used by other employers in determining SFAS 106 costs. Because of this an adjustment of *.7788 (Turnover rate adjustment)* will need to be applied to the BLI ratio.

Furthermore each $1 of TELCO anticipated claim cost will not translate into the same amount of SFAS 106 cost as will each $1 of anticipated retiree claim cost in the GNP. This will be due to two types of demographic differences between TELCO and the GNP. In particular:

- TELCO employees are older and have more past service than those in the GNP.

- TELCO employees tend to retire at earlier ages than is true throughout the national economy.

The extent of these differences is illustrated in Appendix A, and will give rise to the following additional adjustments to the BLI ratio:

Adjustment due to age and past service differences = .8528 (age/service adjustment)
Adjustment due to earlier retirements among TELCO employees = .8188 (retirement rate adjustment)

The total demographic adjustment is derived as (turnover rate adjustment) x (age/service adjustment) x (retirement rate adjustment):

Demographic Adjustment = .7788 x .8528 x .8188 = .5438

The specific methods and assumptions utilized in the derivation of the above adjustment are described in Appendix B. In developing this as well as all future adjustments methodology was employed to ensure that no "double counting" of effects occurred.

Calculation of Current Retiree Adjustment

Because a significant portion of SFAS 106 costs will arise due to the amortization of the liability for current retirees we must allow for the possibility that the relative SFAS 106 cost impact of these current retirees will be different for TELCO than for the GNP. In order to address this, we calculated and compared the average current retiree benefit cost per active employee for TELCO and for the GNP (using for the GNP only the 30.7 million active employees who generate SFAS 106 costs).

For TELCO the average claim cost per current retiree is $3,075 while for the GNP it is $1,802. Furthermore the ratio of current retirees to active employees at TELCO is .4802 compared with .1726 for the GNP. Thus the ratio of current retiree cost per active employee of the GNP to that of TELCO is (.1726 x 1802) ÷ (.4802 x 3075) or .2106.

If the BLI ratio after applying Demographic Adjustment was also .2106 then no further adjustment would be required. However, the BLI ratio after the Demographic Adjustment is .3181 (.5850 x .5438). Current retirees at TELCO represent 21.09% of the increase in costs due to SFAS 106 and active employees represent the other 78.91%. Taking this into account, we calculate:

Current Retiree Adjustment = .7891 + (.2109 x .2106 ÷ .3181) = .9287.

Calculation of Pre-funding Adjustment

Thus far we have assumed that the increase in labor costs due to SFAS 106 for both the GNP and TELCO will equal expense calculated under SFAS 106 minus claim cost for current retirees (i.e. current "pay as you go" cost). If, however, either TELCO or employers in the GNP have been funding and/or accruing expense for post-retirement medical benefits in excess of "pay as you go" cost, then an adjustment must be made. In fact several of the Price Cap LECs have accumulated and are continuing to accumulate assets in trust to pay future post-retirement medical benefits. Therefore the increase in TELCO's labor costs due to SFAS 106 will be less than it would be had no pre-funding taken place. By making the

conservative assumption that no similar accumulation of assets is taking place in the GNP, we calculate an adjustment equal to the increase in TELCO's labor cost if no pre-funding was taking place divided by the increase in TELCO's labor cost taking into account both accumulated assets and ongoing annual pre-funding contributions. Specifically the adjustment was determined as:

> (1991 TELCO SFAS 106 Cost assuming no prior funding - 1991 projected claims payment) ÷ (1991 TELCO SFAS 106 Cost recognizing prior funding - 1991 projected claims payment + additional 1991 funding costs).

Therefore, expressing all amounts in $millions:

Pre-funding Adjustment = (2,858.4-905.5) ÷ (2,693.1-1,205.8) = 1.313

Calculation of Non-Covered Employees Adjustment

Thus far, we have developed a BLI ratio and a set of adjustments that relate to those employees who generate SFAS 106 costs. We must still adjust this ratio to reflect the fact that while TELCO extends its post-retirement medical programs to its entire workforce, there are employers in the GNP who provide benefits to only a portion of their workforce and many employers who do not provide any post-retirement medical benefits at all. Finally, we must allow for public sector employees, none of whom generates SFAS 106 costs. In fact, the Non-Covered Employee Adjustment is simply the percentage of all employees in the GNP who could become eligible for post-retirement medical benefits programs sponsored by their employers which are subject to SFAS 106.

As can be seen in Appendix A, the US General Accounting Office performed a detailed survey in 1990 to determine the extent of post-retirement medical coverage provided by US employers in the private sector. The study concluded that of the 95.8 million private sector employees, 38.5 million work for employers who provide post-retirement medical benefits, but only 30.7 million of these 38.5 million employees could actually become eligible for benefits affected by SFAS 106, with the remaining 7.8 million being ineligible because they work for non-covered subsidiaries, work in non-covered job classes, or are covered by

multi-employer plans which are not subject to SFAS 106. Since government entities are also not subject to SFAS 106 (but are part of GNP), we must adjust for all public sector employees who number 18.6 million. Thus we calculate:

Non-Covered Employees Adjustment = 30.7 ÷ (95.8 + 18.6) = .2684

Calculation of Per Unit Labor Cost Adjustment

Adjustments made thus far have taken account of the fact that employers with the same Benefit Level Indicator may have different SFAS 106 costs per employee. However, even if SFAS 106 costs per employee were the same, labor costs per employee may not be and thus the relative impact of SFAS 106 on per unit labor costs may not be the same.

In fact, the labor costs per employee are significantly higher at TELCO than for other employers in the GNP. This is due, in part, to demographic differences but is also due to the different mix of skilled and unskilled workers at TELCO compared to the average mix in the GNP. As shown in Appendix A, TELCO's total annual compensation per employee is $38,533 as compared to the national average of $29,500. Therefore, to reflect the fact that each $1 of per employee SFAS 106 cost will represent a smaller portion of total labor costs for TELCO than for the GNP, we calculate,

Per Unit Labor Cost Adjustment = 38,533 ÷ 29,500 = 1.3062

Calculation of Labor Cost Percentage Adjustment

Even after applying the Per Unit Labor Cost Adjustment we must address the possibility that the percentage of output represented by labor costs may differ between TELCO and the GNP. If this is so, then even if SFAS 106 had the same percentage impact on the labor costs of both TELCO and the GNP, there would be a difference in its impact on the total costs of each. Unlike the explicit nature of the calculation of the other Adjustments, the Labor Cost Percentage Adjustment has to be calculated implicitly as explained below.

For the economy as a whole output is synonymous with value added (which is total revenue minus the cost of purchased inputs) and labor costs represent 64.27% of total output. For TELCO output consists of the cost of goods plus value added: the cost of goods is 25.7% of output and value added is 74.3% of output. Labor costs at TELCO are $23,623.7M and represent 38.5% of value added.

The impact of SFAS 106 on TELCO's costs is both direct and indirect. The direct impact is the increase in TELCO's own labor costs: the indirect impact is the effect on the labor costs of TELCO's suppliers which is passed on in the prices they charge TELCO for goods.

Before calculating Labor Cost Percentage Adjustment we calculate the

Adjusted BLI Ratio = BLI Ratio x all Adjustments
= .5850 x .5438 x .9287 x 1.313 x .2684 x 1.3062
= <u>.1360</u>

This Adjusted BLI Ratio can be interpreted as meaning that for every percentage point by which SFAS 106 increases TELCO's own labor costs it will increase the labor costs of the average company in the GNP by 13.60% of a percentage point.

On the assumptions that TELCO's suppliers are like the average company in the GNP and that all additional costs will be passed through completely into prices (and into the GNP-PI) an increase of one percentage point in TELCO's own labor costs will increase TELCO's overall costs:

- by 1% of 38.5% of 74.3% of output in respect of its own labor costs, and *(i.e., 1% of the percent of output represented by TELCO's labor costs)*	= .2861% of output
- by .1360% of 64.27% of 25.7% of output in respect of its suppliers' prices *(i.e., by .1360% of the percent of output represented by TELCO's suppliers' labor costs)*	<u>= .0225</u>% of output
- for a total of	<u>.3085</u>% of output

The corresponding increase in the GNP-PI will be

.1360% of 64.27% of output = .0874% of output

Thus the GNP-PI would reflect only .0874 ÷ .3085 or 28.33% of the additional costs incurred by TELCO due to SFAS 106. The Labor Cost Percentage Adjustment has increased the factor of .1360 to a factor of .2833 thus:

Labor Cost Percentage Adjustment = .2833 ÷ .1360 = 2.0831

Extent to which Impact of SFAS 106 on All Employers in the GNP Translates into an Increase in the GNP-PI

In this section we describe the results obtained from a macroeconomic model developed to calculate the impact of SFAS 106 on the GNP-PI.

Motivation for the Macroeconomic Model

The macroeconomic model we use allows us to calculate the impact of SFAS 106 on prices in all sectors as well as the effect on the overall GNP-PI. We can get a simple view of how the price level is affected, as well as an appreciation of the need for a macroeconomic model, by first considering a "back-of-the-envelope" calculation of the effects of SFAS 106 on the price level. To make the interpretation of the calculation as simple as possible, suppose that in the absence of SFAS 106 the GNP-PI would remain constant over time; that is, the rate of inflation would be zero. Later we will consider the more realistic scenario in which there is ongoing inflation in the absence of SFAS 106.

