

OPEC announcements and their effects on crude oil prices[☆]

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ABSTRACT

We investigate evidence on the effects of OPEC announcements on world oil prices by examining announcements from both official conferences and ministerial meetings on major international crudes, including the key benchmarks and several other heavy and light grades. With data from 1982 to 2008, we use event study methodology and find differentiation in the magnitude and significance of market responses to OPEC quota decisions under different price bands. We also find some (weak) evidence of differentiation between light and heavy crude grades.

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1. Introduction

The Organisation of Petroleum Exporting Countries was set up in the mid-1960s with the aim to promote the interests of some of the world's key producing countries, many of them located in the Middle East. Since its inception, OPEC's influence on world oil prices has been mixed. From the oil price hikes in 1973 and 1979, to the reverse oil price shock of 1986, and to the more recent roller-coaster story from 2005 to 2008, OPEC has been both vilified for exerting quasi-monopolistic control over surging oil prices, and dismissed for being unable to exert any control over tumbling oil prices. [Adelman \(2002\)](#) provides an excellent review of the oil history and the OPEC role.

This paper does not set out to discuss the role of OPEC in an economics context and whether it exerts any kind of monopolistic, oligopolistic or other type of influence. Instead we follow a number of authors who look at OPEC purely as a source of news, which may affect supply-side fundamentals and, hence, oil prices.

We do this by looking at empirical evidence on how major international crudes react to OPEC announcements. More specifically, we use event study methodology on a database covering sixteen major international oil grades over the period from 1982 to 2008. We look at oil price returns and we differentiate among various types of announcements, taking into account the relative level of oil prices around each announcement. We also examine the effects on OPEC and non-OPEC crudes, and on different crude qualities (heavy and light grades). By using this relatively long data

series, we are able to provide evidence of changing OPEC behaviour and its varying impact on world oil prices. It is, to our best knowledge, the first time OPEC conference influences are examined in the context of relative oil price levels; and in sub-divisions of OPEC versus non-OPEC grades, as well as heavy versus light grades. These empirical results are important as they would help quantify the effects on world oil prices from OPEC conferences under varying market conditions and shed light on potential differential effects due to varying characteristics of the crudes.

The rest of the paper is organised as follows. Section 2 reviews the literature pertaining to the effects of OPEC announcements on oil markets and the procedure of OPEC announcements. Section 3 explains the methodology adopted for this study and the data used. Section 4 discusses the results of the study and the range of comparisons made, with Section 5 drawing conclusions.

2. Review of literature

Existing literature on the effects of OPEC meetings on oil and oil related products has dealt with two main issues. The first is the information content of the meetings. [Draper \(1984\)](#) analyses the behaviour of heating oil futures prices around OPEC meetings and concludes that investors have correctly anticipated meeting results and reflect their expectations on oil prices before OPEC meetings take place. Draper carries out his analysis using an event study framework. However, the data and context of his analysis are somewhat different to ours. Firstly, his data span only the first few years (fall 1978 to December 1980) after the launch of the heating oil contract on NYMEX.¹ Secondly, the OPEC effects are

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¹ Interestingly, this period coincides with the second oil price shock, at the height of OPEC's power, during which almost all OPEC meeting decisions were probably expected to result in high market prices.

examined through their impact on the heating oil contract, a refined product whose relationship to OPEC crude prices is likely to be distorted by refining economics and government policies (for example taxation).

Deaves and Krinsky (1992), on the other hand, by classifying good (bad) news as first day positive (negative) market reactions after OPEC concluding announcements at the end of their meetings, find evidence that traders systematically under-react to OPEC conferences that convey bullish news, leading to abnormal profits for certain investors. We differ in our approach in that we do not make a judgment on whether a particular announcement constitutes good or bad news. Instead, we look at the effect the result of the announcement (i.e. a quota increase, cut or no change) has on oil market returns.

Guidi et al. (2006) look at the significance of OPEC meetings, but mainly from the point of view of the impact they have on stock markets, rather than on crude oil returns. Their approach involves division of the data (from 1986 to 2004) in periods of 'conflict' and 'non-conflict'. They then compare the reaction of the stock markets in the US and UK to OPEC quota decisions between conflict' and 'non-conflict' periods. Our approach is different in that we focus on the oil prices themselves, not on stock indices. However, an interesting result of Guidi et al., that of an apparent asymmetry of information incorporation is similar to our results, when we compare quota cuts and quota increases.

The second issue relates to the debate whether OPEC is an effective cartel. Loderer (1985) tests the hypothesis of OPEC's cartel power for each of the OPEC meetings that take place during the period of 1974–1983. The author finds mixed evidence of OPEC influencing oil prices. Literature on this issue is rich and goes far beyond the analysis of OPEC conferences. For example, Gülen (1996) examines whether OPEC is an effective cartel by controlling output and influencing oil prices and finds causality from OPEC production to oil prices while Alhajji and Huettner (2000) review OPEC behaviour models and find no clear evidence that OPEC can be characterized as a dominant producer in the world crude oil markets.

