Impact of Younger Establishments on the Job Opening and Labor Turnover Survey October 2010

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In the summer of 2009, the Job Openings and Labor Turnovers (JOLTS), a monthly survey conducted by the U.S. Bureau of Labor Statistics, added a supplemental sample of younger establishments. Previous research has shown that younger establishments have a greater churn rate (hires + total separations), than older stable establishments. The supplemental sample allows younger establishments to be included in the earlier sample, capturing their information sooner. During the past year, these younger establishments were monitored. Current analysis is being done on younger establishments' rates for testing the hypothesis that the rates are different from the older establishments, and the effect they have on the overall estimates produced by JOLTS.

Key words: younger establishments, churn rates, JOLTS

Disclaimer: *The views expressed in this paper are those of the authors and do not necessarily reflect the views or policies of the Bureau of Labor Statistics or the United States government.*

1. Introduction

Starting in 1999, the Bureau of Labor Statistics embarked on the Job Opening and Labor Turnover Survey (JOLTS). JOLTS first set of published estimates was December 2000. A sample of approximately 16,000 business establishments in the private and public sectors, covering all nonagricultural industries for the fifty states and the District of Columbia is selected. The sample is panel driven, where each month a new panel enters the sample and remains for a total of 24 months. The JOLTS collects total employment, job openings, hires, quits, layoffs and discharges, other separations, and total separations data. Before the implementation of JOLTS, there was no economic indicator of labor force demand. The JOLTS serves the purpose of a demand–side indicator.

JOLTS is an annual stratified random sample. The strata are defined by the 4 census regions, 2-digit industry classification, and 6 employment class sizes. A sample of 16,000 establishments is drawn each year with only approximately 8,000 establishments of the sample used in the production of estimates before the next annual sample is drawn. In April 2008, the sampling procedures were updated to include an age variable and the annual sample was post-stratified and re-weighted to include the age variable.

A supplemental sample (birth sample) is drawn every quarter except the 1st quarter from which the annual sample is drawn. Only establishments that are new to the Longitudinal Database whose maximum employment is less than 250 employees in that quarter are selected. The combined sample is comprised of the initial sample (annual sample) and the supplemental sample that is used in monthly estimation.

2. Statement of Concern

Younger establishments were not being included into the sampling frame in a reasonable period. It takes a reasonable amount of time to create the frame, allocate and select a sample, and contact and enroll the respondents. The sample frame is created from the Quarterly Census of Employment and Wages (QCEW), which is a Fed-State program. By the time the data in QCEW is available for use, the information is 6 to 9 months old. There is another 2-3months to contact and enroll the establishment into the JOLTS sample. Finally JOLTS is a panel sample, where one panel is enrolled into estimation system each month, therefore it will take 12 months to enroll the entire sample to be used in estimation. By the time, the establishments enter the production cycle for estimation a year or more has elapsed. Therefore, the assumption is churning has occurred and is missed. Younger establishments are more dynamic, have a greater growth rate and a greater churn rate (hires + separations) than older stable establishments (Crankshaw, 2008). Growth rate is defined as the hires rate minus the total separation rate. Churn rate is a measure of employee attrition and is defined as the number of employees that move within a certain period.

3. Objective of Research

The purpose of this research is to track the younger establishments added to the sample after the initial sample selection process. The tracking of these younger establishments will show the missed churn rate and the impact on the overall estimation. In addition, how the overall response rate compare to the response rate if the younger establishments were not included.

The paper is outlined as follows: Section 4 introduces the sources of data; Section 5 discusses the methodology; Section 6 results; and Section 7 makes recommendations.

4. Data Source

The supplemental sample of younger establishments added to the initial (annual) sample during the estimation process (month specific). SAS datasets (input data used for monthly estimation from July 2009 –June 2010) used in the production of monthly estimates.

