THE EFFECT OF SOME DESIGN AND ESTIMATION ISSUES ON THE VARIANCE ESTIMATES OF THE EMPLOYMENT COST INDEX

Steven P. Paben, BLS, 2 Massacusetts Ave., NE, Room 3160, Washington, DC 20212

Key Words: ECI; Variance Estimation; BRR; Fay's method

Any opinions expressed in this paper are those of the author and do not constitute policy of the Bureau of Labor Statistics.

The Employment Cost Index (ECI) is a fixed-employment-weighted index that tracks quarterly changes in labor costs, free from the influence of employment shifts among occupations and industries. The labor costs consist of wages, salaries, and employer costs for nonwage benefits. The nonwage benefits include items such as health insurance, life insurance, pension plans, and Social Security, as well as paid vacations and sick leave, and nonproduction bonuses.

The calculation of the quarterly change in the ECI involves the multiplication of the previous quarter's cost weight in each industry-major occupational group cell by the estimate of the quarterly change in each cell to obtain a current cost weight for the cell. The cost weights themselves are therefore variable, and the variability may be an increasing function of the number of quarters from the base period due to the chaining process used to calculate the cost weights. For this first issue, we examine the impact on variance estimates due to the change in the variability of the cost weights over time. As part of this issue, we examine the variance of an alternative calculation of the ECI proposed by Loewenstein (2001) that is not affected by the change in the variability of the cost weights over time due to the chaining process.

Additionally, the ECI is currently going through the process of being integrated along with all other Bureau of Labor Statistics compensation measures into a single comprehensive statistical program called the National Compensation Survey (NCS). This will allow all of the compensation data to be collected from a single sample of establishments. This integration requires the ECI to convert from a national-based sample to a geographic area-based sample. Thus, we next assess the impact on the variance estimates of this design change, which added an additional level of sampling while increasing the number of sample establishments.

Finally, the current method of variance estimation for the ECI is standard Balanced Repeated Replication (BRR). Consequently, an estimate of the quarterly change for each industry-major occupational group cell is needed for each replicate. Since some fixed-employment totals in certain cells are small, some cells may be missing in the current sample. Therefore, it is often necessary to collapse cells together in order to obtain an estimate of the quarterly change for the missing cell. By using Fay's method of BRR which contains all units in all replicates, there would be no need to collapse cells separately for each replicate. The collapsing of cells would only need to be done for the full-sample, with the same collapsing used for each replicate. In order to determine the impact of implementing a new variance estimation method, we compare variance estimates using Fay's method of BRR and standard BRR.

Variability of the Cost Weights

In computing the ECI, each observation is assigned to an industry-major occupational group (MOG) cell. The average total compensation or average cost of labor for the current quarter is then computed. These are known as the cost weights. The current quarter's cost weights are calculated by multiplying the previous quarter's cost weight for each industry-MOG cell by the estimate of the quarterly change in each cell. Thus, the current quarter's cost weights, are "chained" to the initial or base period cost weight by the estimates of quarterly change. More specifically, we are calculating an average labor cost for cell *i* and quarter *t*, $\hat{w}_{it}$, based on the quarterly change for cell *i* and quarter *t*. That is,

(1a) $$\hat{w}_{it} = w_{io} \prod_{k=1}^{t} \frac{\sum_{j \in \Gamma i,k} s_{ij} w_{ijk}}{\sum_{j \in \Gamma i,k} s_{ij} w_{ijk-1}},$$

where $\Gamma_{i,k}$ is the set of all *j* observations in cell *i* that are in the sample in both quarters *k* and *k*-1, s_{ij} is the sample weight for observation *j* in cell *i*, and w_{ijk} and w_{ijk-1} are the quarters *k* and *k*-1 labor costs observations, respectively.

The quarterly change for index, $\hat{I}_{t-1,t}$, is then calculated as,

(1b) $$\hat{I}_{t-1,t} = \frac{\sum_{i} E_i \hat{w}_{it}}{\sum_{i} E_i \hat{w}_{it-1}},$$

where E_i is the fixed-employment for cell *i*.

