

Analysis of the Iberian Power Futures Market Hedging Efficiency

Álvaro Capitán Herráiz¹, Carlos Rodríguez Monroy¹

¹ Technical University of Madrid, José Gutiérrez Abascal, 2, 28006 Madrid, Spain
e-mail: alvarocapitan@hotmail.com, crmonroy@etsii.upm.es

Keywords: Hedging efficiency

1. Introduction

Capitán Herráiz and Rodríguez Monroy (2009) provide a description of the evolution of the Iberian power futures market managed by OMIP, located in Lisbon (Portugal), during its first two years of existence. That research focus on the assessment of the ex-post forward risk premia (i.e. the difference between the futures prices and the underlying average spot prices for the corresponding delivery period). OMIP forward risk premia are remarkable, specially at the beginning of this market, limiting its price efficiency. The current research enlarges the data set (from the start of that market on July 3, 2006, to February 28, 2011) in order to identify the main drivers behind the growing evolution of OMIP continuous market. An analysis of the evolution of the traded volumes in OMIP versus the auctions for catering the last resort supplies (the so-called “CESUR” auctions, in Spanish “*Contratos de Energía para el Suministro de Último Recurso*”) and the dominant OTC (“*Over The Counter*”) market is provided. A regression model using Ordinary Least Square methodology intends to assess the effect of the drivers for a key liquidity measure: the evolution of the open interest related to the open positions cleared and settled by OMIP clearing house (OMIClear). This analysis serves to determine if this market is performing properly according to its original role as key hedging vehicle (hedging efficiency).

The article is structured as follows: (i) Section 1.2 analyses the trading drivers in OMIP continuous market; (ii) Section 1.3 presents the regression model for understanding the evolution of OMIP open interest; (iii) Section 1.4 summarises all the insights of the research and concludes.

2. Analysis of the Trading Drivers in OMIP Continuous Market

Figure 1.1 shows the evolution of the traded volumes in OMIP as well as in the CESUR auctions. There are two market modes in OMIP: the continuous market and the call auctions. Whereas the former is the main mode, the latter has performed a key role in the development of the liquidity in OMIP, as the Spanish distribution companies and the Portuguese last resort supplier were obliged by national energy legislation to purchase energy in such auctions until July 2009 and July 2010 respectively. OMIClear permits the clearing and settlement of OTC

volumes of OMIP trading members, either bilaterally or through one of the 2 brokers registered in OMIP. Such OTC volumes cleared by OMIClear are also shown in Figure 1. Since June 2007 until the end of February 2011, 13 CESUR auctions have been celebrated where the Spanish distribution companies acquired the energy for their regulated supplies. Since the 9th auction, such a role was taken over by the last resort suppliers (OMIP-OMIClear, 2011; CESUR, 2010).

It can be observed the dominance of the compulsory call auction volumes in the first two years of existence of the futures market. Since that moment until the end of year 2009 the volumes of the continuous market reach a similar size compared to the call auction volumes. Afterwards, the continuous market volumes follow growing but call auction volumes dwindle. The quarter with biggest negotiation in OMIP continuous market was the second quarter of year 2010, but the month with record volumes was December 2010 (3.37 TWh). During year 2010, the scarce call auction volumes were due to compulsory call auctions only for the Portuguese last resort supplier and regarding peak futures. The liquidity of OMIP peak futures is still almost null. The OTC cleared volumes reached a record volume in November 2008 (4.19 TWh) and keeps a growing pace until the end of year 2010, due to the increasing volumes in the OTC market. Whereas the continuous volumes in the first two months of year 2011 are closed to record volumes, the OTC cleared volumes experienced a remarkable decrease. Further analysis in 2011 is suggested to identify if part of the OTC volumes are migrating towards OMIP continuous market. This would be a positive signal in terms of liquidity development for OMIP power futures market and would facilitate the market supervision to the MIBEL Regulatory Council¹ due to this migration from the opaque OTC market towards the transparency provided by the power exchange.

