



# Modelos Econométricos y su Aplicación en Ciencias Aplicadas, Marketing, Finanzas, Administración y Economía

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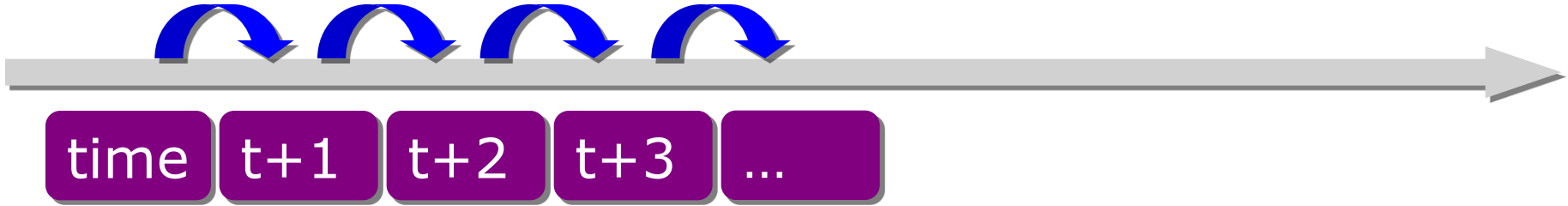
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# Modelos de Estimación Econométrica

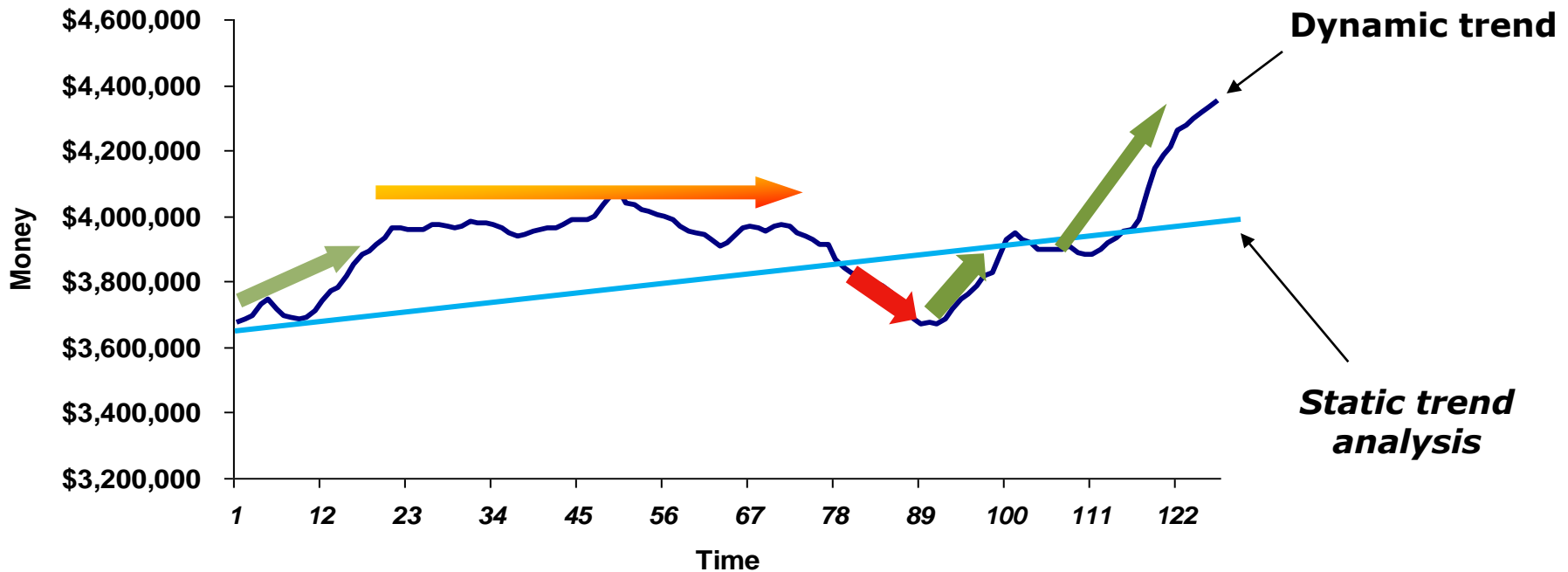
Los modelos econométricos utilizados para estimación, se componen del uso integrado de variados programas estadísticos tales como:

- **SPSS**
- **STATA**
- **SAS**
- **STAMP**
- **S-PLUS**
- **SAWTOOTH**
- **MATLAB**
- **MATHEMATICA**

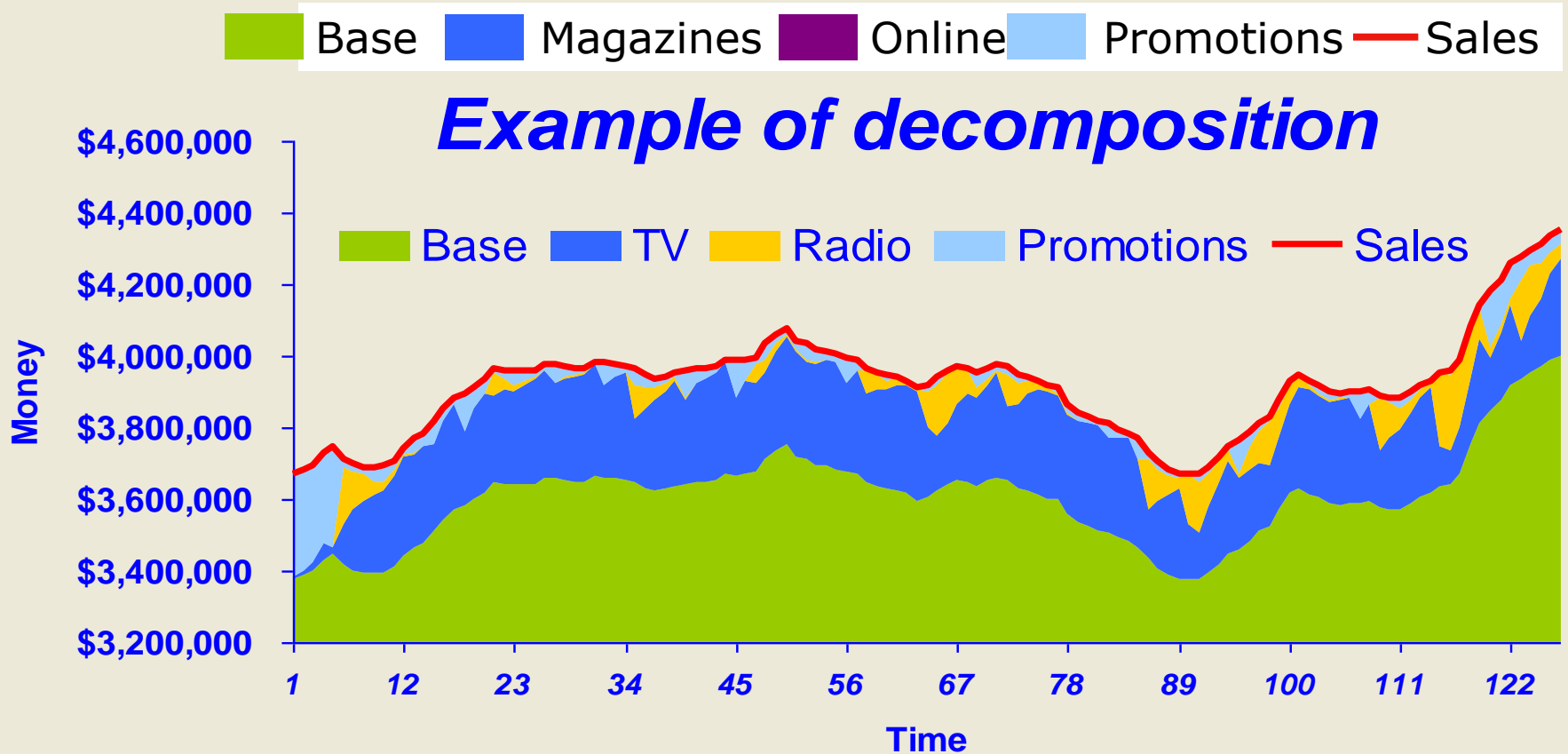
El modelo analiza cada periodo para capturar y cuantificar la tendencia de largo plazo de ventas