Since the current quarter's cost weights are determined by the previous quarter's cost weights x the estimate of quarterly change in each cell, the cost weights themselves are variable. Since the cost weights are "chained" to the base period, this variability may be an increasing function of the number of quarter from the base period. One method of determining the impact of the variability of the cost weights have on the overall variance of the ECI is to apply the cost weights from the base period to subsequent quarters. This removes the effect of the variability of the cost weights from quarter to quarter. The base period in this case is the initial quarter of the cost weights, not the base period of the index. Therefore, instead of calculating the cost weights as in equation (1a), we remove the product of the estimates of quarterly change and calculate the cost weights as follows,

$$(2)\quad \hat{w}_{it} = \hat{w}_{io}\,\frac{\sum_{j\in\Gamma i,t} s_{ij}\,w_{ijt}}{\sum_{j\in\Gamma i,t} s_{ij}\,w_{ijt-1}},$$

where $\Gamma_{i,t}$ is defined similarly as $\Gamma_{i,k}$ in (1a).

In this study, we could not use the cost weights from the base period due to the redesign of the ECI sample. The redesign called for the addition of more variance strata and, hence, more replicates. Therefore, we will use the oldest set of cost weights that incorporated the additional replicates to use as our base period. The oldest set of cost weights available were December 1996 when the actual base period of the cost weights was December 1994 when the latest set of fixed-employment weights were introduced. New "fixed" employment weights are introduced every 10 years.

Table 1 shows the standard errors of the quarterly change for wages using the fixed cost weights from December 1996 compared to the standard errors of the quarterly change for wages using the ordinary cost weights. The ratio of the two sets of standard errors (s.e.'s) is also shown.

Table 1 shows the standard errors are generally lower by keeping the cost weights fixed from December 1996. The first quarter is obviously the same since they use the same set of cost weights. The geometric mean of the other 15 quarters is .91, which implies there is typically about a 9% reduction in the standard error with the fixed cost weights. There were only two quarters where the standard errors using the fixed cost weights did not lead to lower standard errors, June 1997 and December 1999. The results for December 1998 and March 1999 were substantially lower when compared to the results of the other 13 quarters. This suggests that there are other factors in the variability of the cost weights other than simply the number of quarters from the base period. Upon investigation of the reasons for relatively large standard errors for the ordinary calculation in certain quarters it appeared that large cost weights for those quarters in individual cells sometimes contributed more to the standard errors than any increase in variability of the cost weights due to the number of quarters from the base period.

Table 1. SEs of the Quarterly Wage Change Using the Fixed Cost Weights vs. the SEs Using the Ordinary Cost Weights

Quarter	Year	s.e. with Fixed Cost Wgts.	s.e. with Ordinary Cost Wgts.	Ratio
March	1997	0.160	0.160	1.00
June	1997	0.126	0.122	1.04
September	1997	0.107	0.110	0.98
December	1997	0.187	0.196	0.95
March	1998	0.116	0.128	0.91
June	1998	0.117	0.125	0.94
September	1998	0.126	0.143	0.89
December	1998	0.189	0.244	0.77
March	1999	0.139	0.256	0.54
June	1999	0.181	0.201	0.90
September	1999	0.126	0.137	0.92
December	1999	0.089	0.089	1.00
March	2000	0.133	0.137	0.97
June	2000	0.107	0.107	1.00
September	2000	0.136	0.139	0.98
December	2000	0.100	0.101	0.99
Geometric Mean				0.91

As a method of lessening the impact of the variability of the cost weights, an alternative calculation of the ECI was developed by Loewenstein (2001). This alternative estimator is essentially a modified Laspeyres. The ECI is a Laspeyres index.

The alternative estimator calculates the cost weights, w'_{itk}, for cell i and quarter k ($k = t$-1, t) using only observations that are in both quarters t and t-1 instead of chaining the labor cost changes together. That is,

$$(3a)\quad w'_{itk} = \sum_{j\in\Gamma i,t} s_{ij}\,w_{ijk}\ .$$

Substituting (3a) into (1b) yields,

$$(3b)\quad \hat{I}_{t-1,t} = \frac{\sum_i E_i w'_{itt}}{\sum_i E_i w'_{it(t-1)}}\ .$$

Table 2a shows the quarterly change for the alternative calculation of the ECI and the ordinary calculation, while Table 2b compares the standard errors for the alternative calculation of the ECI to the standard errors with the ordinary calculation. The standard errors and the ratio of the standard errors for the wage component and the benefit cost component of the ECI are shown as well as the two components combined, which is total compensation.

