Executive Summary: Sales Forecasting for Alomega Food Stores

This project presents a time series forecasting analysis conducted for **Alomega Food Stores**, a Midwestern grocery chain with 27 locations. The objective was to predict monthly sales using historical sales data from **January 2003 to November 2006**, in order to support better planning and operational decisions.

Two forecasting models were explored: the **Holt-Winters Exponential Smoothing (ETS)** model and a **3-month moving average** model. The Holt-Winters method, which accounts for seasonality and short-term fluctuations, was automatically optimized using statistical software, selecting a multiplicative seasonality structure (MNM).

The dataset was split into a **training set (2003–2005)** and a **validation set (2006)** to evaluate performance. Each model was assessed using Mean Absolute Percentage Error (MAPE) and Root Mean Squared Error (RMSE). Residual diagnostics were also performed to ensure statistical validity.

Model	MAPE (Train)	MAPE (Validation)	Jan 2006 Forecast
Holt-Winters	10.97%	19.80%	$573,437.70
MA (3-month)	19.64%	29.43%	$311,000.00

The **Holt-Winters model outperformed** the moving average approach, demonstrating a stronger fit on both training and testing data. Using this model, projected sales for **December 2006** were **$226,910.50**.

Recommendation: Alomega should adopt the Holt-Winters forecasting model for ongoing monthly sales forecasting. The model should be updated regularly with new data and periodically reassessed to ensure it continues to meet assumptions and performance standards. For greater accuracy, incorporating external drivers like promotions, seasonality effects, and macroeconomic indicators is also recommended.