Contrary to the above, Kaufmann et al. (2004) use a VECM methodology to examine Granger causality between real oil prices and a number of other variables, such as OPEC capacity utilisation, OPEC quotas, the degree to which these quotas are violated, and OECD oil stocks. They find evidence that these variables Granger-cause oil prices, but not vice versa, implying that OPEC does influence oil prices.

In a more recent study, Horan et al. (2004) examine the implied volatility of crude oil options and provide evidence on the pre-meeting rise in implied volatility followed by a post-meeting drop in implied volatility, implying OPEC has a significant impact on oil price.

2.1. The mechanics of OPEC announcements

OPEC conferences are the supreme decision-making authority of the organisation, and consist of national delegations, normally headed by the member-state ministers with a portfolio including oil, energy or mining. There are at least two meetings scheduled every year. Extraordinary meetings can also be initiated, if market conditions call for them. These additional meetings normally need to be approved by the OPEC secretariat, usually during the course of regular OPEC conferences.

Among the many outputs of OPEC conferences, those most significant to oil markets are "market reviews" and subsequent "decisions on quota adjustment". These decisions are announced at press releases after the meetings. Although OPEC has rules in place, which trigger quota changes automatically, in reality this

has only happened once, and quota changes are normally regarded in the market place as "exogenous" events.

OPEC conferences can be as short as one day or as long as one week. The first and last meetings are open to the press. The first press meeting normally sets the tone of the meeting and usually triggers market speculation. The most interesting press releases usually take place at the end, when members formally announce any decisions to adjust production quotas—whether to increase, decrease, or leave them unchanged. It is not unusual, however, that some news on the *in camera* negotiations should reach the public domain as participating officials sometimes talk to the press informally. This may result in market reaction because of changes to expectations on oil prices. We expect, however, that any new information content is assimilated into oil prices at the end of the conferences when the formal announcements are made. Since OPEC meeting dates are well publicised, expectations of quota changes may vary shortly before and during meetings Horan et al. (2004), pp. 106–107, but normally settle after the announcement of the quota decision. Therefore we choose the end of the meeting as the event point.

3. Data and methodology

Daily price data from Thomson Datastream for the period from 1st May 1982 to 31st December 2008 are analysed in this study. We use subsets of these data, which are built around OPEC conferences and corresponding announcements. The crude oils under investigation are listed in Table 1 and classified according to their provenance, broad physical characteristics (gravity and sulphur content) and whether they are constituents of the OPEC basket of crude grades. Among the sixteen crude grades listed, four are OPEC-basket constituents; the rest are non-OPEC. This natural division enables us to examine whether there is any differential behaviour of OPEC and non-OPEC crude grades. Another division of the crudes is by their gravity, so we also differentiate between heavy and light crudes. The decision whether to use heavy or light crude depends on factors such as refining technology, with light crudes are generally more popular among importers. The majority of the grades under investigation are light sweet, with seven being heavy sour ones. Analysis of the above mentioned sub-groups may provide empirical evidence on whether OPEC countries have superior information on oil prices, and whether OPEC effects of quota changes are experienced

Table 1
Crude description.

| Crude grade | Provenance | Gravity | Sulphur | OPEC basket? |
|--------------------|------------|---------|---------|--------------------|
| Alaska North Slope | USA | Heavy | Sour | No |
| Brent blend | UK | Light | Sweet | No |
| Bonny Light | Nigeria | Light | Sweet | Yes |
| Dubai Fateh | UAE | Heavy | Sour | Yes until 15/06/05 |
| Flotta | UK | Heavy | Sour | No |
| Forties | UK | Light | Sweet | No |
| Iranian Heavy | Iran | Heavy | Sour | Not until 15/06/05 |
| Iranian Light | Iran | Light | Sweet | No |
| Minas | Indonesia | Heavy | Sour | Yes |
| Oseberg | Norway | Light | Sweet | No |
| Sahara blend | Algeria | Light | Sweet | Yes |
| Tapis | Malaysia | Light | Sweet | No |
| Urals | Russia | Heavy | Sour | No |
| CPC ^a | Kazakhstan | Light | Sweet | No |
| WTI | USA | Light | Sweet | No |
| West Texan Sour | USA | Heavy | Sour | No |

^a With the exception of CPC, all data are quoted on FOB basis. CPC is quoted on CIF basis. This difference around events days is considered trivial.

