# MODELING AND FORECASTING THE MONTHLY ELECTRICITY DEMAND: A COMPARISON OF ECONOMETRIC METHODS FOR A PANEL OF EUROPEAN AND LATAM COUNTRIES

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## Overview

The paper aims to provide the most reliable econometric forecast technique for the electricity consumption among four major economies in European Union (Germany, France, Italy and Spain) and Latin American (Argentina, Brazil, Chile and Columbia).

To this aim, we consider monthly data within the period comprised between January 2000 and December 2012 composing a dataset of 144 observations for each variable (industrial production, weather factors, calendar effects and some dummy variables accounting for structural breaks in the electricity consumption). The forecasts obtained and compared among the selected countries are the second six months of 2012.

## Methods

We initially survey the main contributions in the energy literature specifically focused on the electricity demand forecasting models. After having analyzed the wide and deep literature explored in the first section, we compare three different econometric methodologies:

- Seasonal Holt-Winters Filter Smoothing
- One-Step Ahead Forecasting Method through multiple regressions
- Hidden Markov Models (HMM) with finite mixture

## Results

We find that the HMM with finite mixture represents the best technique in predicting the electricity demand in the analyzed panel. It performs a smaller forecasting error (MAPE and MSE) compared to the Seasonal Holt Winters Filter Smoothing methodology and the one step ahead forecasting method through multiple regressions.

## Conclusions

Considering the unstable and trend-changing path of electricity demand in many countries analyzed, we believe that developing sophisticated and effective tools and methods is import in this diverse and somehow fragmented niche of the energy literature.

We are confident that the findings showed in this paper represent a valid attempt both to extend the knowledge about the monthly European and South America electricity demand to produce useful insights for industrial strategic planning operations, energy government policies and further academia research.

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