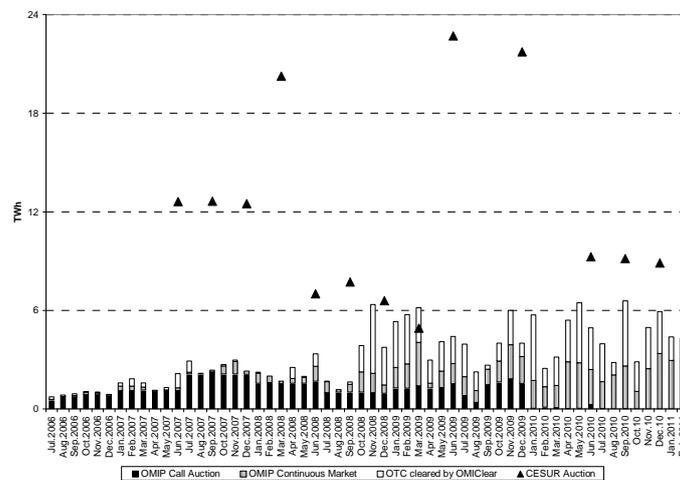


Fig. 1.1 Evolution of Trading Volumes (GWh) in OMIP (auction, continuous, and OTC registered in OMIP). Sources: OMIP-OMIClear (2011), CESUR (2010)

¹ The MIBEL Regulatory Council in charge of the supervision of the Iberian Electricity Market (MIBEL) is composed of the Spanish and Portuguese energy regulatory agencies and financial supervisory authorities, namely: Spanish *Comisión Nacional de Energía (CNE)*, Portuguese *Entidade Reguladora dos Serviços Energéticos (ERSE)*, Spanish *Comisión Nacional del Mercado de Valores (CNMV)*, and Portuguese *Comissão do Mercado de Valores Mobiliários (CMVM)*.

Since the start of OMIP futures market on July 3, 2006, until February 28, 2011, the following key figures are recorded: 178.16 TWh have been cleared by OMIClear, whose origin is as follows: 55.90 TWh (31%) come from OMIP call auctions, 57.01 TWh (32%) come from OMIP continuous market, and 65.25 (37%) TWh are OTC trades cleared by OMIClear (OMIP-OMIClear, 2011).

According to the futures market operator, the last quarter of year 2010 provided several records regarding trading volumes in the continuous market: during one session (0.579 TWh), during one week (1.26 TWh) and during one month (3.37 TWh). The futures market became less concentrated during year 2010 and the market share of the three biggest players at OMIP accounted for 40% in the last months of 2010 (OMIP, 2011). Such a share compares well against the generation market concentration: in Spain, for year 2009, the 3 largest generators' market share, based on the installed capacity, covers around 67%, and in Portugal around 75% (Capgemini, 2010). The 13 CESUR auctions celebrated so far and shown with black triangular markers in Figure 1 reckon a traded volume of 155,95 TWh, very similar in order of magnitude to the total cleared volumes by OMIClear until December 2010 (168,94 TWh) (CESUR, 2010). The OTC market has experienced a steady growing trend until the end of year 2010, summing up approximately 583 TWh in the period July 2006 – January 2011 (Intermoney, 2011). Comparing this figure with OMIP and CESUR volumes, the OTC is 3.3 times bigger than the volumes cleared by OMIClear and 3.6 times bigger than the matched volumes in CESUR auctions. The OTC volumes are 10 times bigger than OMIP continuous market. Only 11% of such OTC volumes are cleared and settled by OMIClear.

Correlation analysis of the traded volumes in OMIP continuous market during each month in the period July 2006 – February 2011 has been done against a bunch of factors to see which ones could explain the steady growing trend of such volumes. The factors showing big correlation are the following ones: the OTC volumes (0.86), the market makers² active at each moment (0.85), the enrolment of financial agents³ (0.82), the enrolment of the generation companies belonging to the integrated group of the corresponding last resort supplier (0.76) and the portion of the OTC volumes that are registered for clearing and settlement by OMIClear (0.70). Both the power futures market operator and the MIBEL Regulatory Council could provide market monitoring reports with aggregated statistics of the volumes traded by different groups of trading members (e.g. financial agents, companies belonging to Iberian integrated energy groups (i.e. the traditional “incumbents”), companies not belonging to such incumbents, and even market makers) to understand which are the most active members. Also, concentration indexes (e.g. Herfindahl-Hirschman index) would provide worthy information about the development and competition of this market.