Table 2
Descriptive analysis of OPEC announcements.

| Type of quota decision | Number of announcements combined with crude oil grades | | |
|------------------------|--|-------------|--------------|
| Cut | 135 | of which in | |
| | | | Price band 1 |
| | | | Price band 2 |
| | | | Price band 3 |
| Increase | 202 | of which in | |
| | | | Price band 1 |
| | | | Price band 2 |
| | | | Price band 3 |
| No change | 440 | of which in | |
| | | | Price band 1 |
| | | | Price band 2 |
| | | | Price band 3 |
| TOTAL | 777 | | |

differently among crudes of varying gravity. The results are discussed in the next section.

OPEC conference dates are obtained from OPEC official press releases. From 21st May 1982 to 31st December 2008, there were 87 OPEC conferences² and 8 Ministerial Monitoring Meetings (MMC)³, which are included in the analysis. We use OPEC announcement days—when actual announcements took place, usually at the end of the conferences—as event day zero. There are 777 such observations (excluding the 1991 Gulf wars)⁴ in total. A descriptive analysis of these observations is given in Table 2.

We also look at the estimation period bearing in mind the general level of oil prices. We do this by constructing a 6-month high–low band of prices, which moves with time. So price returns on and around each event day are observed within the context of the general level of oil prices over the last 6 months and whether prices around the event day are relatively high, low or average within this 6-month moving band.

We utilize event study methodology (Brown and Warner, 1980) to assess the impact of OPEC announcements on daily price series of a number of OPEC and non-OPEC crude oil grades. If OPEC announcements have no impact on oil prices, then the cumulative abnormal returns (CARs) from the event window should be statistically insignificant. This methodology was initially designed for and applied in the financial markets and has since been applied in an OPEC context by authors such as Draper (1984), Deaves and Krinsky (1992), Horan et al. (2004) and Guidi et al. (2006). This methodology allows us to examine the collective behaviour of OPEC conferences rather than individual conferences, which may be influenced by events taking place at the time. Any intrinsic oil related features such as seasonality and rationality are captured in the expected mean return of the data series.⁵

The final choice of inputs in an event study are the event window, estimation period and the calculation of the excess return. We choose a 40-day estimation period (from 50 days to 11 days before the announcements) and a 20-day event window (from 10 days before to 10 days after the announcements). The choice of the event window may appear somewhat arbitrary when compared to other studies (4 months estimation window in Draper; 3 day event window in Deaves & Krinsky). Our design aims to capture the effects of OPEC announcements and keep these effects separate from that of previous and subsequent meetings. On the one hand, it is argued that oil prices may take more time to absorb information in the market place than that of financial products hence needs a relatively long event window. On the other hand, if the event window is set too long, it tends to pick up effects other than the OPEC meetings. Our choice takes a balanced view of the two and is supported by evidence from Wirl and Kujundzic (2004) that the choice of 10 days (or 2 trading weeks) before and after the announcements is the most appropriate of a variety of different event windows. Similarly, the choice of estimation period is influenced by the time gaps between OPEC conferences. Given special meetings are also included in our study, the time gap between a regular and non-regular meeting is significantly narrowed when compared to two regular OPEC meetings (6 months). To accommodate the small time gap between meetings while keeping the observations independent from each other, we adopt a relatively short estimation window and event window. The use of event study methodology is by no means ideal in accommodating market frictions, such as mean-reversion, seasonality and trend following; such frictions typically imply deviation from the underlying normal distribution assumption of event studies. However, it remains a simple and powerful tool to detect the magnitudes of the events.

Finally, we use the ‘mean adjusted’ return to calculate abnormal returns as a small number of the means from the estimation period are not significantly different from zero.⁶ For most of the abnormal returns, the returns of the data series have zero mean (zero expected mean); Guidi et al. (2006) used the unadjusted return for this reason. The alternative method is to use the ‘market model’ or CAPM type of model, where a market-wide index is used to capture the market risk (Draper, 1984; Deaves and Krinsky, 1992; Campbell et al., 1997). However, the lack of an adequate international index for crude oil prices, dictates the use of mean adjusted return method.⁷ Investigation on adopting an alternative method from Brown and Warner (1980) indicates the differences are not great.

Following Brown and Warner (1980) and Campbell et al. (1997), the abnormal return on day t for crude i is calculated as $AR_{i,t} = R_{i,t} - E(R_{i,t})$, where $R_{i,t}$ is the daily log return on crude i at time t ; $E(R_{i,t})$ is the expected return (zero in this empirical paper) assuming the announcement not taking place, which is the

² Only announcements after scheduled OPEC conferences or MMC meetings are included here. Other announcements in relation to quota changes outside pre-scheduled conferences or MMC meetings are rare and only took place in extraordinary circumstances, which might obscure our results if included.

³ MMC meetings in recent years have been scheduled to take place within a few days before the opening of OPEC conferences to serve the purpose of market review. Unlike earlier years, these meetings no longer have the power to change production quotas, therefore not included in our data set.