The back-of-the-envelope calculation involves two steps:

(1) the percentage increase in the price of goods in a given sector equals the percentage increase in the cost of a unit of labor multiplied by the share of labor cost in total costs in that sector; and

(2) the percentage increase in the overall price index is calculated as the weighted average of the price increases in each sector.

As an example suppose that the economy is divided into two sectors. One sector, accounting for 68% of GNP pays no post-retirement health benefits and its costs per unit of labor are not directly affected by SFAS 106. In the second sector, which accounts for 32% of GNP, SFAS 106 directly increases the cost per unit of labor by 3%, and labor costs account for 64% of total costs. According to the back-of-the-envelope calculation, total costs and prices will increase by 1.92% (64% of 3%) in the second sector, and the overall price index will increase by .614% (32% of 1.92%). However, as we discuss below, this calculation overstates the effect on the overall price level.

Why does the back-of-the-envelope calculation overstate the size of the increase in the overall price level? The introduction of SFAS 106 will increase the cost of labor for employers who offer post-retirement health benefits and this increase in cost will lead to a variety of market adjustments. Although the full scope of market adjustments and their interactions can be complex (as detailed in Appendix C) we can get a simple view of the effects by first examining the effects in the labor market.

Because SFAS 106 increases the labor costs of employers who offer post-retirement health benefits, these employers will demand a smaller amount of labor at any given level of the wage rate. This reduction in the demand for labor will reduce the wage rate (not including post-retirement health benefits) facing all employers. The reduction in the wage rate will reduce labor costs of employers who do not offer post-retirement health benefits. Labor costs of employers who do pay post-retirement health benefits will increase by less than the direct impact of SFAS 106 on labor costs captured in the back-of-the-envelope calculation. With competition forcing prices to stay in line with costs, prices will fall in the sector that does not offer post-retirement health benefits and prices will rise by less than in the back-of-the-envelope calculation for employers who offer post-retirement health benefits. With prices rising in one sector and prices falling in the other sector, the <u>overall price level</u> may change by only a small amount.

Although the overall price level may change very little, the relative price of goods in the two sectors may change substantially to reflect the change in the relative labor costs arising from the differential impact of SFAS 106 on employers who offer post-retirement health benefits and employers who do not offer these benefits. In addition to effects we have already discussed, changes in labor costs arising from SFAS 106 will affect the mix of capital and labor used by employers in different sectors, and resulting changes in the prices of goods will shift demand away from the sector with an increased price toward the sector with a decreased price. The shift in demand will cause a reallocation of resources from one sector to the other. All of these additional adjustments are captured by the macroeconomic model which is used to get a quantitative measure of the impact of SFAS 106 on the prices of goods in each sector as well as on the GNP-PI.

Now let's consider the more realistic scenario in which there is ongoing inflation before the introduction of SFAS 106. Over the long run, the price level is very strongly related to the level of the money supply, and the rate of inflation is very strongly related to the growth rate of the money supply. With ongoing money growth there will be ongoing inflation, and the question is how much SFAS 106 affects the price level compared to the value it would have reached in the absence of SFAS 106. The basic results we presented above still hold, but with a slight re-interpretation: Whenever we said that a price increases, we now mean that it increases relative to the level it would have attained in the absence of SFAS 106; whenever we said that a price or wage decreases, we mean that it decreases relative to the level it would have reached in the absence of SFAS 106. Thus, for example, if we find that in the absence of ongoing inflation, SFAS 106 would reduce the wage by 2%, then in the presence of ongoing inflation of 5% per year, the wage would rise by 3% over the course of the year, so that it ends up 2% below the value it would have attained in the absence of SFAS 106 (if the effects of SFAS 106 were fully realized within one year). Thus, when we report that SFAS 106 causes some prices and wages to fall, we mean only that these prices and wages are lower than they would have been without SFAS 106 -- not necessarily that we will observe actual declines in these prices and wages

between one date and some later date. This focus on the effect of SFAS 106 on prices and wages relative to values they would have reached is the correct focus for analyzing the question at hand: What is the impact of SFAS 106 on the GNP-PI?

We have explained that SFAS 106 will cause some prices to rise and other prices to fall relative to their values in the absence of SFAS 106. To get a quantitative measure of this effect we use a mathematical macroeconomic model.

Modeling Strategy

To study the quantitative impact of SFAS 106 on the GNP-PI we use a mathematical macroeconomic model that incorporates production costs for various goods and national demands for these goods. The impact of SFAS 106 is modeled as a direct increase in the cost of labor of employers who offer post-retirement health benefits, and the solution of the model indicates the ultimate effects on the prices of various goods and on the private sector price index. The model is best viewed as a long-run model that fully incorporates the effects of SFAS 106.

Before constructing a macro model to study the price impact of SFAS 106, it is helpful to list a set of desirable criteria for a macro model that can be used to analyze this question. First, the model should be a multi-sector model because SFAS 106 will have different direct impacts on different sectors. In particular, SFAS 106 will directly increase the cost of labor of employers who offer post-retirement health benefits (which we treat as sector 2), but will have no direct impact on employers who do not offer post-retirement health benefits (which we treat as sector 1).

Second, the model should explain how the costs of production are related to the cost of labor and other inputs. At the same time, the model should allow for the possibility that capital may be substituted for labor when labor becomes more expensive as it does in the SFAS 106 sector, and the model should also allow for the possibility that labor may be substituted for capital when labor becomes less expensive as it does in the sector that does not offer post-retirement health benefits.

Third, the model should provide a specification of the aggregate demand for goods related to the overall price index as well as the demands for the different goods produced in the different sectors. Combining the demand structure with the cost structure will permit calculation of the impact of cost changes in each sector on quantities, and more importantly, on prices. Then the price index can be computed.

Fourth, the model should be tractable so that numerical solutions can be computed and readily interpreted.

Fifth, the model should be internally consistent and based on sound economic foundations.

The criteria listed above for an appropriate model guide our choice of a model. To that end, we have developed a macroeconomic model that draws heavily on the model presented in an article published by two prominent macroeconomists -- Olivier Blanchard of M.I.T. and Nobuhiro Kiyotaki of the University of Wisconsin -- in the September 1987 American Economic Review. This article presents a multi-sector macroeconomic model that explicitly accounts for production and cost conditions as well as aggregate demand. Although the model is economically sophisticated and requires some mathematical manipulation to solve, the basic structure is quite tractable. Finally, the model has the advantage of being based on sound economic principles and is internally consistent.

The precise mathematical structure of our adaptation of the Blanchard-Kiyotaki model is presented in Appendix C. Here we will simply describe the three major components of the model:

(1) the demand for goods;

(2) the production functions;

(3) the supply of labor.

(1) The demand for goods. The model is a two-sector model, which means that there are two types of goods. If the relative prices of the goods are held constant, the demand for goods is proportional to the overall level of aggregate demand which depends on the money supply and the overall price level. Changes in the relative price of the two goods shift demand away from the good with the increased relative price toward the good with the decreased relative price. The degree to which demand is shifted is measured by the price elasticity of demand, which is an input to the model.

(2) The production functions. Each type of good is produced using capital and labor. The amount of output that can be produced with any given combination of capital and labor is determined by a Cobb-Douglas production function. The Cobb-Douglas production function is one of the most widely used production functions in economics. Its most important characteristic is that for a competitive company, the share of labor cost in total cost is constant, regardless of the wage rate or the amount of output produced. In applying the model to the United States we specify particular Cobb-Douglas production functions that match the share of labor cost in total cost in the U.S. economy.

(3) The supply of labor. We have already pointed out that the introduction of SFAS 106 will reduce the demand for labor by firms offering post-retirement health benefits, and as a consequence, will reduce the wage rate relative to the level that would have prevailed in the absence of SFAS 106. The magnitude of the effect on the wage rate depends on the response of labor supply to the change in labor demand. The model characterizes the supply of labor in terms of the elasticity of labor supply with respect to the wage rate which measures the percentage fall in the amount of labor supplied resulting from a 1% fall in the wage rate.

To get quantitative results from the model, we must provide certain inputs to the model. Using these inputs, the mathematical macroeconomic model is solved numerically using a FORTRAN program written specifically for this model. In our baseline calculation we use the following values for the major inputs to the model:

Baseline Parameters

price elasticity of the demand for goods:	1.50
share of labor costs in total cost in sector 1:	0.64
share of labor costs in total cost in sector 2:	0.64
initial fraction of labor employed in sector 2:	0.32
direct impact of SFAS 106 on labor costs in sector 2:	0.03
labor supply elasticity	0.00

The price elasticity of demand of 1.5 is probably too high, but it was chosen because experimentation with the model indicated that the impact of SFAS 106 on the GNP-PI increases when the price elasticity of demand increases. Thus, using a value of 1.5 most likely overstates the impact on the GNP-PI.

The share of labor cost in total cost in each sector was set equal to 0.64 to match the actual share of labor cost in total GNP in the United States.

The value of 0.32 for the fraction of labor employed in sector 2 was chosen to match the fraction of U.S. private sector employees covered by SFAS 106. The macroeconomic model is intended as a model of the private sector, so the share of private sector employment covered by SFAS 106 is used for the fraction of employment in sector 2.

The value of 3% for the direct impact of SFAS 106 on labor costs is indicative of the impact of SFAS 106 on those employers who provide post-retirement medical benefits and was chosen to maintain consistency between TELCO SFAS 106 costs and

those assumed for all other employers who will incur SFAS 106 costs. Specifically this value was developed by multiplying TELCO's increase in labor costs due to SFAS 106 by all of the adjustments except for the Non-Covered Employees Adjustment and the Labor Cost Percentage Adjustment.

Finally, the value of the labor supply elasticity is set equal to zero. Empirical studies of labor supply (summarized in Chapters 1 and 2 of the Handbook of Labor Economics, North-Holland, 1986) typically find that in response to a permanent reduction in the wage rate men will tend to increase their labor supply and women tend to reduce their labor supply. That is, these studies typically find a negative labor supply elasticity for men and a positive labor supply elasticity for women. The model uses a value of the *aggregate* labor supply elasticity, which measures the response of aggregate labor supply (men plus women) to changes in the wage rate. The aggregate labor supply elasticity is an average of the negative labor supply elasticity of men and the positive labor supply elasticity of women. It is typically found to be close to zero, or even slightly negative (survey of uncompensated wage elasticities summarized in Table 3.5 of Mark R. Killingsworth, Labor Supply, Cambridge University Press, 1983). Because the impact of SFAS 106 on the GNP-PI is larger for higher labor supply elasticities, we set the labor supply elasticity equal to zero rather than slightly negative to guard against understating the impact on the GNP-PI.

Using the values listed above in our baseline calculation leads to an increase of 0.0138% in the private sector price index. For comparison, the back-of-the-envelope calculation for this case leads to an increase of 0.614% in the price index. It is useful to define the "passthrough coefficient" as the increase in the price index according to the model divided by the back-of-the-envelope price increase. In this case the passthrough coefficient is 0.0225 (0.0138% ÷ 0.614%), which indicates that the increase in the private sector price index is only 0.0225 times as large as indicated by the back-of-the-envelope calculation.

Sectors 1 and 2 together comprise the private sector. The macroeconomic model treats the government sector as an independent sector with employment and output determined independently of the private sector. The effect of SFAS 106 on the GNP-PI equals the share of government sector value added in GNP (10.6%)

multiplied by the impact on government sector prices plus the share of private sector value added in GNP (89.4%) multiplied by the increase in private sector prices. Because the government is not subject to SFAS 106, the impact on government sector prices is zero. Therefore, the impact on the GNP-PI is 89.4% of the impact on the private sector price index. Thus the back-of-the-envelope calculation yields a 0.549% (0.894 x 0.614%) increase in the GNP-PI, and the baseline calculation indicates that the GNP-PI will increase by only 0.0124% (0.894 x 0.0138%). The passthrough coefficient for the GNP-PI is 0.0225 which is identical to the passthrough coefficient for the private sector price index.

The conclusion from the baseline calculation is very strong: The impact of SFAS 106 on the GNP-PI is only a tiny fraction of the amount indicated by the back-of-the-envelope calculation.

Resulting Impact of SFAS 106 on TELCO Relative to its Overall Impact on the GNP-PI

To calculate the resulting relative impact of SFAS 106 on the GNP-PI compared to TELCO, we return to the calculation of the Labor Cost Percentage Adjustment. This was based on the assumption that all additional costs will be passed through completely into prices (and into the GNP-PI) and we must now change that assumption to reflect the output of our macroeconomic model.

The model indicates that the GNP-PI will increase by 0.0124%.

Looking first only at the direct effect of SFAS 106 on TELCO, we find that the increase in TELCO's direct labor costs is 6.295%. Thus TELCO's costs will increase:

- by 6.295% of 38.5% of 74.3% of output = 1.8027% of output
  (i.e., by 6.295% of the percent of output represented by TELCO's labor costs)

Thus the GNP-PI would reflect only 0.0124 ÷ 1.8027 or 0.69% of the additional direct costs incurred by TELCO due to SFAS 106.

Additional Macroeconomic Effects of SFAS 106

In addition to the result reported above our macroeconomic model indicates that, in response to the impact of SFAS 106, the wage rate in the national economy could eventually fall in relative terms by 0.926% (i.e., relative to what it would have been in the absence of SFAS 106). To the extent that TELCO could also benefit from a relative reduction in its wage, this could help to offset the increase in its costs due to SFAS 106. If TELCO were able to achieve the full reduction of 0.926% the effect may be calculated as explained below.

SFAS 106 increases TELCO's direct labor costs by		6.295%
If the national wage rate is, in fact, reduced TELCO's direct labor costs are reduced by		.926%
The net increase in TELCO's direct labor costs is		5.369%
Thus TELCO's overall costs would increase		
- by 5.369% of 38.5% of 74.3 of output in respect of its own labor costs, *(i.e., by 5.369% of the percent of output represented by TELCO's labor costs)*	=	1.5375% of output
- by 0.0124% of 25.7% of output in respect of its suppliers' prices *(i.e., by .0124% of the purchased inputs used by TELCO)*	=	.0032% of output
- for a total increase of	=	1.5406% of output

Thus if TELCO could benefit from a relative wage reduction of .926%, its overall costs would increase by 1.5406% of output instead of the 1.8027% of output calculated earlier. This indicates that macroeconomic effects, including a possible reduction in TELCO's wage rate could finance a percentage of its additional SFAS 106 cost, calculated to be:

$$(1.8027 - 1.5406) \div 1.8027 = 14.53\%$$

Thus the combined effect of the impact of SFAS 106 on the GNP-PI (0.7%) and on other macroeconomic variables including the wage rate (14.5%) would still leave 84.8% of TELCO's additional SFAS 106 costs unrecovered.

IV

IV. SENSITIVITY OF RESULTS

While we have attempted to calculate the results outlined previously in as accurate a manner as possible, it should be obvious that many of the results are subject to variability due to either the uncertainty of the underlying data or the need to make some assumptions about future or unknown factors. In this section we discuss the sensitivity of each of the previously derived values and of the aggregate result to reasonable variation in underlying data and/or assumptions.

The BLI Methodology

Initial Calculation of GNP BLI and TELCO BLI: In calculating GNP BLI and TELCO BLI there were two areas of uncertainty that we analyzed. With respect to the calculation of GNP BLI we utilized average BLIs by industry and then utilized industry weightings derived from the GAO survey to derive a final GNP BLI. Had we, instead, utilized an aggregate employee weighted average based on our data base only we would have derived GNP BLI as .2613 instead of .2568. This would have resulted in increasing the relative impact of SFAS 106 on GNP compared to TELCO from 28.3% to 28.7%. With respect to the calculation of TELCO BLI, the greatest area of uncertainty arose in deciding how to weight the various plans sponsored by each Price Cap LEC. We decided to weight them based on employee counts. We believe this was a conservative approach because in our data base only one set of plan provisions is maintained for each employer. If we assume that where an employer has more than one plan it is the more generous plan which is reported in the data base, then it would be appropriate to utilize only the more generous plans in calculating the TELCO BLI. If we had taken this approach it would have reduced the relative impact of SFAS 106 on GNP compared to TELCO from 28.3% to 27.7%.

Demographic Adjustment - We adjusted for the fact that TELCO will utilize lower rates of turnover than those used by other employers in determining SFAS 106 costs. It is hard to argue that the same pre-retirement withdrawal assumption should be made because TELCO's demographics are themselves the result of lower

turnover rates actually experienced by TELCO. However, if we were to assume the same withdrawal patterns for both TELCO and GNP (while retaining the different demographics), the relative impact of SFAS 106 on GNP compared to TELCO would increase from 28.3% to 34.6%.

The adjustment due to age and past service differences relies on demographic data provided by the separate Price Cap LECs and averaged into a single composite TELCO census having an average age of 41.6 with average past service of 16.6 years. If we were to reduce the age and service to 40.6 and 15.6 respectively, the relative impact of SFAS 106 on GNP compared to TELCO would increase from 28.3% to 29.7%.

A degree of uncertainty is also present in our adjustment due to earlier retirement among TELCO employees. This uncertainty arises in the determination of a national average retirement age assumption. We believe our use of age 63 was a conservative assumption in that the limited data on the subject (Gerontologist Vol. 28, No. 4) seems to indicate a national average retirement age between 63.5 and 64. Furthermore, if as expected, employers in the GNP tend to be aggressive (i.e., optimistic) in setting assumptions for accruing post-retirement liability, it might seem reasonable to utilize an age 64 assumption. If an age 64 assumption had been used the relative impact of SFAS 106 on GNP compared to TELCO would have been reduced from 28.3% to 25.6%.

Current Retiree Adjustment - The calculation of this adjustment is predicated on an average claim rate per retiree for the GNP of $1,802 and a ratio of retirees to covered actives of .1726. The claim rate was derived by taking the 1990 rate of $1,514 as reported in the Hewitt Associates Survey of Retiree Medical Benefits and increasing it by 19% for medical trend inflation. The ratio of retirees to covered actives was derived from the GAO study. While we believe 19% to be a realistic assumption for medical inflation, we recognize that the national average could actually have increased by more. If we assume a 25% increase in the average claim, to $1,892, and further assume that the actual ratio of retirees to actives has increased to .2 (from .1726) the relative impact of SFAS 106 on GNP compared to TELCO would increase from 28.3% to 29.2%.

Also, inherent in this Adjustment is the assumption that the demography of the current TELCO retiree is identical to that of the GNP. In fact, this too is a conservative assumption because TELCO employees generally retire at younger ages than the national average and thus the liabilities for TELCO will tend to be higher on this account than for the retirees in the national economy. If, however, we were to assume that retirees at TELCO were somewhat older than those in the GNP and hence generated SFAS 106 cost per $1 of retiree claim cost that was 10% less than that for the GNP, the relative impact of SFAS 106 on GNP compared to TELCO would only increase from 28.3% to 28.8%.

Pre-funding Adjustment - This adjustment looked at the effect of TELCO's existing pre-funding of post retirement medical benefits as compared with no pre-funding. By doing this we made the conservative assumption that there is no pre-funding in the GNP. If we assume there is pre-funding in the GNP to the extent that assets equal to one years claims have accumulated, and that annual contributions to such funds amount to claims plus 10%, the relative impact of SFAS 106 on GNP compared to TELCO would reduce from 28.3% to 26.2%.

Non-covered Employees Adjustment - This adjustment comes from the GAO survey which determined that 30.7 million private sector employees in the U.S. may eventually qualify to receive benefits under their employer's post-retirement medical plan. According to the GAO this estimate is subject to some sampling error and could be as high as 37.5 million or as low as 23.9 million. At the extremes this would cause the relative impact of SFAS 106 on GNP compared to TELCO to vary from 22.4% to 34.1% as compared to our determination of 28.3%.

Per Unit Labor Cost Adjustment - In calculating Per Unit Labor Cost Adjustment, allocated compensation and headcount were used. No sensitivity analysis was performed on this Adjustment because of the validity of the data used and the straightforward nature of the calculation.

Labor Cost Percentage Adjustment - In calculating the Labor Cost Percentage Adjustment we assumed that TELCO's suppliers were like the average company in the GNP. In particular we assumed that their labor costs were 64.27% of output and that their increase in labor costs was 13.60% of the corresponding increase for

TELCO. Had we assumed that they had no increase in labor costs due to SFAS 106 the relative impact of SFAS 106 on GNP compared with TELCO would have been 30.6% instead of 28.3%; had we assumed they would experience the same increase due to SFAS 106 as TELCO the relative impact would have been 19.3% instead of 28.3%.

The Macroeconomic Model

How robust is the conclusion drawn from the macroeconomic model in Section III? To answer this question we have examined the effect of varying each of the baseline parameters that constitute the major inputs to the model.

We indicated earlier that we believe the price elasticity of demand of 1.5 is probably too high and thus guards against understating the effect on the GNP-PI. Nonetheless we will show the effect of increasing the value of this parameter to 3.

For the economy as a whole labor costs are 64% of output and our baseline calculations assume that the same is true in each of the two sectors of our macroeconomic model. To test sensitivity we will show the results if, in each sector in turn, labor costs were as low as 50% of output or as high as 78% of output.

We used a fraction of labor employed in sector 2 of 0.32. This was based on the same numbers from the GAO survey as were used for the Non-Covered Employees Adjustment (30.7 million out of 95.8 million private sector employees). As indicated on page 36 the GAO calculated that due to possible sampling error the figure of 30.7 million could be as high as 37.5 million (39.1% of 95.8 million) or as low as 23.9 million (24.9% of 95.8 million). We will show the effect of using fractions of labor employed in sector 2 of 0.24 and 0.40.

As noted earlier, the direct impact of SFAS 106 on labor costs in sector 2 was taken to be +3%. The corresponding impact on TELCO labor costs is +6.3% and the baseline value of 3% is derived using the Adjustment factors in Section II as

$$
\begin{aligned}
& 6.3 \times (3) \times (4) \times (5) \times (6) \times (8) \\
= \; & 6.3 \times .5850 \times .5438 \times .9287 \times 1.313 \times 1.3062 \\
= \; & \underline{3.18}
\end{aligned}
$$

There is thus an appropriate consistency in the baseline value used for this parameter. Nonetheless we will show the results of varying this value over a wide range (from 2% to 5%) while keeping the TELCO value constant at 6.3%.

