego emphasized.

One expectation regulators have is that companies and agents need to explain why customers' rates are what they are and we feel the insurance industry needs to explain the use of credit scoring. "It is in the best interest of the industry to improve consumer education," she concluded.

Addressing the actuaries from a credit-scoring vendor's perspective, John Wilson, assistant vice president - analytics for ChoicePoint, outlined what score vendors

A vertical banner advertisement for Insurance Journal. At the top, it features the magazine's logo and a "REBOUND?" headline with a "SUBSCRIBE NOW" call to action. Below this, it states "GET 24 BIWEEKLY ISSUES PER YEAR" and lists benefits for agents and brokers, including exclusive articles, regional news, coverage directories, new markets, and more. At the bottom, it offers a "SAVE 45%" discount when ordering online, with a "CLICK HERE" button.

should do to help address regulatory concerns over insurance credit scoring, the key concerns about its use, and what other groups are involved.

Wilson said his company can provide satisfactory support materials and/or data to insurance carriers and/or regulators to support that using scores is actuarially sound and credible. "We can meet with regulators to explain how the scores were developed and provide full model disclosure," he said.

ChoicePoint believes it is incumbent on vendors to provide full model disclosure and has done that in several states where there is no confidentiality protection, Wilson pointed out. But there are other vendors who have spent a lot of money building their own models and are hoping to achieve an advantage in the marketplace from that, so they are taking a slightly different position, he said. Even there, though, every vendor or every insurance carrier that develops their own model ought to be willing to disclose how it works, Wilson added.

"There is some concern, I think, about how scores get delivered for use and we have spent some time talking with regulators about the general processes used, whether they are being applied for prescreening, new business or renewals and the impact of their application so consumers feel that the process treats them as fairly as possible," the ChoicePoint official said.

Insurance agents want to know how to explain the use of credit scoring, so ChoicePoint can produce explanatory materials in print and make them available on the web. "It's important to explain everything," Wilson continued, "and it is appropriate for carriers to provide guidance on definitions and obligations."

"While there are specific state concerns, part of the problem is that some concerns (about credit scoring) are derived from anecdotes and often it is unclear what the support for removal of a variable is or what the impact will be," Wilson said. These requests for changes can be taken care of and some states have suggested an appeals process for special considerations. It's a balancing act where you want to be consistent and objective while making allowances for extenuating circumstances, he said.

Examining the issue of credit scoring from the insurance company perspective, Roosevelt Mosley, consulting actuary, Pinnacle Actuarial Resources, Inc, talked about some of the things heard in the market from insurers and regulators and the responses to insurance scoring in the past, as well as how the issues might be addressed in the future.

A year ago, credit scoring was an issue in about 30 states and now at least 40 states have addressed it in some fashion, Mosley told the actuaries. There has even been some judicial attention to the issue, he said, with a federal court suit in which an insurance company was accused of using credit to mask intentional racial discrimination. "And there could be more such cases," Mosley added.

"There is the potential for increased attention to the issue in 2003 with some additional legislative activity, increased regulatory and judicial attention, and studies on the subject being released," Mosley remarked. How insurers addressed the issue of credit scoring in the past gives some insight into how it may be addressed in the future, Mosley suggested.

Companies often treated the use of credit scoring as a trade secret and regulators have expressed some frustration over companies and vendors "passing the buck" on the issue, Mosley noted. Often, there has not been a lot to back up the arguments in favor of the use of credit scores, "so we better do more in the future or run the risk of losing the ability to use credit models," he warned.

Mosley said something that could assist the industry are the results of a University of



Texas-Austin study – a true multivariate study that concludes that credit has strong predictive power. And if other states follow the lead of Washington in regulating the use of credit scoring, companies may need to continue to justify their use of scoring independently to regulators and the public.

The use of credit scoring will survive in some form, Mosley concluded, but that form could potentially take on 51 different shapes (for each state and the District of Columbia). "It is important for insurers to be proactive in forming what those shapes look like," he added.

