

**II JORNADES D'INVESTIGACIÓ ETSIE**  
**6 i 7 d'abril de 2017**

**COMPUTER SIMULATION, INNOVATION  
AND ENTREPRENEURSHIP**

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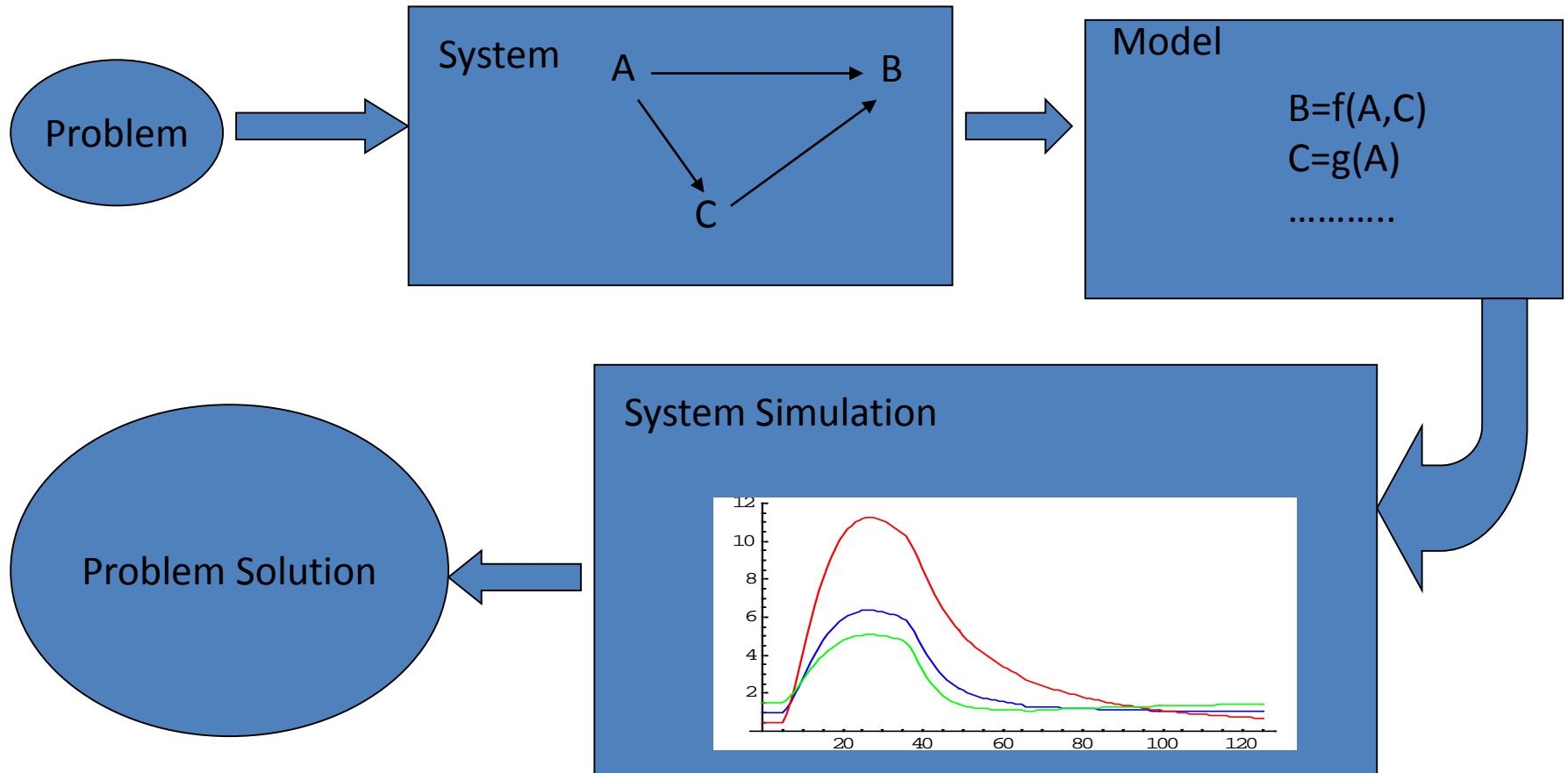
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# 1. GENERAL OBJECTIVE

**Objective:** Solve a problem of a complex system: a mathematical model is built and validated to simulate the system and to search the problem solution.