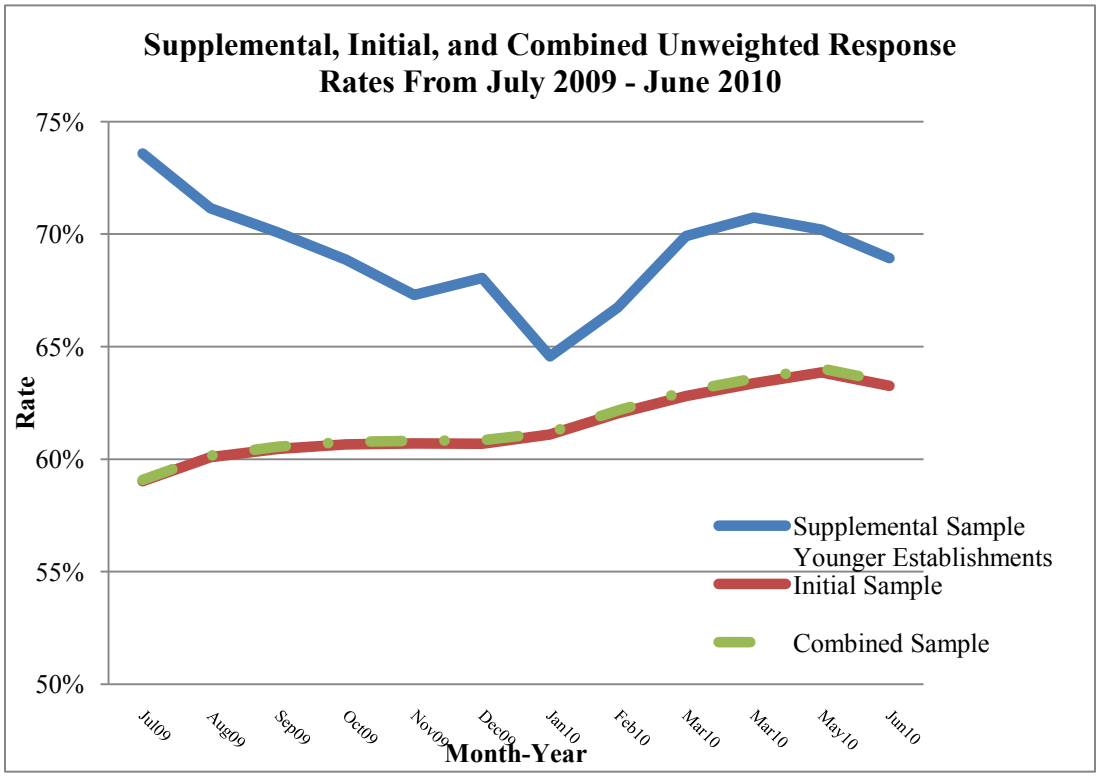
5. Methodology

To help ensure that these younger establishments are captured as early as possible supplemental samples of the younger establishments are drawn every quarter (expect for the quarter in which the annual sample is drawn). For the supplemental sample to be drawn every eligible quarter, a sampling frame of all in-scope new establishments is built. The supplemental sample frame consists of establishments that started reporting positive employment during the quarter in which the sample is drawn. Then using the current sampling weights of the younger establishments during the annual sample, an allocation amount is determined by the sampling frame strata count divided by the sampling weights rounded to a whole number. There is also an added condition that at least 3 establishment be selected per strata. The establishments selected are from employment size class 1(1-9 employees), 2(10-49 employees), and 3(50-249 employees). The sample is then randomly selected within the strata. The establishments selected as a part of the supplemental sample are then weighted to the supplemental sample frame. The sample units are divided among the 3 panels to be used in estimation during the corresponding quarter

Use the supplemental sample to differentiate the younger establishments from the initial sample. The response rates are calculated by using the JOLTS response codes (Estimation System Documentation, 2000).

Table1: Supplemental and Initial Sample Response Rates, and Combined Sample from July 2009 – June 2010

	Supplemental Sample Younger Establishments				Initial Sample				Combined Sample			
MonYr	samp	oob	resp	rate	samp	oob	resp	rate	samp	oob	resp	rate
Jul09	60	7	39	74%	15250	830	8511	59%	15310	837	8550	59%
Aug09	119	15	74	71%	15305	845	8688	60%	15424	860	8762	60%
Sep09	178	21	110	70%	15353	847	8769	60%	15531	868	8879	61%
Oct09	237	25	146	69%	15420	857	8833	61%	15657	882	8979	61%
Nov09	296	33	177	67%	15473	878	8859	61%	15769	911	9036	61%
Dec09	355	42	213	68%	15534	903	8879	61%	15889	945	9092	61%
Jan10	416	52	235	65%	15587	958	8938	61%	16003	1010	9173	61%
Feb10	476	67	273	67%	15646	984	9095	62%	16122	1051	9368	62%
Mar10	536	84	316	70%	15705	1026	9218	63%	16241	1110	9534	63%
Mar10	469	52	295	71%	14813	599	9008	63%	15282	651	9303	64%
May10	469	53	292	70%	14899	600	9130	64%	15368	653	9422	64%
Jun10	469	57	284	69%	14994	620	9093	63%	15463	677	9377	63%
Mean	340	42	205	69%	15332	829	8918	62%	15672	871	9123	62%



Note: (OOB) Out of Business, (Resp) Response, Rate = Resp/ (Sample – OOB)

Using the monthly processed datasets, we recalculated the monthly estimates (Estimation System Documentation, 2000) by identifying the supplemental sample (younger establishment) from the initial sample.