URL: [www.insurancejournal.com/news/newswire/national/2003/04/15/28010.htm](http://www.insurancejournal.com/news/newswire/national/2003/04/15/28010.htm)

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**June 2003**

**Attachment 8  
April 14, 2003 Article from *BestDay*,  
“Insurance scoring 'Color Blind,' Says Arkansas Insurance Commissioner”**

BestWire - 04/14/2003 03:56 pm

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## Insurance scoring 'Color Blind,' Says Arkansas Insurance Commissioner

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OLDWICK, N.J. April 14 (BestWire) - Credit-based insurance scoring is a fair predictor of risk, said the president of the National Association of Insurance Commissioners, adding he doesn't expect the association to conduct a study on whether it has disparate effects on certain classes of people.

Mike Pickens, Arkansas insurance commissioner and NAIC president, said insurance scoring is valid and credible, pointing to a recently released University of Texas study showing a high correlation between credit scores and frequency, probability and degree of loss.

The study "was the first one not bought and paid for by an insurance company," Pickens said. "It basically legitimizes everything we heard. Why it works, I don't know, but it does work."

If people take care of their most important asset --their finances --they are likely to exercise the same amount of responsibility in other areas of their lives, Pickens said. They're also more likely, if they have a minimal loss, to pay for the loss themselves "because they have the financial wherewithal, rather than file a claim."

The NAIC has a task force, led by the Washington state and Oregon insurance departments, looking at insurance scoring. They've issued an educational brochure for consumers, and the efforts at the NAIC have been aimed at disclosure, Pickens said.

But funded consumer representatives at the NAIC want state commissioners to go further and determine whether the use of insurance scoring adversely impacts "minorities and other protected classes," he said. "It's a tough issue to get your arms or mind around. It could open up a lot of other legitimate underwriting criteria to scrutiny," he said.

Pickens said he was speaking as the Arkansas insurance commissioner. "Credit scoring seems to be a fairly color blind way of making a determination of risk," he noted. "When you look at credit you don't know what their ethnicity or age is."

A valid and credible study on whether the use of credit has a disparate affect on certain classes of people would involve polling consumers, he said. "I don't know if you'll see the NAIC pursue a study in this area because it's time consuming and costly and probably wouldn't be very constructive at the end of the day."

Insurance commissioners have taken a balanced and thoughtful approach on this issue, which is what's taken place legislatively in a majority of states, Pickens said.

The Texas University study helps demonstrate causality, but more needs to be done to explain why there is a correlation, he said. "Why is the primary question for regulators and legislators. They want more information on why. The Texas study didn't try to answer that question."

Speaking during an April 11 Deloitte & Touche presentation entitled "Credit Scoring: The Regulations, the Models and the Alternatives," Pickens said a "great deal" of legislative activity is going on in the states this year concerning the issue of insurers' use of credit information in underwriting.

Some 41 bills on the subject have been introduced in legislatures around the United States, he added.

In his home state for example, two bills were introduced in this legislative session. One was based on a model bill approved by the National Conference of Insurance Legislators. Pickens said his department worked with the Independent Insurance Agents & Brokers, and the American Insurance Association.

But another legislator wanted to place a total ban on the use of credit information for personal passenger automobile insurance rates, along with other credit information-related restrictions, Pickens said.

What ended up being passed by the Arkansas legislature was a bill that sets "pretty reasonable standards on the way credit scoring is used," and one with which independent agents and insurance companies are comfortable, Pickens said.

As in Arkansas, the scope of the bills introduced around the country varied. Pickens said many states started out with legislation that was pretty restrictive, "but most states have done something reasonable and come up with something close to the NCOIL model," he said.

Part of the reason for the consumer outcry and flurry of legislative activity, not only this year, but for a few years, is that insurance companies didn't do a good job of educating consumers or agents prior to using credit information in underwriting, Pickens said.

"The industry didn't educate consumers and agents as they should have," Pickens said.

Regulators would be open to other predictive variables besides insurance scoring if insurers explain what it is and why it works, he said. But if the industry is not open to more regulation and scrutiny.

(By Dennis Kelly, Washington bureau manager, BestWeek: Dennis.Kelly@ambest.com) BN-NJ-04-14-2003 1555 ET #

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