

# White Papers



## Forecasting U.S. Nonfarm Payrolls: Preliminary vs Revised Values

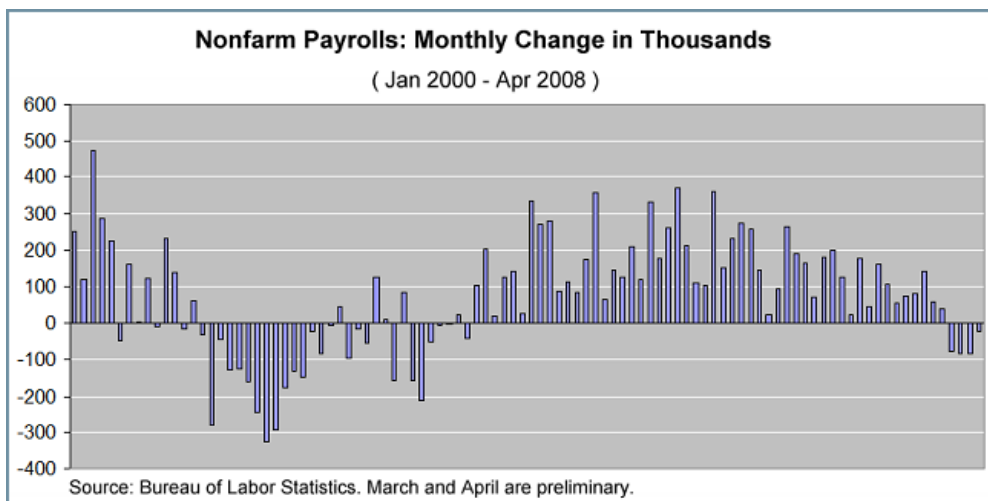
### Abstract

The CME Group in early 2008 listed for trading futures and options contracts on the monthly Nonfarm Payroll (NFP) release and this in turn has sparked interest in forecasting this important economic statistic. Graphs are drawn and regressions are run that match historical monthly changes in NFP with other variables in the hope of finding a stable relationship. The main problem with this approach - and one that many traders may not be aware of - is that the historical data have been revised several times. The futures contract, in contrast, is based on the preliminary estimate for the most recent month and this estimate can differ markedly from the final, revised figure. Consequently, forecasting the NFP futures price needs to take into account the discrepancy associated with the preliminary figure.

Near the start of every month, the U.S. Department of Labor, Bureau of Labor Statistics (BLS) releases data on the condition of the labor market in the United States and the most closely watched of these is the Nonfarm Payroll (NFP) number – the count of employment positions on record in the previous month covering some 390,000 business and government establishments. The significance of the NFP release arises in part from its timeliness: Data for any given month is collected and reported usually on the first Friday of the following month and this provides a nearly current indicator of the health of the U.S. economy in general and the labor market in particular.

The release of the NFP number can have an impact on several major markets, especially when its value deviates from market expectations. In the first quarter of this year, for example, the release of a much weaker-than-expected number was typically associated with broad-based selling of U.S. equities and, to the extent that it reinforced expectations of monetary easing by the Federal Reserve Board, selling of the U.S. dollar and buying of domestic fixed-income products including government bonds.

Month-to-month changes in seasonally adjusted NFP vary widely, reaching over 400,000 jobs in the late 1990s and declining by as much as 300,000 jobs in 2001. This variability represents both risk and opportunity and both can now be managed in the context of a traditional futures and options contract.



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## Nonfarm Payroll Futures & Options Contracts

At the end of April, the CME Group (the merger of what was formerly the Chicago Board of Trade and the Chicago Mercantile Exchange) began trading futures and options on futures on the monthly release of U.S. Nonfarm Payrolls.

The price of this cash-settled futures contract represents the market's estimate of the change in thousands of total NFP for the month prior to the contract month. A price of 71 for the July futures, for example, means that the market is estimating an increase of 71,000 jobs in June. The final settlement price of the July futures contract is set equal to the change in NFP in June as released by the Bureau of Labor Statistics on July 3, the date of the contract's expiration.

The price of the NFP futures, like the underlying statistic itself, can be positive (meaning a net increase in jobs) or negative (meaning a net loss of jobs). For any given futures price, a trader who anticipates a stronger number would buy the futures contract, with every point representing \$25. For example, if a trader bought the futures at -51 and the contract settled at +24, then the trader would realize a gain of 75 points or \$1,875 per contract, less trading fees. Correspondingly, a trader who expects a weaker number would sell the contract. Success in both cases depends upon the trader's ability to forecast the NFP number.

### CME Group Nonfarm Payroll Contract Specifications

	Futures Contract	Options Contract
Trade Unit	\$25 x change in Nonfarm Payrolls (seasonally adjusted and measured in thousands) as published by the Bureau of Labor Statistics (BLS).	One (1) Nonfarm Payrolls Futures contract.
Settle Method	Cash Settled. For the purpose of determining the Final Settlement Price, the Nonfarm Payrolls data as originally released shall be used. Subsequent revisions shall not be recognized.	Cash Settled.
Point (Tick) Size	1 point = 1.0 = \$25.00	1 point = 1.0 = \$25.00
Strike Price Interval		Exercise prices will be established at 10 point (or 10,000 jobs) intervals from -500,000 to +500,000 jobs. All listed series.
Limits/Price Banding	Price limit of plus/minus 200 points (200,000 jobs = \$5,000) applied to the final settlement price from the previous business day's settlement price.	Movement in the value of a call (put) is effectively capped (floored) by virtue of the price limit applied to the futures contract.
Minimum Fluctuation	Regular 1 = \$25.00 per contract.	Regular 0.5 = \$12.50 per contract.
Trading Hours	-	Sundays through Thursdays from 5:00 p.m. Central Time (CT) to 4:00 p.m. CT next day.
Product Codes		Clearing - NFP Ticker - NFP Globex - NFP
Product Calendar		Contracts are available for all NFP releases. New contracts are listed on the Monday after the previous month's release. Initial Contract month is May 2008.

## Forecasting the Change in Nonfarm Payrolls

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Constructing a model to forecast the monthly change in NFP is a difficult exercise for several reasons. Because the collection, processing and distribution of BLS employment data are done in such a timely manner, there are only a few related indicators that are available prior to their release. Chief among these are the monthly ADP National Employment Report, the weekly change in initial jobless claims that measures the number of filings for state jobless benefits, and the monthly reports prepared by the Institute for Supply Management.

The monthly change in NFP is heavily influenced by seasonal factors and while the BLS attempts to adjust the employment data for these effects when creating its concurrent seasonally adjusted series, it nevertheless remains a challenge to fully isolate and measure the seasonality from one month to the next.

Finally, extraneous factors such as strike activity can have a pronounced impact on the monthly change in NFP. By intent, no compensatory adjustment is made in the employment series for strike activity but the BLS does release a Strike Report several days prior to the NFP release that shows the net change in employment resulting from strike activity over the survey period.

Beyond these issues, there is an added complication when creating a forecasting model that builds upon the historical NFP data: The historical NFP data disseminated by the BLS have been revised several times since their first, preliminary release. The NFP number for the most recent month, which is the number on which the corresponding futures contract is settled, is a preliminary number and this preliminary number can differ markedly from its final revised value.

### Preliminary vs Final Value

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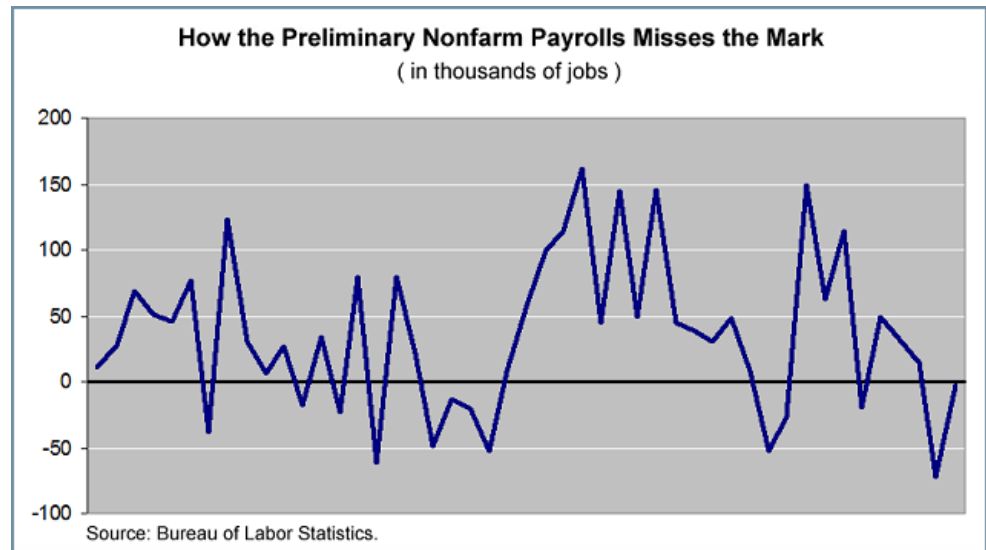
The preliminary NFP number for the most recent month can differ from its final value for two major reasons. Firstly, because the employment survey is voluntary, not all participants submit their data in time to be included in the number's release at the start of the month. According to the BLS, the preliminary number typically reflects data from 65% to 69% of survey respondents. Over the subsequent two months, data from the remaining survey participants are included thus leading to revisions of the initial NFP estimate. In view of this, the BLS indicates in its employment reports that the most recent and second most recent months are preliminary.

Secondly, every year, the BLS benchmarks the prior year's March level of employment as measured by their survey to the level of employment derived from the unemployment insurance tax reports that nearly all employers are required to file with State Workforce Agencies. (The most recent benchmark revision is March 2007.) This benchmark revision results in a level change to the NFP series, either higher or lower, that is distributed among the 12 months since the prior benchmark month.

How the Preliminary Nonfarm Payrolls Misses the Mark shows the discrepancy between the preliminary and the final, revised monthly change in NFP over the period May 2003 to March 2007. (Effective May 2003, the BLS finalized several significant modifications to the survey's method and processing so results prior to that month are not strictly comparable. Data more recent than March 2007 are subject to future benchmark and other revisions and are therefore not included in the Chart.) Where this value is positive, the preliminary number understates the actual increase in jobs, or overstates the actual decline – in other words, provides a more pessimistic outlook of the employment situation.

On several occasions, the preliminary estimate understated the actual increase in NFP by as much as 150,000 jobs – a sizeable discrepancy relative to the average size of the monthly change itself. Over the period under study, the preliminary number provided a more pessimistic view of the employment situation 72% of the time, and on those occasions when it did, the average error was approximately 62,000 jobs. On two occasions, the preliminary number even provided the wrong direction of the change, in both cases indicating a mild contraction in jobs while the final figures indicated an increase in employment.

Interestingly, the preliminary value has less of a reputation of overstating employment. Over the period under study, the preliminary figure provided a more optimistic outlook of the final change in NFP only 28% of the time with the average overshoot being about 35,000 jobs.



### Implications for Traders

The discrepancy between the preliminary and revised NFP data presents a unique challenge to the futures trader in constructing a forecasting model. Since it is the preliminary number which is important for trading the corresponding futures contract and earning profit, some adjustment must be made to the model to account for the mismatch associated with the preliminary figure. From May 2003 until March 2007, the preliminary monthly change in NFP understated the actual (revised) change by 35,000 jobs on average. Using this as a guide, the NFP model-based forecast for the most recent month can be reduced by this amount in an attempt to better track the preliminary figure.

Beyond this, the variance of the mismatch (standard deviation is 59,000 jobs) can be used to construct a buffer around the NFP forecast to increase confidence in the trade. For example, if the model predicts a futures price of +85 (meaning an increase of 85,000 jobs), then the trader can consider buying the futures only at a price 59 points or more below that point and selling at 59 points or more above it. In other words, buy the futures at 26 or lower and sell at 144 or higher.

Tweaking the forecasting model further will depend upon the trader's ability to identify and exploit any underlying pattern or bias in the preliminary data. Keep in mind, though, that the BLS monitors the performance of, and has in the past changed, the survey method for exactly the reason of eliminating any systematic bias. So, if any underlying behavior does exist, it likely won't be easy to identify. As more data are accumulated, particularly over periods of employment contraction, it may become easier to identify any underlying pattern and exploit it for improved profitability.

## Disclosures

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THE RISK OF LOSS IN TRADING COMMODITY CONTRACTS, OPTION CONTRACTS AND LEVERAGED INVESTMENT VEHICLES IN GENERAL CAN BE SUBSTANTIAL. YOU SHOULD, THEREFORE, CAREFULLY CONSIDER WHETHER SUCH TRADING IS SUITABLE FOR YOU IN LIGHT OF YOUR FINANCIAL CONDITION. TRADING IN FUTURES AND OPTIONS IS NOT SUITABLE FOR EVERYONE.

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