² At the end of February 2011, 4 market makers are active in OMIP, providing quotations for prompt month, quarter and year baseload futures contracts whose underlying price corresponds to the spot price of the Spanish zone. Two of them are financial entities and the other two are non integrated energy traders. Since the beginning of OMIP, 5 market makers have been active.

³ At the end of February 2011, 10 financial entities (investment banks and brokers) are registered in OMIP as trading members. The rest of trading members active in OMIP is composed of 7 generation companies belonging to an Iberian based integrated group, 5 Spanish and 1 Portuguese last resort suppliers belonging to such groups, and 11 non integrated energy traders, summing up 34 trading members.

3. Analysis of the open interest

Lucia and Pardo (2008) research about the measurement of speculative and hedging activities in futures markets from volume and open interest data. They indicate that a necessary condition to be a hedger is to have a spot (or forward) commitment that involves a risk exposure. The speculators are outright position-takers, including the day traders, holding their positions for less than one trading day. The daily open interest determines the number of outstanding contracts at the end of a trading day (entered contracts but not yet liquidated). The open interest equals the number of outstanding long positions (or equivalently, short positions) at the end of the day. The open interest increases whenever neither of the two traders involved in a contract trade is closing out a position and decreases when both parties are closing out a position. It remains the same when only one trader is closing out a position, being this trader replaced by another one. The daily trading volume reflects somehow movements in the speculative activity. The daily open interest captures hedging activities as it excludes all intraday positions taken by day traders, mainly inspired by speculative reasons. Hedgers tend to hold their futures market positions longer than speculators.

OMIP open interest is studied considering the evolution of OMIP cleared volumes per delivery month. Only month, quarter and year baseload futures with underlying price the spot price of the Spanish zone are considered. The rest of contracts⁴ are not considered as they are still very illiquid.

Equation 1.1 shows the regression model composed of 3 variables (constant a_0 is included) supposedly explaining the evolution of the open interest per delivery month (MWh_{OI_t}). Those variables are: $MWh_{Auction_t}$, $MWh_{Continuous_t}$, and $MWh_{OTC_cleared_t}$, showing respectively for each delivery month the volumes (MWh) cleared in OMIP from call auctions, continuous market, or from external OTC trades as shown in Figure 1.1. The number of observations is 56 (delivery months from August 2006 to March 2011).

$$MWh_{OI_t} = a_0 + a_1 * MWh_{auct_t} + a_2 * MWh_{cont_t} + a_3 * MWh_{OTC_cleared_t} \quad (1.1)$$

As shown in Table 1.1, the model renders a reasonable high R-squared statistic (0.84). According to the significance level (2.02), the auction volumes are very significant (16.10) and positive as expected and the continuous volumes are significant (4.20) and positive as expected. Thus both the call auctions and the continuous market are contributing to hedging. The OTC cleared volumes do not provide neither positive nor significant coefficient, not providing hedging gains.

⁴ Week baseload futures with underlying price the spot price of the Spanish zone, available since OMIP start on July 3, 2006; week, month, quarter and year OTC baseload forwards and swaps that can be cleared by OMIClear, whose underlying price is the spot price of the Spanish zone, available since March 2, 2009; week, month, quarter and year baseload futures whose underlying price is the spot price of the Portuguese zone, available since July 1, 2009; week, month, quarter and year peak futures whose underlying price is the spot price of the Spanish zone, available since January 20, 2010. Since July 1, 2007, there are two price zones (Spanish and Portuguese) for the spot market within the MIBEL. In case of congestion occurs in the cross-border trading, market splitting mechanism is applied providing two different prices (the most expensive one corresponds to the zone where the congestion arises, i.e, the importing zone).

Table 1.1. Regression model of OMIP open interest per delivery month. Source: Authors

Regression model results of OMIP Open Interest			
a_0	12.05	t_0	0.00
a_1	0.91	t_1	16.10
a_2	0.46	t_2	4.94
a_3	-0.06	t_3	-0.72
R^2	0.84	t	2.01

