

Automation forecasting of regional macroeconomic series

The case of the Valencian Community

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Motivation

Need of macroeconomic forecasts for decision making

Limitations

- A constant, progressive reduction of decision times.
- A current increase in uncertainty:
 - Crisis 2008-2012 and current pandemic (2020-present).
- Dependent on skilled personnel and production times.

Context

Increased interest of economic decision-makers in the automation of processes.

Solution

- To create an application for automatic attaining estimates of future growth of Gross Domestic Product (GDP) from the available historical information contained in medium-term economic series.

First Set¹

- National Statistical Institute (INE) through the Spanish National Accounts (CNE), the Regional Accounts of Spain (CRE) and the Quarterly Accounts of Spain (CTR).

Second Set

- *Benchmark* of economic prediction, consisting of the predictions made for Spain by different economic prediction organizations for Spain (eg: CEEM-URJC, CEPREDE-UAM, Funcas or Oxford Economics, among others).

The second set of data is mandatory work for the user, since it requires an individualized search, agency by agency to obtain national economic predictions.

¹The first set can be provided by the user or the application itself extracts them from the official sources.

Phases

- 1 Recapitulation, debugging and time calibration of chained volume indices. Verification of the correction of calendar adjustment and seasonal adjustment.
- 2 Construction of the database for the prediction. Definition of the target time horizon. For annual predictions:
 - Current period: t
 - Current period and an additional period: $t + 1$
 - Current period and two additional periods: $t + 2$
- 3 Modelling through an assembly of predictions through a dynamic model (Petris et al., 2009).

Tested models

- VECM Model (Error Correction Vector) (Johansen, 1988).
- **ARIMA (Integrated Autoregressive Models of Mobile Media)**
- **Assembly of Dynamic Econometric Models**
- Assembling Dynamic Weighted Econometric Models
- VAR Model (Autoregressive Vector) (Londoño, 2005).
- Dynamic Factor Model (Cuevas and Quilis, 2012).
- Conjunctural Models.

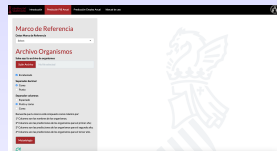
Application development

- Software R (Team, 2021) via Shiny (Chang et al., 2020).
- Interactive application with a high level of customization.
- Adaptability to the needs of the user.

The application is structured in three large blocks.



(a) Introduction



(b) Economic forecast



(c) User manual

Figure: App structure

Application Development - Introduction

- Explanation of the purpose of the application.
- Frame where it is developed.
- Mention of developed applications.
- Funding institution.

Portal de Desenvolupament de Previsions Macroeconòmiques de l'Economia Valenciana

Previsió elaborada per la Direcció de Evolució Econòmica, Sistema Productiu, Creixement i Treball.

Uno de los principales problemas a los que se enfrentan los agentes económicos es la toma de decisiones en entornos con incertidumbre. La utilización de métodos cuantitativos de predicción que utilizan las relaciones históricas entre las variables de interés permiten disponer de información útil para la toma de decisiones, valorando el grado de incertidumbre asociado a la misma.

En este escenario, la Dirección General de Economía Sostenible integrada en la Consejería de Economía Sostenible, Sistema Productivo, Comercio y Trabajo y la Universidad de Valencia han establecido un convenio de colaboración para fomentar y desarrollar el conocimiento de la economía valenciana y sus perspectivas en el corto y medio plazo, mediante la investigación para el desarrollo de un marco de previsiones macroeconómicas de la economía valenciana lo más completo posible.

En este portal web se pueden encontrar distintas aplicaciones (APP) desarrolladas en el marco de dicho convenio, que constituyen una herramienta abierta, flexible y actualizable en la que poder obtener predicciones de producción y empleo, bien entendido que, dentro de las metodologías propuestas (que se incorporan en función de su oportunidad y de los últimos avances metodológicos) cada agente económico pueda confeccionar sus propias proyecciones.

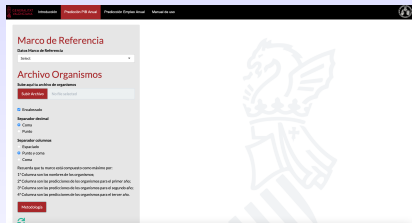
Dado que este portal es la herramienta que utiliza la propia Consejería para obtener sus proyecciones económicas. Por otro lado, la vocación de servicio público y de transparencia son las que motivan a poner este instrumento a disposición de los agentes económicos interesados en estos aspectos económicos que contribuye a mejorar el conocimiento sobre las expectativas de crecimiento y desarrollo de la economía valenciana.

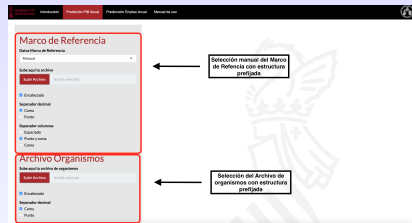
Figure: Introduction

Structure

- Frame of reference data.
- Source file.



(a) Prediction tab

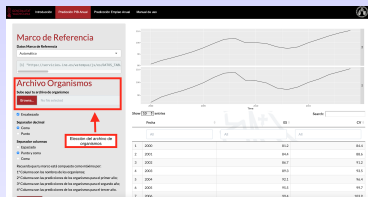


(b) Parts of the structure

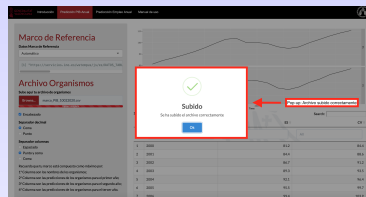
Figure: App structure

Application development - Economic Forecast

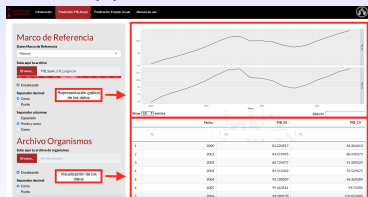
● Display:



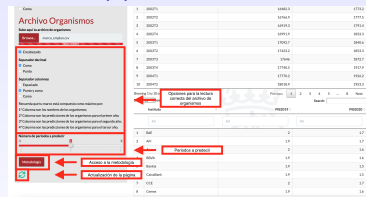
(a) Data uploading



(b) Correct climb



(c) Data displaying



(d) Time horizon and methodology

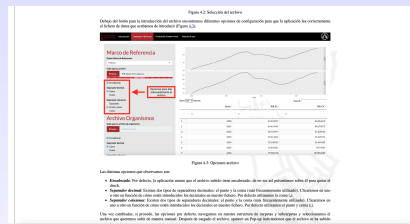
Figure: Economic Forecast

Application development - User manual

- Manual developed for the correct use and management of the economic forecasting application.



(a) Structure of the manual



(b) Manual

Figure: Viewing the Manual

The main conclusions and future lines of research:

- Yes, automation is possible but supervised.
- External information dependency.
- Need for a synthetic indicator capable of showing us the future trend of the economy, as a variable to test.
- Generation of calendar regressors for optimal seasonal adjustment using RJDemetra (Quartier la Tente, 2020) for each of the economic indicators.
- Knowledge of the reality in the very short term, thanks to the quarterly GDP.

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Thank you for your time!