Tables 2a and 2b show that the results for the wage component are generally consistent. The alternative calculation of the ECI generates a consistently smaller standard error while yielding point estimates that are approximately the same. The results for the benefit cost component, however, are slightly more variable. The reason for the large differences during this time period is the current sample's average benefit cost for some cells are vastly different from the "chained" estimate of the average benefit cost. For example, a cell in September 1997 using the alternative calculation had an average benefit cost for the previous quarter that was 5 times greater than the chained estimate of the average benefit cost for the ordinary calculation, and there was a large change in the cell for this particular quarter. This cell is mainly responsible for the variance estimate being greater for the alternative calculation for this quarter. A similar occurrence happened with a different cell in March 1998 except the chained estimate of the average benefit cost was much greater than the alternative calculation estimate. The large change with a greater benefit cost weight for this cell is mainly responsible for the higher variance estimate for the ordinary calculation. This leads to the fundamental question for the alternative calculation. Should average costs for a time period *t*-1 be based only on the *t*-1 sample or be based on the estimated change from the base period using a chaining process?

The ratio of the standard errors for total compensation shown in Table 2b are generally between the ratio of the standard errors for the wage and benefit cost component. Overall, the alternative calculation yields smaller standard errors for total compensation than the ordinary calculation of the ECI and the ratios are generally closer to the ratios for wages than benefits. This is to be expected, since wages generally contribute more to total compensation than benefit costs.

Impact on Variance of the Sample Redesign

The ECI is currently going through the process of being integrated into NCS. This integration requires the ECI to convert from a national-based sample to a geographic area-based sample. The national-based sample consists of selecting establishments pps for a set of industry strata. In the second stage of sampling, occupations are selected pps within the establishment with the number of occupational selections being dependent on the size of the establishment. The area-

Table 2a. Quarterly Change of the Alternate and Ordinary ECI Calculations

		Wages & Salary		Benefit Costs		Total Compensation	
Quarter	Year	Alternative Qtrly. Chg.	Ordinary Qtrly. Chg.	Alternative Qtrly. Chg.	Ordinary Qtrly. Chg.	Alternative Qtrly. Chg.	Ordinary Qtrly. Chg.
March	1997	1.019	1.005	0.497	0.558	0.871	0.880
June	1997	0.857	0.895	0.616	0.554	0.788	0.800
September	1997	0.962	1.013	0.304	0.533	0.778	0.879
December	1997	0.929	0.980	0.675	0.685	0.859	0.898
March	1998	1.050	1.034	0.691	0.624	0.951	0.920
June	1998	0.922	0.911	0.684	0.719	0.857	0.858
September	1998	1.213	1.268	0.512	0.605	1.020	1.085
December	1998	0.549	0.623	0.389	0.476	0.505	0.583
March	1999	0.590	0.495	1.038	1.002	0.715	0.634
June	1999	1.157	1.181	0.943	0.996	1.099	1.130
September	1999	0.900	0.897	0.861	0.920	0.890	0.904
December	1999	0.831	0.837	0.990	1.023	0.874	0.888
March	2000	1.190	1.188	2.414	2.371	1.520	1.513
June	2000	1.115	1.097	1.269	1.276	1.157	1.147
September	2000	0.942	0.935	1.103	1.126	0.986	0.988
December	2000	0.620	0.640	0.708	0.726	0.644	0.664
Cumulative Change		15.922	16.097	14.589	15.161	15.540	15.835

Table 2b. SEs of Quarterly Change for the Alternate and Ordinary ECI Calculations