⁴ Press releases usually take place immediately after the end of meetings, and any decisions in relation production quotas reach the public domain on the same day of the last press conference, with the exception of the Far East markets, where the markets are already closed. For those Far East markets, next trading days are used instead.

⁵ The mean returns of all oil price series are not significantly different from zero. This is also true for sub-periods of oil price series. The majority of the mean returns of the 40-day estimation window are not significantly different from zero.

⁶ We also conducted robustness checks using two alternative estimation methods: one using unadjusted mean returns (zero mean adjusted) and the other using adjusted variance that take into account non-zero covariance among events in estimation periods as that of Fuertes and Thomas (2006). Both methods yield similar results to ours with the exception of some instances of reduced significance from the latter methodology, which may be due to the known event dates inherent in the event window. We report the mean-adjusted version as it incorporates the null-mean hypothesis. It is also less affected by the length of the event window than that of the other alternative.

⁷ We considered the GSCI and CRB indices as candidates for market indices. Both of them have disproportionately large energy oil components: 72% and 24%, respectively, which makes the interpretation of either a market model or a risk-adjusted model difficult. Furthermore both indices are limited to representation of commodities, rather than the broader asset classes (stocks, bonds, etc.). The empirical application of CAPM model on crude oil prices was carried out by Deaves and Krinsky (1992). The beta estimated was not significant from zero.

average daily return of the estimation period as the proxy for the expected return for crude i .

The CARs (cumulative abnormal returns) for each individual crude i , are computed by summing the daily abnormal returns, starting from ten days before the OPEC announcement, ending at ten days after the announcement:

$$CAR_{iT} = \sum_{t=-10}^T AR_{it}$$

where T can take values from -10 to 10 . CAR is the average CAR_{iT} cross N crudes at time T , and is calculated as:

$$\overline{CAR}_T = \frac{1}{N} \sum_{i=1}^N CAR_{iT} = \frac{1}{N} \sum_{i=1}^N \sum_{t=-10}^T AR_{it} \quad (1)$$

Variance of the CARs is calculated as follows, given that there are no overlapping periods between events and events are independent of each other:

$$\text{Var}[\overline{CAR}_T] = \frac{1}{N^2} \sum_{i=1}^N (CAR_{iT} - \overline{CAR}_T)^2 \quad (2)$$

4. Results

The most significant and interesting results are obtained when we look at the effect of OPEC announcements in the three price bands, outlined above. Let's have a look at each type of decisions separately.

Table 3 shows CARs around the time of the OPEC meetings, for all types of quota announcements (cuts, increases and no-changes), in the three different price bands. In panel A of this table (also depicted in Fig. 1), the effects of quota cuts are shown. When we look at the post-announcement returns, we can observe that the effect of a cut is consistent in bands 2 and 3, i.e. it produces positive (and statistically significant) returns. The magnitude of these CARs also tends to increase post-announcement, especially from day 5 (CAR_5) onwards. In band 1, however, a different story emerges. Returns are negative and those which are significant tend to be closer to the announcement day. This is more difficult to explain intuitively. When we looked at the individual announcements, the key reason for prices moving further down is that the market perceived cuts as not far-reaching enough, or found that OPEC was not credible enough to enforce the said cuts on its members.

The picture changes a little for quota increases (panel B and also depicted in Fig. 2). Results are as expected, that is returns are negative around quota increases. In bands 1 and 2 these results tend to be stronger and statistically significant, especially post-announcement. In band 3, however, no clear behaviour is shown. Results tend to have the wrong sign (positive) but they are also largely insignificant. One would expect that given quota increases when prices are relatively high, returns would be negative and significant. Again this is not necessarily counter-intuitive. In weak or balanced a 'balanced' market is one with no excessive demand or supply, without major supply disruptions or unexpected demand peaks and with enough spare capacity to provide a sense of security in case there are sudden movements in either demand or supply. Traditionally a spare capacity of 2–3 mbpd has provided such a 'comfort' margin. markets an announcement of a quota increase is bound to have a very obvious and pronounced negative effect on prices. In a tight market, where prices have firmed up, a quota increase may do nothing more than confirm informal 'violations' of previous quotas by members who take the opportunity to sell more of their crude at lucrative market prices. Kaufmann et al. (2004) implicitly recognise this behaviour, by

including a variable for 'OPEC cheating' on quotas in their analysis. So such increases may do nothing more than dampen a price rally, rather than result in a price drop. This observation suggests an asymmetric market reaction to OPEC announcements: quota cuts when prices are relatively low result in negative and mostly significant returns; quota increases when prices are relatively high do not result in negative and significant returns.

