

**An Examination of the Predictive Abilities of
Economic Derivative Markets**

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I. Introduction

In late 2002, Deutsche Bank and Goldman Sachs introduced regular auctions of economic derivatives. These options allow market participants to take positions on a variety of official macroeconomic measures, in anticipation of their scheduled announcement. The statistics covered to date include U.S. Nonfarm Payrolls, Initial Jobless Claims, the Institute for Supply Management's manufacturing index, the U.S. Retail Report, and the Eurozone Index of Consumer Prices.

The auctions are conducted using a Pari-mutuel Derivatives Call Auction (PDCA) technology developed by Longitude, Inc. The auctions last for between one to two hours and are typically held the day of or one day prior to the actual data release. While the auction is in progress, investors can enter limit orders to buy or sell digital or vanilla options. The digital options offer a \$1 payout per contract if the actual release is at or above (for calls) or below (for puts) the strike, while vanilla options offer a payout of \$1 per point the actual release is above or below the strike. The available strikes for each auction are determined in advance by the auction sponsors (Deutsche Bank and Goldman Sachs). The available strikes center around economist consensus estimates and express a range of possible outcomes for the announced figure.

Using the limit orders received during the auction, the PDCA technology calculates a unique equilibrium price for the various options that will 1) maximize the premiums collected and 2) ensure that the premiums collected will equal the total amount to be paid out for any given actual release number.¹ The equilibrium price of each digital option gives an indication of the subjective probability the market assigns to that particular option expiring in the money and,

¹ The process by which this unique equilibrium price is calculated is outside the scope of this paper, but is explained in detail by Baron and Lange.

thus, gives insight into what the market expects the announced figure to be. This figure is called the implied forecast.

As the auction proceeds, auction participants have access to real time information displaying indicative prices and implied forecasts (final prices and implied forecasts are not displayed until the auction has concluded). These figures are updated as the auction proceeds to reflect incoming orders. For example, if an auction participant expects (with high probability) that the released number will be higher than the current implied forecast, s/he may place an order for a digital call option with a strike at or near the current implied forecast. If this order is placed at or above the current indicative price, it will result in an upward adjustment of the implied probabilities above the strike and a downward adjustment of the implied probabilities of outcomes below the strike. As a result, the implied forecast will increase, expressing the revised view of the market taking the latest order into account. Deutsche Bank makes available on its economic derivatives website (www.economicderivatives.com) post auction reports which summarize each auction and the final implied forecast. Appendix I contains some examples of these post auction reports.

Experience with other predictive markets, such as the Iowa Electronic Markets, suggests that the implied forecasts generated by these auctions may prove to be accurate predictors of the officially announced statistics.² In this paper, I examine the efficacy of the economic derivatives market in predicting the announced numbers, particularly in comparison to economists' consensus predictions. Specifically, I examine the following four research questions:

- 1) Do the auctions generate more accurate predictions than those of economists, measured on an absolute basis?

² See Berg, Forsyth, Nelson and Rietz (2001)

- 2) If the auction predictions are not more accurate on an absolute basis, are they useful indicators of the surprise in a forthcoming announcement?
- 3) Do the auctions generate forecasts which are more or less biased than those of economists? and
- 4) Have the auction predictions improved over time?

Unfortunately, given the short span of time the economic derivative markets have been in existence, there is limited data available and it is difficult to reach conclusions with a high degree of statistical significance. My analysis of the data suggests that the auction forecasts are no better at predicting the actual announcements than economist consensus forecasts. Nor are they useful as indicators of the direction of any potential surprise. Both processes produced forecasts which were, on average, about 0.57 standard deviations from the actual announced figure. However, there does appear to be an interesting result relating to the degree of upward bias in the two types of forecasts. While the auction and economist forecasts both tended to be overly optimistic, the auction forecasts appear to be less so.

II. Data

Data were collected from 56 auctions, held over the period October 2002 to March 2004 and pertain to 49 actual announcements of the following measures: ISM Manufacturing, Nonfarm Payrolls, and Retail Sales.³ There were seven Nonfarm Payroll announcements for which auctions were held both on the day of and day prior to the announcement, resulting in the difference between the number of announcements and the number of auctions. An additional 22 auctions, covering a European inflation measure, were not included because of difficulty in obtaining economist consensus estimates for those announcements. Economist consensus

³ Auctions covering Initial Jobless Claims were introduced in February 2004. However, because there have only been three auctions on this measure to date, these auctions were not included in this study.

estimates of the remaining three measures were collected from the Bloomberg terminal, as displayed on the day of the auction. Bloomberg surveys about 50 to 60 economists on a regular basis and reports the resulting median estimate as the consensus forecast. The actual announced statistic (not including any post-announcement revisions) was also collected from the Bloomberg terminal. **Table 1** summarizes the available data. A full listing of the source data used in this analysis is contained in Appendix II.

Table 1: Summary Descriptive Statistics

	<i>Observations</i>	<i>Mean</i>	<i>St. Dev.</i>
Announcements			
ISM Manufacturing	15	53.19	5.78
Retail Sales	16	0.37	0.63
Nonfarm Payroll	18	-17.78	104.15
Auction Forecasts			
ISM Manufacturing	15	53.23	5.08
Retail Sales	16	0.30	0.29
Nonfarm Payroll	25	46.06	85.98
Economist Forecasts			
ISM Manufacturing	15	53.52	4.91
Retail Sales	16	0.34	0.20
Nonfarm Payroll	18	38.28	70.14
<i>Units: ISM Manufacturing - Index 0-100; Retail Sales - % Monthly Change; Nonfarm Payroll - Monthly Change in Thousands</i>			

The 56 observations cover announcements of economic statistics that are measured in very different ways. The ISM number is an index, the Retail Sales figure is a percentage change, and the Nonfarm Payroll is an absolute change. Accordingly, the data must first be standardized to allow for meaningful comparison. The relevant statistics of interest, for each of the 56 observations, are the magnitudes of the Auction Forecast Errors and Consensus Forecast Errors relative to the variation of the underlying statistic. The Forecast Errors were obtained by subtracting the actual announced statistic from the auction's implied forecast or the economist consensus forecast, respectively. The Forecast Errors were then standardized by dividing the

Forecast Error by the standard deviation of the announced statistic between October 2002 and March 2003.⁴

III. Accuracy of the Predictions

The accuracy of the forecasts generated by the auctions and the economist surveys can be assessed by comparing the absolute values of the Standardized Errors for each observation. The one-sided research hypothesis to be tested is that the mean absolute error generated by the auction process is less than the mean absolute error generated by economist surveys. The null hypothesis, therefore, is that the mean absolute error generated by the auction is equal to (or greater than) that generated by the survey. As can be seen from the paired t-test results summarized in **Table 2**, this null hypothesis cannot be rejected. Both processes produce mean absolute errors about 0.57 standard deviations from the announced statistic.

