DISASTER STATISTICS: REVISITING THE FIRE PROBLEM IN THE UNITED STATES

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ABSTRACT

This paper revisits an earlier study on fire statistics in the United States. Additional data have recently become available, and some important changes in trends are noteworthy. Specifically, monetary and human costs over the period 1980 through 1991 are examined.

INTRODUCTION

John R. Hall, Jr., has provided an annual report on the total cost of fires in the United States for many years (Hall 1993). A cost/benefit analysis was carried out by the author two years ago (Sullivan 1992), and it is time for a follow-up to that report.

Hall breaks the total cost of fires in the United States down into several categories. One way to describe the two major categories Hall uses is economic and non-economic. Economic costs are those losses sustained directly or indirectly in a fire. Non-economic costs are those for fire protection. The terminology is perhaps not ideal, but consistent with prior use (Hall 1991 and Sullivan 1992). Clearly, one would hope that increased fire protection expenditures (over and above inflation) would proportionately reduce the economic losses from fires.

Economic costs may be further broken down into three components: reported, unreported, and indirect. Reported and unreported costs are direct expenses, whereas indirect losses refer primarily to business interruption costs.

In this paper, all monetary values discussed have been adjusted (for inflation) to 1991 dollars, using the Consumer Price Index. Values can be found on page 481 of "Statistical Abstracts of the United States", 113th edition, for the years under consideration (1980 through 1991).

ECONOMIC LOSSES

Figure 1 displays reported direct costs of fires. The data are somewhat erratic, but a general declining trend is apparent. In this and subsequent graphs, linear least-squares curve fitting has been used. Both the actual data (adjusted for inflation) and the least-squares fit show about a billion dollar decrease over the years under consideration. This amounts to about a ten percent reduction.

Figure 2 graphs the unreported direct costs of United States fires. The actual data are very erratic, but a small decrease over time is evident.

Figure 3 charts the indirect costs of fires. The data are erratic, but a significant decrease over time (20 to 30 percent) is evident.

Figure 4 shows the total economic losses of fires in the United States. Once again, the data are erratic, but a declining trend (slightly over 10 percent) is apparent.

So, it is fair to say that a general decline occurred over the period from 1980 through 1991. However, the decline can be characterized as "modest".

NON-ECONOMIC COSTS

Perhaps "fire protection costs" is a more descriptive term than "non-economic costs", but we will use the latter terminology to maintain consistency with earlier work (Hall 1991 and Sullivan 1992). What we are interested in here is the costs which are involved in waging war against fires. This category of expenses can be broken down into career fire department costs, building construction costs, and net insurance costs.

Career fire department costs are those associated with running fire

departments: salaries, equipment, etc. Figure 5 demonstrates how much has been spent over the last few years in this area. The data are fairly linear, with roughly a 50 percent increase over time. This is a disturbing trend, since this is almost five times what the decrease in total economic cost is. The trend has leveled off over the last few years, and we can only hope this abatement continues.

Building construction costs are those associated with fire protection (sprinklers, smoke alarms, etc.). The least-squares fit has about a 30 percent increase, whereas the actual data increase at about 15 percent. Again, this category of expenses is increasing faster than the economic cost of fires is decreasing.

Net insurance is the amount left over after insurance companies pay out their claims. Figure 7 displays these costs from 1980 through 1991. There appears to have been about a 50 percent decline in these costs over this time span. This might seem to be good news, but it definitely is not: if this trend continues, it will only be a few more years before either insurance companies go out of business or have to raise their rates dramatically. Insurance companies refer to net insurance costs by different terminology: operating expenses and profits. Although some of this decline may be due to automation and other productivity enhancements, there is little doubt that most of the decline is due to premiums not keeping pace with claims.

Since net insurance costs are being driven by different forces than either career fire department or building construction costs, summing these three quantities is somewhat deceptive. However, such a total does give us a measure of our monetary outlays for fire protection. The actual data (see Figure 8) show about a ten percent increase from 1980 through 1991. The least-squares fit estimates an increase of over 20 percent. So, at best we are doing about the same as in 1980, and at worst, we are doing about ten percent worse than we were in 1980.

Another method of demonstrating this is to compare the economic costs of U.S. fires with the total cost (economic plus non-economic) of fires. Since we obtain unitless ratios, the effects of inflation are eliminated. This method also shows the trend to be generally increasing. (Graph is at end of text.)

