



ELSEVIER

Contents lists available at SciVerse ScienceDirect

## Resources Policy

journal homepage: [www.elsevier.com/locate/resourpol](http://www.elsevier.com/locate/resourpol)

## The Spanish building crisis and its effect in the gypsum quarry production (1998–2012)

M.J. Herrero\*, J.I. Escavy, M. Bustillo

Departamento de Petrología y Geoquímica, Facultad de Ciencias Geológicas, Universidad Complutense Madrid, C/ Jose Antonio Novais 2, 28040 Madrid, Spain

### ARTICLE INFO

#### Article history:

Received 8 January 2013  
 Received in revised form  
 26 February 2013  
 Accepted 26 February 2013  
 Available online 29 March 2013

#### Keywords:

Gypsum  
 Industrial mineral  
 Building bubble  
 Mineral trade  
 Regression analysis  
 Spain

### ABSTRACT

Gypsum is one of the most important mined mineral commodities of the world. As an industrial rock, it is primarily used by the construction industry. Therefore, the economics of the gypsum market can be correlated with parameters that have controlled the origin and development of the Spanish building bubble between years 1998 and 2006. The burst of this building bubble has been interpreted as the main triggering factor for Spain's current crisis.

Gypsum quarry production during the golden period of Spain's building industry, reached 15.3 Mt, with domestic apparent demand as high as 11.8 Mt. After this period, domestic demand decreased to 4.3 Mt in year 2010, and quarry production fell to 7.0 Mt. These decreases were caused not only by the burst of the building bubble, but also from the global financial crisis and the public works investment cuts. This analysis predicts a continuation of decreasing domestic demand in year 2013, of at least 270,000 t.

© 2013 Elsevier Ltd. All rights reserved.

### Introduction

Gypsum was the seventh natural mineral commodity mined in the world in 2011 after aggregates, iron ore, lime, salt, bauxite and phosphate (Salazar and McNutt, 2012). According to these authors, world production of gypsum in year 2011 was 148 million tonnes. Gypsum, together with aggregates, brick clay and limestone for cement manufacture are high-bulk and low-price industrial rocks that derive much of their values from extraction points being located close to the demand points, and therefore, they have a high place-value (Bates, 1960).

In Spain, gypsum-bearing geological formations are very common, with a total outcrop area of 21,700 km<sup>2</sup> that represents about 4.2% of the total country extent, an area about the size of Israel (22,072 Km<sup>2</sup>) or El Salvador (21,041 km<sup>2</sup>). From the total gypsum-bearing outcrops of Spain, 17,328.4 km<sup>2</sup> correspond to non-minable areas, due, either to the low gypsum grade, or to environmental and geographical restrictions that prohibit production (reserves sterilization). After these adjustments, the area with potential minable gypsum is approximately 4371.6 km<sup>2</sup> (Escavy et al., 2012). The Geological Survey of Spain (IGME) calculated the Spanish reserves of gypsum to be above 60,000 million tonnes (Regueiro and Calvo, 1997). These gypsum reserves, if confirmed, would satisfy the

present world demand (~148 Mt per year) for more than four centuries.

Gypsum, as an industrial rock, is mainly used by the construction industry: wallboard and plaster products, cement production, and a small percentage in agriculture, pharmacy and chemicals. In 2011, in the United States, 95% of the consumption was for building plasters, Portland cement and wallboard products (Salazar and McNutt, 2012). In Spain, in 2010, 38% of the gypsum mined was exported, and the remaining 62% was used by the domestic construction industry (Minetur, 2012).

