



Improving Microeconomics Teaching with an Interactive R-shiny Application

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INTED 2026

Introduction

Objective and Pedagogical Framework

Microeconomics relies heavily on abstract models and static diagrams. Students often struggle to build intuition and understand comparative statics. The limitations of traditional teaching are based on *chalk-and-talk* instruction, static supply-demand and optimization graphs and limited opportunity for experimentation has a weak understanding of comparative statics.

The main goal is to develop an **R**-based interactive Shiny application that transforms static models into dynamic visual learning environments.

Based on a constructivist approach (Piaget, 1964) we promote active learning and skills-based education (ICT + reasoning) by built an interactive microeconomic simulator with **R** Shiny with the following characteristics:

- Web-based microeconomic simulator
- Real-time parameter manipulation
- Dynamic graphical feedback

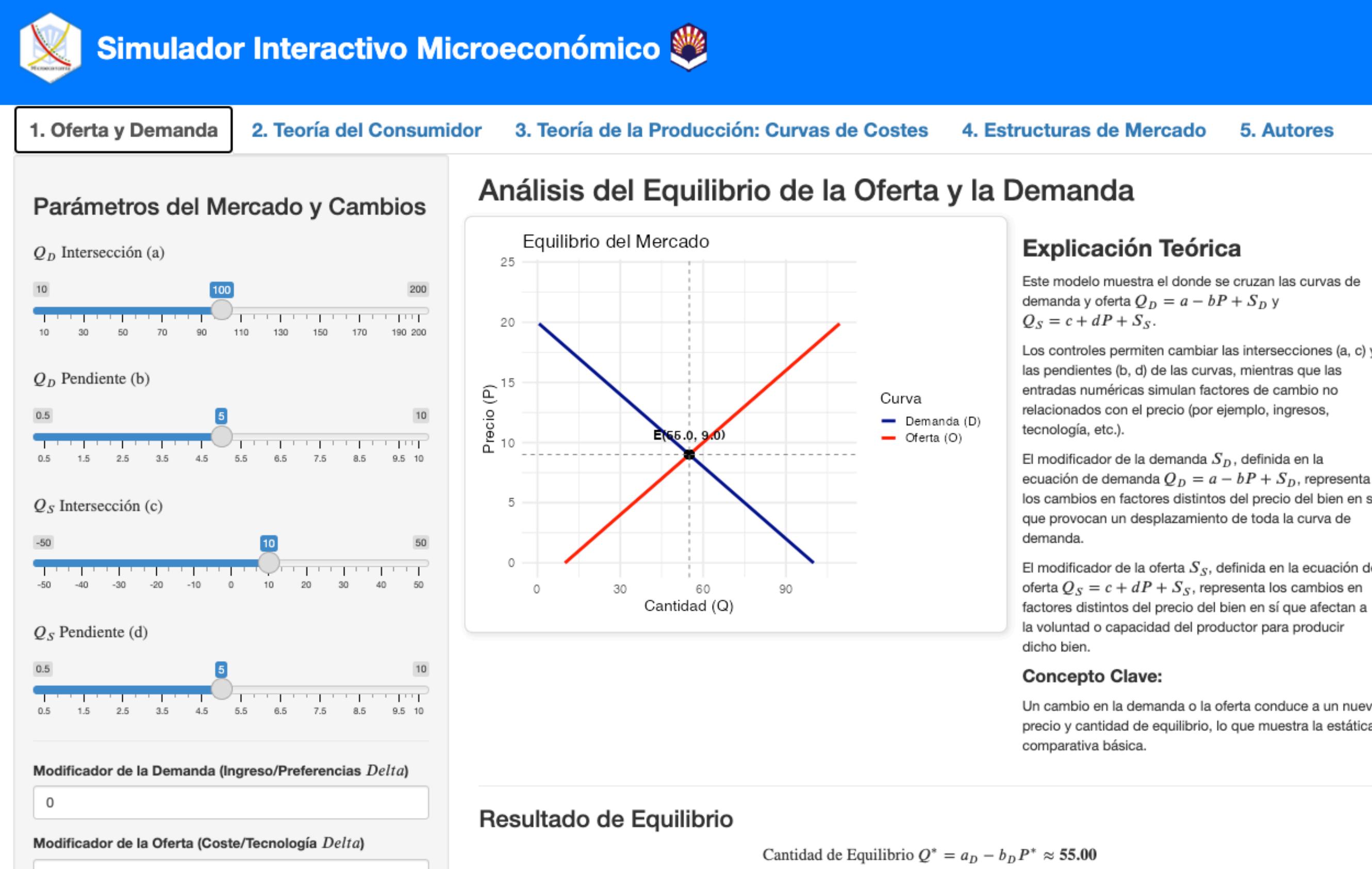
Methods

Design and Structure of the Shiny application

Open Science: App available at zenodo.org/records/18220705

jrcaro.shinyapps.io/microeconomics

The application is developed using the **R** Shiny framework and relies on well-established R packages for data visualisation, including **ggplot2** and **plotly**.