## 2. GENERAL MODELING METHODOLOGY

**S1: PROBLEM**  
Description in natural language

**S2: INVOLVED FACTORS**

**S2.1:** Brain Storming  
**S2.2:** Discussion  
**S2.3:** Involved Factors

**S3: MATHEMATICAL MODEL**

**S3.1:** Involved variables  
**S3.2:** Hydrodynamic Diagram  
**S3.3:** Equations

**S5: MODEL VALIDATION**

1. Historical data.  
2. Calibration.  
3. Scholar consulting.

**S4: COMPUTER MODEL PROGRAMING**

**S6: DESIGN OF EXPERIMENTS**

1. Strategies (control variables)  
2. Scenarios (exogenous variables)

**S7: SIMULATIONS**

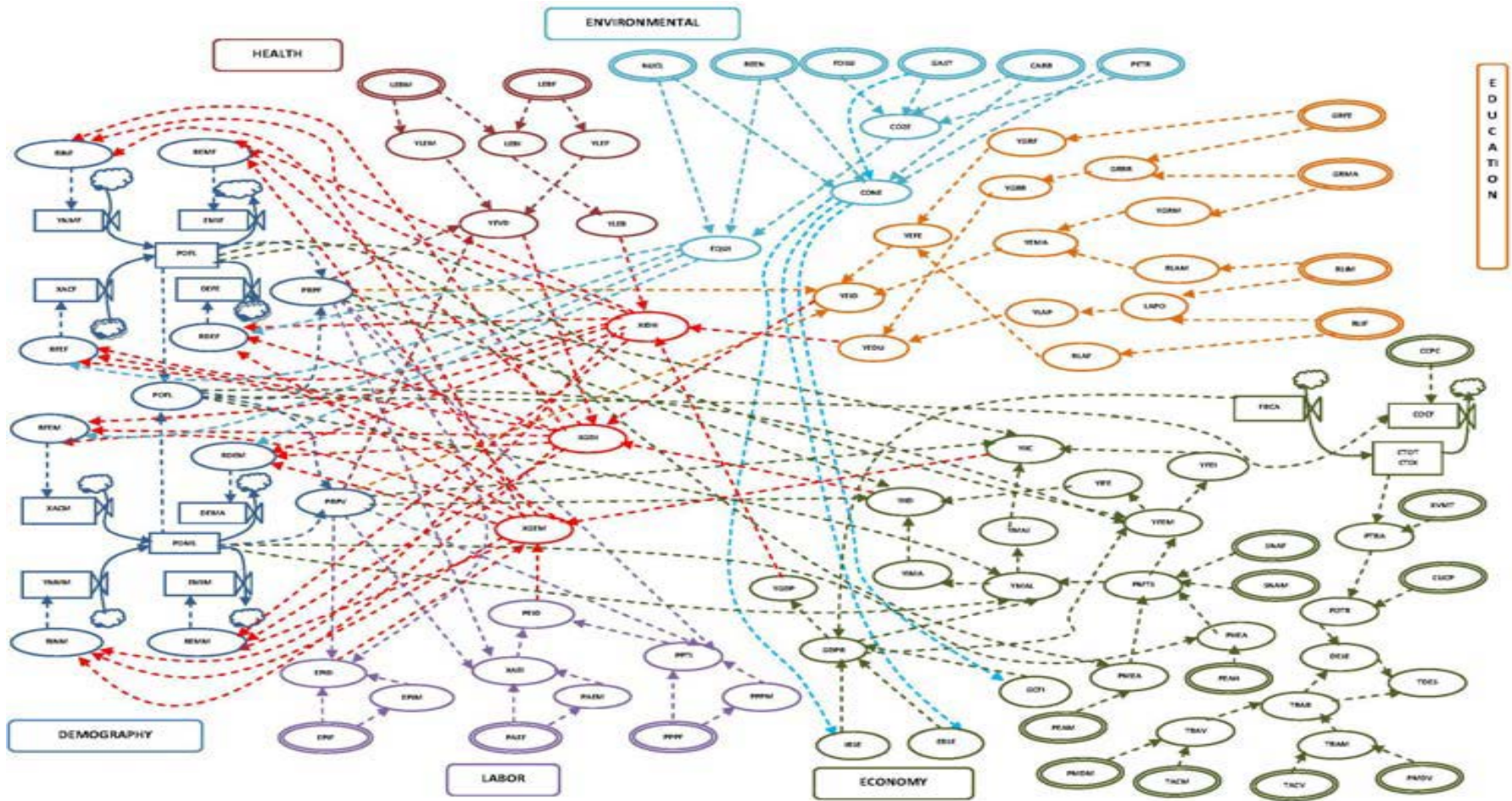
For each pair Strategy-Scenario

**S8: PRESENTATION AND USE OF RESULTS**  
(Causal Diagram)



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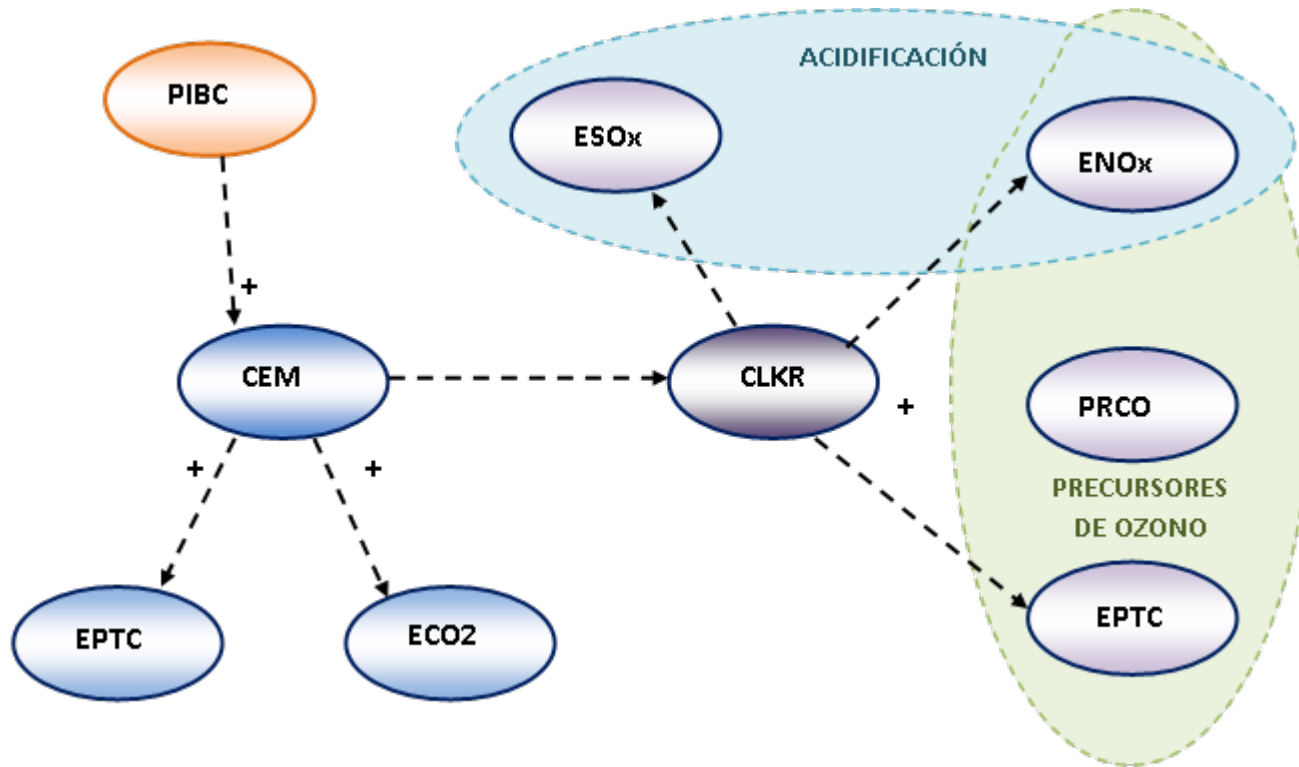
### 3. ENVIRONMENTAL IMPACT AND WELL-BEING



