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The Dynamics of Risk Premiums in Nord Pool's Futures Market

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INTRODUCTION

The existence of premiums in futures prices has been the subject of much debate. This debate has centered around two views: the no-arbitrage model or theory of storage, and the equilibrium approach, sometimes called the theory of normal backwardation. The no-arbitrage approach equates the futures price to the spot price, storage cost and convenience yield. One can see immediately that it is difficult at best to apply this approach to electricity markets, where the underlying commodity is non-storable[1]. Storage costs and convenience yield either become infinite or lose their meaning. It is of particular interest, then, to examine these prices from the equilibrium approach, which splits futures prices into an expected spot price component and a risk premium component. (Fama and French, 1987)

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[1] Whereas electricity itself is non-storable, fuel in the form of reservoir water, coal, oil or gas is not. However, this storage is only possible for a segment of the market (some producers), while consumers and producers of intermittent power (river power and wind) cannot store their input. Even water reservoirs have limits, as they will spill over if they are too full.

An important aspect of Nord Pool's market is to provide both producers and consumers of power with good price signals. Risk premiums are not easily visible and may be seen by end-users to "distort" market transparency, so it is important to examine the size of risk premiums as well as the factors which affect them over time. The theory of normal backwardation, proposed by Keynes (1930) and Hicks (1939), states that the risk premium component of prices is dependent on the risk preferences of hedgers and speculators. In backwardation, hedgers in commodity markets are producers who will sell their wares forward at lower prices than those expected in spot markets, essentially paying an insurance premium for reducing their risk. Speculators are willing in this case to buy futures in order to earn this premium on average. In contango, the opposite situation occurs, where buyers wish to hedge their exposure and pay a premium on futures prices to speculators, which take the risk. The sign of the risk premium depends on whether hedging volume is larger on the buyer or the seller side.

Various studies have tried to find evidence of risk premiums with varied results. Chang (1985) demonstrates the ability for speculators in agricultural markets to make a profit using a nonparametric approach. Fama and French (1987) find evidence of backwardation in some commodity portfolios, but do not find the evidence strong enough to conclude that premiums are non-zero. The evidence in electricity markets is stronger. Bessembinder and Lemmon (2002) develop an equilibrium model for electricity in lieu of arbitrage models, and use it to demonstrate relatively large premiums in the Pennsylvania, New Jersey, Maryland (PJM) and California markets. Shawky, Marathe and Barrett (2003) find stronger evidence for risk premiums in California-Oregon Border (COB) contracts traded on the NYMEX exchange, while Longstaff and Wang (2004) find premiums in day-ahead forwards in the PJM market. Maudal and Solum (2003) find similar evidence in the Nordic electricity market. This study also showed that these premiums vary by season.

The inability for market players to arbitrage this non-storable commodity may explain why evidence is strong for relatively sizable risk premiums. Hedgers are forced to use derivative markets to reduce risk, rather than exercise a "buy and hold" strategy. For the same reason, there tend to exist contracts with longer maturities in electricity markets than for other commodities. The papers cited above have largely looked at contracts which are close to maturity. Risk premiums may also vary in various segments of the curve. Volatility for electricity is higher than for most commodities, so hedging can be important for buyers as well as sellers. Players in the Nordic region often assume that buyers hedge using short-maturity contracts, while sellers hedge using the long end of the curve.

This paper assumes the existence of risk premiums in the Nordic electricity markets and sets out to examine how these premiums have changed over time in Nord Pool contracts based on two important events: the presence and subsequent exit of many non-Nordic players during 2000-2001, and the period following extraordinarily high prices and volatilities due to a drought in the winter of 2002-2003. Tests are performed to determine whether (1) the degree of speculation in the market has reduced the absolute value of the risk premium, and (2) the high-price winter of 2002-2003 created a shift in the risk premium due to increased hedging by consumers.

This paper is structured as follows: section 2 introduces some background to the Nordic market and its history, motivating the choice of hypotheses. Section 3 outlines the hypotheses, tests and data used, section 4 shows the results and section 5 concludes.