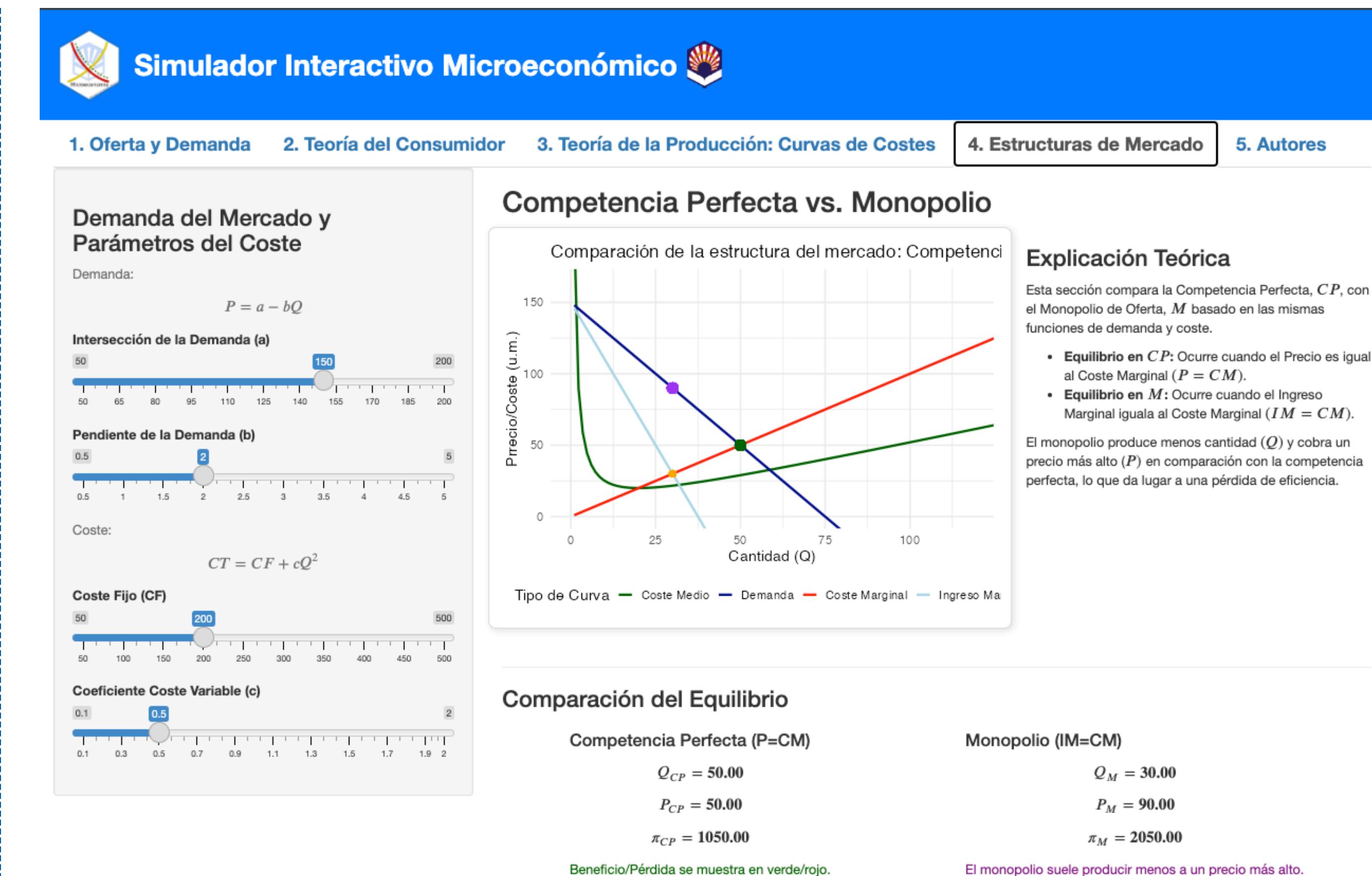
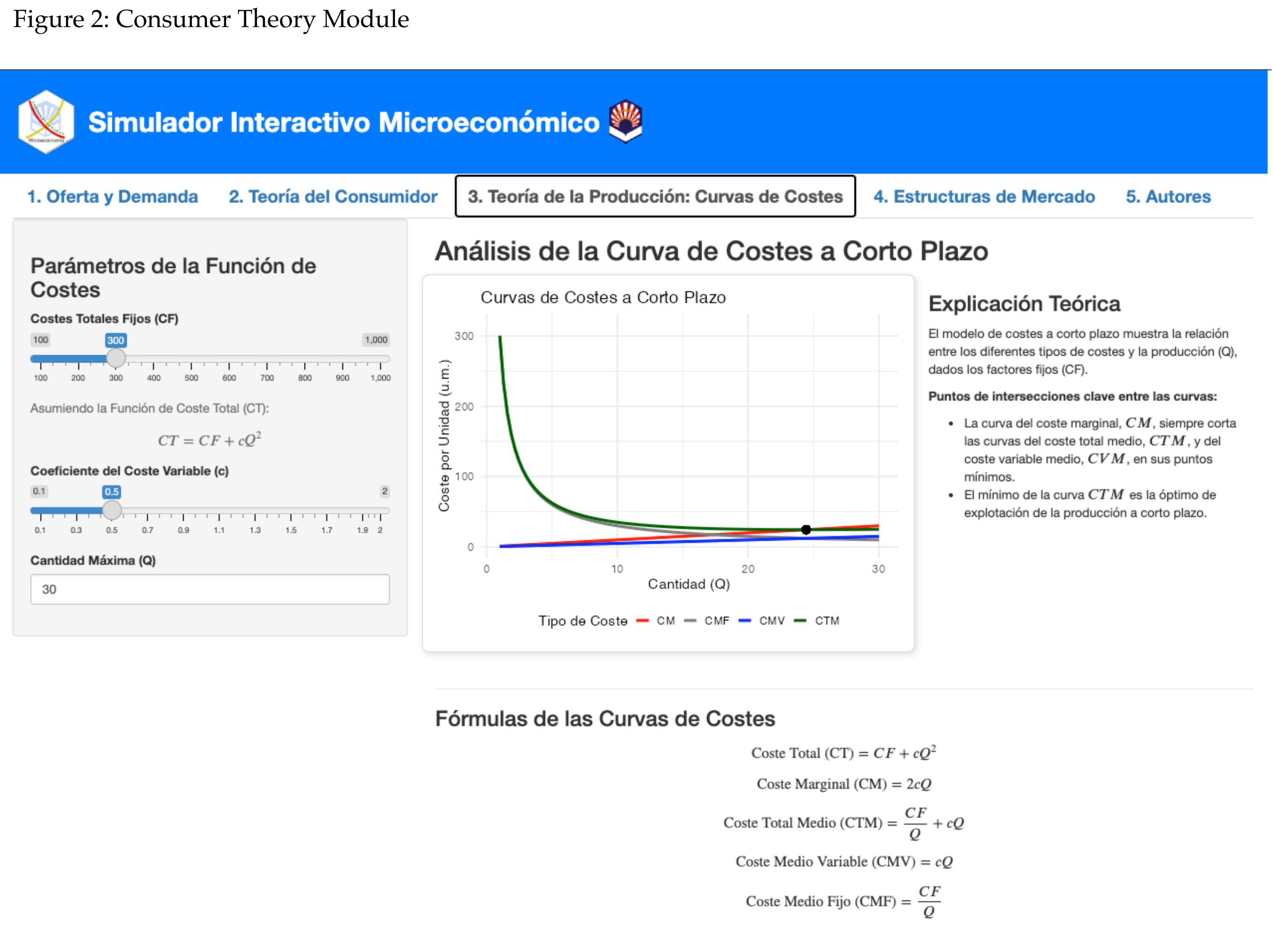
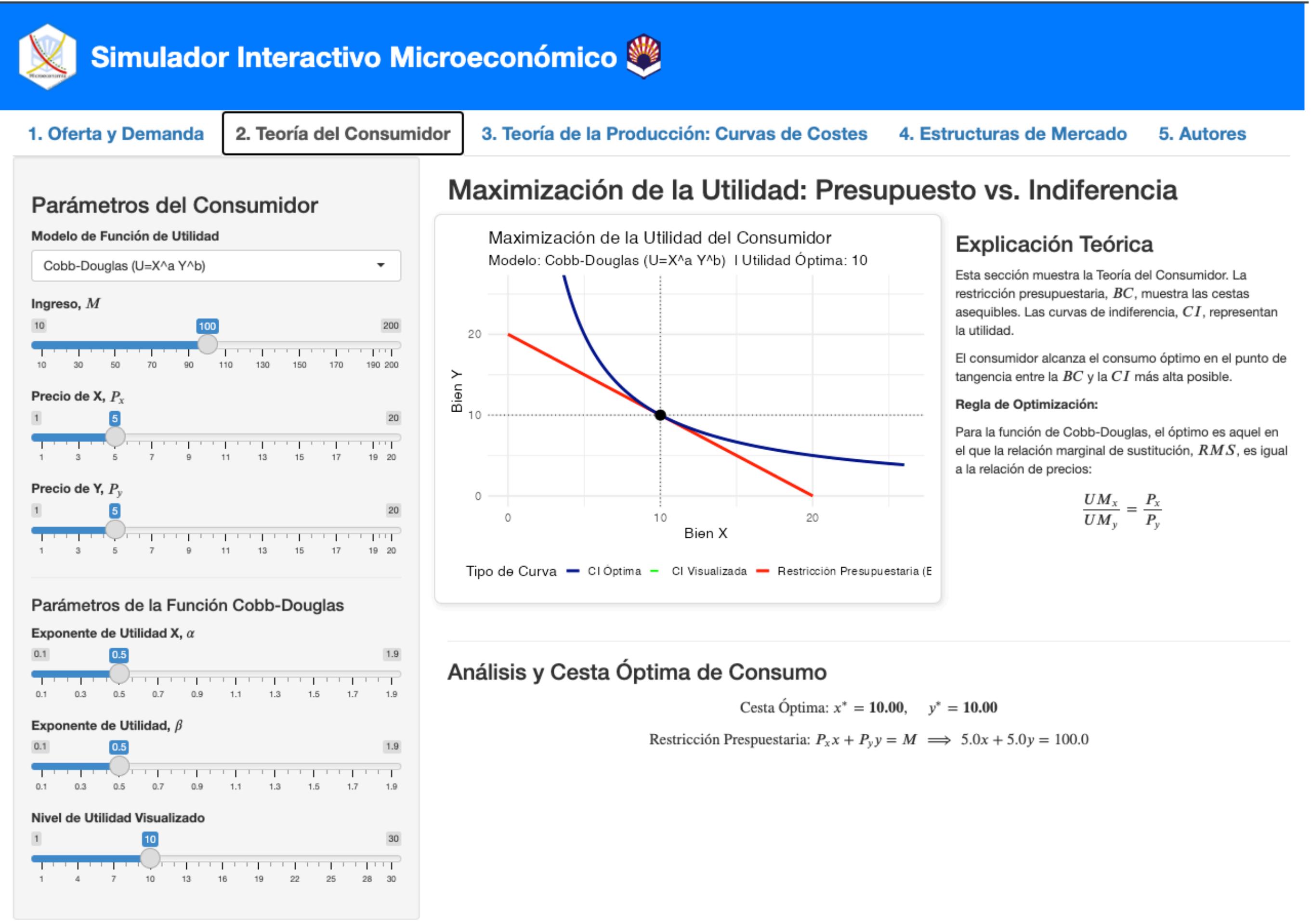


The user interface is split into thematic tabs corresponding to a major topic in introductory microeconomics syllabus. The modular design facilitates independent practice or integration of selected elements in a single continuous learning model.

The app now comprises the following fundamental modules:

1. Supply and Demand (Fig. 1)
2. Consumer Theory (Fig. 2)
3. Theory of Production: Short-Run Cost Curves (Fig. 3)
4. Market Structures: Perfect Competition and Monopoly (Fig. 4)

Every module consists of interactive controls, dynamic graphical output and a short theoretical explanation expressed in simple language, to make it more accessible.



Conclusions

The implementation of this interactive application reveals several significant results.

1. For real-time exploration of microeconomic models, the application functions effectively as a dynamic visual lab without any technical road blocks for students.
2. Initial experiences in the classroom indicate high levels of engagement, particularly in topics historically regarded as abstract or challenging to grasp.

The experiment results demonstrated a **significant increase in learning gains** students who are exposed to the application are achieving, particularly in the realm of graphs and comparative statics.

These findings align with qualitative feedback that students express more clarity and confidence in their ability to interpret economic models.

Main References

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