**PUBLICATION:** MARÍA T. SANZ , ANTONIO CASELLES JOAN C. MICÓ & DAVID SOLER (2016)  
**Including an environmental quality index in a demographic model**, Int. J. Global Warming, Vol. 9, No. 3, 2016

## 4. TFG 2014-2015

# STUDY OF THE ENVIRONMENTAL IMPACT OF CEMENT PRODUCTION IN SPAIN THROUGH A SIMULATION MODEL



**Author:** Laura Moya  
**Director:** Joan C. Micó



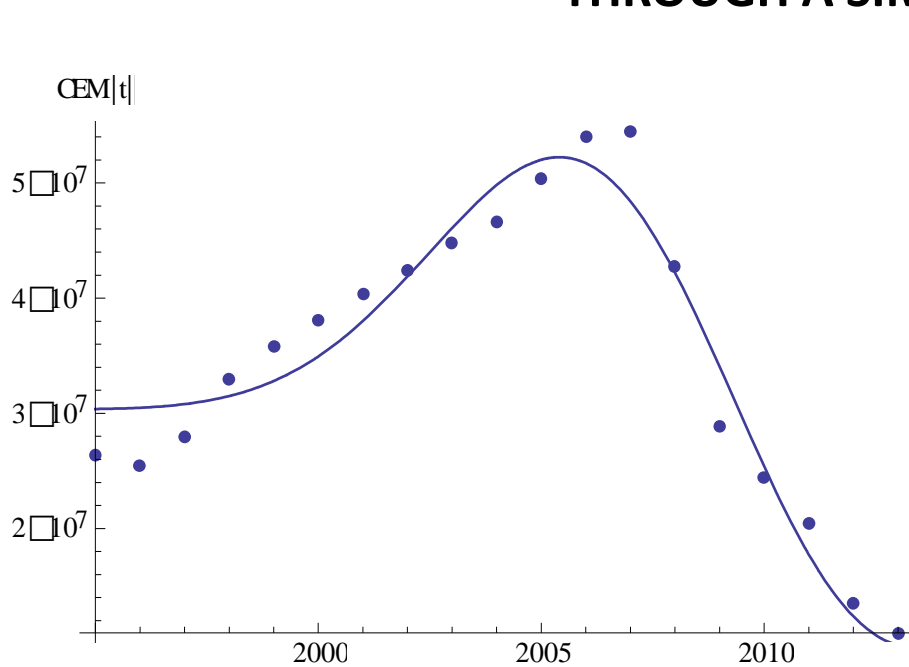
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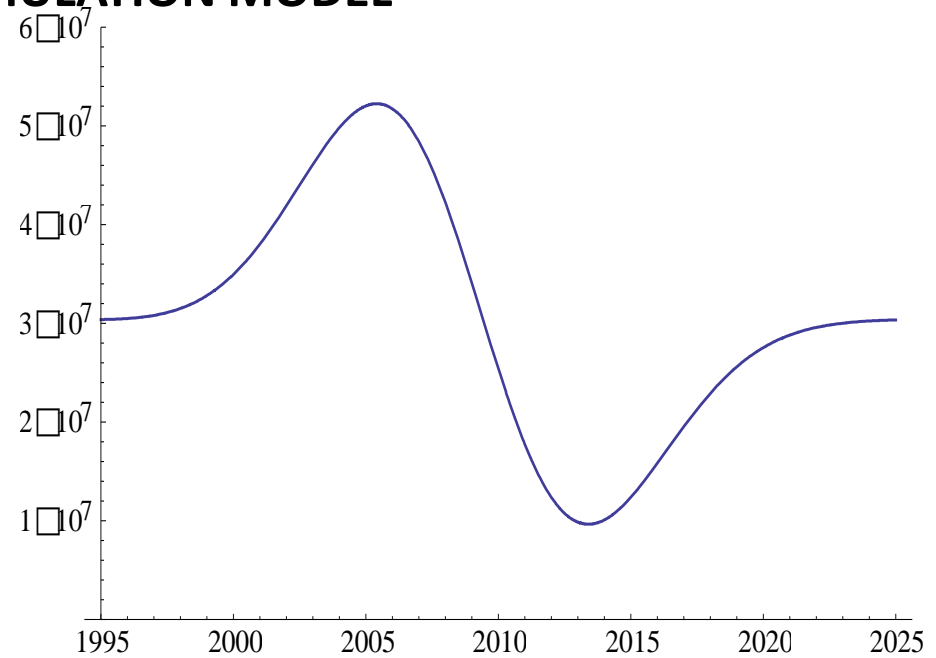
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# STUDY OF THE ENVIRONMENTAL IMPACT OF CEMENT PRODUCTION IN SPAIN THROUGH A SIMULATION MODEL