Table 2: Paired T-Test Comparing Mean Absolute Auction Forecast Error with Mean Absolute Consensus Forecast Error

	<i>Observations</i>	<i>Mean</i>	<i>Standard Deviation</i>	<i>Standard Error of Mean</i>
Auction	56	0.57	0.53	0.07
Consensus	56	0.57	0.54	0.07
Difference	56	-0.00	0.19	0.03
T-Test of mean difference = 0 (vs > 0): T-Value = -0.05 P-Value = 0.519				

Similar results are obtained when this test is conducted separately for each economic statistic. The auction and consensus forecasts each generated mean absolute errors of about 0.21 for ISM releases, 0.76 for Nonfarm Payroll releases, and 0.62 for Retail Sales releases.

IV. Predictions of the Surprise

Although the auction forecasts do not appear from these data to provide a more accurate prediction of the announced statistics than consensus forecasts, an interesting question is whether the auctions provide an indication of the direction of the surprise element contained in the

⁴ This method of standardization follows that used by Balduzzi et al. (2001) and Andersen et al (2003) to measure the surprise element in macroeconomic news announcements.

announcement. The surprise element is typically measured as the difference between the announced figure and the consensus estimate. If the auction forecast tended to be above (below) the consensus estimate whenever the actual figure was also above (below) the consensus figure, the auction could prove to be an important indicator of the direction of the coming surprise, if not the magnitude. However, it turned out that the auction accurately predicted the sign of the surprise for only 31 of the 56 auctions, in line with what would be expected to occur by random chance. As is the case with the accuracy of predictions, this result is consistent across all types of data releases.

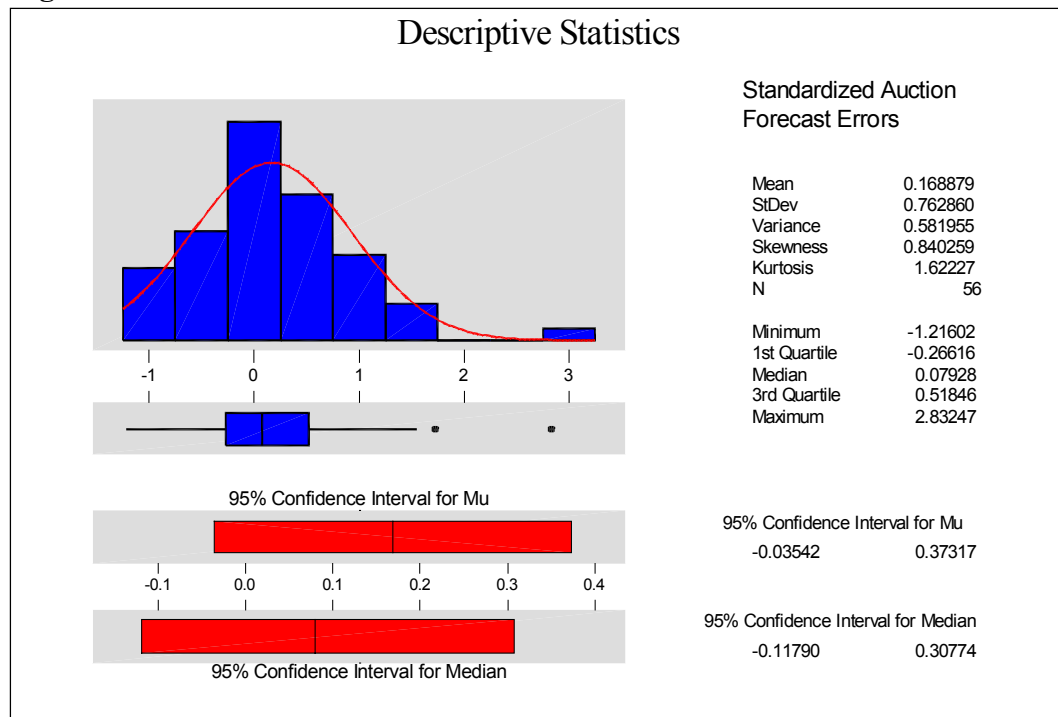
The practice of measuring the surprise element in a news announcement in this fashion (*i.e.*, as the difference between the announced figure and the consensus estimate) has been the norm in large part because there has been no other way to measure the market's expectation for the announced figure. For this reason, much of the research measuring the impact of news announcements on financial markets (*e.g.*, Balduzzi et al. (2001) on bond markets and Andersen et al. (2003) on foreign exchange markets) measures the correlation between the market reaction and the surprise as measured by economist forecasts. However, the introduction of the economic derivative auctions presents an alternative measure of market expectations. It may be interesting to revisit the work of Balduzzi et al. and Andersen et al., measuring the surprise component as the difference between the *auction* forecast and the announced figure and see whether this measure of surprise does a better or worse job of predicting the actual market impact of the news announcement. Such a question is beyond the scope of this paper, but is highlighted as a potential area for future research.