HUMAN COSTS

Another dimension of the United States fire problem is the costs to humans in terms of lives lost and injuries. Hall considers both civilians and fire fighters in his data.

Figure 9 graphs the civilian deaths due to U.S. fires. Significant progress seems to have been made, especially during the last few years. The actual data have about a 30 percent decrease, whereas the least-squares fit shows about a 20 percent decrease. This is good news, and we can only hope this trend continues.

Figure 10 charts the fire fighter deaths. Again, important progress has been accomplished. The actual data show about a 20 percent decrease, and the least-squares fit displays an approximate 15 percent decrease. This is more good news.

Figure 11 shows the number of injuries to civilians from 1980-1991. There is a small decrease in evidence here. The least-squares fit declines about 6 percent over the twelve-year period, but the actual data decrease only about 3 percent. In absolute numbers, this is not good news when compared to the increase in non-economic costs.

Figure 12 displays the number of injuries to fire fighters. Note that although the ratio of civilian deaths to fire fighter deaths is about 40 or 50 to 1, the ratio of injuries for fire fighters to civilians is about 3 or 4 to 1. These ratios have been roughly constant over the years surveyed here. Unfortunately, the number of injuries to fire fighters has increased slightly over this time span: the actual data show about a 5 percent increase, but the least-squares fit has less than a 2 percent increase. Again, this news is not good.

If these injury and death data were adjusted for population, the results would be only slightly more positive since the population increased by about 10 percent over this period of time. (See, for example, page 360 of the "World Almanac", 1994).

CONCLUSION

In monetary terms, there is still a serious problem with fires in the United States. We are spending more and getting less for it, at least in terms of the economic cost of fires. Over the last few years, however, these

trends appear to be changing in a positive direction. There is still a major problem with insuring against fire risks, and one that may soon cause turmoil in the insurance industry.

Progress in reducing human costs of fires is very encouraging overall. It will be very interesting to see if these trends continue.

Computer, communications, and other advanced technology have been receiving widespread acceptance in the fire fighting community over the last few years. Although it would be difficult to prove, that may well be the cause of the improvements observed in these statistics.

REFERENCES

Hall, John R., Jr.: "The Total Cost of Fire in the United States Through 1989"; National Fire Protection Association; Quincy, Massachusetts; 1991.

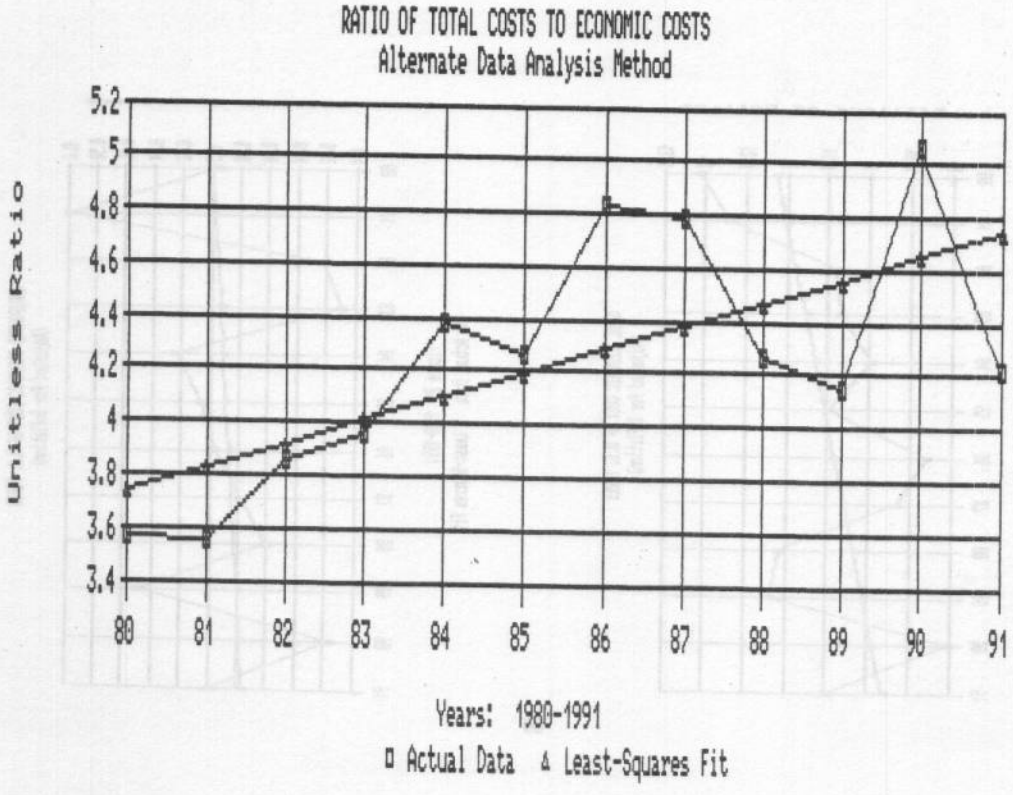
Hall, John R., Jr.: "The Total Cost of Fire in the United States Through 1991"; National Fire Protection Association; Quincy, Massachusetts; 1993.