Gypsum mined in Spain increased from the mid-nineties to 2006, when production attained a maximum of 15.3 million tonnes (Minetur, 2012). At that time, Spain was leading European production and ranked third in the world, after China and Iran. After reaching the historical maximum in 2006, Spanish gypsum production dropped sharply due to the combination of several factors: (i) the burst of the building bubble in Spain; (ii) the financial international crisis; and finally, (iii) budget cuts in public works investments (a result of the first two factors). The persistence of the crisis in Spain in 2012 (European Commission, 2012a), continues decreasing the domestic demand of this industrial rock to levels not seen in the last 25 years. A similar decrease has been observed for other building materials such as aggregates, where the demand boom started in 1993 and lasted until 2006 (ANEFA, 2012; Menegaki and Kaliampakos, 2010).

The main objectives of this study are first, to determine the direct impact of the Spanish building crisis in the indigenous gypsum production and, second, to forecast future gypsum demand in Spain.

\* Corresponding author. Tel.: +34 913944906; fax: +34 915442535.

E-mail addresses: [mjherrer@ucm.es](mailto:mjherrer@ucm.es) (M.J. Herrero), [jiescavy@ucm.es](mailto:jiescavy@ucm.es) (J.I. Escavy), [bustillo@ucm.es](mailto:bustillo@ucm.es) (M. Bustillo).

This paper uses a simplified terminology from Kuntz (2009). Herein, we refer to gypsum as the naturally occurring rock with dominant calcium sulfate dihydrate mineralogy. We refer to plaster as calcined gypsum, regardless the level of calcination attained, whereas plasterboard refers to any type of paper lined plaster board or fiber reinforced gypsum panels. We use the term synthetic gypsum as the calcium sulfate dihydrate generated as waste or byproduct of industrial processes such as flue gas desulfurization of smokestack emissions (FGD gypsum), sulfuric acid neutralization, byproduct of phosphoric acid manufacture (phosphogypsum), etc.

The data used for this research is mostly derived from online freely available information from different Spanish government departments such as the National Statistics Bureau (INE), Ministry of Industry, Energy and Tourism (Minetur), Spanish Geological Survey (IGME), Ministry of Economy and Competitiveness (Mineco) and the Bank of Spain. International information has been obtained from the European Commission, the World Bank, the International Monetary Fund and the United States Geological Survey (USGS).

## Economic context

Classically, the generation of a building bubble has been explained by a combination of several reasons: increased home ownership, speculative transactions rather than secured or guaranteed transactions, low interest rates, residential real estate viewed as a safe harbor, bad lending practices, etc (Merriam, 2009). All these *objective* factors can explain only part of the total magnitude of the bubble, and some *subjective* input is additionally important, such as unrealistic expectations produced by an excessive optimism about future housing prices (Glaeser et al., 2010).

In Spain, from 2000 to 2006, all the aforementioned conditions for the genesis and growth of a building bubble were in place.

- Homeownership in Spain has historically been very high. In 2010, for example, 83% of the population lived in owned homes (vs. 17% living in rented houses). At that time, the average homeownership for the European Union countries was 70% (European Commission, 2012b).
- Building construction is cyclical and controlled by factors such as economic growth, demographic changes and interest rates (Poulin et al., 1994). From 2000 to 2007, Spain benefited from a robust economic growth with an average annual Gross Domestic Product (GDP) of 3.6%, combined with low average lending interest rates of 3.2%. The GDP is similar to average annual inflation (World Bank, 2012) although the lending interest rates were lower than inflation rate during the period 2004–2006 (Fig. 1).

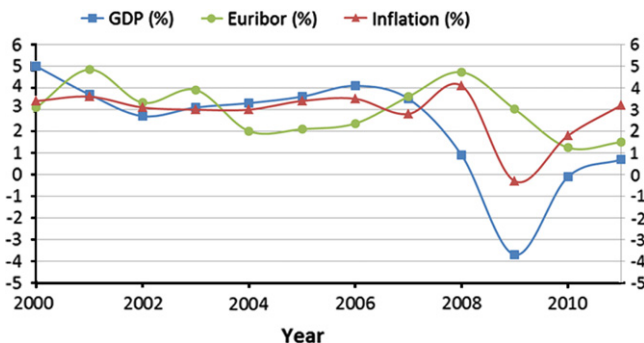


Fig. 1. Variation (%) of GDP, Inflation and interest rate (Euribor) from 2000 to 2011 in Spain. (World Bank, 2012).