V. Bias in the Predictions

In a study of the accuracy of economists' consensus estimates for major monthly news announcement, Moersch (2001) concluded that, although the forecasts tended to be fairly accurate, they frequently contained an element of upward bias. Moersch finds this to be consistent with earlier studies of long-term forecasts, which attribute bias to strategic behavior of forecasters such as a reluctance to adjust predictions in light of new information for fear that sharp adjustments might call into question a forecaster's original estimates and damage his/her standing with clients.⁵

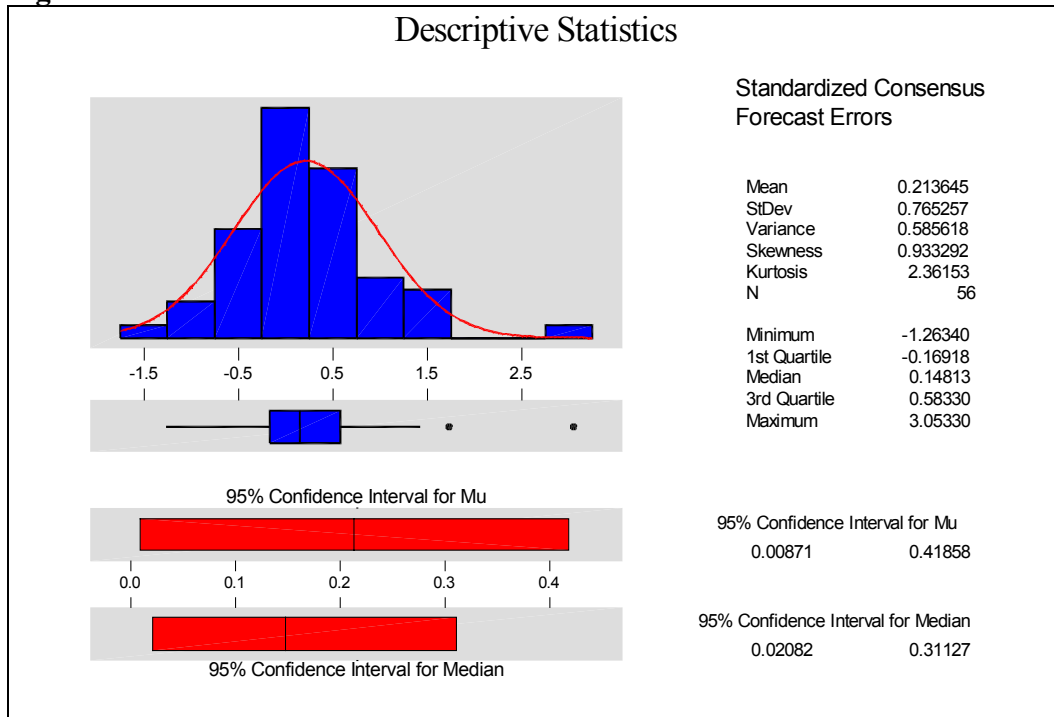
Bias is evident in a given forecasting process to the extent that the mean forecast errors deviate from zero. **Figures 1 and 2**, shown below, contain histograms and descriptive statistics of the standardized forecast errors generated by the auctions and by the economists' estimates, respectively.

Figure 1: Standardized Auction Forecast Errors



⁵ See, e.g., Laster et al. (1999) and Ehrback and Waldmann (1996)

Figure 2: Standardized Consensus Forecast Errors



At first glance both distributions appear centered near zero, as would be expected. However, the consensus forecast errors demonstrate a more pronounced skew to the right than the auction forecast errors (skewness measures of 0.93 and 0.84, respectively). In addition, the mean forecast error generated by the auction process is nearly 25% closer to zero than that generated by the consensus estimates. The 95% confidence intervals for the true mean forecast errors generated under each process allow one to conclude that the consensus predictions are upwardly biased (*i.e.*, significantly greater than zero), but the same cannot be said for the auction (because the confidence interval includes zero).

A more rigorous test of whether the auction forecast errors are systematically less optimistic than the consensus estimates can be conducted using a paired t-test. Such a test, summarized in **Table 3**, below, is borderline significant at the 5% level. Although the auctions

may result in less of an upward bias, further data would need to be examined in order make a conclusive determination.

Table 3: Paired T-Test Comparing the Mean Auction Forecast Error with the Mean Consensus Forecast Error

	<i>Observations</i>	<i>Mean</i>	<i>Standard Deviation</i>	<i>Standard Error of Mean</i>
Auction	56	0.17	0.76	0.10
Consensus	56	0.21	0.77	0.10
Difference	56	-0.04	0.19	0.03
T-Test of mean difference = 0 (vs < 0): T-Value = -1.77 P-Value = 0.041				

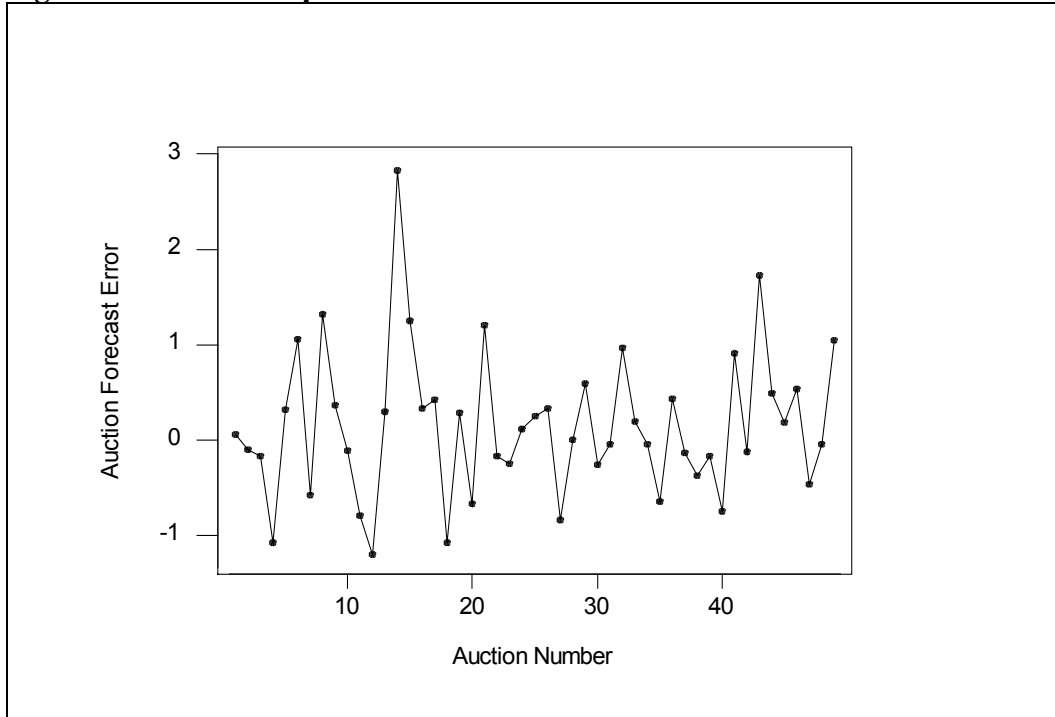
Interestingly, similar analyses conducted for each of the three types of data announcements reveal varied distribution patterns for each type of announcement. Neither the consensus estimates nor the auction predictions for ISM announcements generate mean forecast errors significantly different from zero, but a test of whether the auction forecasts are less pessimistic than consensus estimates is significant at the 5% level. Mean forecast errors for Retail Sales announcements were also not significantly different from zero (for either process) and, for these announcements, a test of whether the auctions were more pessimistic was not quite significant at the 5% level. Payroll forecast errors, on the other hand, *were* significantly greater than zero for both processes, but the auction and consensus estimates were both equally optimistic.