Panel C in Table 3 (and Fig. 3) show the behaviour of crude oil returns when OPEC announcements did not result in any quota changes. The results we get are mixed with some CARs being significant, while others were not. Bands 1 and 3 show the most statistically significant results, all of them negative. Band 1 returns also show a larger scale, with returns being almost as low as -10% (CAR_4 is -9.82%). This is as expected: in a relatively weak market, a decision not to change quotas can often be interpreted as 'firm indecisiveness'. Members probably realise that the correct reaction to market fundamentals should be a cut, but clashing interests of individual members result in an effective inability to change the status quo. This signals to the market that supply will continue to flow in abundance and prices tumble further down.

Band 3 results, on the other hand, are more difficult to interpret. One would expect that when prices are relatively high markets would expect a quota increase. Hence an unchanged quota would lead to a market rally. Looking closer at the specific OPEC meetings, however, we noticed that in almost all cases there is considerable 'noise'. All but very few of these announcements are overshadowed either by announcements of unexpected oil stock increases (particularly in the US), or market reports that some OPEC members are already producing above their quota, or simply that the market is paying more attention to other world economy parameters, such as expectations for slower economic growth.

Finally, results in band 2 are mostly insignificant and of small scale (just over 2% at most). It looks OPEC announcements have little effect on market dynamics and adds very little or no new information.

We have also looked at the potential differences in market returns for OPEC versus non-OPEC crudes, as well as light versus heavy grades. Results for the former comparison are all insignificant and are, therefore, not reported. Results for the latter comparison (reported in Table 4) are significant only in two instances: quota unchanged in bands 1 and 3 (shown in Fig. 4). What we observe in these instances is that heavy grades have bigger price losses than light grades. The scale of this is particularly evident in band 1. This implies that in relatively weak markets a decision to leave quotas unchanged (i.e. not a cut) not only pushes prices down, but means that the relative abundance of better quality (light sweet) grades exerts an even bigger pressure on the prices of the lower quality (heavy sour) grades, which are more expensive to refine. However, it is more difficult to explain why this would be the case when prices are relatively high (band 3), although the scale of the difference is not substantial (at best 2.75% in CAR_3).

5. Conclusions

Our research builds on the existing literature on investigating the effects of OPEC announcements on oil prices. Using event study methodology we find that such announcements affect price returns, but the magnitude of such effects varies primarily according to the existing price regime. Quota cuts result in positive price returns, except in weak market conditions. Quota increases do not have a clear-cut effect when prices are relatively

Table 3
CARs around the time of end of OPEC meeting announcements.

| | Panel A Quota cut | | | Panel B Quota increase | | | Panel C Quota unchanged | | |
|--------|----------------------|-----------|-----------|---------------------------|-----------|----------|----------------------------|----------|-----------|
| | Band 1 | Band 2 | Band 3 | Band 1 | Band 2 | Band 3 | Band 1 | Band 2 | Band 3 |
| N | 60 | 50 | 25 | 21 | 65 | 116 | 87 | 125 | 228 |
| CAR-10 | -0.43% | 1.66%*** | -0.75%*** | -0.03% | -0.92% | 0.85% | -0.08% | 0.07% | 0.20% |
| CAR-9 | -3.19%*** | 2.04%*** | 0.39% | -0.54% | -0.97% | 1.11% | 0.14% | 0.20% | -0.21% |
| CAR-8 | -2.02%*** | 3.35%*** | -1.90% | -0.61% | -1.25% | 1.75% | -0.55% | 0.84%*** | -1.06%*** |
| CAR-7 | -2.60%*** | 3.22%*** | -1.34% | -1.03% | -1.82% | 1.37% | -1.63%*** | 0.24% | -1.29%*** |
| CAR-6 | -3.64%*** | 3.10%*** | 0.47% | -0.10% | -1.42% | 1.83% | -2.35%*** | 0.10% | -2.01%*** |
| CAR-5 | -3.26%*** | 3.72%*** | -0.12% | -0.32% | -2.08% | 1.63% | -2.56%*** | 0.43% | -2.01%*** |
| CAR-4 | -2.53%*** | 3.27%*** | -0.04% | -1.47% | -1.01% | 1.23% | -2.97%*** | 0.89% | -2.30%*** |
| CAR-3 | -0.79% | 2.89%*** | 0.37% | -2.89%*** | -0.17% | 1.10% | -4.77%*** | 0.42% | -2.62%*** |
| CAR-2 | -0.14% | 3.90%*** | -0.34% | -2.12% | -0.18% | 1.67%*** | -5.07%*** | 0.41% | -2.31%*** |
| CAR-1 | -0.25% | 3.79%*** | 1.03% | -2.04% | -0.20% | 1.58%*** | -5.64%*** | 0.46% | -2.11%*** |
| CAR 0 | -1.75% | 5.49%*** | 2.18% | -4.51%*** | -0.71% | 1.99%*** | -7.03%*** | 0.86% | -2.37%*** |
| CAR1 | -5.04%*** | 7.57%*** | 1.70% | -5.46%*** | -0.95% | 1.17% | -7.02%*** | 1.79%*** | -2.46%*** |
| CAR2 | -5.10%*** | 9.75%*** | 3.01% | -5.85%*** | -1.96% | 2.31%*** | -7.59%*** | 2.08%*** | -2.36%*** |
| CAR3 | -4.60%*** | 9.50%*** | 4.90% | -7.43%*** | -2.92%*** | 1.96%*** | -8.97%*** | 2.39%*** | -2.96%*** |
| CAR4 | -1.03% | 11.66%*** | 4.73% | -7.33%*** | -3.53%*** | 2.13%*** | -9.82%*** | 2.04%*** | -2.90%*** |
| CAR5 | -2.61%*** | 13.24%*** | 5.80% | -7.73%*** | -4.33%*** | 1.56% | -8.80%*** | 1.89%*** | -2.52%*** |
| CAR6 | -1.64% | 14.13%*** | 6.82%*** | -6.24%*** | -4.08%*** | 2.16% | -8.58%*** | 1.25% | -2.06%*** |
| CAR7 | -1.65% | 15.25%*** | 6.66%*** | -7.42%*** | -3.92%*** | 1.46% | -8.65%*** | 1.32% | -2.59%*** |
| CAR8 | -1.36% | 15.52%*** | 6.38%*** | -7.25%*** | -4.27%*** | 0.96% | -7.57%*** | 0.38% | -4.24%*** |
| CAR9 | -1.99% | 15.53%*** | 6.04%* | -5.74% | -3.98%*** | 0.01% | -7.80%*** | -0.65% | -3.92%*** |
| CAR10 | -4.04%*** | 14.89%*** | 6.44%*** | -6.49%* | -2.27% | -0.92% | -7.93%*** | -0.48% | -4.43%*** |