EVENTS IN THE NORDIC ELECTRICITY MARKET

The Nordic Electricity Exchange recently celebrated its tenth anniversary, as it was established in 1993 (as "Statnett Marked"). It organized trading of both a day-ahead physical spot market and a futures market which uses the spot price as a reference, initially for only the Norwegian power market. It was renamed Nord Pool when Sweden joined this market in 1996, and between 1998 and 2000 both Finland and Denmark joined the family. In 1997, Nord Pool offered clearing of over-the-counter contracts in addition to exchange trades.

Initially Nord Pool listed only week futures for base, day and night load and with physical delivery. As the market grew, many changes were implemented to improve trading volumes and liquidity and to attract speculators. Contracts became settled financially rather than physically. In 1997, forward contracts were listed and the contract structure was expanded to include year contracts up to four years forward. Today, the following contracts are available: days and weeks (listed as futures), months, quarters and years (listed as forwards), as well as options and contracts-for-differences (special contracts which are based on area prices). Until recently, instead of month and quarter contracts, contracts called "blocks" (as futures) and "seasons" (as forwards) were listed. A year was made up 13 4-week blocks, as well as 3 hydrological seasons: Winter 1, Summer and Winter 2). All contracts settle on the "system price", a pan-Nordic index price which may deviate from physical delivery prices. This has concentrated liquidity in a single class of contract, and also makes data analysis simpler as delivery area does not have to be taken into account.

Bessembinder and Lemon (2002) point out that the existence of outside speculators would be expected to decrease the risk premium:

> *It will be of interest to observe whether financial contracts that allow outside speculators to take positions in power markets are introduced, and if power forward prices then converge toward average spot prices.*

Since speculative trading in derivative markets is a zero-sum game, speculators are attracted by the premium paid by hedgers. As more speculators enter the markets, it would be expected that this premium would be smaller. When the risk premium is zero, speculators are simply competing amongst themselves for the best trading and prediction skills.

The entrance and exit of traders like Enron at Nord Pool gives an opportunity to test this. Trading at Nord Pool has always been a mixture of hedging and speculation, both from industry participants as well as outside speculators. There was growing interest in trading at Nord Pool from many US-based companies, such as Enron, Dynergy, El Paso and TXU, who became members between 1996 and 2001. After Enron filed for bankruptcy under Chapter 11 of the US bankruptcy code, many such players made strategic decisions to exit power trading in Europe and terminated their exchange membership at Nord Pool in the course of 2002. Although Nord Pool does not register how much trading is hedging and speculation, it may be reasonable to assume that the degree of speculation was higher in the period between 2000-2002 due to the presence of these players. Figure 1 shows that member activity and the share of trades originating from non-Nordic players topped in 2000-2002. Many traders have since complained of poor liquidity. If the participation of outside speculators does cause forward prices to converge to expected spot prices, then we should see smaller risk premiums in the years 2000-2002 than the periods before and after.

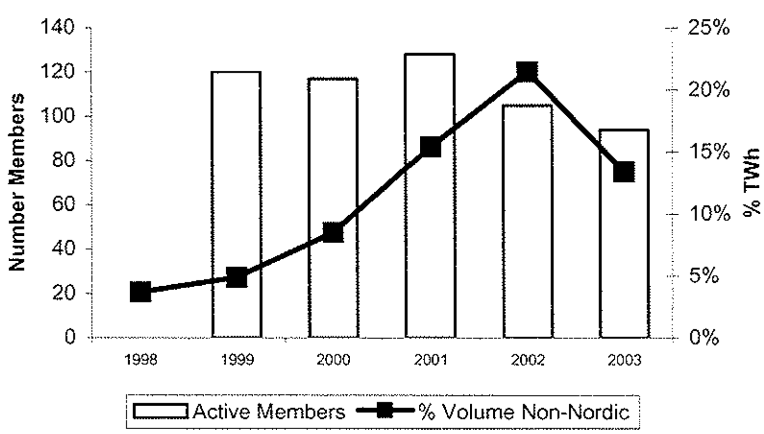

Figure 1: Non-Nordic volume and total number of active players, Nord Pool's Financial Market
(source: Nord Pool)

In a young market such as Nord Pool, events may occur which change the behavior of market players. Bessembinder and Lemmon (2002) and Figlewski (1984) discuss such a "learning effect" which may arise in new markets. Such a learning effect may have occurred during and after the winter of 2002-2003. Despite indications of a normal season, the winter suddenly turned dry and cold, and reservoir levels were the lowest ever recorded. The threat of electricity rationing hung over the region. Prices and volatilities shot up in December 2002 to record high levels, coming somewhat down in the following months but remaining high (see Figure 2 below). Due to a great deal of press coverage and the surprising size of electricity bills, many consumers were suddenly made aware that electricity liberalization also exposed them to price risk. **Figure 3** demonstrates this increase in media attention. While Swedish end-users had mostly fixed-price contracts for power, most Norwegians were accustomed to "variable" contracts, where prices were adjusted with 2-4 weeks' notice. The focus on fixed price contracts offered by competing power producers increased substantially. This paper proposes the hypothesis that increased hedging from the demand side through the financial market caused a shift in risk premiums.

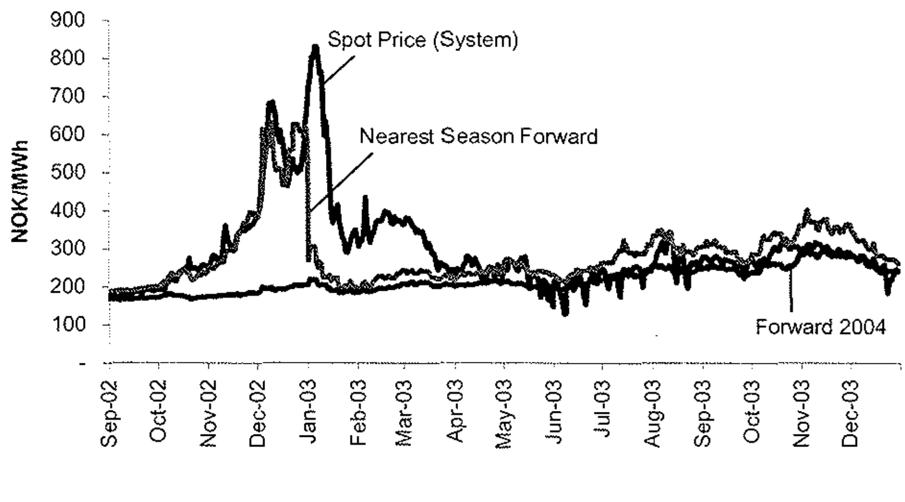

Figure 2: Spot and forward prices September 2002 - December 2003
(source: Nord Pool)

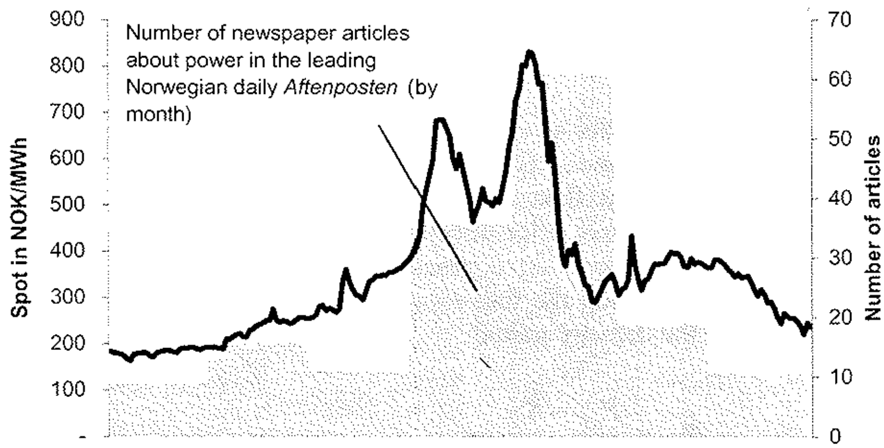

Figure 3: Media attention due to power prices during the winter of 2002-2003
(source: Aftenposten and Nord Pool ASA)

HYPOTHESES, TESTS AND DATA

This paper sets out to test three main hypotheses:

1. Risk premiums were present in the Nord Pool futures market during the period 1997-2004.
2. Risk premiums in the Nord Pool futures market were smaller or absent during the period of 2000-mid 2002, when many non-Nordic speculators were active trading members of Nord Pool.
3. There was a significant change in risk premiums in Nord Pool's futures market after the winter of 2002-2003 due to a change in consumer hedging behaviour.

In order to test these hypotheses, futures prices are compared to realized spot prices in their delivery periods. The *futures premium*[2] is defined as the percentage difference between the futures (or forward) price at time t and the expected spot price at time T, or

[2] We do not distinguish between the futures and forward premium, as both futures and forward data are used to estimate premiums. Note that sometimes the definition of "risk premium" has the opposite sign of a "futures/forward premium". In our case, Keynes' "backwardation" (when sellers are hedging) has a negative futures premium, while "contango" has a positive one (when buyers are hedging).

$$P_{t,T} = \frac{F_{t,T} - E[S_T]}{F_{t,T}} \qquad (1)$$

where T - t is the number of trading days to maturity. Thus the premium will be positive if consumers hedge more than producers, and negative if producers hedge more than consumers. We are unfortunately unable to observe the expected spot price directly (although Bessembiner and Lemmon estimate this via a modeling approach), and so we estimate the forward premium by differencing the futures or forward price with the realized spot system price in the delivery period:

$$\hat{P}_{t,T} = \frac{F_{t,T} - \overline{S}_T}{F_{t,T}} \qquad (2)$$

The difference $\hat{P}_{t,T} - P_{t,T}$ is then a pure expectations error, which can be assumed to be uncorrelated with information at time t under rational expectations.

Nord Pool contracts are settled every day throughout the entire delivery period against the daily spot price. (Recall that delivery in this market is purely financial.) It is necessary then to average these spot prices for the delivery period specified by the futures. As can be seen later, this can mean that risk premiums are not necessarily zero at the contract's expiry day, since players are exposed to price risk during the settlement period.

Nord Pool's "block" futures are used as a compromise between frequency and liquidity. Blocks were listed until the start of 2003 and specify a four-week (occasionally five) delivery period, where a year is comprised of 13 blocks. Blocks were listed 6 months before delivery, and could be used as a medium-term hedge. In 2003, blocks were replaced by month forwards. In order to have as complete a data series as possible in 2003, the data consists of 82 non-overlapping block futures between Block 7 1997 - Block 10 2003, and 5 month forward contracts between October 2003 - February 2004. Blocks split into different week contracts 4-7 weeks before delivery, so blocks near maturity are synthesized by average prices of four (or five) week contracts.

Prices for all contracts for T - t from 1 to 110 trading days before delivery are all compared with their average spot delivery price. Here the last trading day (T - t = 1) is defined as the last day before the first week of the block expires and goes to delivery. The remaining weeks continue to trade in the financial market until they also expire. Average premiums for contracts traded 1, 30, 60 and 90 days before delivery are estimated.

First it is necessary to check whether risk premiums exist in Nord Pool's future market before we can compare results from different time periods. To test this first hypothesis, futures premiums are estimated for the entire data set of block and month contract prices from 1997 to February 2004.

This is performed by means of the following simple estimation on premiums with d trading days to delivery, for $d = 1$, 30, 60 and 90. Here the intercept parameter is estimated while the trend parameter is forced to zero to estimate average premiums.

$$\hat{P}_{t,t+d} = \beta + \varepsilon_t \qquad (3)$$

The error term ε_t arises because we use realized rather than expected spot prices at time T. As indicated above, it is uncorrelated with information available at time t under rational expectations. It may, however, be heteroscedastic and serially correlated. Serial correlation may arise because traders do not have a chance to observe their realized expectation errors for a trade made at time t before making a new trade at time $t+j$, where $t < t+j < T$, so the new trade is made before the start of the delivery period for the first trade. The fact that the delivery period is 20 days long exacerbates this problem and there is the potential for serial correlation even for $T - t = 1$. In order to avoid biased t-statistics, an OLS-estimation using a Generalized Method of Moments variance / covariance matrix is used, which is robust to autocorrelation as well as heteroscedasticity.

Subsequently, we test our second hypothesis, that risk premiums in the Nord Pool futures market were smaller or absent during the period when many non-Nordic speculators were present. We compare estimated premiums for three different time periods:

1. 1997-1999, where the market was still growing rapidly
2. 2000-mid 2002, where large outside speculators were active participants, and
3. mid 2002-beg 2004, where many of the speculators had exited the market.

This is performed by means of the following estimation on premiums, this time with 60 trading days to delivery:

$$\hat{P}_{t,t+60} = \beta_1 d_1 + \beta_2 d_2 + \beta_3 d_3 + \varepsilon_t \qquad (4)$$

where the β_i parameters are the mean futures premiums for the respective periods and the d_i terms are dummy variables for the corresponding sub-samples $i = 1$ to 3. The same assumptions about the error term are made as described above for equation (3). We expect the absolute value of the futures premium to be lower in period (2) than periods (1) and (3), i.e., closer to zero.

We then test to see whether the futures premiums in periods (1) and (2), and periods (2) and (3) are equal, rearranging the terms in the previous equation to estimate the differences $\beta_2 - \beta_1$ and $\beta_3 - \beta_2$:

$$\hat{P}_{t,t+60} = \beta_1(d_1 + d_2) + (\beta_2 - \beta_1)d_2 + \beta_3 d_3 + \varepsilon_t \qquad (5)$$

$$\hat{P}_{t,t+60} = \beta_1 d_1 + \beta_2(d_2 + d_3) + (\beta_3 - \beta_2)d_3 + \varepsilon_t \qquad (6)$$

Note that the rearranged equations (5) and (6) are identical to equation (4). This is done in order to easily and directly test the difference parameters $\beta_2 - \beta_1$ and $\beta_3 - \beta_2$ using the same estimation procedure and assumptions as above.

To test the third hypothesis, that there was a significant change in risk premiums at Nord Pool's futures market after the winter of 2002-2003 due to a change in consumer hedging behavior, we divide the same sample period from 1997 - 2004 into two new sub-periods:

4. 1997-2002, before the harsh winter and high prices, and
5. 2003-start 2004, during and after the high-price period.

Again, we estimate risk premiums, β_4 and β_5 for these two periods separately in equation (7) using futures with 60 trading days to delivery, as well as testing whether the premiums in these two periods are equal by estimating the difference $\beta_5 - \beta_4$ in the rearranged equation (8) below. Error term assumptions are identical to those stated above. For period (5), the number of observations begins to become rather small. Since prices in this period were quite unpredictable, we expect large variations in observed premiums.

$$\hat{P}_{t,t+60} = \beta_4 d_4 + \beta_5 d_5 + \varepsilon_t \qquad (7)$$

$$\hat{P}_{t,t+60} = \beta_4(d_4 + d_5) + (\beta_5 - \beta_4)d_5 + \varepsilon_t \qquad (8)$$

Finally, as suggested by Shawky et al. (2003), a regression is performed using the estimates of risk premiums for each $T - t$ (from 1 to 110), against trading days to delivery, to show the trend as the contract nears maturity. This is done by synchronizing the maturity dates and performing the regression

$$\hat{P}_{t,T} = \alpha + \beta(T - t) + \varepsilon_t \qquad (9)$$

where $T = 1, ..., 110$ for a given t. The intersect α represents the premium at the start of delivery, and the slope β shows the trend in premiums as the contract is further from maturity. We employ the same assumptions on the error term as above. This way it is possible to see more intuitively how premiums can vary across different segments of the forward curve.

RESULTS

In order to estimate the futures premiums as defined above, first a one-sample test is performed on the entire period for 1, 30, 60 and 90 days before delivery of the block or month contract, as shown in equation (3). This is estimated for the entire time period between June 1997 and February 2004 (Table 1). The test employs the null hypothesis that the futures premiums are zero, against the alternative that premiums are non-zero (either positive or negative).

The premiums are positive and vary between 3.7% and 9.3%. As could be expected they are larger the further they are from delivery (i.e., larger premiums for larger risks). The 1-day estimate is significant at the 95% confidence level, and 30 and 60-day premiums at the 90% confidence level. One might expect that the 1-day premium would be zero, but the 3.7% premium seems to represent the risk between the day before expiry and the rest of the four-week delivery period, since settlement in Nord Pool contracts is stretched out across the delivery period.

Table 1

Futures premiums for block/month contracts delivery Jun 97 - Feb 04
Equation (3), (OLS estimation using a GMM variance/covariance matrix)

Period	*Days to Delivery (T-t)*	*Mean*	*Standard Error*	*Durbin-Watson*	*Prob*
Jun 97 - Feb 04 (whole)	1 day	0.037	0.015	1.714	0.011
Jun 97 - Feb 04 (whole)	30 days	0.073	0.038	0.824	0.055
Jun 97 - Feb 04 (whole)	60 days	0.081	0.048	0.741	0.091
Jun 97 - Feb 04 (whole)	90 days	0.093	0.057	0.507	0.106

Premiums estimated 60 days to delivery are used to test the two hypotheses about speculation and learning effects. In our second hypothesis we are testing the null hypothesis that there is no difference between the futures premiums in the three time periods before, during and after active participation of large non-Nordic traders, against the alternative that there was a reduction in premiums during this period. The third tests the null hypothesis that there is no difference between futures premiums before and after the winter of 2002-2003. This is tested against the alternative that there is indeed a difference between these periods, whether positive or negative.

The time period is divided up into three non-overlapping periods, as defined in the previous section. (Note that the period shown in the tables are *delivery* periods. Periods are divided up to correspond to the appropriate trading periods, e.g., the August 2002 delivery period corresponds to the "mid-2002" trading period 60 days before.) The same OLS test with a GMM matrix as above is used for robust t-statistics. Equation (4) is used to estimate periods before, during and after the presence of speculators.

The results in Table 2 show that the futures prices in the first period (before speculators were active) had a significant positive premium (17.4%) while prices in subsequent periods had premiums which are not statistically different from zero. This is consistent with the hypothesis that in periods with speculation, the risk premium is zero. However, it is surprising that a zero-premium cannot be rejected for the last period after 2002 as well. We expected that when speculators left Nord Pool the premium would again deviate from zero. This result could be because of a number of reasons: The sample size here is relatively small and the period was dominated by large prices movements, which can introduce large errors in the observed premiums. It is also possible that although many non-Nordic speculators exited as members, that a number of other market players continued to speculate in the market, keeping premiums low.

Table 3 gives more weight to these findings by testing the significance of the differences between premiums in different periods (equations 5 and 6). Although the differences between periods (2) and (1) appear to have low significance, we are only interested in estimating the degree to which the premium is reduced, so we can use a one-sided test which gives a p-value of 0.071 which is significant at the 90% confidence level. There is no significant difference, however, between premiums before and after the delivery period of August 2002.

Table 2

Futures premium for block/month contracts 60 days to delivery
Equations (4) and (7) (OLS estimation using a GMM variance/covariance matrix)

Period	*Days to Delivery (T-t)*	*Mean*	*Standard Error*	*Durbin-Watson*	*Prob*
Hypothesis (2), Equation (4)					
Jun 97 – Feb 00 (before speculation)	60 days	0.174	0.061	0.800	0.004
Mar 00 - Aug 02 (during speculation)	60 days	0.051	0.059	0.800	0.392
Sep 02 - Feb 04 (after speculation)	60 days	-0.035	0.125	0.800	0.778
Hypothesis (3), Equation (7)					
Jun 97 - Feb 03 (before winter)	60 days	0.066	0.054	0.744	0.219
Mar 03 - Feb 04 (after winter)	60 days	0.163	0.100	0.744	0.102