VI. Improvement over Time

The final question to be addressed is whether auction participants “learn” from prior auctions with the result that, over time, the auction forecasts do a better job of predicting the announcements. To address this question, I first examined a plot of the auction forecast errors

against a chronological ordering of the auctions (shown below in **Figure 3**) to determine if there was a pattern over time.⁶

Figure 3: Time series plot of auction forecast errors



If the forecasts are becoming more accurate over time, there should be a reduction in the variance in auction forecast errors for later auctions. To test whether this is the case, I divided the auctions into two groups – the earlier half and the later half – and conducted a variance ratio test to determine whether the two groups exhibit non-constant variance. The F-statistic for this test is 2.307 with a tail probability of 0.047, suggesting that the variance may be decreasing over time. To determine whether this result holds for auction forecasts of all three economic measures, I repeated the test for ISM auctions, Nonfarm Payroll auctions, and Retail Sales

⁶ Note that, for the seven Nonfarm payroll announcements with two associated auctions, I used only the earlier of the two auctions in this analysis, as the earlier auction forecasts are more directly comparable with the announcements for which there was only one auction.

auctions separately. It appears that the overall reduction in variance is driven solely by a reduction in the variance of Retail Sales forecast errors.

To further analyze the improvement over time, I conducted a regression to see whether the absolute value of the standardized auction forecast error is related to the chronological auction number, using the equation $Error_{(t)} = \alpha + \beta \times t$, where t = the chronological auction number. This analysis was conducted for the combined sample and for each of the individual types of announcements. The regressions were not significant for the combined sample or for the ISM and Nonfarm Payroll auctions, yielding F-statistics ranging from 0.03 to 0.61 (with associated tail probabilities of 0.87 to 0.44). Once again, however, Retail Sales auctions did demonstrate improvement. The regression for Retail Sales provided the results summarized in **Table 4**, below. For Retail Sales, it appears that each new auction is associated with a reduction in the absolute value of the forecast error of about 0.05 standard deviations.

Table 4: Regression of Retail Sales Absolute Forecast Errors vs Auction Number

	<i>Coefficient</i>	<i>Standard Error of Coefficient</i>	<i>T-Statistic</i>	<i>Tail Probability</i>
Constant	1.05	0.19	5.53	0.00
Auction Number	-0.05	0.02	-2.59	0.02
Adjusted R ² = 27.7%, F-statistic = 6.73 with tail probability of 0.021				

It is unclear why Retail Sales would be the only economic measure with a demonstrated improvement in auction forecast errors over time. It is not the least volatile of the measures under consideration here – ISM manufacturing announcements exhibit a much smaller standard deviation relative to its mean. There also does not appear to have been a predictable trend in the Retail Sales announcements over the period in question that might explain the improvements.

Perhaps the improvement in Retail Sales forecasts over time is related to its position in the monthly cycle of data releases. In a study of the impact of macroeconomic announcements on foreign exchange markets, Andersen et al (2003) found that releases which occur earlier in the

month tend to have a greater impact on markets than those that occur later in the month, presumably because later releases contain little “new” information. In keeping with those findings, we might expect to see auctions for Retail Sales releases, which take place later in the month, generate more accurate predictions than those for Nonfarm Payrolls, which take place about a week earlier, and for the ISM index, which typically occurs the first or second day of the month. Notwithstanding the improvement in Retail Sales predictions over time, however, this does not appear to be the case. As noted in section III, above, ISM auctions generated the smallest mean absolute errors (0.21), followed by Retail Sales auctions (0.62) and, finally, by Nonfarm Payrolls (0.76). A likely explanation for this unexpected result might be the impact of the so-called “jobless recovery” coming out of the 2001 recession. Nonfarm Payroll auction participants may have made overly optimistic predictions after receiving good news about the expanding economy.

VII. Conclusion

The analysis in this paper showed that, on average, the implied market forecasts from the auctions were not significantly different than economists’ consensus forecasts, and the auction predictions did not embody expertise in judging the surprise in the forthcoming announcement. However, the data do seem to support a finding that the auctions produce less overly optimistic forecasts than economist consensus estimates. It appears that market participants are more cautious when money is at risk than economists are when their reputation is at risk. Finally, with the possible exception of Retail Sales announcements, the accuracy of the auction forecasts does not appear to have improved with time.

References

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Appendix I – Sample Post Auction Reports

(a) Post Auction Report. Change in US Non-farm Payrolls, November 2002 Report

The first graph shows implied probabilities that are fairly symmetric based on opening prices. The second graph shows the evolution of the implied market forecast over the auction period with a sharp change in the implied forecast around 3:00 PM. The third graph shows the revised implied probabilities based on the closing option prices.

(b) Post Auction Report. ISM Manufacturing PMI, November 2003

The first graph shows implied probabilities based on opening prices. Note the symmetry in the graph and upturn for extreme high and low values. The second graph shows the revised implied probabilities based on closing option prices. These revised probabilities differ considerably from the first graph.