Finally we will examine the sensitivity of our results to variations in the value used for labor supply elasticity. We believe, by setting the labor supply elasticity equal to zero rather than slightly negative, that already we have guarded against understating the impact on the GNP-PI. Nonetheless we will show the effect of using positive values of 0.1, 0.2, and 0.3 for the labor supply elasticity.

The table that follows shows the results obtained by changing each of the 6 baseline parameters, one at a time. In each of the rows of the table, the values of 5 of the 6 inputs to the model are the same as in the baseline calculation listed above. The input shown in the table is the one input that is changed from the baseline calculation.

Sensitivity Analysis

	Effect on GNP Price Index	Passthrough Coefficient
Price elasticity of demand = 3	0.0227%	0.041
Labor share in total cost, sector 1 = 0.50	0.0099%	0.021
Labor share in total cost, sector 1 = 0.78	0.0145%	0.023
Labor share in total cost, sector 2 = 0.50	0.0103%	0.020
Labor share in total cost, sector 2 = 0.78	0.0141%	0.024
Fraction of labor employed in sector 2 = 0.24	0.0104%	0.025
Fraction of labor employed in sector 2 = 0.40	0.0137%	0.020
Direct impact on labor costs in sector 2 = +2%	0.0056%	0.015
Direct impact on labor costs in sector 2 = +5%	0.0336%	0.037
Labor supply elasticity = 0.1	0.0642%	0.117
Labor supply elasticity = 0.2	0.1136%	0.205
Labor supply elasticity = 0.3	0.1579%	0.287

The Overall Results

We have concluded that the overall impact of SFAS 106 on the GNP-PI will reflect only 0.7% of the SFAS 106 costs incurred by TELCO. Separately we have calculated that if TELCO were able to benefit from the same relative reduction in its wage rate as will be experienced in the economy as a whole this would finance a further 14.5% of its additional SFAS 106 costs. This would leave 84.8% of TELCO's additional SFAS 106 costs to be met from other sources. We now show the sensitivity of the overall results to the interaction of the variability of the BLI Methodology and the variability of the inputs to the Macroeconomic Model.

The baseline inputs to the model include the assumption that the direct impact of SFAS 106 on labor costs in sector 2 is +3%. We have shown the effect on the model of reducing this figure to +2% or increasing it to +5% with other inputs remaining unchanged. The value of 3% (more precisely 3.18%) corresponds to a SFAS 106 Cost Increase Ratio of 28.3% (page 9). The values of 2% and 5% correspond to Cost Increase Ratios of 17.8% and 44.5% respectively: we believe this range adequately encompasses the likely variations in this ratio. To demonstrate the interactive effect of possible variability we have produced three sets of results, one for each of the values 2%, 3% and 5%. The following schedule shows for each of these values the results if each of the other inputs is set at the baseline values followed by the results if each of the other inputs is varied alone as indicated.

PERCENTAGE OF TELCO'S ADDITIONAL SFAS 106 COSTS:

(a) reflected in the GNP-PI,
(b) financed by potential reduction in relative wage rate and
(c) to be met from other sources

Input to Macroeconomic Model (All Baseline except as indicated)	If Additional SFAS 106 cost of Average Employer With SFAS 106 Liabilities is 2%			3%			5%		
	(a)	(b)	(c)	(a)	(b)	(c)	(a)	(b)	(c)
Baseline	0.3	9.9	89.8	0.7	14.5	84.8	1.9	23.4	74.7
Price elasticity of demand = 3	0.6	9.6	89.8	1.3	14.1	84.6	3.4	22.3	74.3
Labor share in total cost, sector 1 = 0.50	0.2	9.5	90.3	0.6	13.9	85.5	1.5	22.6	75.9
Labor share in total cost, sector 1 = 0.78	0.4	11.4	88.2	0.8	16.8	82.4	2.2	27.2	70.6
Labor share in total cost, sector 2 = 0.50	0.3	10.4	89.3	0.6	15.5	83.9	1.6	25.0	73.4
Labor share in total cost, sector 2 = 0.78	0.4	8.6	91.0	0.8	12.8	86.4	2.1	20.6	77.3
Fraction of labor employed in sector 2 = 0.24	0.3	7.3	92.4	0.6	10.9	88.5	1.6	17.5	80.9
Fraction of labor employed in sector 2 = 0.40	0.3	12.4	87.3	0.8	18.2	81.0	2.1	29.4	68.5
Labor supply elasticity = 0.1	2.2	8.4	89.4	3.6	12.3	84.1	6.6	19.9	73.5
Labor supply elasticity = 0.2	4.0	7.1	88.9	6.2	10.4	83.4	11.0	16.6	72.4
Labor supply elasticity = 0.3	5.7	5.8	88.5	8.8	8.4	82.8	15.1	13.6	71.3