Note: */**/** indicates t-statistic is significant at 10%/5%/1% level.

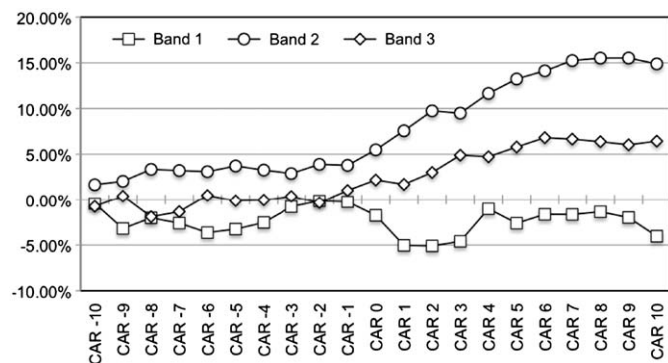


Fig. 1. Crude behaviour under quota cut.

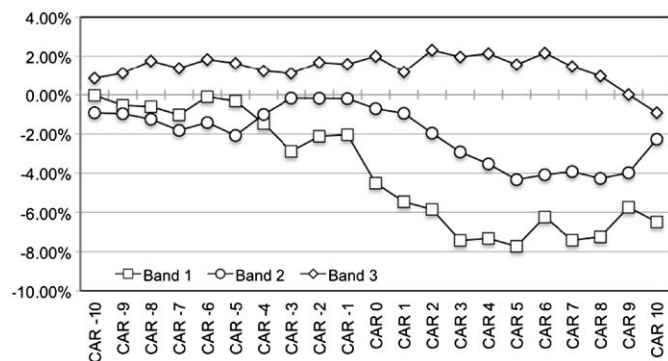


Fig. 2. Crude behaviour under quota increase.

high, an asymmetry, which is noted earlier on. Quota increases do, however, result in negative returns in weak and 'normal' market prices, i.e. neither too low, nor too high. No changes in quotas seem to result in negative or insignificant returns, although more context is needed to draw a definitive reason for this behaviour.

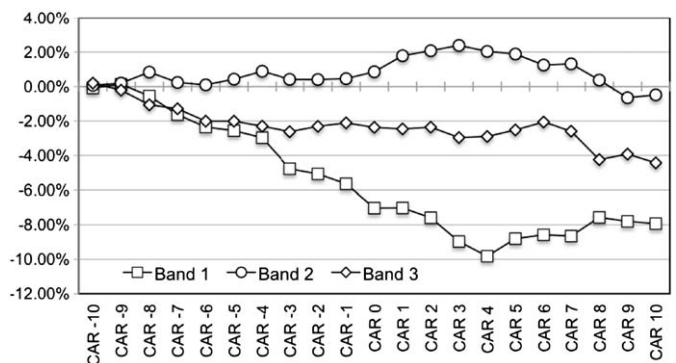


Fig. 3. Crude behaviour under unchanged quota.

There are no significant differences between OPEC and non-OPEC crudes in relation to OPEC announcements, despite the popular belief that OPEC has superior information on oil price. Likewise, there are generally no significant differences between heavy and light grades, which are expected as this issue is more closely related to refining technology and other demand side issues.

The message we seem to be getting from our analysis is that the importance of OPEC announcements is dependent on the context in which they are made. Both the type of decisions (cut, increase or no change) and the price environment (relatively low, average, or relatively high) are important and necessary if one is to evaluate the role and impact of OPEC announcements on crude oil markets. Some OPEC meetings generate excessive interest (and speculation) and are extensively covered in the press. Other meetings pass almost unnoticed. We cannot (and do not seek to) establish whether OPEC is losing or gaining ground in terms of power and impact.

Post 2006, we have witnessed exceptionally dramatic changes in world oil prices. The seemingly insatiable thirst for the commodity (in its physical form for refining or as an investment vehicle) pushed its price to almost \$150/bl. In the latter part of

Table 4
CARs around the time of end of OPEC meeting announcements.

| Type | Panel A Quota cut | | | | | | Panel B Quota increase | | | | | | Panel C Quota unchanged | | | | | |
|--------|----------------------|--------|-----------------|--------|-----------------|-----------|---------------------------|--------|-----------------|--------|-----------------|--------|----------------------------|-----------|-----------------|--------|-----------------|-----------|
| | Band 1 Heavy | Light | Band 2 Heavy | Light | Band 3 Heavy | Light | Band 1 Heavy | Light | Band 2 Heavy | Light | Band 3 Heavy | Light | Band 1 Heavy | Light | Band 2 Heavy | Light | Band 3 Heavy | Light |
| N | 23 | 37 | 18 | 32 | 9 | 16 | 5 | 16 | 23 | 42 | 50 | 66 | 27 | 60 | 45 | 80 | 93 | 135 |
| CAR-10 | −0.10% | −0.64% | 1.50% | 1.75% | −1.16% | −0.52%*** | −1.72% | 0.50% | −1.09% | −0.83% | 0.93% | 0.78% | −0.08% | −0.08% | 0.12% | 0.04% | 0.09% | 0.28% |
| CAR-9 | −2.98% | −3.33% | 2.20% | 1.95% | −0.38% | 0.82% | −1.44% | −0.27% | −1.04% | −0.93% | 1.18% | 1.06% | 0.02% | 0.19% | 0.35% | 0.11% | −0.25% | −0.18% |
| CAR-8 | −1.63% | −2.27% | 3.14% | 3.48% | −2.65% | −1.48% | −1.34% | −0.38% | −0.99% | −1.39% | 1.79% | 1.72% | −0.87% | −0.41% | 1.13% | 0.67% | −1.19% | −0.96% |
| CAR-7 | −2.26% | −2.81% | 3.14% | 3.26% | −2.16% | −0.88% | −2.98% | −0.42% | −1.46% | −2.01% | 1.35% | 1.39% | −2.11% | −1.41% | 0.57% | 0.05% | −1.53% | −1.13% |
| CAR-6 | −3.45% | −3.76% | 3.06% | 3.12% | −0.19% | 0.84% | −2.08% | 0.52% | −0.79% | −1.76% | 1.66% | 1.97% | −3.36% | −1.90% | 0.84% | −0.32% | −2.37% | −1.77% |
| CAR-5 | −4.01% | −2.79% | 3.42% | 3.89% | −0.78% | 0.25% | −1.78% | 0.14% | −1.42% | −2.44% | 1.26% | 1.92% | −3.72% | −2.04% | 1.48% | −0.16% | −2.47% | −1.69% |
| CAR-4 | −3.28% | −2.07% | 2.99% | 3.42% | −1.13% | 0.58% | −3.27% | −0.90% | −0.38% | −1.35% | 0.87% | 1.51% | −4.24% | −2.40% | 2.03% | 0.24% | −2.82% | −1.94% |
| CAR-3 | −1.23% | −0.52% | 2.67% | 3.01% | −1.33% | 1.33% | −3.80% | −2.61% | 0.61% | −0.60% | 0.70% | 1.40% | −6.12% | −4.16% | 1.62% | −0.25% | −3.21% | −2.20% |
| CAR-2 | −1.02% | 0.41% | 3.76% | 3.97% | −2.22% | 0.72% | −2.77% | −1.91% | 0.38% | −0.48% | 1.42% | 1.85% | −6.88% | −4.26% | 1.80% | −0.38% | −3.02% | −1.82% |
| CAR-1 | −2.02% | 0.85% | 3.67% | 3.85% | −1.50% | 2.45% | −3.70% | −1.53% | 0.20% | −0.42% | 1.52% | 1.63% | −8.07% | −4.55%* | 1.66% | −0.21% | −2.78% | −1.65%* |
| CAR 0 | −3.56% | −0.62% | 5.81% | 5.30% | 0.32% | 3.23% | −5.97% | −4.06% | −0.19% | −0.99% | 1.68% | 2.22% | −9.81% | −5.79%* | 1.26% | 0.63% | −3.24% | −1.77%* |
| CAR1 | −6.18% | −4.34% | 7.90% | 7.39% | 0.17% | 2.55% | −7.26% | −4.90% | −0.61% | −1.14% | 1.08% | 1.23% | −10.00% | −5.69%*** | 2.48% | 1.40% | −3.51% | −1.74%*** |
| CAR2 | −6.62% | −4.16% | 9.64% | 9.81% | 1.35% | 3.95% | −9.03% | −4.85% | −2.28% | −1.78% | 2.12% | 2.45% | −10.27% | −6.39%* | 2.78% | 1.69% | −3.35% | −1.67%* |
| CAR3 | −6.04% | −3.71% | 9.46% | 9.52% | 3.89% | 5.48% | −10.30% | −6.53% | −3.49% | −2.61% | 1.86% | 2.04% | −12.58% | −7.34%*** | 3.11% | 1.99% | −4.00% | −2.25%* |
| CAR4 | −2.30% | −0.24% | 11.61% | 11.70% | 3.96% | 5.16% | −12.02% | −5.87% | −3.89% | −3.33% | 1.81% | 2.37% | −13.92% | −7.98%*** | 2.90% | 1.56% | −3.89% | −2.22%* |
| CAR5 | −3.32% | −2.16% | 13.29% | 13.21% | 5.63% | 5.90% | −11.90% | −6.43% | −5.18% | −3.87% | 1.47% | 1.63% | −12.72% | −7.03%*** | 2.63% | 1.47% | −3.67% | −1.73% |
| CAR6 | −2.27% | −1.24% | 14.23% | 14.07% | 6.43% | 7.04% | −9.82% | −5.12% | −5.34% | −3.39% | 2.00% | 2.29% | −12.59% | −6.77%*** | 2.07% | 0.79% | −3.15% | −1.31% |
| CAR7 | −2.29% | −1.25% | 15.86% | 14.90% | 6.04% | 7.01% | −13.20% | −5.62% | −4.69% | −3.50% | 1.43% | 1.49% | −12.57% | −6.89%* | 2.04% | 0.91% | −3.70% | −1.83% |
| CAR8 | −2.10% | −0.90% | 16.81% | 14.80% | 6.31% | 6.42% | −12.89% | −5.49% | −4.99% | −3.87% | 0.81% | 1.06% | −10.83% | −6.11% | 0.84% | 0.12% | −5.31% | −3.50% |
| CAR9 | −2.63% | −1.59% | 16.35% | 15.07% | 5.29% | 6.46% | −11.82% | −3.84% | −4.68% | −3.59% | 0.11% | −0.07% | −10.97% | −6.37% | −0.13% | −0.93% | −5.06% | −3.13% |
| CAR10 | −5.00% | −3.45% | 15.64% | 14.47% | 5.58% | 6.92% | −12.69% | −4.56% | −2.96% | −1.90% | −0.53% | −1.22% | −11.17% | −6.47% | 0.09% | −0.81% | −5.58% | −3.63% |