POST AUCTION REPORT

Change in US Non-farm Payrolls November 2002 Report (IMF +70k)

THE OFFERING

Event:	Change in US Non-farm Payrolls for October as published by the Bureau of Labor Statistics
Auction Date:	Thursday, December 5 2002
Auction Time:	3pm – 4.30pm London time (10am – 11.30am EDT)
Expiration/Release Date:	Friday, December 6, 2002
Strike Prices:	-150, -100, -75, -50, -25, 0, 25, 50, 75, 100, 125, 150, and 200
Units:	1000 jobs
Currency:	USD
Instruments:	Vanilla Call and Put Spreads Digital Calls and Puts, Range Binaries

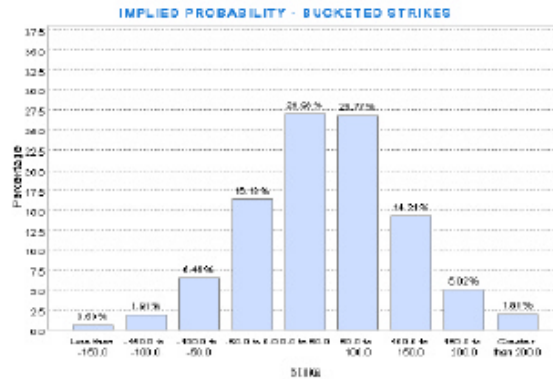
OPENING PRICES

October's non-farm payroll report, released on November 1st, showed non-farm payrolls decreasing by 5K, slightly below the consensus expectation of no change. With the November release on December 6th, Wall Street economists expect a slight improvement in the employment situation.

A current Bloomberg survey of 59 economists shows an expected increase of 36K in non-farm payrolls, with forecasts ranging from a low of -100K to a high of +75K. Deutsche Bank's own estimate is up 40k.

With the continuing slew of relatively strong recent US data, the opening orders for the auction on 5th December were distributed around a mean of 45k - slightly higher than the economist's consensus - with a standard deviation of around 75k (the standard deviation of the "surprise" between economist expectations and the actual release over the last 3 years).

This gave the following implied probabilities and opening prices (note the "current implied market forecast" at 45):



Auction: NFPNov02a
Event: Nonfarm Payroll Nov'02 **Auction Period:** 05 Dec 2002 15:00:00 GMT
 05 Dec 2002 16:30:00 GMT
Expiration: 06 Dec 2002 13:30:00 GMT **Current Time:** 05 Dec 2002 10:56:37 GMT
Strike Units: Thousands of Jobs **Last Pricing Time:** 04 Dec 2002 16:05:09 GMT
Status: closed

Current Implied Market Forecast: 45.07

[Refresh Prices](#)

DIGITAL CALLS (inclusive of Strike Price)

Strike	Bid	Offer	Payout
-150	0.5800	1	1
-100	0.9009	0.9909	1.00918
-75	0.9374	0.9074	1.0337
-50	0.8903	0.9203	1.07920
-25	0.8304	0.8004	1.10225
0	0.7345	0.7545	1.30854
25	0.0090	0.0390	1.50348
50	0.4047	0.4647	2.02143
75	0.3139	0.3439	2.80782
100	0.1970	0.2270	4.40528
125	0.1113	0.1413	7.07714
150	0.0549	0.0849	11.77558
200	0.0049	0.0349	26.73563

DIGITAL PUTS (exclusive of Strike Price)

Strike	Bid	Offer	Payout
-150	0.0000	0.0200	50
-100	0.0091	0.0391	25.57545
-75	0.0320	0.0620	15.27444
-50	0.0737	0.1037	9.0432
-25	0.1590	0.1890	5.82023
0	0.2355	0.2655	3.75548
25	0.3004	0.3304	2.50148
50	0.5053	0.5353	1.80811
75	0.6091	0.6391	1.40751
100	0.7730	0.8030	1.24533
125	0.8597	0.8897	1.12524
150	0.9151	0.9451	1.05009
200	0.9652	0.9952	1.00482

VANILLA CALLS

Strike	Bid	Offer
-150	191.1	190.1
-100	142.3	140.3
-75	110.4	107.9
-50	95.4	100.4
-25	73.0	70.1
0	53.9	57.9
25	37.0	40.5
50	23.5	28.5
75	13.0	18.3
100	7.44	9.44
125	3.58	5.08
150	1.43	2.43

VANILLA PUTS

Strike	Bid	Offer
-100	0.14	1.14
-75	0.75	2.28
-50	2.21	4.21
-25	5.0	7.5
0	9.0	12.0
25	17.4	20.9
50	29.4	32.4
75	43.2	47.7
100	61.3	66.3
125	81.0	87.4
150	104.3	110.3
200	151.8	158.8

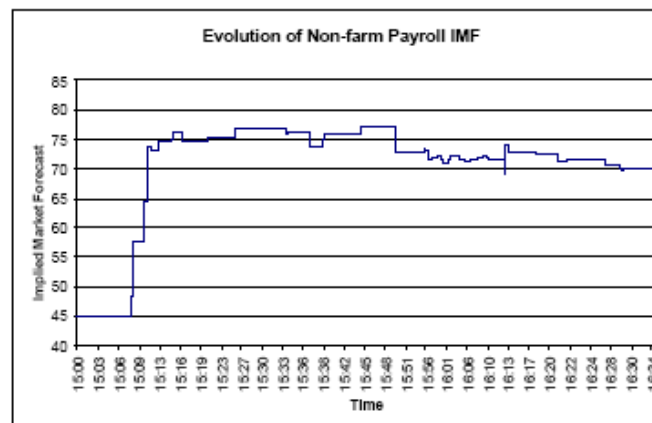
DURING THE AUCTION

Right from the auction open, it was clear the market was expecting a figure far higher than suggested by the economists' consensus, and saw immediate value in buying the higher strikes – as can be seen from the graph below. A mixture of digital ranges with strikes ranging anywhere from +50k up to +125k were the preferred strategies, pretty much instantly moving the implied market forecast (IMF) from +45k at the open to a high of just over +77k – all within 15 minutes of the auction open.