- Loose lending conditions with lower down payment requirements and over-appraisal of the properties were conspicuous during this period (years 2000–2006).
- Housing approvals (12-month moving sum) increased from 387,000 in mid-2002 to 776,000 in May 2007 (Fig. 2). This strong demand was only partially attributed to demography, with an average annual population increase of 720,000 persons (INE, 2012) mostly immigrants arriving in Spain. Housing demand from 1998 to 2001 was mainly for residency, but from 2002 to 2005 most of the transactions were done by investors or speculators (Bernardos, 2009).

The Global financial crisis was the result of macroeconomic causes (build-up of financial imbalances due to international capital flows and low interest rates), and an inadequate regulation and supervision of the financial sector. These factors promoted an excessive leverage and risk taking (Glaeser et al., 2010).

Public works demand is a function of government funding, which is politically driven, sometimes as countercyclical investment strategy to attenuate the lower part of the economic cycles (Meyer and Zelnak, 1991). In Spain, until year 2003, public work investment was inversely correlated to the Gross Domestic Product. From year 2003 to 2006, public works investment grew at an average of 23% per year, fueling the demand of building materials.

Once a bubble has been created, an event can spark the unwinding of the over-optimism and trigger the bursting of the bubble (Duca et al., 2010). In Spain, there was not a unique event. The cycle change started in 2006, produced by a housing demand reduction combined with the arrival of an enormous quantity of new houses on the market. The credit restriction generated after the start of the subprime crisis helped to intensify the magnitude of the fall of the housing market of Spain, although it was not the triggering factor (Bernardos, 2009). At the end of 2009 the stock of unsold new houses was of 688,044 units (for a country of less than 45,000,000 people). The reduction of the stock of unsold new houses in the years 2010 and 2011 has been almost nonexistent, with a stock at the end of 2011 of 676,038 units (Fomento, 2012).

Therefore, the construction crisis in Spain resulted from a combination of the burst of the housing bubble in 2007, the start of the world Late-2000's financial crisis, and not insignificantly, the cut in government investment budgets to meet debt reduction

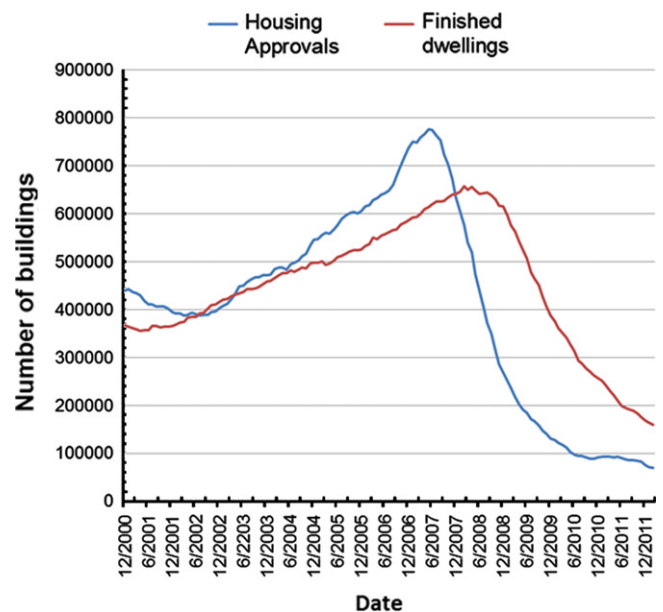


Fig. 2. Housing approvals and finished dwellings in Spain (12-month moving sum).

Download English Version:

<https://daneshyari.com/en/article/985698>

Download Persian Version:

<https://daneshyari.com/article/985698>

[Daneshyari.com](https://daneshyari.com)