Where EI = Economic Indicator: Job Openings; Hires; Quits; Layoffs and Discharges; Other Separations; Totals Separations
NRAF = Non-Response Adjustment Factor
Wgt = sampling weight
BMK = Benchmark Factor

Rate = Economic indicator / employment; except for job opening rate which is calculated by rate = job opening / (job opening + employment)

Churn rate =hires rate + total separation rate
Growth rate (net gain or loss) =hires rate – total separation rate

Combined Sample Monthly Rates (July 2009 – June 2010

	Rates							
MonYr	jor	hr	qr	ldr	osr	tsr	churn-rate	growth-rate
Jul09	1.63%	3.04%	1.25%	1.44%	0.22%	2.90%	5.94%	0.13%
Aug09	1.77%	3.21%	1.56%	1.61%	0.25%	3.42%	6.63%	-0.21%
Sep09	1.76%	2.93%	1.31%	1.70%	0.22%	3.23%	6.17%	-0.30%
Oct09	1.66%	2.73%	1.10%	1.38%	0.23%	2.71%	5.44%	0.01%
Nov09	1.51%	2.58%	1.01%	1.34%	0.15%	2.50%	5.08%	0.07%
Dec09	1.52%	1.92%	1.00%	1.69%	0.21%	2.90%	4.82%	-0.98%
Jan10	1.74%	2.39%	1.05%	1.48%	0.26%	2.79%	5.17%	-0.40%
Feb10	1.78%	2.34%	0.97%	0.98%	0.19%	2.13%	4.47%	0.21%
Mar10	1.92%	2.92%	1.11%	1.00%	0.21%	2.32%	5.25%	0.60%
Apr10	2.05%	2.95%	1.23%	1.00%	0.22%	2.46%	5.41%	0.50%
May10	2.07%	3.23%	1.31%	1.06%	0.21%	2.58%	5.81%	0.64%
Jun10	1.97%	3.52%	1.38%	1.23%	0.28%	2.89%	6.41%	0.63%

Initial Sample Monthly Rates (July 2009 – June 2010)

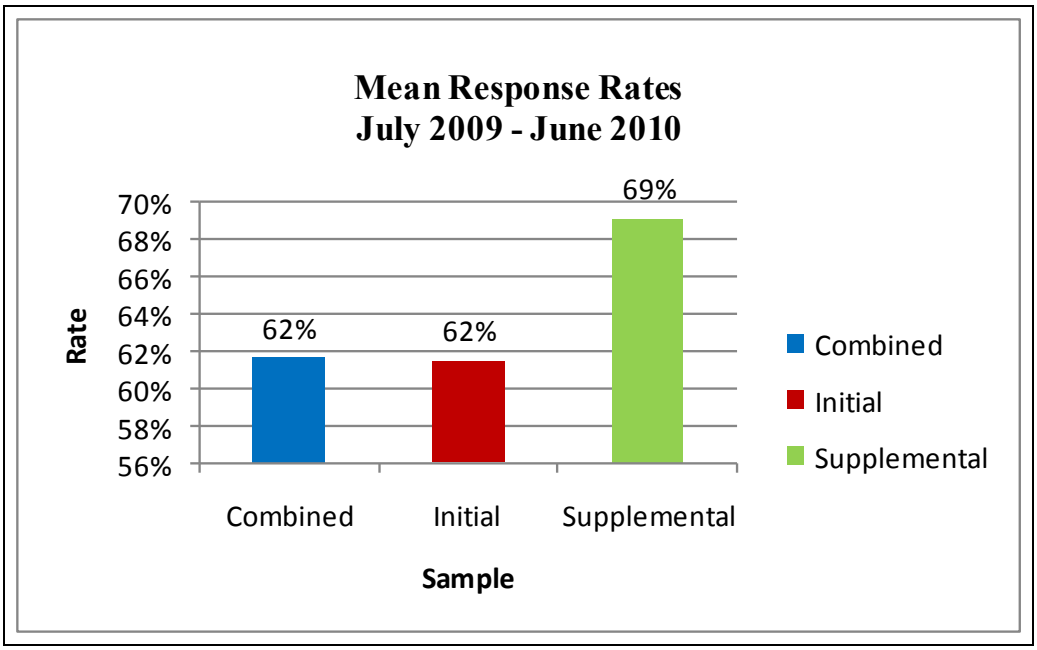
	Rates							
MonYr	jor	hr	qr	ldr	osr	tsr	churn-rate	growth-rate
Jul09	1.63%	3.04%	1.25%	1.44%	0.22%	2.90%	5.93%	0.14%
Aug09	1.77%	3.17%	1.55%	1.60%	0.25%	3.40%	6.57%	-0.22%
Sep09	1.75%	2.93%	1.28%	1.68%	0.22%	3.19%	6.12%	-0.26%
Oct09	1.65%	2.71%	1.10%	1.36%	0.23%	2.69%	5.40%	0.02%
Nov09	1.51%	2.53%	1.00%	1.35%	0.15%	2.51%	5.04%	0.03%
Dec09	1.52%	1.91%	1.00%	1.68%	0.21%	2.89%	4.80%	-0.98%
Jan10	1.72%	2.37%	1.03%	1.48%	0.26%	2.78%	5.15%	-0.40%
Feb10	1.78%	2.32%	0.96%	0.97%	0.19%	2.12%	4.45%	0.20%
Mar10	1.93%	2.91%	1.10%	1.00%	0.21%	2.31%	5.22%	0.60%
Apr10	2.04%	2.94%	1.22%	1.00%	0.22%	2.45%	5.39%	0.49%
May10	2.06%	3.21%	1.29%	1.04%	0.22%	2.55%	5.76%	0.66%
Jun10	1.96%	3.50%	1.36%	1.23%	0.28%	2.87%	6.37%	0.63%