Note: */**/** indicates t-statistic is significant at 10%/5%/1% level. Significance of t-statistic refers to the difference between heavy and light and is reported next to the relevant CAR for the light crude.

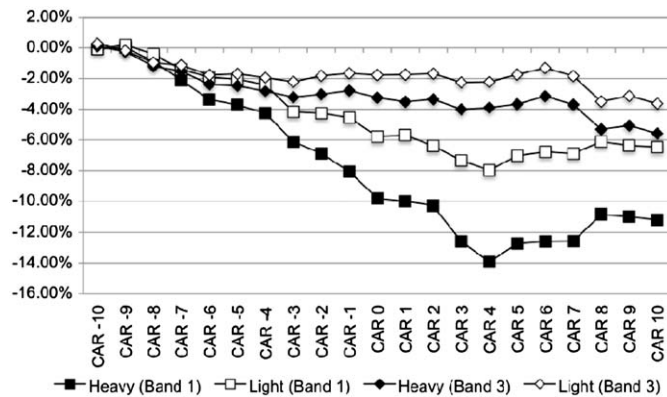


Fig. 4. Heavy versus light crude behaviour under unchanged quota.

2008 it came down even faster than it went up. OPEC's position does not seem to have changed substantially. In high prices every single OPEC meeting was headline news. As prices tumbled down, OPEC meetings lost their lustre and it is only the most recent one (March 2009) where an announcement of cuts coupled with a firm (but painful) resolution by members to adhere to them seems to have arrested, for now, the price fall. This behaviour seems to be in line with our analysis and findings.

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