Figure 1.2 shows the evolution of the open interest for each month (i.e. the open interest of the month baseload futures at the last quotation trading session, “final open interest”) divided by the total cleared volumes of baseload futures whose energy is delivered in that month (such cleared volumes come from call auctions, continuous market and OTC trades cleared by OMIClear). Another ratio is provided calculated as the open interest divided by the call auction volumes with energy delivery in that month. Until the end of year 2008 the open interest is almost equal to the call auction volumes (correlation 0.99 between both series). As almost all the auction volumes come from compulsory purchases of the Spanish distribution companies and the Portuguese last resort supplier, no other hedges are established out of such compulsory trades (the rest of players tend to close their open positions prior to expiration for profit taking). Afterwards, the volumes from compulsory auctions are quite smaller, and that ratio grows remarkably. Considering the ratio open interest versus all cleared volumes, a downward trend is appreciated showing values around 0.3 since the second half of year 2010 (only 1/3 of the cleared volumes are hedged, assuming that OMIP members trade in the spot market the energy related to the resulting open interest). It seems a moderate figure as only 1/3 of the trading members in OMIP are financial entities, being the rest composed of energy traders that could employ the futures market to hedge their power forward commitments. Figure 1.3 provides a comparison with the often ranked most efficient European power futures market (Nord Pool ASA, the energy derivatives exchange in the Nordic countries), according to NordREG (2010). The open interest at the last trading session of each year is compared with the total cleared volumes during that year. OMIP figures are larger, being a good hedging signal, as Nord Pool ASA is a good benchmark (according to NorREG (2010), Nord Pool ASA satisfies the hedging needs of the participants, and the non cleared OTC is relatively limited).

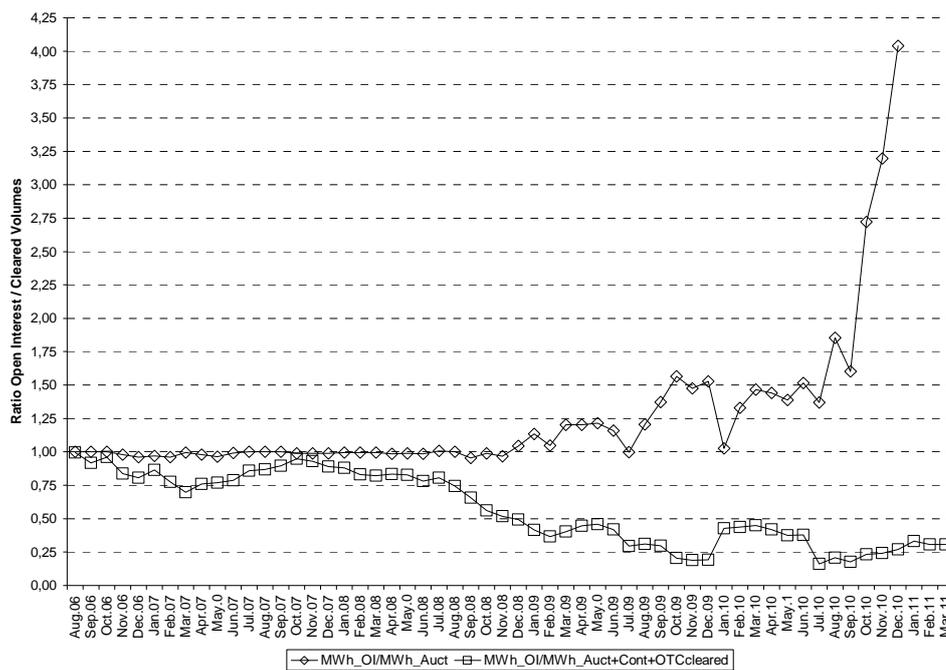


Figure 1.2. Evolution of OMIP open interest versus the call auction volumes and the total cleared volumes per delivery month. Source: OMIP-OMIClear (2011) adapted by authors

