

## Analysis of the efficiency of the Iberian power futures market

Álvaro Capitán Herráiz\*, Carlos Rodríguez Monroy

Department of Business Administration, Madrid Technological University (UPM), José Gutiérrez Abascal, 2 28006 Madrid, Spain

### ARTICLE INFO

#### Article history:

Received 23 September 2008

Accepted 7 April 2009

Available online 4 June 2009

#### Keywords:

Iberian Power Futures Market

Market efficiency

Forward risk premium

### ABSTRACT

Market efficiency is analysed for the Iberian Power Futures Market and other European Power Markets, as well as other fuel markets through evaluation of ex-post Forward Risk Premium. The equilibrium price from compulsory call auctions for distribution companies within the framework of the Iberian Power Futures Market is not optimal for remuneration purposes as it seems to be slightly upward biased. In the period considered (August 2006–July 2008), monthly futures contracts behave similarly to quarterly contracts. Average risk premia have been positive in power and natural gas markets but negative in oil and coal markets. Different hypotheses are tested regarding increasing volatility with maturity and regarding Forward Risk Premium variations (decreasing with variance of spot prices during delivery period and increasing with skewness of spot prices during delivery period). Enlarged data sets are recommended for stronger test results. Energy markets tend to show limited levels of market efficiency. Regarding the emerging Iberian Power Futures Market, price efficiency is improved with market development of all the coexistent forward contracting mechanisms and with further integration of European Regional Electricity Markets.

© 2009 Elsevier Ltd. All rights reserved.

### 1. Introduction

Since its beginning in July 2006, the Iberian Power Futures Market managed by Iberian Forward Market Operator (OMIP), within the framework of the Iberian Electricity Market (MIBEL), has experienced a continuous development, in terms of number of participants and liquidity. At this moment, around 30 market players participate in OMIP. Almost half of them (12) belong to Iberian energy incumbents (vertically integrated energy groups with separated generation and distribution companies). Only six members are pure financial agents, still a reduced figure. Additionally, only two market makers have been active in OMIP: *RBS Sempra* quoting monthly contracts in the periods September 2007–March 2008 and May 2008–October 2008, and *EGL Spain* quoting quarterly and yearly contracts in the period November 2008–April 2008. The main amount of traded energy in OMIP is still driven by compulsory call auctions according to national regulations aimed at fostering the MIBEL. The Spanish distribution companies and the Portuguese last resort supplier with more than 100,000 clients are obliged to purchase in these auctions, in order to partly cover their portfolios of end-user-regulated supplies. Such an obligation comprises 5% of their regulated supplies, for

the 2nd half of year 2006, as agreed by MIBEL Council of Regulators in the Évora Summit (November 2005), and published in the corresponding legislation (Spanish Order ITC/2129/2006 and Portuguese “Portaria” 643/2006), and 10% for year 2007 onwards, as agreed in the Badajoz Summit (November 2006), and published in Spanish Order ITC/3990/2006 and Portuguese Dispatch 780/2007 (for 1st half of year 2007), Spanish Order ITC/1865/2007 and Portuguese Dispatch /2007 of 29 June, 2007 (for 2nd half of year 2007 and 1st half of year 2008), Spanish Order ITC/1934/2008 and Portuguese Dispatch 19098/2008 (for 2nd half of year 2008), and Spanish Order ITC/3789/2008 and Portuguese Dispatch 125-A/2009 (for 1st half of year 2009) (Fernández Domínguez and Xiberta Bernat, 2007; Capitán Herráiz and Rodríguez Monroy, 2009).

As shown in Fig. 1, since the last quarter of 2007 the amount of energy traded in the OMIP continuous market has grown slightly compared to previous trading levels, with a record in June 2008, though it is still less than the auctioned amounts. In the first two years of OMIP continuous market (i.e., since July 2006 until July 2008), the accumulated amount of energy traded in OMIP call auctions is more than five times bigger than in the continuous market. Within the first two years of OMIP, despite the record level in June 2008, no generalised trend of increasing volumes is appreciated in the continuous market. Therefore, liquidity of this market is still reduced compared to other European Power Futures Markets.

An analysis of the efficiency of the Iberian Power Futures Market is done to assess the situation of this emerging market.

\* Corresponding author.

E-mail addresses: [alvarocapitan@hotmail.com](mailto:alvarocapitan@hotmail.com) (A. Capitán Herráiz), [crmonroy@etsii.upm.es](mailto:crmonroy@etsii.upm.es) (C. Rodríguez Monroy).