Tables 2 and 3 also show results from testing the third hypothesis, that risk premiums have been affected by increased hedging by consumers after the high-priced winter. If this were the case, we would see higher futures/forward premiums for delivery periods after February 2003 (more "contango" in the Keynesian terminology). Equations (7) and (8) are used to estimate mean premiums and differences in premiums between the two periods. Again, the GMM method is employed for robust t-statistics.Testing this hypothesis proves difficult since we have only data for one year after the winter of 2002-2003, so none of our estimates has statistical significance at the 90% level, although we have somewhat higher confidence in the "after winter" period estimate of 16.3%, shown in Table 2. The two-sample test, as shown in Table 3, is however unable to demonstrate a statistically significant difference between these two estimates. It is also possible that the increased consumer hedging has a larger effect on the longer end of the curve, in season and year contracts, than on block contracts which we examine here. These contracts are so long however, that the frequency of the data is insufficient to conduct a meaningful analysis. The issue remains unresolved until better data can be examined.

Table 3

Difference in 60-day premiums during and after speculation period
Equations (5-6) and (8) (OLS estimation using a GMM variance/covariance matrix)

Between Periods	*Diff Estimate*	*Standard Error*	*Durbin-Watson*	*Prob*
Hypothesis (2) Equation (5)				
During (Mar00-Aug02) - before speculation (Jun97-Feb00)				
Hypothesis (2) Equation (6)	-0.123	0.084	0.800	0.142
After speculation (Sep02-Feb04) - During (Mar00-Aug02)	-0.086	0.138	0.800	0.534
Hypothesis (3) Equation (8)				
After (Mar03-Feb04) - Before winter (Jun97-Feb03)	0.097	0.114	0.744	0.397

Table 4 and Figure 4 show the same data from a different perspective. Rather than focus simply on the premium estimates at 60 trading days to delivery, estimates are made for every day from 1-110 trading days before delivery, covering the length of the life of block and month contracts. The regression in equation (8) is run on these estimates in order to determine the trend.

Table 4

Futures premium trends by days to expiry, from 1 – 110

Equation (9) (OLS estimation using a GMM variance/covariance matrix)

Period	*α*	*β*	*t (for β)*	*R-Squared*
Jun 97 - Dec 99 (before speculation)	0.0456	0.0020	39.888	98.3 %
Jan 00 - Aug 02 (during speculation)	0.0371	0.0004	17.633	91.4 %
Sep 02 - Feb 04 (after speculation)	0.1109	-0.0023	-11.817	84.5 %
Jun 97 - Feb 04 (whole)	0.0564	0.0004	8.572	75.9 %

In one way these trends support the claims made. There is a strong indication that the futures premium decreased substantially after the year

2000. The trends are statistically strong.[3] At first glance it would seem that premiums in trading from mid-2002 to 2004 have a negative trend. However, the premium (point) estimates for this period are largely positive when $T - t < 60$ and negative otherwise, so the result is inconclusive. Perhaps this represents different hedging behavior at different segments of the forward curve. This casts doubt, however, on the claim that buyers were hedging more after the winter of 2002-2003.