Sullivan, James D.: "Are We Winning the War Against Emergencies?"; Proceedings of the 1992 International Emergency Management and Engineering Conference; Orlando, Florida; April 6-9, 1992.

BIOGRAPHICAL SKETCH

James D. (Jim) Sullivan has served as a leading organizer for five international emergency management and engineering conferences. He is the founder and current president of The International Emergency Management and Engineering Society. Mr. Sullivan has published over a dozen papers on the use of advanced technology in emergency management, as well as a variety of papers on other subjects.

He has been an independent consultant since 1983. Mr. Sullivan had several years of experience as a programmer, programmer/analyst, and senior systems analyst prior to becoming a consultant. He holds the designations of CCP, CDP, and CSP from the Institute for Certification of Computer Professionals (ICCP). Mr. Sullivan specializes in training, assistance in hardware/software selection and acquisition, and systems development.



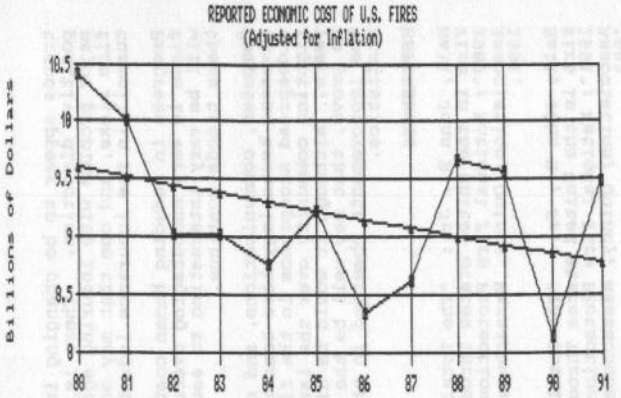


Figure 1: 1980-1991
□ Actual Data △ Least-Squares Fit

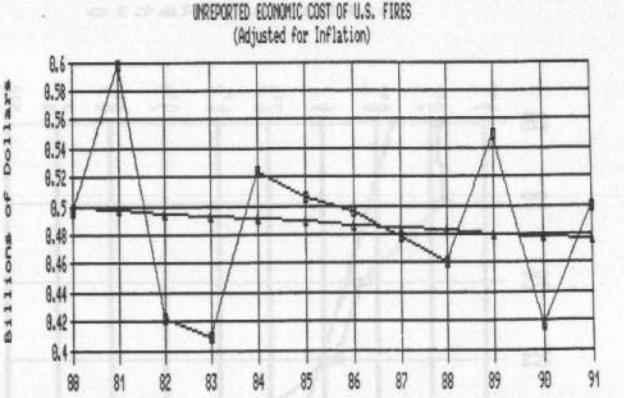


Figure 2: 1980-1991
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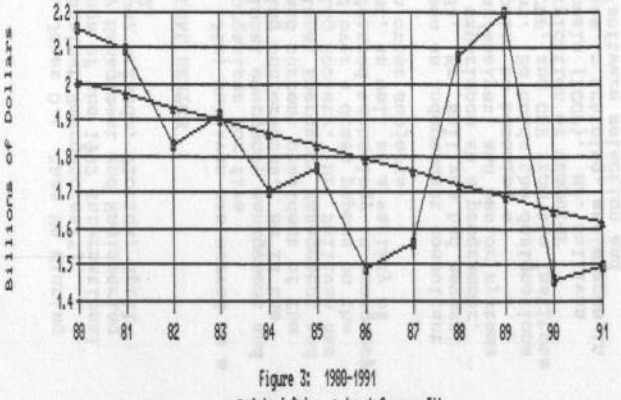