Cement Production in Spain  
versus time: Calibration

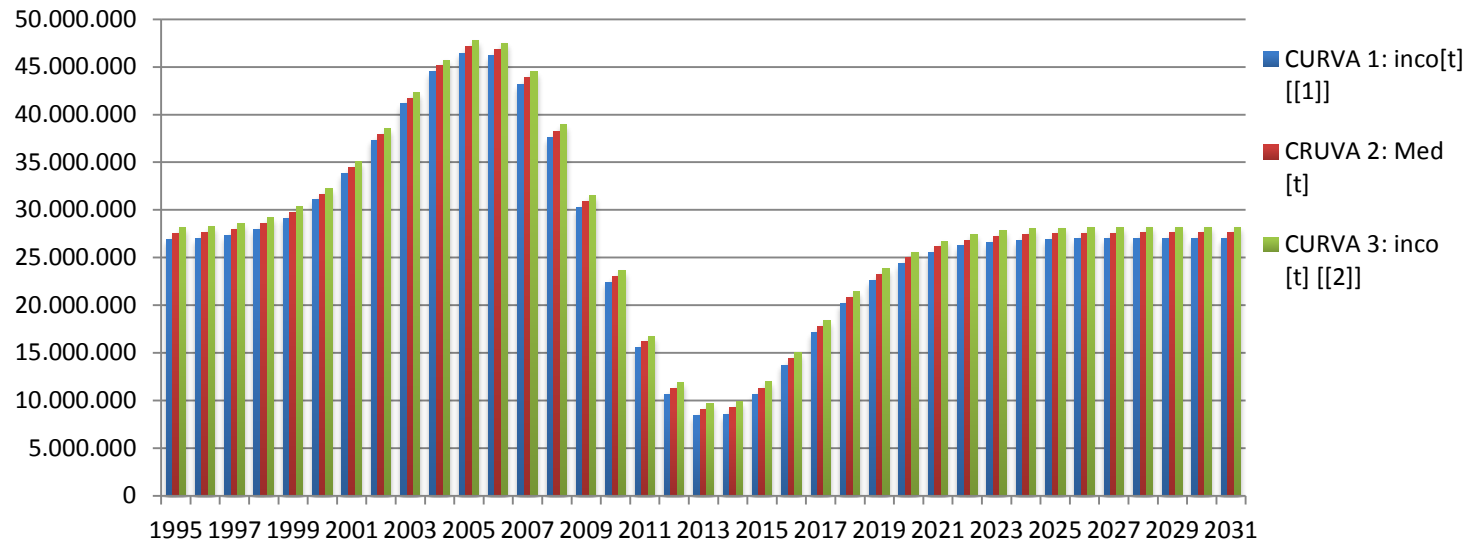


Cement Production in Spain  
versus time: Future prediction

**Author:** Laura Moya  
**Director:** Joan C. Micó

## 4. TFG 2014-2015

# STUDY OF THE ENVIRONMENTAL IMPACT OF CEMENT PRODUCTION IN SPAIN THROUGH A SIMULATION MODEL



Prediction of CO2 emission per made cement tone (1995-2031)

