

ELASTICITY OF HIRING AT THE FIRM LEVEL

NOVEMBER 9, 2004



DR. RAJEEV DHAWAN
DIRECTOR

**ECONOMIC FORECASTING CENTER
GEORGIA STATE UNIVERSITY**

This note builds up on the regression analysis in the statistical appendix to the August 2004 *Forecast of the Nation* report. In that investigation, for 133 publicly traded firms in 2003, it was found that job growth requires revenue growth as a precondition. It seemed that for this period profit improvement came at the expense of job growth. Now, are these fact also true in periods when both the economy and the stock market is booming, and grabbing market share might be the over-arching objective, as happened in the late 90's in the dot-com heydays? Additionally, do these findings hold up for a bigger sample of firms, such as the ones in the S&P500 index, which is more diversified?

To answer these two questions, data was collected for firms in the S&P500 index for 5 years--from years 1999 to 2003. Revenues, employee count, profits, assets and industry type information was obtained at annual frequency. (I thank Will Edwards from the At-

lanta office of Bloomberg Services for very kindly providing me this data) The accompanying chart shows that employment growth was virtually zero in 2003 compared to its 5.3% growth in 2000. Profits, on the other hand, were growing by 10.3% in 2003, much higher than the 7.7% rate seen in 2000. Total assets were used to define firm size, with small firms being defined as ones with assets less than \$10 billion. Sample statistics are presented in the data appendix to this report.

The companion page reports the functional form of the regression equation and the estimation results for these two different periods. As expected, for both of these time-periods, the regression coefficient for revenue change is significantly positive. The regression coefficient for profit change is negative in 2002-2003, but positive in the 1999-2000 period. This implies that profit improvement was not inimical to hiring in the go-go 90's.

Elasticity of Hiring

	Δ Employment	Δ Revenue (\$ Mil)	Δ Profit (\$ Mil)	E_r^1	E_p^2
1999—2000	2426.3	1499.9	-59.4	0.345	-0.009
2002—2003	227.3	1170.6	713.2	2.976	-0.427

¹—Employment Elasticity with respect to revenue

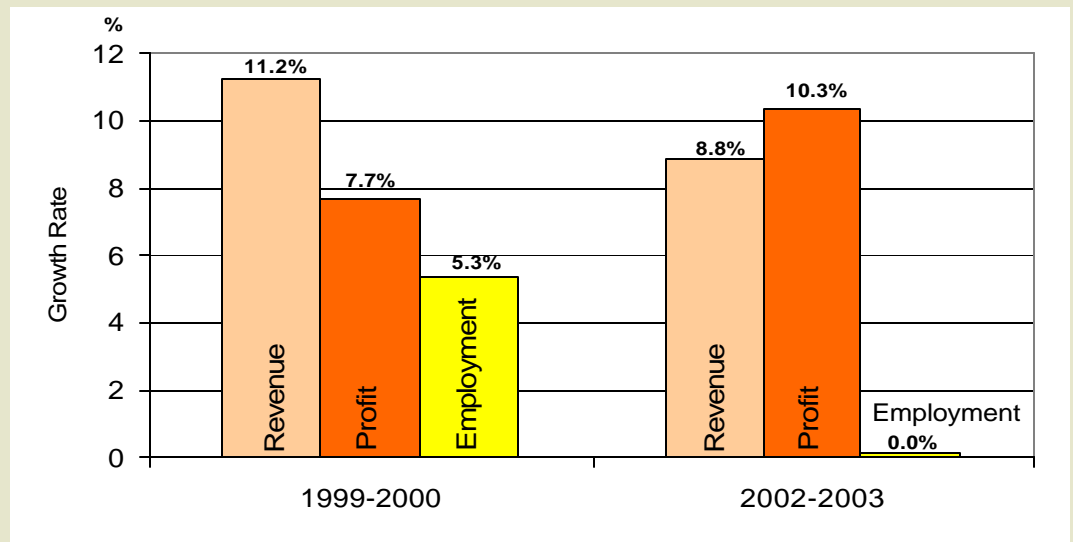
²—Employment Elasticity with respect to profit

$$E_p = b_1 \times \frac{\Delta \text{ Profit}}{\Delta \text{ Emp}} \quad E_r = b_2 \times \frac{\Delta \text{ Revenue}}{\Delta \text{ Emp}}$$

So what are the economic implications of these results? The best way is to calculate elasticity coefficients of employment change with respect to changes in revenues and profits for these two time-periods. The table below presents these calculations at the mean value of the data variables. One thing is very clear: hiring elasticity w.r.t. revenue growth is almost 9 times higher in 2003 when compared to 2000! In simple terms, a \$1 billion increase in revenues for the S&P500 companies will result in almost 3000 jobs being created, or one job per 300 thousand of revenue increase. This requirement was almost \$3 mil-

job in 2000. (Median elasticity calculations for 2003 were not possible given that the median value for employment change was exactly zero) Hiring elasticity w.r.t profit changes was almost zero in year 2000, implying that profit improvement did not come at the expense of job elimination. This elasticity number, however, was negative 0.427 in 2003. This result provides proof for the assertion that profit improvements in 2003 came at the expense of jobs, and were sufficiently larger in magnitude. No wonder, we had a job less recovery in 2003.

Revenue, Profit and Employment Growth for S&P500 Firms



Main Equation: Regress Employment Change on Profit and Revenue Changes

$$\Delta Emp_i = a + b_1 * \Delta Profits_i + b_2 * \Delta Rev_i + b_3 * Size_i + \sum_{i=1}^{11} b_i * Industry(i) + e_i$$

Regression Period 1999—2000

$$\Delta Emp_i = 72.6566 + 0.36215 * \Delta Profits_i + 0.55747 * \Delta Rev_i + 4201.08 * Size_i - 3694.74 * Ind 4 + 2476.06 * Ind 5 + 3578.74 * Ind 6 + 5884.04 * Ind 8$$

(0.10) (1.87)[†] (5.39)[†] (3.57)[†]
 (2.23)[†] (1.22) (2.26)[†] (3.07)[†]

R²=0.138

Where i = 1, 2, 3 ... 479

Regression Period 2002—2003

$$\Delta Emp_i = -61.6971 - 0.13612 * \Delta Profits_i + 0.57791 * \Delta Rev_i - 1170.06 * Size_i - 1259.05 * Ind 4 + 5781.79 * Ind 5 + 1041.56 * Ind 6 - 1613.44 * Ind 8$$

(0.13) (2.11)[†] (5.96)[†] (1.60)
 (1.18) (4.70) (1.1) (1.32)

R²=0.1324

Where i = 1, 2, 3 ... 499

[†] - Denotes statistically significant values at 5% level of confidence.