## *Time Series*

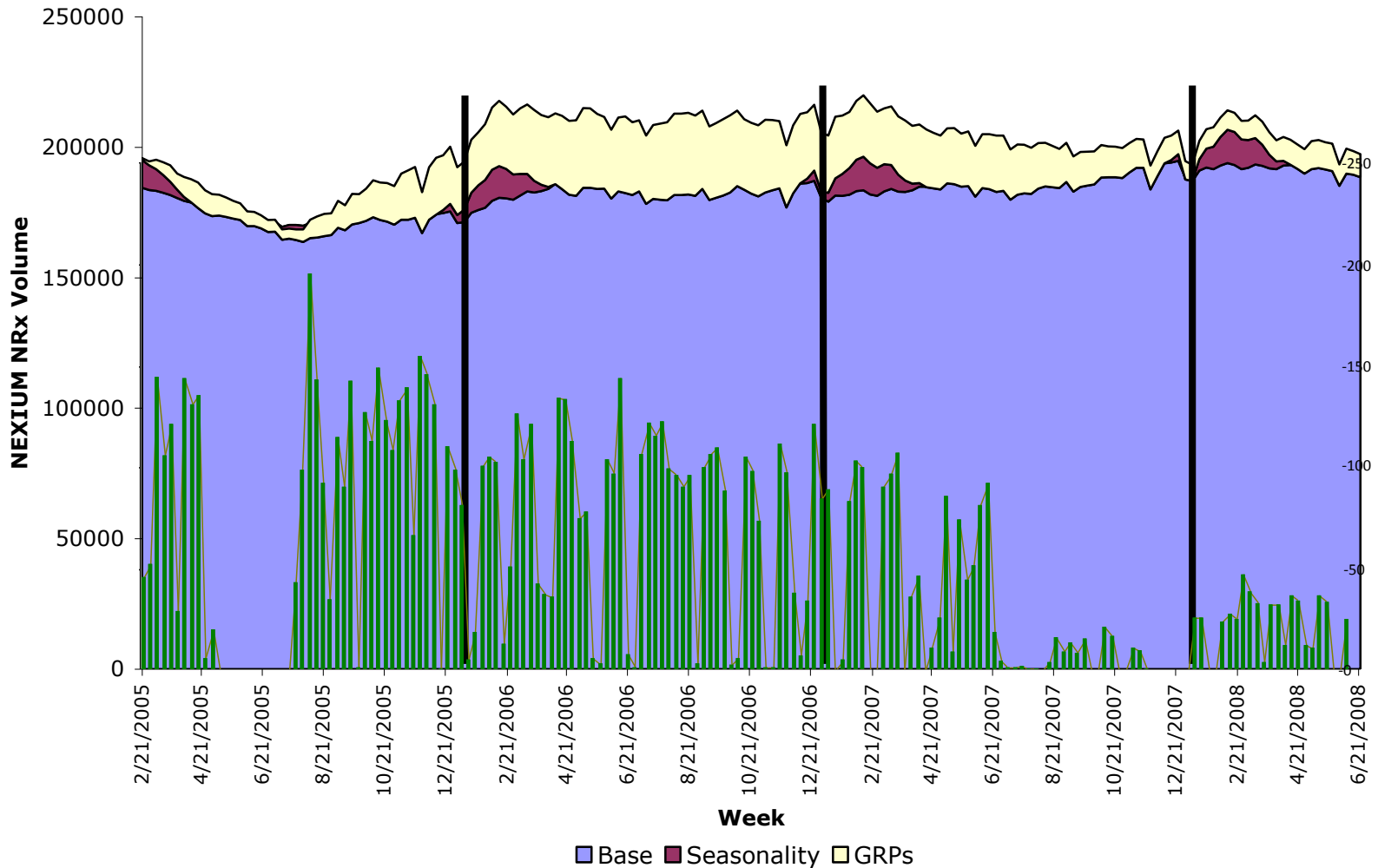


# Contribución Variables de Marketing sobre Ventas



# Contribution of Television Advertising to NRx Volume

There is a strong relationship between TV advertising and NRx volume (Medical Prescription). The average contribution of TV advertising to NRx is 8% (the highest NRx volume was achieved in 2006, a period with the most TV support).