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**Director:** Joan C. Micó



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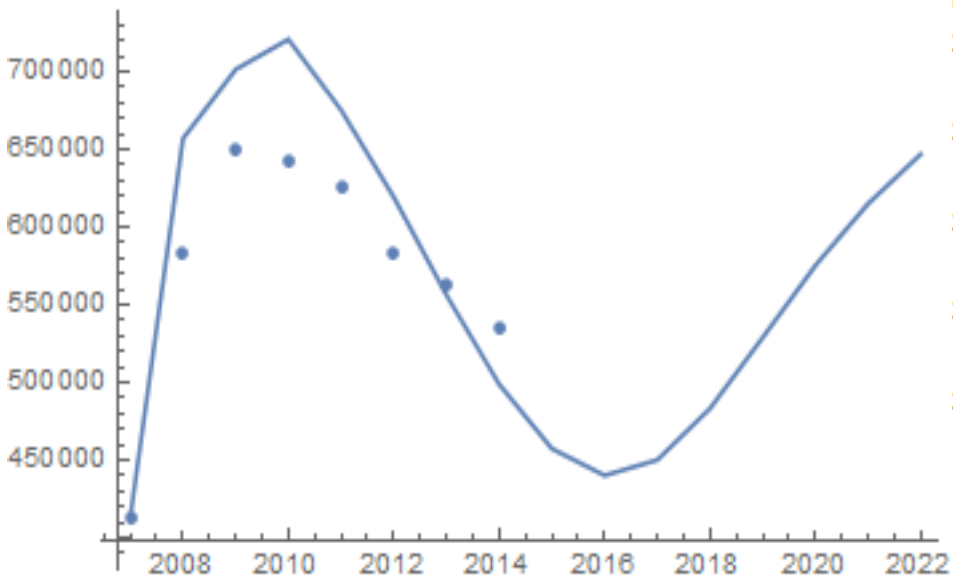


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## 5. TFG 2015-2016...to be completed

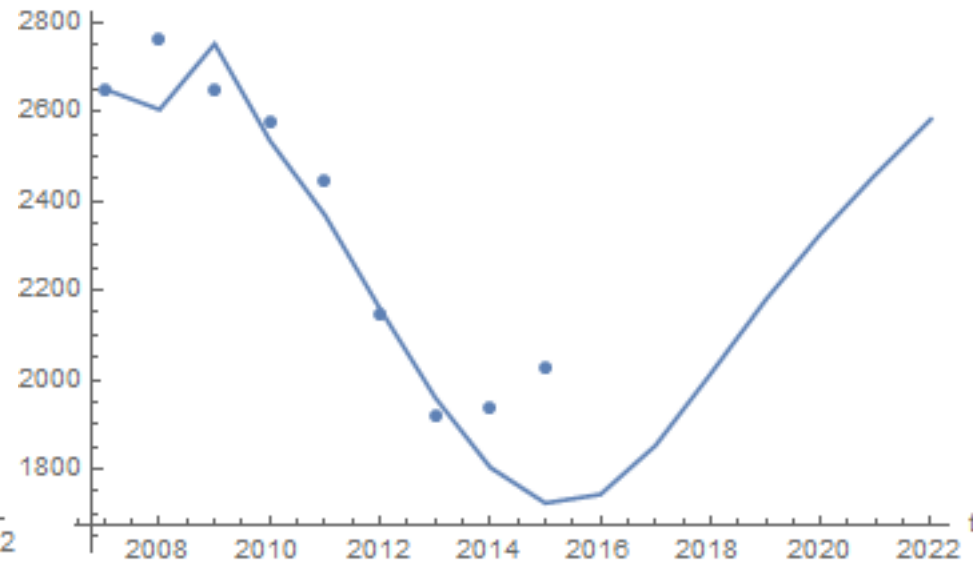
# EVOLUTION OF THE HOUSING PRIZE IN SPAIN: A MODEL OF THE REAL ESTATE MARKET OF SPAIN