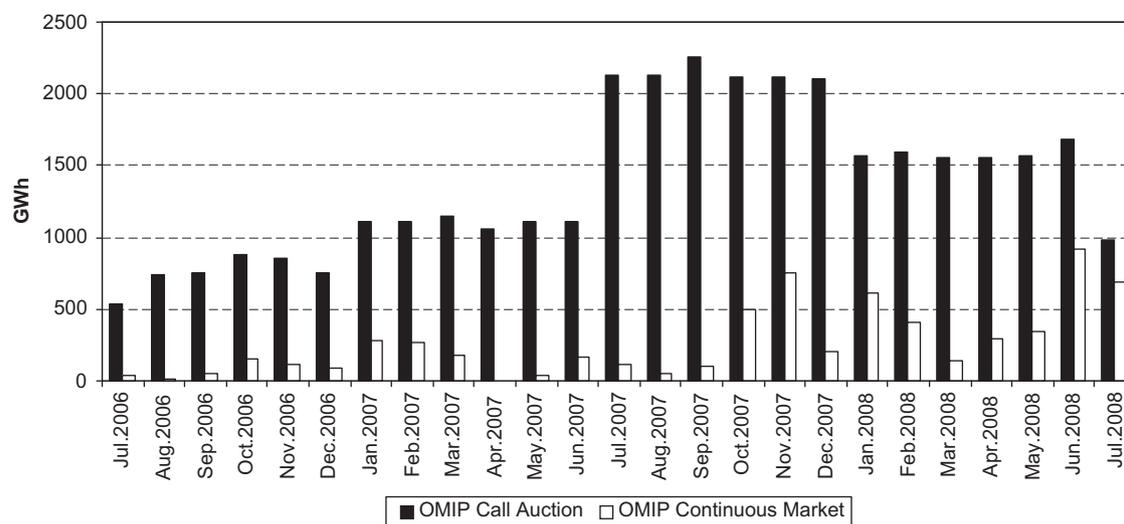


Fig. 1. Evolution of trading levels (GWh) in OMIP call auctions and OMIP continuous market.

This information is of special interest both for all MIBEL market players and for MIBEL Regulatory Committee in charge of MIBEL market supervision. In order to perform this analysis, the article is structured as follows: Section 2 *Iberian Power Futures Market* describes how OMIP call auctions and OMIP continuous market work, as well as other coexisting forward contracting mechanisms within MIBEL scope, namely, the so-called EPE auctions (in Spanish “Emisiones Primarias de Energía”, commonly known in English as virtual power plant (VPP) auctions) and CESUR auctions (in Spanish “Contratos de Energía para Suministros de Último Recurso”, i.e., last resort supply auctions); Section 3 *Literature Review about Market Efficiency* briefly describes the main studies regarding price efficiency of energy and other commodity markets; Section 4 *Definition of the Ex-post Forward Risk Premium*, builds that premium as the difference between the average settlement price of a futures contract and the resulting average spot price during delivery (e.g., Furió and Meneu, 2009), and constitutes it as the driver of the diverse tests performed in the following Sections; Section 5 *Test 1 Assessment of OMIP Auction Equilibrium Prices* assesses if the price formation in OMIP call auctions is satisfactory; Section 6 *Test 2 Analysis of Basic Statistics of Futures & Spot Prices* compares the price evolution of various energy markets; Section 7 *Test 3 Analysis of Ex-post Forward Risk Premium magnitudes* assesses the Forward Risk Premium existence and compares the futures behaviour towards maturity of these energy markets; Section 8 *Test 4 Bessembinder's and Lemmon's hypothesis compliance* analyses the compliance of OMIP, Powernext and Nord Pool Power Markets regarding the hypothesis derived from seminal research based upon an equilibrium model by Bessembinder and Lemmon (2002), claiming that the Forward Risk Premium decreases in the variance of spot prices and increases in the skewness of wholesale prices; finally, Section 9 *Conclusions* summarises the findings of this research and proposes future developments related to this topic.

## 2. Iberian power futures market

Since November 18th, 2008, the Iberian Power Futures Market has the EU Regulated Market status, according to Directive 2004/39/EC of the European Parliament and of the Council of April 21st, 2004 on markets in financial instruments (MiFID), following the registration with the Portuguese Securities Market Commission (Comissão do Mercado de Valores Mobiliários, CMVM) on October

30th, 2008. Whereas OMIP works as Market Operator of the MIBEL Derivatives Market, OMIClear acts as the Clearinghouse. There are two trading modes coexisting within OMIP: the *continuous market* (default mode) and the *call auction*. In the continuous trading, anonymous buy and sell orders interact immediately and individually with opposite side orders, generating trades with an undetermined number of prices for each contract. Buy orders with the highest prices and sell orders with the lowest prices are executed first. In the call auction trading, a single-price auction maximizes the traded volume, being all trades settled at the same price (*equilibrium price*). The call auction algorithm is based on the maximum tradable volume and minimum price criteria, following a *First In First Out* allocation method. Additionally, OMIP trading members may settle *Over The Counter* (OTC) trades through OMIClear, either registering their transactions by themselves or through a broker, experiencing this activity a remarkable growth in the last quarter of year 2008 due to the difficulties of holding credit lines in the current global financial turmoil. OMIP trading sessions are composed of the following time windows: *pre-trade* phase happens between 8 a.m. and 9 a.m.; *auction* phase between 9 a.m. and 9:10 a.m.; *continuous trading* phase between 9:10 a.m. and 4:30 p.m.; and *pre-close* phase between 4:30 p.m. and 6:30 p.m. The first four Wednesdays of each month, the auction phase is extended until 10 a.m. as the compulsory call auctions where Spanish distribution companies and the Portuguese last resort supplier are to purchase regulatorily fixed volumes occur (OMIP OMIClear, 2008).

As stated by Martín Martínez and Villaplana (2009), the current regulatory development in Spain and Portugal towards the establishment of last resort tariffs competing with the liberalised market will foster the electricity derivatives use as hedging instruments for the market players. In this sense, since June 2007 other forward contracting mechanisms based on compulsory auctions have been created, namely: virtual power plant auctions (in Spanish, the so-called “Emisiones Primarias de Energía” or EPE auctions), and the last resort supply auctions (in Spanish, the so-called “Contratos de Energía para Suministros de Último Recurso” or CESUR auctions). The coexistence of these instruments is boosting the liquidity of energy derivatives for risk management purposes, both within OMIP market as well as in the OTC market, the latter already active since 1999. The Royal Decree 1634/2006, of 29 December, established the five first EPE auctions with physical delivery. In these auctions, call options regarding “virtual” capacity of the Spanish incumbent generators (Endesa

متن کامل مقاله

دریافت فوری ←

**ISI**Articles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات