

# The *ADP National Employment Report*

## Overview of Methodology & Methodological Enhancements

February 22, 2007

### I. Overview

Publication of the *Employment Situation* by the Bureau of Labor Statistics (the BLS) is the first — and generally the most important — release of government-sponsored economic data every month. Employment is an intrinsically important statistic. Furthermore, financial markets react, sometimes strongly, to “surprises”<sup>1</sup> in the BLS estimates of establishment employment that might signal future changes in monetary policy. Hence, information that helps analysts anticipate monthly changes in employment is valuable.

Automatic Data Processing, Inc. (ADP) is the nation’s premier provider of payroll-related services. Currently, ADP processes over 500,000 payrolls, for approximately 430,000 separate business entities, covering over 24 million employees, in all major industries and states. While doing so, every month ADP collects a wealth of information related to payroll employment well before publication of the *Employment Situation*.

ADP has contracted with Macroeconomic Advisers, LLC to create and maintain from this rich, timely dataset new estimates of nonfarm private employment published in the *ADP National Employment Report*. These are constructed from ADP’s data on payrolls following a procedure similar to that used by the BLS to process its monthly survey of Current Employment Statistics into the “official” estimates of establishment employment. The *ADP National Employment Report* is released, for public use only, two days prior to the *Employment Situation*.

There is information in the *ADP National Employment Report* not previously available. Indeed, empirical analysis performed by Macroeconomic Advisers demonstrates that estimates of employment published in The *ADP National Employment Report*: (1) can be used, in real time, to improve upon consensus forecasts of the monthly change in establishment employment; (2) anticipate revisions to preliminary estimates of the change in establishment employment; (3) can be used to improve upon commonly applied regression models of the monthly change in establishment employment, in total or by select industry.

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<sup>1</sup> Surprises can be measured as errors in the then-available “consensus” forecasts of the initial estimate of the monthly change in establishment employment reported by BLS.

This is an unprecedented event. Never before has such a rich set of private data that directly measures an economic variable of such vital importance to analysts, traders, and policy-makers, become available to the public in such a regular, timely manner, and in a form that can be understood quickly and used effectively in empirical analysis. Consequently, the *ADP National Employment Report* is, and is likely to remain, one of the most closely watched economic statistic produced on a regular basis within the private sector.

## II. Construction

Late in each month, anonymous aggregate data on payrolls are collected by ADP from its customers, checked for anomalies, and, by secure means, made available to Macroeconomic Advisers for further processing. That processing normally begins on the Monday before the monthly publication by the BLS of the *Employment Situation*. Macroeconomic Advisers, in conjunction with ADP, assigns NAICS<sup>2</sup> industry codes and pay periods to as many of ADP's payroll records as possible. The resulting sample of payrolls during the last six months of 2007 averaged approximately 392,000, covering roughly 24 million employees in all major private industries and regions. After this initial processing of the underlying data, estimates of employment published in the *ADP National Employment Report* are computed as follows.

- If employment on an ADP payroll record is for a pay period that includes the 12<sup>th</sup> of the month, that record is used directly in subsequent calculations.
- If employment on an ADP payroll record is for a pay period after the 12<sup>th</sup> of the month, an estimate of employment on the 12<sup>th</sup> of the month is computed as a linear interpolation of the current and previous level of employment shown on that record, and then used in subsequent calculations.
- Historically, if employment on an ADP record is for a pay period before the 12<sup>th</sup> of the month, an estimate of employment on the 12<sup>th</sup> of the month is computed as a linear interpolation of the current and following level of employment shown on that record, and then used in subsequent calculations. This “forward interpolation” cannot be performed in the current month, and so is the basis for revisions the following month.
- Using the ADP data, monthly “matched-sample”<sup>3</sup> growth rates of employment are computed in 90 “cells”: 9 size classes within 10 non-farm private industries.<sup>4</sup>

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<sup>2</sup> NAICS is the North American Industrial Classification System.

<sup>3</sup> A “matched-sample” growth rate is based on payrolls common to both periods over which growth is computed. In the context of retail sales, it is also sometimes referred to as a “same-store” growth rate.

<sup>4</sup> These are the 10 private NAICS “super-sectors”.

- The monthly growth rates of employment in each cell are seasonally adjusted using the Census Bureau's X-12 ARIMA program. Both the seasonal factors and the centered moving averages on which the seasonal factors are based are estimated excluding the effect of estimated outliers in each cell. The sample period for estimation of the seasonal factors and the centered moving average trend is advanced each month.
- For each ADP record, a growth residual is calculated by subtracting from the growth rate of employment on that record both the seasonal factor and the centered moving average trend estimated for that cell.
- These growth residuals are grouped into 9 classes by size of payroll and, in each size class, each month, are ranked in descending absolute value. For each size class, each month, the payroll records with the largest 0.01 percent of growth residuals (in absolute value) are discarded as cross-sectional outliers, and the matched sample growth rates are recomputed in each of the 90 cells cell from the remaining records.
- The new matched sample growth rates are seasonally adjusted using X-12 ARIMA, with estimated outliers in each cell replaced with the predicted value from the underlying ARIMA model; the occurrence of estimated outliers is rare. The sample period for the estimation of the seasonal factors (and the centered moving average) is advanced each month.
- An additional adjustment for 5 week intervals between BLS survey dates is made by regressing the matched sample growth rates in each cell on a dummy variable that has a value of one in "long" months and zero otherwise. If the variable is statistically significant, the regression is used to eliminate the effect of the long month in that cell. Significant "long-month" effects were found in approximately 25% of the 90 cells.
- Using the seasonally adjusted data, matched-sample growth rates by industry are computed by taking a weighted average of the matched sample growth rates by size within each industry. The weights are based on monthly interpolations of the March estimates of employment by industry and size from the Quarterly Census of Employment and Wages (QCEW).
- The benchmarked-revised BLS data (as currently reported) for growth of employment by industry are regressed on: (a) the matched-sample growth rates by industry based on the ADP data; (b) a weighted average of the historical average growth rates of employment in each cell based on QCEW data; (c) a weighted average of the historical average growth rates of employment in each cell based on the ADP data. The coefficient on term (b) is restricted to unity. The coefficient on (c) is restricted to the negative of the coefficient on term (a). This method allows different trends of employment by size of payroll within industries, while assuming that the industry-wide relationship between monthly variations in

the ADP data and monthly variations in the BLS data holds for all size classes within that industry.

- A level of employment is established in each cell by cumulating the predicted value of the matched sample growth rate in each cell forward and backwards from the most recently benchmarked March estimate of employment in that cell. Such referencing effectively weights the growth rates of the ADP data in each cell by the observed distribution of employment by industry and size classification.
- These levels are then summed to the aggregates by select industry and size of payroll that are shown in the summary table of the monthly report.

Estimates of employment published in the *ADP National Employment Report* are available beginning in January of 2001. Initial estimates are revised one month later when, on those payroll records that were for pay periods before the 12<sup>th</sup> of the month, employment on the 12<sup>th</sup> can be estimated by linear interpolation. In addition, the entire history of the report is revised once a year after the annual benchmarking of the national employment data by the BLS, usually in February. At this time, the sample for the industry regressions used in *ADP National Employment Report* is advanced twelve months, as is the reference month for initializing the levels of employment shown in *The Report*. The historical seasonal factors are also restated then. Note that while seasonal factors are estimated concurrently, estimates of employment published in the *ADP National Employment Report* are on a “best change” basis pending annual revisions

### III. Reporting and Dissemination

The *ADP National Employment Report* is intended for use by the general public. It is updated monthly and released by ADP to the public, free of charge, at 8:15am Eastern Time typically on the Wednesday prior to publication by the BLS of the *Employment Situation*. The monthly press release includes a table (see sample below) with six months of data on the level of employment by select industry (total private non-farm, goods-producing, service-providing, and manufacturing), and by size of payroll (small, medium, and large). There are also four charts in the press release. Three compare the growth rates of employment as reported by the BLS with the growth of employment as estimated in the *ADP National Employment Report* (for total, goods-producing, and service-providing sectors). A fourth shows the growth of employment by size of payroll. (See sample charts below.) Users can find the *ADP National Employment Report* at [www.ADPemploymentreport.com](http://www.ADPemploymentreport.com) or subscribe to it via e-mail. The web site carries a file, updated every month, of available historical data for all series appearing in the summary table of the press release.

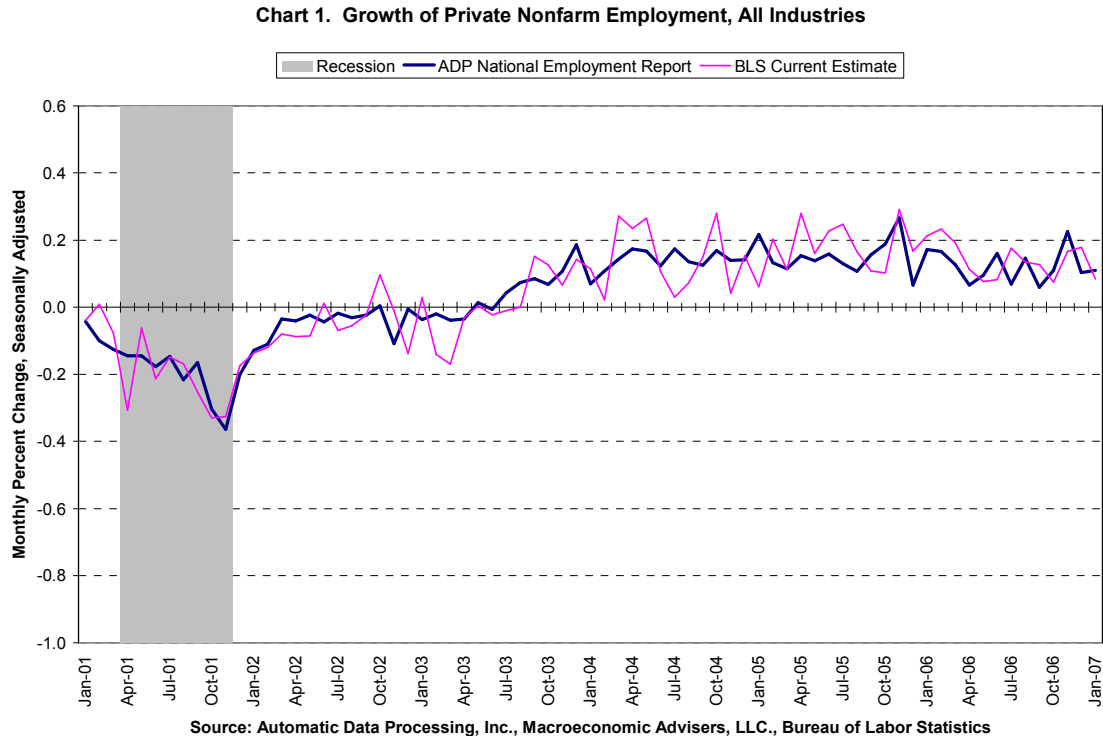
DERIVED FROM ADP PAYROLL DATA							
Table 1. Employees on nonfarm private payrolls by selected industry sector and size (In thousands)							
Industry / Size of Payroll	Seasonally Adjusted						Change from: Dec. 2006 - Jan. 2007p
	Aug. 2006	Sep. 2006	Oct. 2006	Nov. 2006	Dec. 2006	Jan. 2007p	
<b>Total nonfarm private.....</b>	114,365	114,432	114,557	114,815	114,933	115,059	126
Small (1-49).....	49,977	50,040	50,106	50,203	50,299	50,376	77
Medium (50-499).....	44,976	45,000	45,053	45,166	45,191	45,241	50
Large (> 499).....	19,412	19,392	19,398	19,446	19,443	19,442	-1
<b>Goods-producing.....</b>	22,539	22,492	22,473	22,491	22,473	22,461	-12
Small (1-49).....	8,087	8,085	8,087	8,102	8,115	8,124	9
Medium (50-499).....	9,966	9,941	9,933	9,943	9,926	9,917	-9
Large (> 499).....	4,486	4,466	4,453	4,446	4,432	4,420	-12
<b>Service-providing.....</b>	91,826	91,940	92,084	92,324	92,460	92,598	138
Small (1-49).....	41,890	41,955	42,019	42,101	42,184	42,252	68
Medium (50-499).....	35,010	35,059	35,120	35,223	35,265	35,324	59
Large (> 499).....	14,926	14,926	14,945	15,000	15,011	15,022	11
<b>Addendum:</b>							
Manufacturing.....	14,165	14,133	14,118	14,117	14,095	14,074	-21

#### IV. Confidentiality

Payroll data collected by ADP and used in the calculation of the *National Employment Report* are aggregate in nature, encoded to ensure anonymity, and made available to Macroeconomic Advisers for processing only under tightly secured procedures. Macroeconomic Advisers does not know the identity of an ADP customer or receive any information related to any individual employee. During the time between the collection of the data and the release of the *National Employment Report* to the general public, personnel involved in the computation and publication of *The Report* are prohibited from discussing it under rigid guidelines developed and strictly enforced by ADP and Macroeconomic Advisers.

## IV. Statistical Properties

Statistical analysis performed by Macroeconomic Advisers demonstrates that the National Employment Report is highly correlated with estimates of total nonfarm private establishment employment published by the Bureau of Labor Statistics. For example, the simple correlation between the monthly percent changes in total nonfarm private employment as published in the *National Employment Report* and as currently reported by the BLS is 0.87 since January of 2001. (See chart above.)



Because it is available earlier than the corresponding *Employment Situation*, the *National Employment Report* offers valuable advance insights into the monthly growth of employment. It is also of value in anticipating revisions to preliminary estimates of employment reported earlier by the BLS. In particular, statistical analysis by *Macroeconomic Advisers* demonstrates that:

- Estimates of monthly employment growth reported in the *ADP National Employment Report* are on the “right” side of consensus forecasts roughly 70% of the time.
- Estimates of monthly employment growth published in the *ADP National Employment Report* can be used to improve significantly upon consensus forecasts.

- Estimates of monthly employment growth published in the *ADP National Employment Report* can be used to improve significantly upon forecasts based on other statistical models commonly used on Wall Street to predict monthly growth in total employment, and the growth of employment in both the manufacturing and service-providing industries.
- There is a moderate statistical tendency for estimates of growth of establishment employment, as reported by the BLS in the two months following release of the initial estimates by the BLS, to be revised in the direction of estimates previously published in the *ADP National Employment Report*.
- There is a very powerful statistical tendency for estimates of growth of establishment employment, as reported by the BLS after annual benchmarking, to be revised in the direction of estimates previously published in the *ADP National Employment Report*.

Given these demonstrable properties, the *ADP National Employment Report* will likely remain one of the most closely followed economic statistics produced regularly in the private sector.