		Wages & Salary			Benefit Costs			Total Compensation		
Quarter	Year	Alternate s.e.	Ordinary s.e.	Ratio	Alternate s.e.	Ordinary s.e.	Ratio	Alternate s.e.	Ordinary s.e.	Ratio
March	1997	0.155	0.160	0.97	0.150	0.191	0.79	0.125	0.134	0.93
June	1997	0.119	0.122	0.98	0.139	0.137	1.01	0.101	0.106	0.95
September	1997	0.098	0.110	0.89	0.187	0.120	1.57	0.096	0.099	0.97
December	1997	0.179	0.196	0.92	0.153	0.147	1.04	0.145	0.157	0.93
March	1998	0.118	0.128	0.93	0.258	0.335	0.77	0.110	0.129	0.85
June	1998	0.111	0.125	0.89	0.148	0.132	1.12	0.092	0.097	0.95
September	1998	0.117	0.143	0.82	0.222	0.187	1.19	0.119	0.130	0.91
December	1998	0.191	0.244	0.78	0.127	0.106	1.21	0.152	0.185	0.82
March	1999	0.193	0.258	0.75	0.205	0.175	1.17	0.163	0.202	0.80
June	1999	0.166	0.201	0.83	0.152	0.154	0.99	0.135	0.157	0.86
September	1999	0.102	0.137	0.74	0.129	0.138	0.94	0.088	0.114	0.78
December	1999	0.084	0.089	0.94	0.079	0.102	0.77	0.070	0.071	0.98
March	2000	0.144	0.137	1.05	0.226	0.319	0.71	0.138	0.152	0.91
June	2000	0.100	0.107	0.93	0.100	0.112	0.90	0.081	0.089	0.91
September	2000	0.133	0.139	0.96	0.097	0.127	0.76	0.110	0.120	0.91
December	2000	0.102	0.101	1.01	0.131	0.137	0.96	0.091	0.092	0.98
Geometric Mean				0.89			0.97			0.90

based sample makes the selection of geographic areas the PSUs. This design change should generally increase the variance since there is an additional level of sampling. In order to compensate for this change, the number of establishments selected and consequently the number of occupational selections was increased. We were interested in knowing to what extent does the design change increase the variance with equal sample sizes.

From March 1997 – September 2000, the ECI sample was a mixture of a national-based and geographic area-based sample. Thus, we can calculate the variance of the quarterly change for the national-based sample design, $V(\hat{I}_{N,t-1,t})$, and the area-based sample design, $V(\hat{I}_{A,t-1,t})$, during this time frame separately. If we assume that the variance is inversely proportional to sample size, we can calculate an adjusted area-based variance, $V'(\hat{I}_{A,t-1,t})$, and an adjusted national-based variance, $V'(\hat{I}_{N,t-1,t})$,such that the number of occupational selections for the two designs are equal to the sample size of the full area-based design. The assumption that the variance is inversely proportional to sample size only holds true, if it hold true at all, for the within-area component of $V(\hat{I}_{A,t-1,t})$. The between-area component is not affected by the number of sample establishments and consequently the proportion of the total variance that is between-area increases with increasing sample size. The within-area variance, $V(\hat{I}_{Awi,t-1,t})$, can be determined by ignoring the selection of the areas and treating the selection of the establishments as the PSUs. The between area variance, $V(\hat{I}_{Abtwn,t-1,t})$, is not calculated directly. It is determined by subtracting the within-area variance from the total area variance. Finally, we can calculate the ratio, R_t , of the adjusted area-based variance to the national-based variance to determine the increase in variance due to the change in sample design. That is,

(3)

$$R_t = \frac{V'(\hat{I}_{A,t-1,t})}{V'(\hat{I}_{N,t-1,t})} = \frac{(\frac{n_A}{n})V(\hat{I}_{Awi,t-1,t}) + V(\hat{I}_{Abtwn,t-1,t})}{(\frac{n_N}{n})V(\hat{I}_{N,t-1,t})},$$

where n_A is the number of usable occupational selections for the area-based sample, n_N is the number of usable occupational selections for the national-based sample, and n is the number of occupational selections with the design change fully implemented. In our calculations, we used n = 32,000.

Table 3 shows $V'(\hat{I}_{A,t-1,t})$, $V'(\hat{I}_{N,t-1,t})$, and R_t for wages and salaries, benefit costs, and total compensation. It also shows n_A and n_N for each quarter. It should be noted that for several quarters, some negative between-area variances were calculated. In these cases, the negative between-area variances were replaced with zero between-area variance.