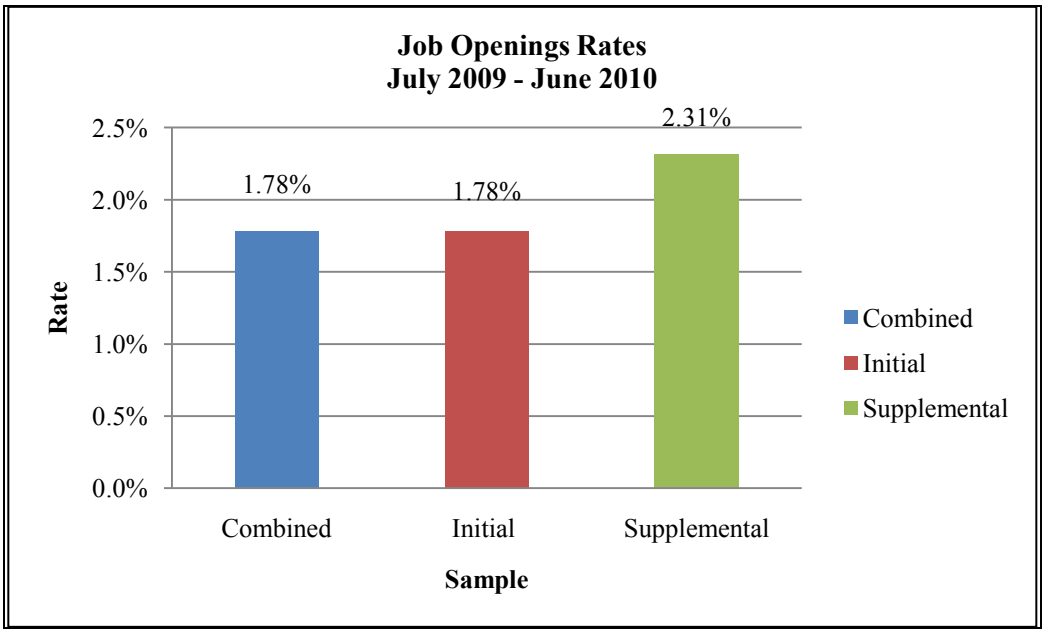
Supplemental Sample Monthly Rates (July 2009 – June 2010)

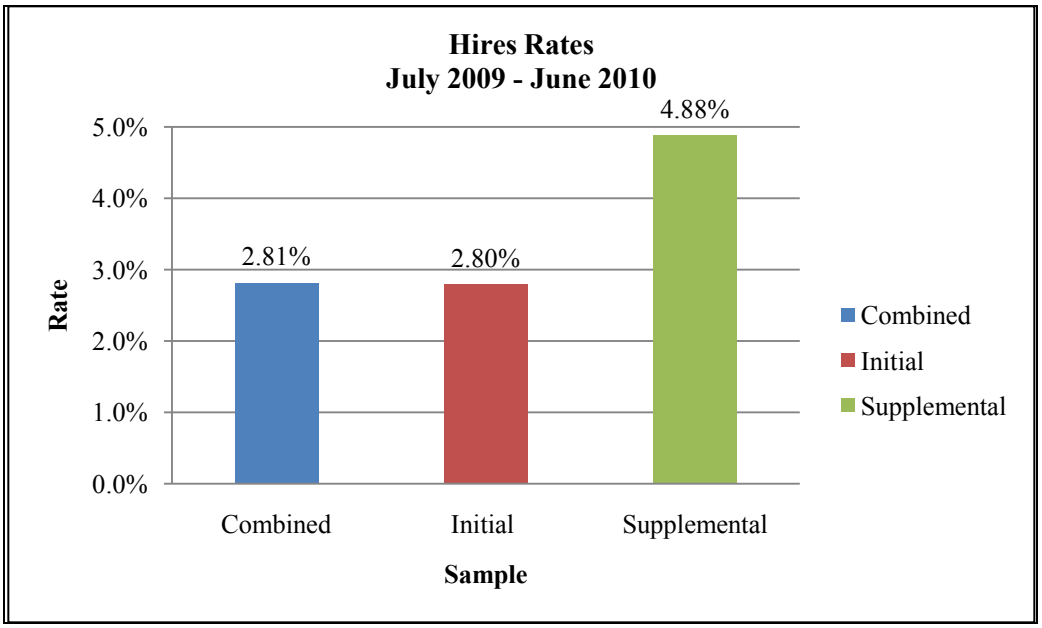
	Rates							
MonYr	jor	hr	qr	ldr	osr	tsr	churn-rate	growth-rate
Jul09	4.31%	4.99%	2.84%	3.35%	0.08%	6.27%	11.26%	-1.27%
Aug09	2.58%	14.39%	7.41%	3.92%	0.22%	11.55%	25.94%	2.85%
Sep09	2.97%	4.09%	6.47%	7.75%	0.08%	14.30%	18.39%	-10.21%
Oct09	3.14%	6.08%	2.01%	4.05%	0.24%	6.30%	12.38%	-0.22%
Nov09	1.41%	6.05%	1.41%	0.72%	0.12%	2.26%	8.31%	3.79%
Dec09	1.36%	2.95%	1.32%	2.84%	0.20%	4.36%	7.31%	-1.40%
Jan10	3.10%	3.80%	2.72%	1.36%	0.09%	4.17%	7.97%	-0.37%
Feb10	1.64%	3.70%	1.36%	1.38%	0.18%	2.92%	6.62%	0.77%
Mar10	1.58%	4.06%	2.48%	0.84%	0.06%	3.38%	7.43%	0.68%
Apr10	2.50%	4.16%	2.31%	0.81%	0.10%	3.22%	7.38%	0.94%
May10	2.37%	4.87%	2.47%	3.01%	0.19%	5.67%	10.54%	-0.81%
Jun10	3.50%	5.69%	3.00%	1.57%	0.21%	4.78%	10.47%	0.91%