Figure 3: 1980-1991
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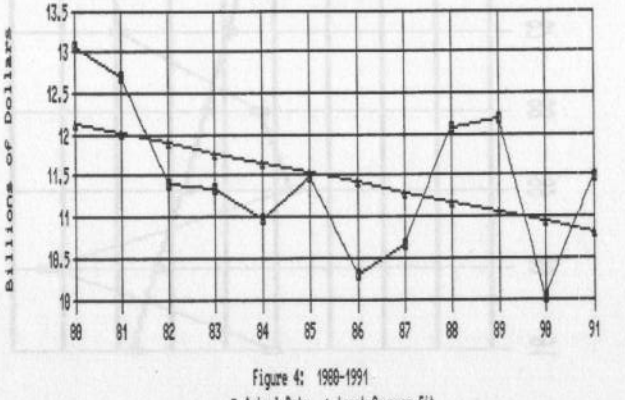

Figure 4: 1980-1991
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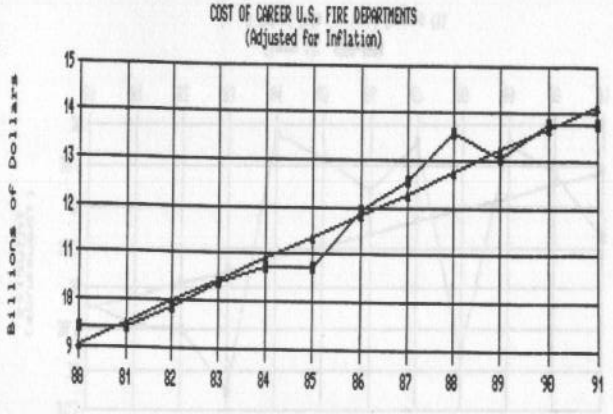

Figure 5: 1980-1991
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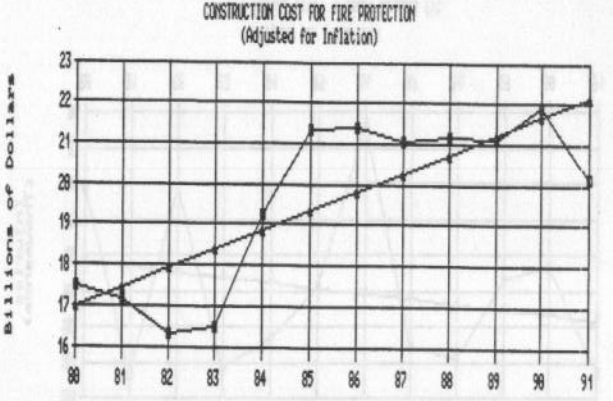