Table 3. Ratio of Adjusted Area-Based Sample Variance to National-Based Sample Variance

				Wages & Salaries			Benefit Costs			Total Compensation		
Qtr.	Year	n_A	n_N	$V'(I_{At-1,t})$	$V'(I_{Nt-1,t})$	R_t	$V'(I_{At-1,t})$	$V'(I_{Nt-1,t})$	R_t	$V'(I_{At-1,t})$	$V'(I_{Nt-1,t})$	R_t
Mar.	1997	4,790	13,034	0.0105	0.0096	1.099	0.0216	0.0103	2.084	0.0065	0.0068	0.954
Jun.	1997	5,276	12,622	0.0118	0.0048	2.438	0.0150	0.0075	1.989	0.0103	0.0036	2.889
Sep.	1997	5,110	12,359	0.0043	0.0023	1.890	0.0126	0.0036	3.485	0.0039	0.0018	2.203
Dec.	1997	4,962	12,052	0.0110	0.0271	0.405	0.0032	0.0105	0.311	0.0077	0.0168	0.461
Mar.	1998	7,716	11,680	0.0088	0.0058	1.513	0.0158	0.0154	1.026	0.0067	0.0037	1.814
Jun.	1998	7,508	11,340	0.0056	0.0082	0.680	0.0073	0.0049	1.481	0.0034	0.0049	0.693
Sep.	1998	7,288	11,055	0.0038	0.0092	0.417	0.0179	0.0039	4.565	0.0042	0.0060	0.695
Dec.	1998	7,128	10,775	0.0061	0.0331	0.184	0.0038	0.0057	0.669	0.0026	0.0195	0.135
Mar.	1999	6,794	10,428	0.0069	0.0230	0.302	0.0219	0.0073	3.014	0.0072	0.0143	0.503
Jun.	1999	14,206	10,220	0.0206	0.0104	1.990	0.0125	0.0082	1.512	0.0138	0.0063	2.197
Sep.	1999	21,251	6,643	0.0312	0.0076	4.101	0.0317	0.0050	6.345	0.0257	0.0055	4.693
Dec.	1999	20,659	6,400	0.0071	0.0027	2.613	0.0062	0.0021	2.883	0.0053	0.0018	2.948
Mar.	2000	20,021	5,879	0.0188	0.0077	2.450	0.0210	0.0312	0.673	0.0141	0.0061	2.325
Jun.	2000	19,402	5,727	0.0085	0.0042	2.031	0.0092	0.0025	3.667	0.0049	0.0030	1.609
Sep.	2000	25,883	2,781	0.0251	0.0045	5.552	0.0120	0.0021	5.826	0.0184	0.0030	6.107
Geometric Mean						1.251			1.964			1.373

Table 3 shows that based on the geometric mean the variance would increase with the area-based sample design by approximately 25% for wages, 96% for benefits, and 37% for total compensation. However, due to the great amount of variability in R_t, these estimates are highly unreliable. In other words, the "noise" of the data makes it difficult to ascertain the true effect of the sample design change. Since the production variance estimates have generally not increased with the area-based sample design, either the increase in sample size was enough to account for the change in sample design or the assumption that the variance is inversely proportionate to sample size does not hold in this case.

Fay's Method

Since some fixed-employment totals in certain cells are small, some cells may be missing in the current sample. Therefore, it is often necessary to collapse cells together in order to obtain an estimate of the quarterly change for the missing cell. The current method of variance estimation for the ECI is BRR. BRR requires that each replicate be collapsed separately, since there are a differing set of half the sample units used in each replicate. This is a time consuming process operationally. By using Fay's method, which is a variant of BRR that uses all units in all replicates, there would be no need to collapse cells separately for each replicate. The set of collapsed cells for each replicate would simply be the same as the full-sample.

Fay's method was motivated by the observation that the standard half-sample variance estimator runs into difficulty for ratio estimates when the denominator is zero for some replicates (Judkins, 1990). This is the exact case we have here. With Fay's method, one half of the sample is weighted down by a factor K where $K \leq 1$ for each replicate and the remaining half of each replicate is weighted up by a compensating factor of $2 - K$. For example, if $K = .70$, then the weights decrease by 30 percent in one half-sample and increase in the other half sample by 30 percent. When using Fay's method of BRR, the variance of the replicates from the full sample estimate becomes too small by a factor of $(1 - K)^2$ (Judkins, 1990). Therefore, the variance estimate of the quarterly change with Fay's method is,

$$(4)\quad V(\hat{I}_{t-1,t}) = \frac{1}{(1-K)^2 R}\sum_{r=1}^{R}(\hat{I}_{t-1,t,r} - \hat{I}_{t-1,t}),$$

where R is the number of replicates used.

If K = 0, then (4) simply reduces to standard BRR. In this study, Fay's $K = 0.5$ was used.