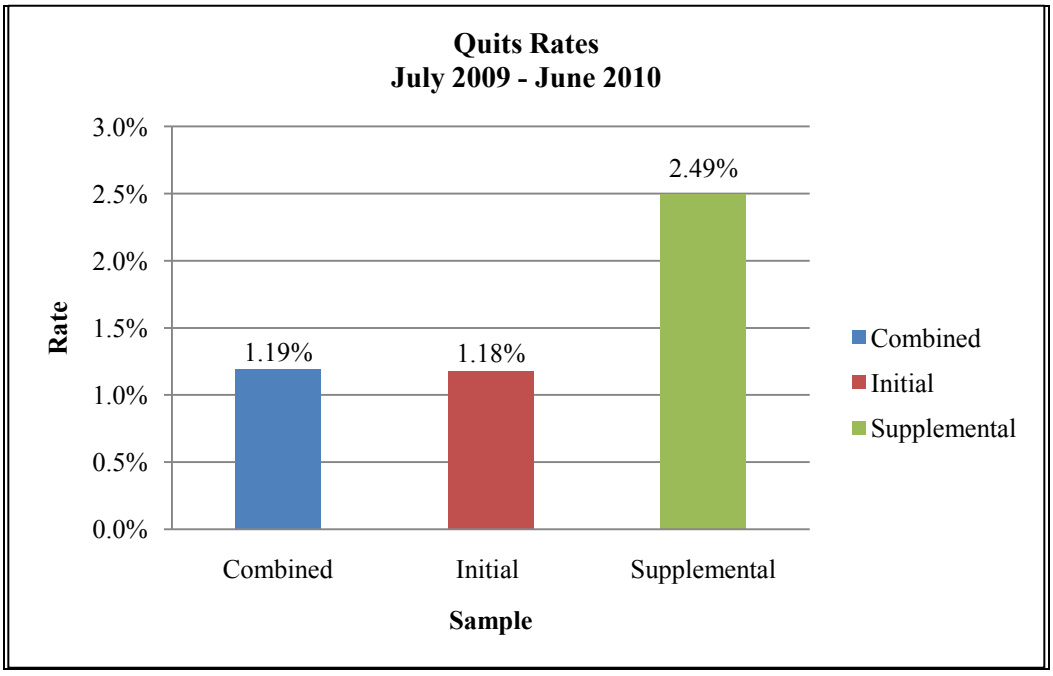
6. Results

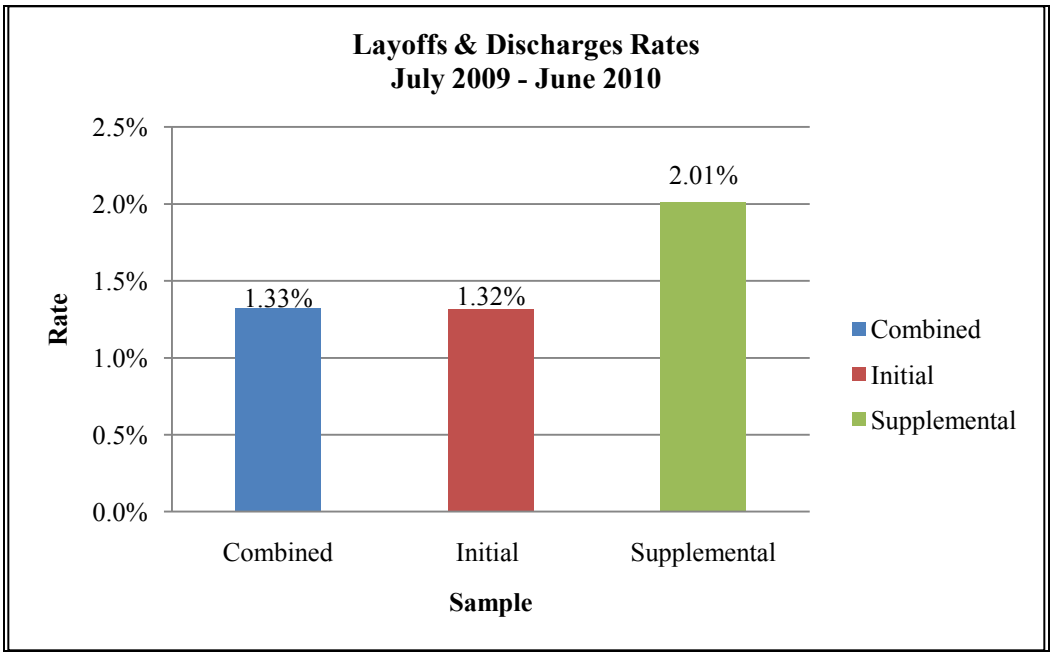
The following graphs illustrate the nature of the sample (in terms of responses, job openings, hires, quits, layoffs and discharges, other separations, and total separations). They detail the mean rate over the period July 2009 through June 2010.

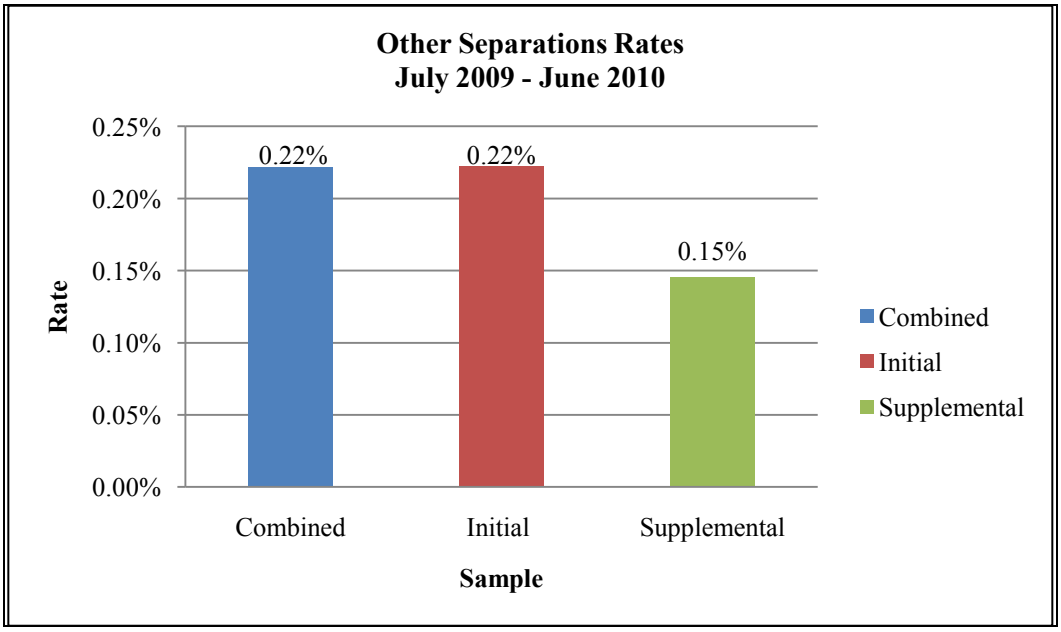

Mean Response Rates
July 2009 - June 2010
70%
68%
66%
64%
62%
60%
58%
56%
Rate
62%
62%
69%
Combined
Initial
Supplemental
Sample
Combined
Initial
Supplemental