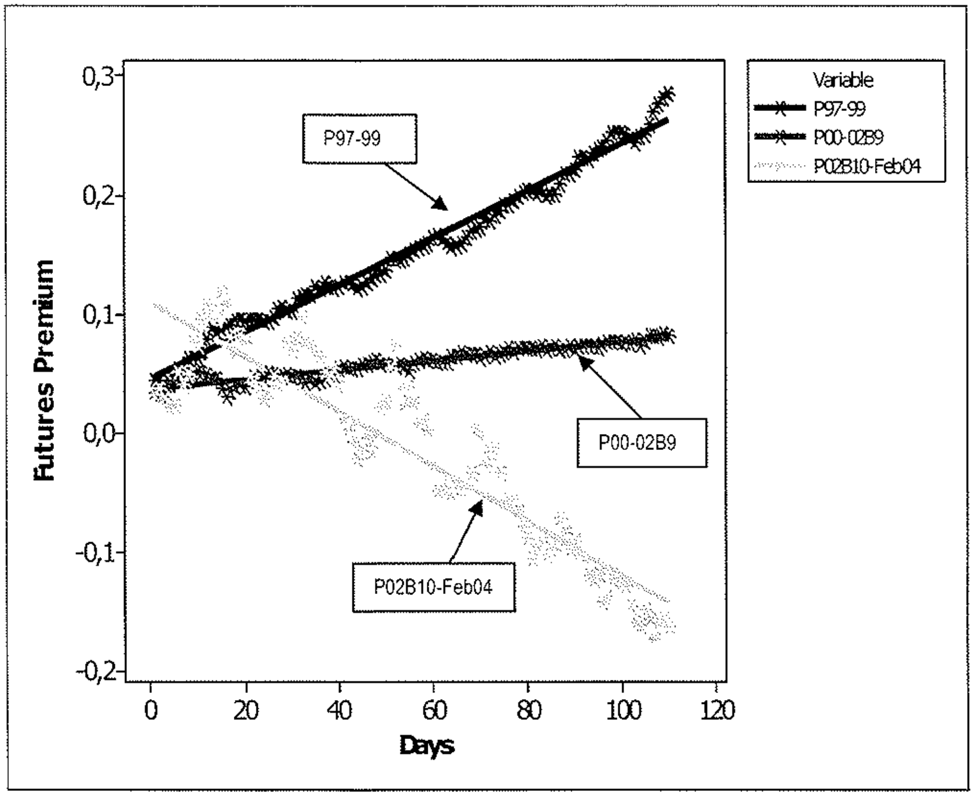

Figure 4: Futures premiums before, during and after active outside speculation estimate for every day from 110 – 1 trading days before delivery

[3] The observant reader will note that serial correlation in the error terms is visible in Figure 4. It is interesting to note that this forms a pattern with peaks every 20 trading days, which corresponds to the length of the spot delivery period. It is possible that this is caused by traders "rolling" contracts (selling one contract and buying the adjacent one) as the futures approach delivery. This would be an interesting subject for further study.

Note finally that, at least for the curves from 1997 – 1999 and 2000 – mid-2002, they converge not at zero but at about 4%. This is also demonstrated by a statistically significant intercept coefficient. This indicates that there is still a large futures premium present when the contract begins its delivery period.

SUMMARY AND CONCLUSIONS

According to previous studies, risk premiums appear to be present in several electricity markets, where the underlying commodity is non-storable, and so arbitrage between derivatives and spot markets does not exist. Electricity markets are young, and have therefore not always had the degree of outside speculation which contributes to reducing risk premiums in other more established markets.

This paper seeks to test whether risk premiums are present in Nord Pool's futures market for electricity. We propose that these risk premiums vary over time, and therefore test two additional hypotheses: whether the presence of outside speculators reduced risk premiums, and whether a period of high prices and volatility caused more buyers to hedge in the futures market. Nord Pool has experienced in its ten-year history a period of growth, with the presence of a number of large trading companies between 2000 and 2002. If speculators reduce risk premiums, then the estimates for this period should be closer to zero than for the previous and following periods. Block futures and month forward contracts are compared to spot delivery prices in order to estimate futures premiums. Premiums were significantly positive between 1997-1999, but were quite low in the period where speculators were present. Interestingly, the premium after Enron and others left the market does not show significant futures premiums, although a trend analysis indicates that premiums may in fact have become negative.

Nord Pool has also experienced a winter in 2002-2003 which caused record high prices and volatilities and an increased public focus on hedging for consumers. It would seem reasonable that many consumers, both industry and end-users, would react by purchasing more fixed-price contracts, which would drive up futures premiums in the market. The statistics do not however show any indication that this has occurred. If anything the trend seems to be the opposite. However, there is not yet enough data to make any conclusions for this period.

Premiums seem then to be an important element in pricing Nord Pool futures and forwards, and warrant further study. Premiums may have seasonal variations, may vary according to contract maturity, and may contain other elements are not uncovered here. If premiums are indeed again present, this would seem to be an invitation for speculators to again enter the market and earn profits through trading with other market participants who are willing to pay to reduce risk.

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