This move created some good opportunities for those who thought the market may be getting ahead of itself in its assessment of the US economy, fearing a similar result to Monday's ISM release – where the market predicted 51.0, only to be disappointed when the figure was released at 49.2. With this in mind, participants began looking at buying strikes around the economists' consensus. For example, a digital range with strikes of 0k and +50k was now around 25%. For those with a more bearish view, a digital range with strikes of –25k and +25k was priced at 17%. A preferred in-house trade was buying a +25k digital put for around 33%.

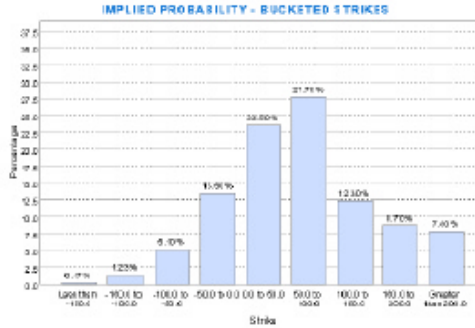
This interest to consider downside strikes was, however, not large enough to move the market significantly lower, and, as can be seen from the graph, the market drifted lower throughout the rest of the auction.

The resulting auction moves, though, were a textbook case for why orders should be submitted early on, and clearly demonstrated the cooperative nature of the auction process. The large initial orders that moved the market during the first fifteen minutes were eventually filled at considerably better prices than the original limit price submitted. Putting these orders in early allowed those participants with differing views to appreciate the value and submit their own limit orders – which not only improved the prices but also the size of the eventual fills.



AUCTION CLOSE – DISTRIBUTION AND PRICES

The implied market forecast at auction close was for a Non-farm payrolls release of +70k, considerably higher than the economist consensus of +36k. This suggests that the market is probably short futures or long USD and that unless we see a release over +100k, the market will be prone to disappointment and a move lower on the USD or short covering on futures could be seen.



Auction: NFPNov02a			
Event:	Nonfarm Payroll Nov'02	Auction Period:	05 Dec 2002 15:00:00 GMT 05 Dec 2002 16:30:00 GMT
Expiration:	06 Dec 2002 13:30:00 GMT	Current Time:	05 Dec 2002 17:42:15 GMT
Strike Units:	Thousands of Jobs	Last Pricing Time:	05 Dec 2002 16:41:42 GMT
Status:	finalized		

Current Implied Market Forecast: 70.02

[Refresh Prices](#)

DIGITAL CALLS (inclusive of Strike Price)

Strike	Bid	Offer	Payout
-150	0.993259	1	1
-100	0.971000	1	1
-75	0.953000	0.993000	1.01729
-50	0.920000	0.950000	1.05293
-25	0.890271	0.890271	1.13601
0	0.795000	0.915000	1.22600
25	0.699000	0.719000	1.30276
50	0.650000	0.690000	1.72414
75	0.373000	0.403000	2.48130
100	0.273000	0.303000	3.30093
125	0.205000	0.235000	4.25532
150	0.150000	0.180000	5.65556
200	0.053001	0.093001	10.75257

DIGITAL PUTS (exclusive of Strike Price)

Strike	Bid	Offer	Payout
-150	0.000000	0.016741	59.73959
-100	0.000000	0.029000	34.45278
-75	0.017000	0.047000	21.2768
-50	0.050000	0.090000	12.6
-25	0.110720	0.140720	6.67973
0	0.195000	0.216000	4.66118
25	0.292000	0.312000	3.20513
50	0.420000	0.460000	2.22222
75	0.597000	0.627000	1.6090
100	0.697000	0.727000	1.37552
125	0.755000	0.785000	1.26795
150	0.820000	0.850000	1.17547
200	0.905000	0.935000	1.06724

VANILLA CALLS

Strike	Bid	Offer
-150	213.330	220.330
-100	164.128	170.128
-75	130.910	140.910
-50	116.314	121.314
-25	93.018	98.418
0	73.218	77.218
25	64.953	68.153
50	38.710	41.710
75	26.354	28.854
100	17.8577	19.8577
125	11.7545	13.2545
150	6.9970	7.9970

VANILLA PUTS

Strike	Bid	Offer
-100	0.0000	0.7906
-75	0.0900	1.6900
-50	0.0795	2.0795
-25	3.070	5.670
0	6.870	9.870
25	12.924	15.324
50	21.372	25.372
75	33.525	38.025
100	43.510	54.510
125	67.925	73.425
150	87.558	93.558
200	129.651	135.651

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POST AUCTION REPORT

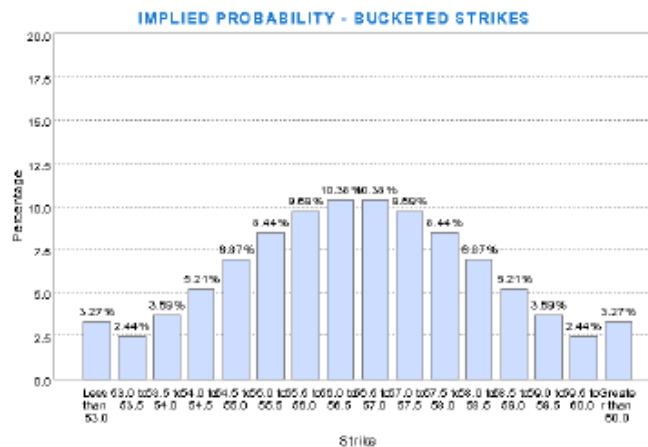
ISM Manufacturing PMI

November 2003

DETAILS

Event:	ISM Manufacturing PMI as published by the Institute for Supply Management
Auction Date:	Monday, December 1 2003
Auction Time:	1pm – 2pm London time (8am– 9am EDT)
Expiration/Release Date:	Monday, December 1 2003
Strikes:	53, 53.5, 54, 54.5, 55, 55.5, 56, 56.5, 57, 57.5, 58, 58.5, 59, 59.5 and 60
Units:	Index points
Currency:	USD
Instruments:	Vanilla Calls, Puts, Spreads, Straddles, Strangles, Risk reversals Digital Calls, Puts, Range Binaries, Strangles and Risk reversals and the Forward