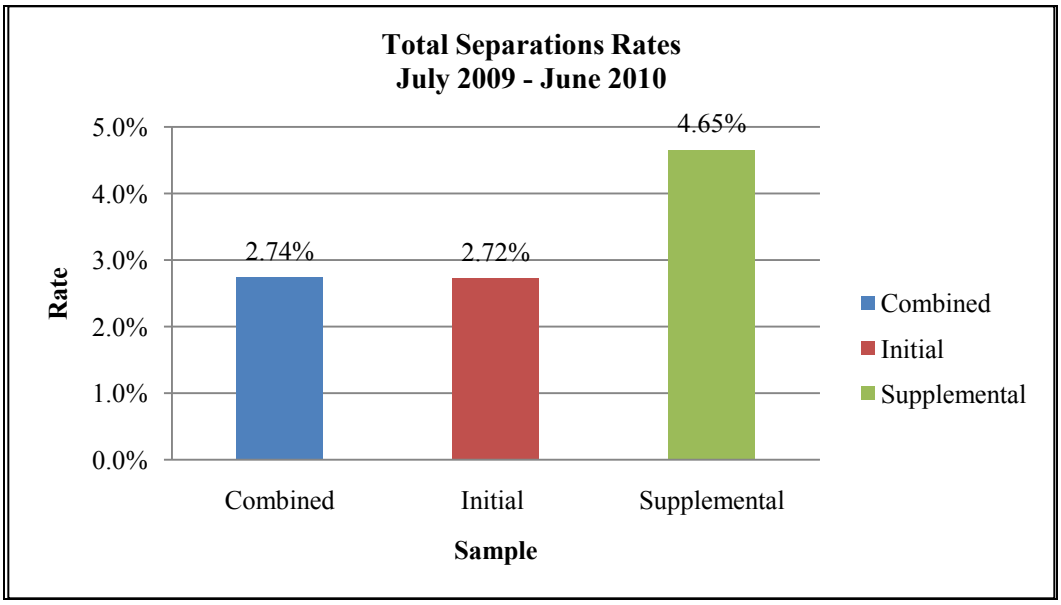

Job Openings Rates
July 2009 - June 2010
2.5%
2.0%
1.5%
1.0%
0.5%
0.0%
Rate
1.78%
1.78%
2.31%
Combined
Initial
Supplemental
Sample
Combined
Initial
Supplemental

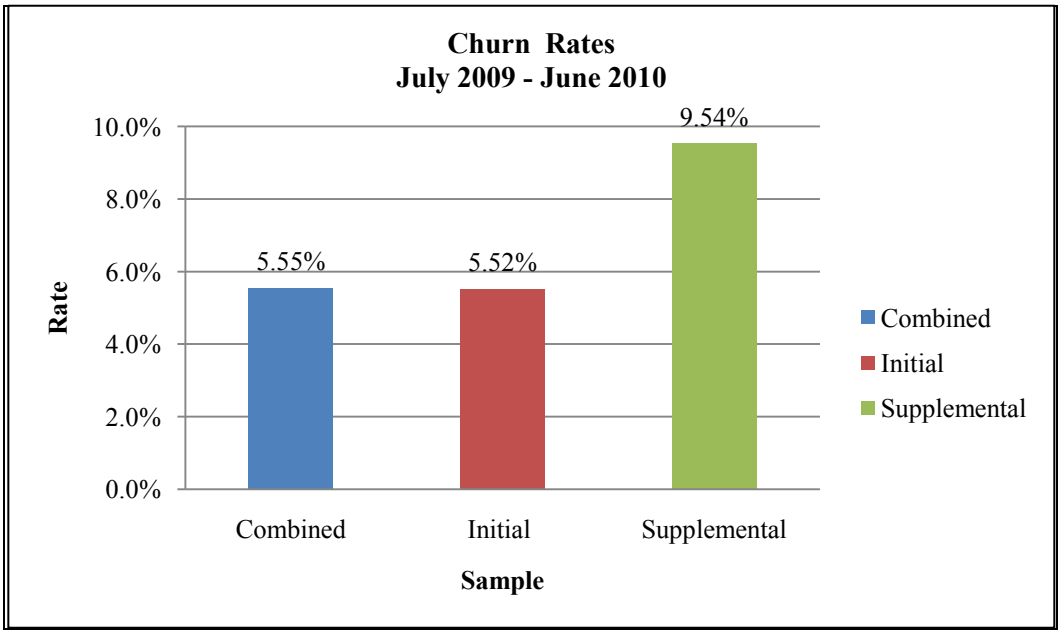

Hires Rates
July 2009 - June 2010
5.0%
4.0%
3.0%
2.0%
1.0%
0.0%
Rate
2.81%
2.80%
4.88%
Combined
Initial
Supplemental
Sample
Combined
Initial
Supplemental

