TABLE 1: OVERVIEW OF FORECASTING METHODS

Forecasting method	Description/preferred application	Current usage		References	
		Among actuaries	Within business generally	Basic	More advanced
A. Extrapolative methods					
1. Simple moving average	This method averages the last n observations of a time series. It is appropriate only for very short or very irregular data sets, where features like trend and seasonality cannot be meaningfully determined, and where the mean changes slowly.	Widely used	Widely used	[1, 2]	
2. Exponential smoothing, such as the Holt-Winters method	A more complex moving average method, involving parameters reflecting the level, trend and seasonality of historical data, usually giving more weight to recent data. Widely used in general business because of its simplicity, accuracy and ease of use. This method's robustness makes it useful even when historic data are few or volatile. It is a frequent winner in forecasting competitions.	Generally not used	Widely used for time-series analysis.	[2-5]	[6]
3. Autoregressive moving average (ARMA)—aka Box-Jenkins	An even more complex class of moving average models, capable of reflecting autocorrelations inherent in data. It can outperform exponential smoothing when the historical data period is long and data are nonvolatile. But it doesn't perform as well when the data are statistically "messy."	Generally not used	Widely used	[2, 7]	[6]
B. Explanatory variable methods					
1. Regression analysis	Fitting a curve to historical data using a formula based on independent variables (explanatory variables) and an error term. Although these methods are relatively simple, and are helpful both in analyzing patterns of historical data and for correlation analysis, they are not generally recommended for forecasting. They have performed poorly in forecasting competitions.	Widely used	Widely used	[2, 8, 9]	[6, 10]
2. Predictive modeling	An area of statistical analysis and data mining, that deals with extracting information from data and using it to predict future behavior patterns or other results. A predictive model is made up of a number of predictors, variables that are likely to influence future behavior.	Gaining in popularity	Widely used	[11-13]	
3. Artificial neural networks	Patterned after the neural architecture of the brain, these methods allow for nonlinear connections between input and output variables, and for learning patterns in data.	Generally not used	Sometimes used	[2, 14-16]	
4. Econometric modeling	Systems of simultaneous equations to represent economic relationships.	Generally not used	Widely used	[17, 18]	[19]

TABLE 1: OVERVIEW OF FORECASTING METHODS continued

Forecasting method	Description/preferred application	Current usage		References	
		Among actuaries	Within business generally	Basic	More advanced
C. Simulation modeling methods					
1. Cell-based modeling	Modeling of individual homogeneous units (cells) over time, such as age/sex cells in pension forecasting. These models are usually deterministic, but may be stochastic. They are useful to model large systems.	Frequently used	Frequently used	[20]	
2. System dynamics simulation	Simulation of a system as a whole over time, incorporating feedback loops as well as stocks and flows. Such methods are useful for complex systems.	Generally not used	Becoming more widely used	[21]	[22]
3. Multi-agent simulation	A computer representation that employs multiple interacting agents and behavioral rules to mimic the behavior of a real system. This method is especially useful for modeling complex adaptive systems.	Generally not used	Becoming more widely used	[23-25]	[26, 27]
D. Judgmental methods	These methods rely on expertise and intuition, rather than on statistical analysis of historical data. Such methods are particularly useful when historical data is scarce. Many of the methods of "futurism"—such as the Delphi method, visioning and scenario building—fall under this category.	Frequently used, usually on an informal basis	Frequently used, often on a structured basis	[2, 28-30]	
E. Composite methods					
1. Bayesian forecasting	This family of methods combines statistical methodology with structured integration of human judgment: new evidence is used to update a statistical forecast, based on application of Bayes' theorem. These methods are good for highly seasonal data with short history.	Generally not used	Generally not used	[31]	[32]
2. Other	Combinations of forecasting methods usually perform better in forecasting competitions. The use of composite methods will increase as decision makers are increasingly called on to combine their intuitions with data-based decision making from forecasting models.	Generally not used	Generally not used	[2, 33, 34]	

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