OPENING DISTRIBUTION AND PRICES



GLOBAL MARKETS – Economic Derivatives

Auction: ISMNov03			
Event:	Nov '03 ISM Manufacturing PMI	Auction Period:	01 Dec 2003 13:00:00 GMT 01 Dec 2003 14:00:00 GMT 01 Dec 2003 11:59:59 GMT
Expiration:	01 Dec 2003 15:00:00 GMT	Current Time:	
Strike Units:	0	Last Pricing Time:	28 Nov 2003 20:36:21 GMT
Status:	closed		

Current Implied Market Forecast: 56.45

[Refresh Prices](#)

FORWARD

Clearing Price	56.453
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DIGITAL CALLS (inclusive of Strike Price)

Strike	Clearing Price
53	0.8973
53.5	0.8426
54	0.9059
54.5	0.8538
55	0.7851
55.5	0.7007
56	0.6039
56.5	0.5000
57	0.3962
57.5	0.2993
58	0.2149
58.5	0.1462
59	0.0941
59.5	0.0572
60	0.0327

DIGITAL PUTS (exclusive of Strike Price)

Strike	Clearing Price
53	0.0327
53.5	0.0572
54	0.0941
54.5	0.1462
55	0.2149
55.5	0.2993
56	0.3962
56.5	0.5000
57	0.6039
57.5	0.7007
58	0.7851
58.5	0.8538
59	0.9059
59.5	0.9428
60	0.9673

VANILLA CALLS

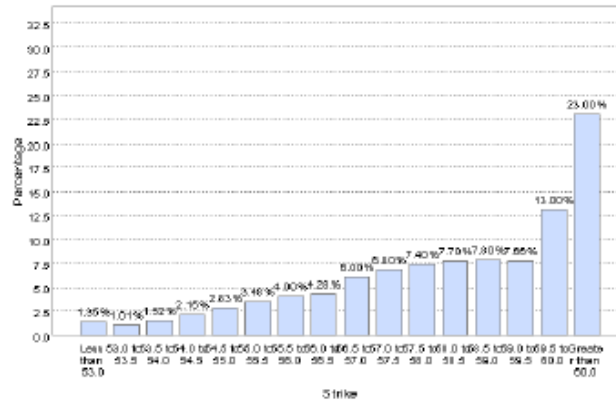
Strike	Clearing Price
53	3.453
53.5	2.877
54	2.517
54.5	2.079
55	1.673
55.5	1.306
56	0.996
56.5	0.714
57	0.486
57.5	0.326
58	0.202
58.5	0.116
59	0.0572
59.5	0.0212

VANILLA PUTS

Strike	Clearing Price
53.5	0.0237
54	0.0634
54.5	0.126
55	0.220
55.5	0.353
56	0.531
56.5	0.761
57	1.042
57.5	1.373
58	1.746
58.5	2.161
59	2.604
59.5	3.066
60	3.547

AUCTION CLOSE – DISTRIBUTION AND PRICES

IMPLIED PROBABILITY - BUCKETED STRIKES



GLOBAL MARKETS – Economic Derivatives

Auction ISMNov03			
Event:	Nov '03 ISM Manufacturing PMI	Auction Period:	01 Dec 2003 13:00:00 GMT 01 Dec 2003 14:00:00 GMT
Expiration:	01 Dec 2003 15:00:00 GMT	Current Time:	01 Dec 2003 15:40:00 GMT
Strike Units:	0	Last Pricing Time:	01 Dec 2003 14:02:53 GMT
Status:	Finalized		

Current Implied Market Forecast: 58.35

[Refresh Prices](#)

FORWARD

Sell At	Closing Price	Purchase At
57.99493	59.09493	58.13493

DIGITAL CALLS (inclusive of Strike Price)

Strike	Sell At	Closing Price	Purchase At
59	0.976495	0.989495	0.996495
59.5	0.966408	0.979408	0.986408
60	0.951161	0.961161	0.971161
60.5	0.929640	0.939640	0.949640
61	0.901304	0.911304	0.921304
61.5	0.866458	0.876458	0.886458
62	0.826471	0.836471	0.846471
62.5	0.783636	0.793636	0.803636
63	0.721634	0.731634	0.741634
63.5	0.655638	0.665638	0.675638
64	0.581636	0.591636	0.601636
64.5	0.504634	0.514634	0.524634
65	0.424637	0.434637	0.444637
65.5	0.350609	0.360609	0.370609
66	0.290609	0.290609	0.240609

DIGITAL PUTS (exclusive of Strike Price)

Strike	Sell At	Closing Price	Purchase At
59	0.012154	0.012605	0.014855
59.5	0.021233	0.022692	0.025552
60	0.034955	0.036939	0.042723
60.5	0.054324	0.05698	0.063596
61	0.079829	0.083695	0.092569
61.5	0.113342	0.118342	0.130342
62	0.153529	0.159529	0.173529
62.5	0.196364	0.203364	0.219364
63	0.256364	0.263364	0.276364
63.5	0.324364	0.333364	0.348364
64	0.398364	0.408364	0.418364
64.5	0.476364	0.488364	0.495364
65	0.553363	0.566363	0.573363
65.5	0.63099	0.64099	0.65099
66	0.70699	0.71099	0.73099

VANILLA CALLS

Strike	Sell At	Closing Price	Purchase At
59	4.99493	5.06493	5.13493
59.5	4.56971	4.67471	4.63971
60	4.02108	4.09108	4.15108
60.5	3.56195	3.61695	3.67195
61	3.16563	3.18952	3.20563
61.5	2.84544	2.71044	2.75544
62	2.24490	2.26420	2.23420
62.5	1.84302	1.87892	1.81302
63	1.47000	1.50000	1.53000
63.5	1.12858	1.16358	1.17858
64	0.82296	0.84296	0.86296
64.5	0.55525	0.57025	0.58525
65	0.326328	0.335328	0.346328
65.5	0.13600	0.14100	0.14600

VANILLA PUTS

Strike	Sell At	Closing Price	Purchase At
59.5	0.008801	0.009770	0.010757
60	0.023531	0.025190	0.026764
60.5	0.04682	0.050202	0.053723
61	0.081844	0.087071	0.09378
61.5	0.13096	0.13851	0.14606
62	0.19735	0.21028	0.21920
62.5	0.28250	0.31369	0.34528
63	0.39597	0.43597	0.47597
63.5	0.54385	0.58805	0.63365
64	0.72684	0.77684	0.82684
64.5	0.95032	1.00532	1.06032
65	1.21140	1.27140	1.33140
65.5	1.51197	1.57697	1.64197
66	1.85597	1.93597	2.01597

The next auction will be on Thursday 4th December for US Non-farm Payrolls.