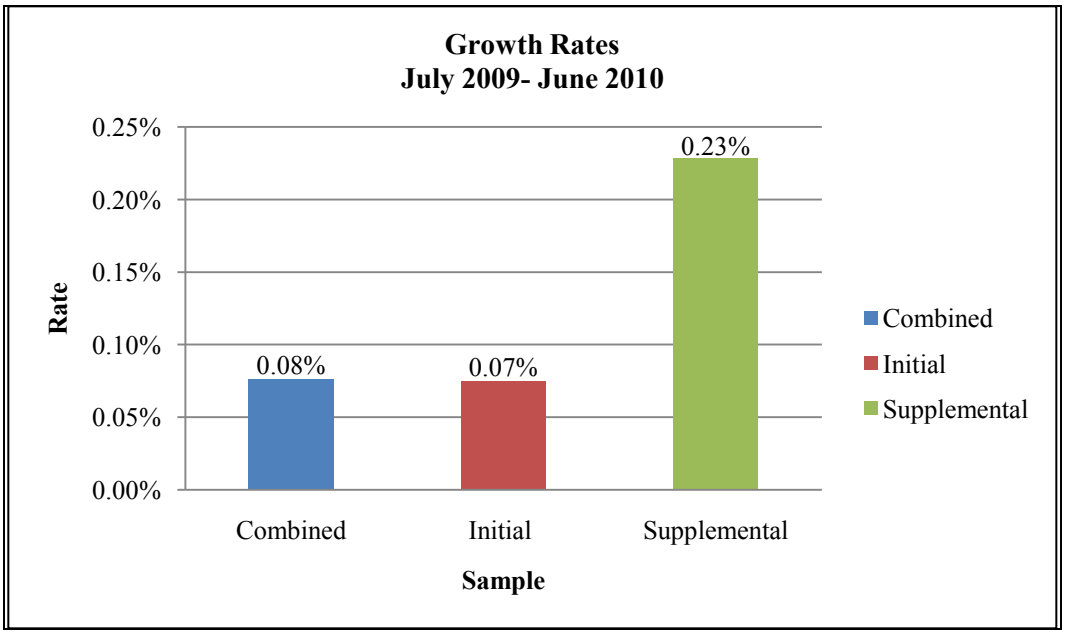

Quits Rates
July 2009 - June 2010
3.0%
2.5%
2.0%
1.5%
1.0%
0.5%
0.0%
Rate
1.19%
1.18%
2.49%
Combined
Initial
Supplemental
Sample
Combined
Initial
Supplemental


Layoffs & Discharges Rates
July 2009 - June 2010
2.5%
2.0%
1.5%
1.0%
0.5%
0.0%
Rate
1.33%
1.32%
2.01%
Combined
Initial
Supplemental
Sample
Combined
Initial
Supplemental


Other Separations Rates
July 2009 - June 2010
0.25%
0.20%
0.15%
0.10%
0.05%
0.00%
Rate
0.22%
0.22%
0.15%
Combined
Initial
Supplemental
Sample
Combined
Initial
Supplemental


Total Separations Rates
July 2009 - June 2010
5.0%
4.0%
3.0%
2.0%
1.0%
0.0%
Rate
2.74%
2.72%
4.65%
Combined
Initial
Supplemental
Sample
Combined
Initial
Supplemental


Churn Rates
July 2009 - June 2010
10.0%
8.0%
6.0%
4.0%
2.0%
0.0%
Rate
5.55%
5.52%
9.54%
Combined
Initial
Supplemental
Sample
Combined
Initial
Supplemental



The graphs above shows that rates by sample follow a similar pattern with the supplemental having a higher rate than the initial except for other separations whereas it is the initial sample with the higher rate. The supplemental sample churn rate is noticeably larger than the initial sample churn rate.

The overall impact on the combined sample is very minimal to non-existent. The only rates with an increase of more than 0.01% were total separations rate by 0.02% and churn rate by 0.03%.

JOLTS used the economic indicators during estimation with initial sample and the supplemental sample. As a measure of economic indicators we are using economic indicator rates. Two groups of normal estimates (12 per group) were produced monthly. Economic indicator rates are measured at the end of the month. Group A uses the initial sample. Our hypothesis is that mean economic indicator rates of Group B will be higher than Group A. We are assuming that the estimates require higher rates to use the initial sample than the supplemental sample.

Table1: T-values

T-test							
jor	hr	qr	ldr	osr	tsr	churn-rate	growth-rate
0.016	0.012	0.008	0.047	0.002	0.014	0.005	0.674

The t-value is an indication of the probability that both populations from which we selected our samples have the same mean and that differences in our sample means are due to random fluctuation. As the t-value gets smaller (approaches

zero) the probability that the population means are the same gets larger. As the t-value gets larger (in either the positive or negative direction) the probability that the population means are the same gets smaller.

We can use the t-value to decide between our two statistical hypotheses:

1. Null hypothesis : The two populations have the same mean rates
2. Alternative hypothesis: The population that uses the supplemental sample has a higher economic indicator rate than the initial sample.

To find out the probability associated with our t-value see table 1 above we use t-value (t = 1.717) (Statistical Methods, Snedecor, G.W., Cochran, W.G., 1989, p466), Critical Values for the t-Distribution. We do this by computing the degrees of freedom, where degrees of freedom (df) equals: 12 +12 - 2 = 22. We go down the *df* column of Table A until we get to the row 22. Go across the row and find the number from the column labeled $\alpha = .05$. The value is 1.717.

If our computed t-value is the same as or smaller than the tabled t-value, we accept the null hypothesis and conclude that the populations have the same mean. If our t-value is larger, we can accept the alternative hypothesis. Since our t-value (see table 1 above) is smaller than the tabled t-value (t = 1.717), so it is reasonable to conclude that the mean rates are the same.

7. Recommendations

Compare the first year supplemental sample to the second year supplemental sample, to see if there are any significant differences. Combine the first and second year samples and compare them to the initial sample. Combining the two supplemental samples will give them more establishments to make a better analysis.

References:

Crankshaw, Mark.(July, 2008), Simulating JOLTS Hires and Separations Data Using the LDB, BLS Working Paper.

Estimation System Documentation, 2000

Snedecor, G.W., and Cochran, W.G. (1989). Statistical Methods 8th Edition. Ames. Iowa State University Press