Table 4 shows the results of calculating the variance of the quarterly change for wages and salaries, benefit costs, and total compensation using Fay's method of BRR and standard BRR for March 1997 to December 2000.

Table 4. Ratio of Fay's Method Standard Errors to BRR Standard Errors

		Wages & Salary			Benefit Costs			Total Compensation		
		Fay	BRR		Fay	BRR		Fay	BRR	
Quarter	Year	s.e.	s.e.	Ratio	s.e.	s.e.	Ratio	s.e.	s.e.	Ratio
March	1997	0.173	0.160	1.09	0.219	0.191	1.15	0.157	0.134	1.17
June	1997	0.119	0.122	0.98	0.125	0.137	0.91	0.103	0.106	0.98
September	1997	0.099	0.110	0.90	0.109	0.120	0.91	0.089	0.099	0.90
December	1997	0.226	0.196	1.15	0.143	0.147	0.97	0.178	0.157	1.13
March	1998	0.115	0.128	0.90	0.210	0.335	0.63	0.096	0.129	0.75
June	1998	0.122	0.125	0.98	0.129	0.131	0.98	0.101	0.097	1.04
September	1998	0.136	0.143	0.95	0.179	0.189	0.95	0.120	0.131	0.91
December	1998	0.242	0.244	0.99	0.123	0.108	1.14	0.187	0.185	1.01
March	1999	0.246	0.256	0.96	0.187	0.183	1.02	0.196	0.206	0.95
June	1999	0.198	0.201	0.98	0.135	0.154	0.88	0.155	0.157	0.99
September	1999	0.134	0.137	0.98	0.119	0.138	0.86	0.109	0.114	0.96
December	1999	0.082	0.089	0.92	0.090	0.102	0.88	0.069	0.071	0.97
March	2000	0.132	0.137	0.96	0.157	0.319	0.49	0.110	0.152	0.72
June	2000	0.097	0.107	0.91	0.090	0.112	0.80	0.083	0.089	0.93
September	2000	0.126	0.139	0.90	0.099	0.127	0.78	0.109	0.120	0.91
December	2000	0.095	0.101	0.94	0.120	0.137	0.88	0.080	0.092	0.86
Geometric Mean				0.97			0.87			0.94

Table 4 shows that on average the variances using Fay's method tend to be lower than the variances using BRR. The variances for the wages & salary component tend to be only slightly lower, but there are some substantial differences in the variances of the two methods for the benefit cost component in particular for March 1998 and March 2000. Since we do not have a measure of the true variance, we do not know if one method is more accurate than the other. on the other hand, Fay's method does seem to produce more stable variance estimates at least for the benefit costs. However, any decision to change from BRR to Fay's method of variance estimation will more likely be based on operational considerations.

Conclusion

As with any complex survey, design and estimation issues arise from time to time with the ECI. We were particularly interested in three such issues and their impact on the variance estimates of the ECI. First, the results on the variability of the cost weights showed that they have an impact on the variance estimates. However, we determined there are other factors that contribute to the variability of the cost weights than simply the number of quarters from the base period. An alternative calculation of the ECI that does not depend on the change in the variability of the cost weights over time due to the chaining process produces a lower variance as long as there are no dramatic changes in the average cost of a cell due to sampling variability. The variance estimates of the ECI will generally be larger with an area-based sample design than with a national-based sample design if the sample sizes are the same, but the size of the increase is still in question based on our study. Since the variance estimates for ECI have generally not increased with the area-based sample design, either the increase in sample size was enough to account for the change in sample design or the assumption that the variance is inversely proportionate to sample size does not hold in this case. Fay's method unlike BRR does not require that collapsing of cells be done separately by replicate. Fay's method tended to yield slightly lower variance estimates than BRR, but we have no measure of the true variance. The decision to implement Fay's method will be based primarily on operational considerations.

References

ECI Bulletin (1999). Employment Cost Indexes, 1975-98. Bulletin 2514. Bureau of Labor Statistics.

Judkins, D.R. (1990). Fay's Method for Variance Estimation. Journal of Official Statistics, 6, 223-239.

Loewenstein, M. (2001). Internal BLS memorandum, dated February 7.

Ponikowski, C.H. (1996). Specifications for Computing Variances for Indexes. BLS memorandum to the Record, dated January 22.