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Appendix II – Data

Event	Release Period	Release Date	Auction Date	Auction Implied Market Forecast	Economist Consensus Forecast	Actual Announcement
ISM	Oct-02	11/1/2002	10/31/2002	47.5	48.9	48.5
ISM	Nov-02	12/2/2002	12/2/2002	51	51	49.2
ISM	Jan-03	2/3/2003	1/31/2003	53.2	54	53.9
ISM	Feb-03	3/3/2003	2/28/2003	52.2	52	50.5
ISM	Mar-03	4/1/2003	3/31/2003	48.1	49	46.2
ISM	Apr-03	5/1/2003	4/30/2003	47	47.2	45.4
ISM	May-03	6/2/2003	5/30/2003	48.4	48.65	49.4
ISM	Jun-03	7/1/2003	7/1/2003	51.2	51	49.8
ISM	Jul-03	8/1/2003	7/31/2003	51.8	52	51.8
ISM	Aug-03	9/2/2003	9/2/2003	54.4	54	54.7
ISM	Sep-03	10/1/2003	10/1/2003	53.4	54.5	53.7
ISM	Oct-03	11/3/2003	11/2/2003	56.2	56	57
ISM	Nov-03	12/1/2003	12/1/2003	58.4	58.5	62.8
ISM	Jan-04	2/2/2004	2/2/2004	64.6	64	63.6
ISM	Feb-04	3/1/2004	3/1/2004	61.1	62	61.4
Retail Sales	Oct-02	11/14/2002	11/13/2002	0.01	0.30	0.70
Retail Sales	Nov-02	12/12/2002	12/11/2002	0.13	0.20	0.50
Retail Sales	Dec-02	1/14/2003	1/13/2003	0.23	0.30	0.00
Retail Sales	Jan-03	2/13/2003	2/12/2003	0.53	0.50	1.30
Retail Sales	Feb-03	3/13/2003	3/12/2003	-0.21	-0.10	-1.00
Retail Sales	Mar-03	4/11/2003	4/10/2003	0.41	0.40	1.10
Retail Sales	Apr-03	5/14/2003	5/13/2003	-0.14	0.20	-0.90
Retail Sales	May-03	6/12/2003	6/11/2003	0.17	0.20	0.10
Retail Sales	Jun-03	7/15/2003	7/14/2003	0.16	0.30	0.70
Retail Sales	Jul-03	8/13/2003	8/12/2003	0.63	0.60	0.80
Retail Sales	Aug-03	9/12/2003	9/12/2003	0.82	0.80	0.70
Retail Sales	Sep-03	10/15/2003	10/15/2003	0.57	0.40	0.30
Retail Sales	Oct-03	11/14/2003	11/14/2003	0.09	0.20	0.20
Retail Sales	Nov-03	12/11/2003	12/11/2003	0.32	0.30	0.40
Retail Sales	Dec-03	1/15/2004	1/15/2004	0.41	0.40	0.10
Retail Sales	Jan-04	2/12/2004	2/12/2004	0.6	0.50	0.90
Nonfarm Payroll	Sep-02	10/4/2002	10/1/2002	-38	6	-43
Nonfarm Payroll	Sep-02	10/4/2002	10/3/2002	-18	6	-43
Nonfarm Payroll	Oct-02	11/1/2002	10/29/2002	-16	0	-5
Nonfarm Payroll	Oct-02	11/1/2003	10/31/2002	-13	0	-5
Nonfarm Payroll	Nov-02	12/6/2002	12/5/2002	70	35.5	-40
Nonfarm Payroll	Dec-02	1/10/2003	1/9/2003	36	20	-101
Nonfarm Payroll	Jan-03	2/7/2003	2/6/2003	59	68	143
Nonfarm Payroll	Feb-03	3/7/2003	3/6/2003	-13	10	-308
Nonfarm Payroll	Mar-03	4/3/2003	4/3/2003	-65	-35	-108
Nonfarm Payroll	Apr-03	5/2/2003	5/1/2003	-119	-60	-48
Nonfarm Payroll	May-03	6/6/2003	6/5/2003	-44	-30	-17
Nonfarm Payroll	Jun-03	7/3/2003	7/2/2003	4	0	-30
Nonfarm Payroll	Jul-03	8/1/2003	7/31/2003	17	10	-44
Nonfarm Payroll	Aug-03	9/5/2003	9/4/2003	7	20	-93
Nonfarm Payroll	Sep-03	10/3/2003	10/3/2003	-3	-25	57
Nonfarm Payroll	Sep-03	10/3/2003	10/2/2003	-11	-25	57
Nonfarm Payroll	Oct-03	11/7/2003	11/6/2003	86	65	126
Nonfarm Payroll	Oct-03	11/7/2003	11/7/2003	88	65	126
Nonfarm Payroll	Nov-03	12/5/2003	12/4/2003	151	150	57
Nonfarm Payroll	Nov-03	12/5/2003	12/5/2003	160	150	57
Nonfarm Payroll	Dec-03	1/9/2004	1/8/2004	181	150	1
Nonfarm Payroll	Dec-03	1/9/2004	1/9/2004	162	150	1
Nonfarm Payroll	Jan-04	2/6/2004	2/5/2004	167	175	112
Nonfarm Payroll	Jan-04	2/6/2004	2/6/2004	174	175	112
Nonfarm Payroll	Feb-04	3/6/2004	3/6/2004	130	130	21