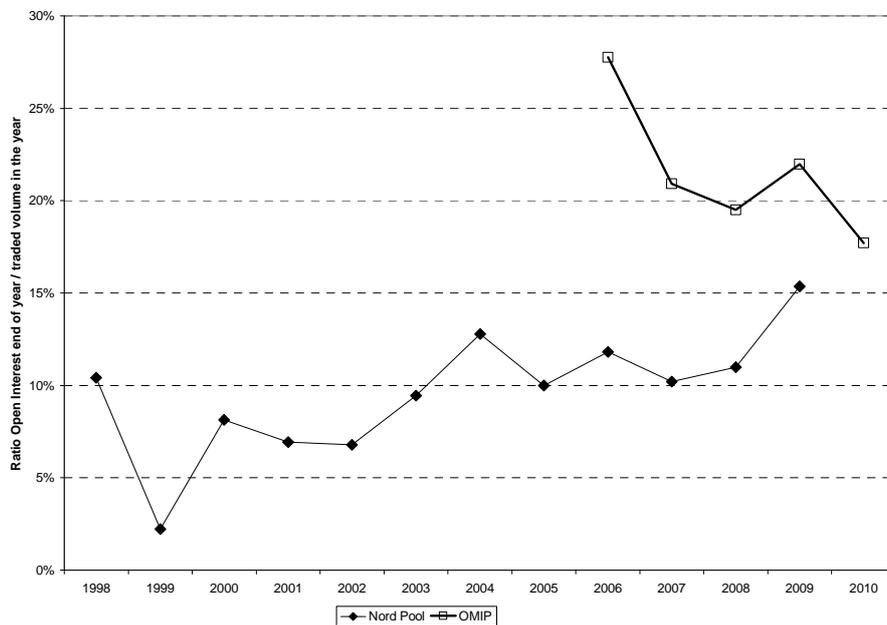


Figure 1.3. Evolution of OMIP and Nord Pool ASA open interest at year-end versus volume turnover. Source: OMIP-OMIClear (2011) and NordREG (2010)

4. Conclusions

Since its start on July 3, 2006, the Iberian power futures market managed by OMIP has experienced a steady growing in the traded volumes in the continuous market. Such a growth is influenced by the OTC market, the active market makers, the enrolment of financial agents and generation companies belonging to the integrated group of the last resort supplier, and the OTC cleared volumes by OMIClear. The assessment of the liquidity evolution is completed with an analysis of the open interest. The open interest is closely related to the call auction and continuous volumes. Until the end of year 2008, almost no hedge was done out of the compulsory purchases by the Spanish distribution companies and the Portuguese last resort supplier. Since July 2010, 1/3 of the cleared volumes are hedged. Comparison with the Nordic energy derivatives market shows better hedging ratios for the Iberian power futures market, but that result should be interpreted cautiously (whereas almost all OTC volumes are cleared at Nord Pool ASA, only 11% of the OTC volumes are cleared by OMIClear, hence the latter are providing a partial snapshot of the forward market behaviour). Monforte (2011) indicates that CESUR auctions have suffered speculation since July 2009. The power futures market operator and the MIBEL Regulatory Council could provide market monitoring reports with aggregated statistics of the volumes traded by different groups of trading members, concentration indexes, and open interest to shed some light on the level of competition and speculation in the Iberian power futures market, helping to understand the Iberian forward market behaviour.

References

- Capgemini (2010). European Energy Markets Observatory, 2009 and Winter 2009/2010 Data Set, Twelfth Edition, November 2010.
- Capitán Herráiz, A., Rodríguez Monroy, C. (2009). “Analysis of the efficiency of the Iberian power futures market”. *Energy Policy*, 37, 3566–3579.
- CESUR (2010). Official websites of Spanish Bilateral Contracting Auctions for Last Resort Supplies (“CESUR Auctions”): 1st to 5th auctions, www.subasta-cesur.eu/auction.asp; from 6th to 13th, www.subastasesur.omel.es/frames/index.jsp
- Intermoney (2011). El Mercado Eléctrico en España, febrero 2011. Madrid, 16 de marzo de 2011, im energía sa, consultoría, p. 57.
- Lucia, J., Pardo, Á. (2008). On measuring speculative and hedging activities in futures markets from volume and open interest data. *Applied Economics*, 2008, iFirst, pp. 1-9.
- Monforte, C. (2011). La especulación con la tarifa eléctrica ha costado a los españoles 726 millones. *CincoDías*, Madrid, 21 de marzo de 2011.
- NordREG (2010). The Nordic financial electricity market. Report 8/2010. Nordic Energy Regulators, November 2010.
- OMIP (2011). OMIP 2010 Results Show Strong Growth. Press release, 5 January 2011.
- OMIP-OMIClear (2011). OMIP-OMIClear Daily Market Bulletins of the MIBEL Derivatives Market, July 3, 2006 – February 28, 2011.