# ***DYNAMIC REGRESSION MODEL***

*Combines Bayesian theory, Kalman Filter and Fourier Transforms*

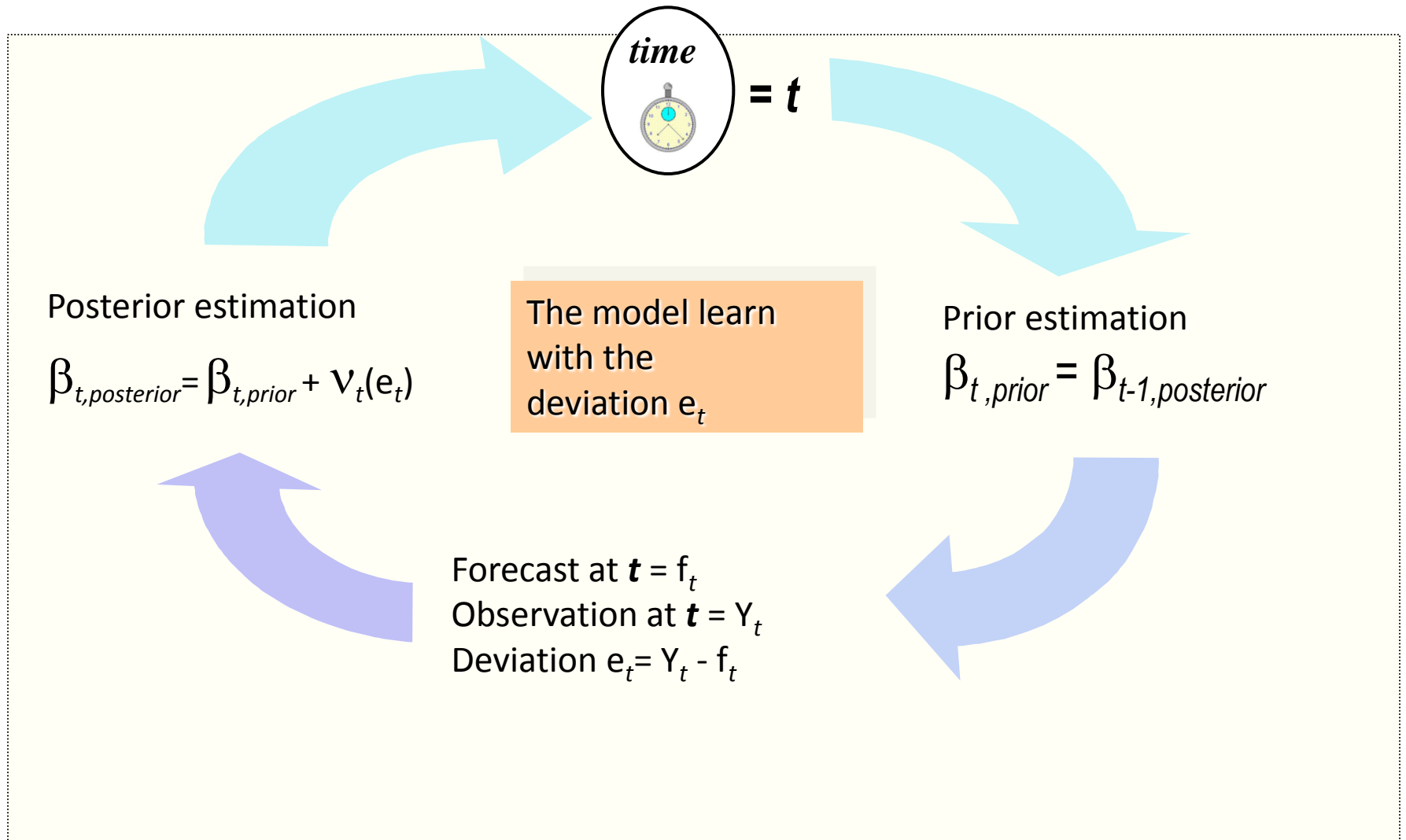
# The three components of the Dynamic Model

The model is made of three major components:

- A so-called "**polynomial**" component which actually includes the intercept term as well as a mechanism that reflect a trend component
- A "**seasonal**" component (optional) which includes either "direct" components or "Fourier" harmonics components
- A "**regression**" component (optional) which includes all the explanatory variables terms

$$Y_t = \underbrace{\alpha_{0t}}_{\text{polynomial}} + \underbrace{\sum_{j=1}^T \gamma_{jt} \times \delta_{jt}}_{\text{seasonal}} + \underbrace{\sum_{i=1}^n \beta_{it} \times X_{it}}_{\text{regression}}$$

# Kalman Filter Algorithm: a **learning** process





## Model's Performance and Quality Assurance Testing

- Goodness of Fit: Adjusted R-squared
- Residual Analysis
- Root MSE
- VIF (Variance Inflation Factor)
- Ramsey Test Specification (Omitted variables)
- Test for Autocorrelation
- Test for Heteroskedasticity
- Test for Normality or Specific Sample Distributions
- Akaike and Bayesian Information Criterion (TS data)
- Other Specific to Particular Models