Vacant Houses



Vacant Houses versus time

Mean Price



Mean Price versus time

**Author:** Pablo Soriano

**Director:** Joan C. Micó



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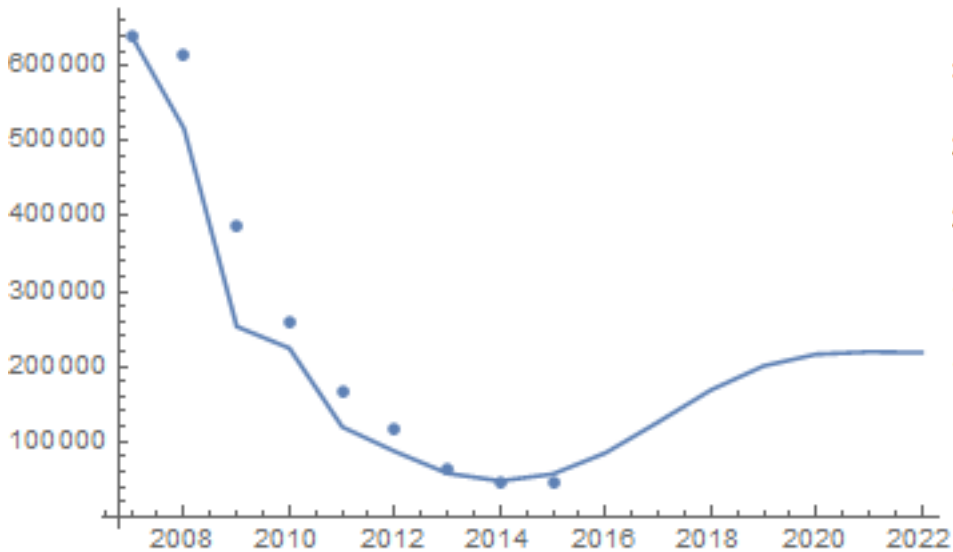
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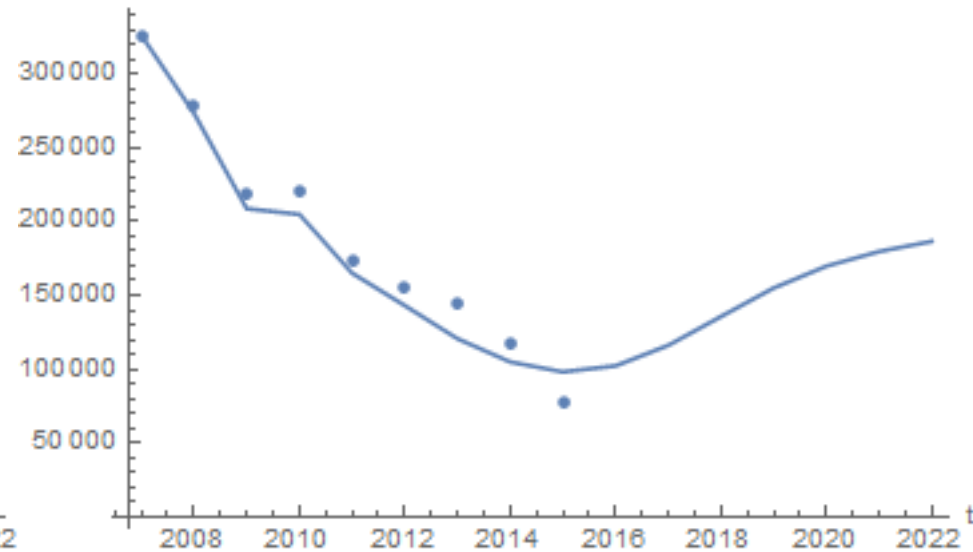
# EVOLUTION OF THE HOUSING PRIZE IN SPAIN: A MODEL OF THE REAL ESTATE MARKET OF SPAIN

Built Houses



Built Houses versus time

Sold Houses



Sold Houses versus time

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## 6. Proposals of Research Programs in Edification Context

1. General: A Simulation Model to Study the Viability of a System, Firm or Organization.
2. A Simulation Model to Study the urban well-being: a tool to plan the Urban Systems.
3. A Simulation Model to Study the Real Estate Market of a City or a Country.
4. Etc.....



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