Figure 6: 1980-1991
□ Actual Data ▲ Least-Squares Fit

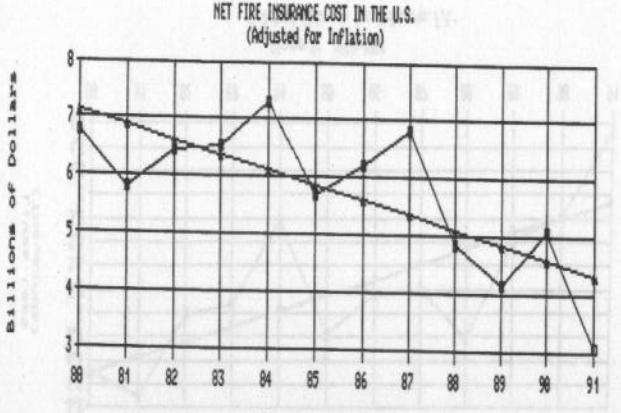

Figure 7: 1980-1991
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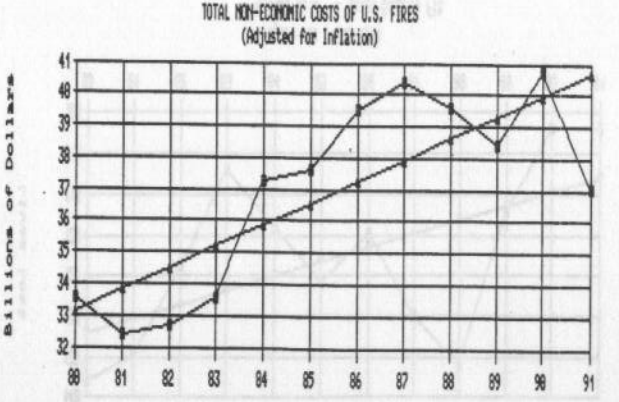

Figure 8: 1980-1991
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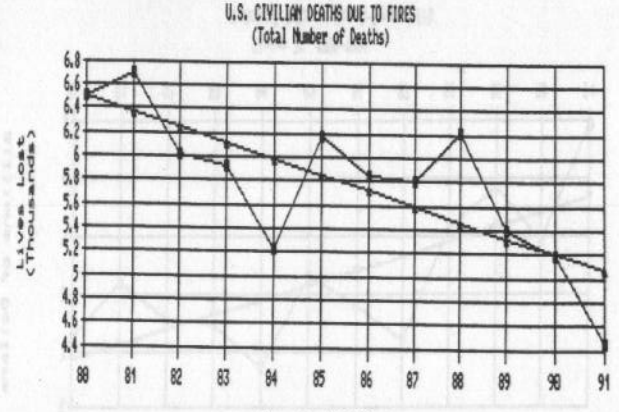

Figure 9: 1980-1991
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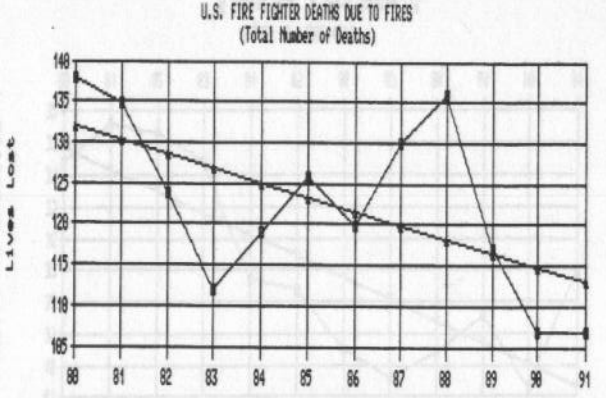

Figure 10: 1980-1991
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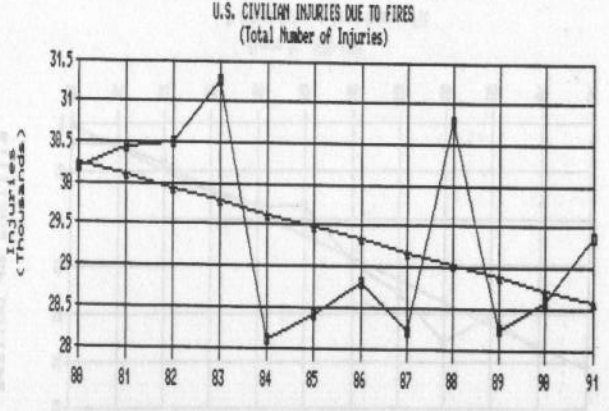

Figure 11: 1980-1991
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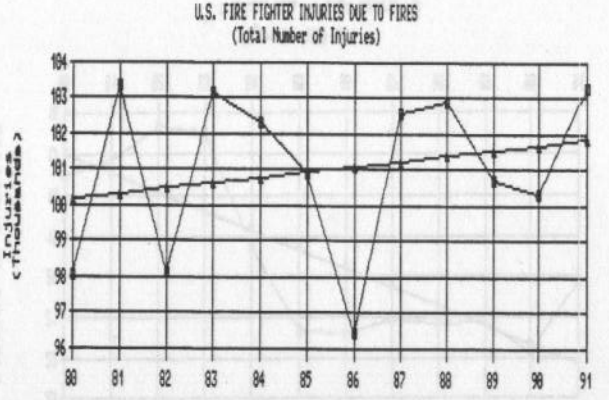

Figure 12: 1980-1991
□ Actual Data ▲ Least-Squares Fit