(B6) $Y_1 = N_1^{\rho_1} K_1^{1-\rho_1}$

Using $Y_1$ from (B6), the nominal wage and the nominal rental price of capital can be determined from the first-order conditions (A18) and (A19) for sector 1 to obtain

(B7) $w = \rho_1 Y_1 P_1/(D_1 N_1)$

(B8) $r = (1-\rho_1) Y_1 P_1/K_1$

Now calculate $\nu$ in the labor supply curve (eq. A15) as

(B9) $\nu = N_o^* (P/w)^\eta$

To calibrate $A_i$, $i = 2,\ldots,m$, substitute the production function (A16) into the first-order condition for labor (A18) and set $P_i = 1$ (eq. B1) to obtain

(B10) $A_i = (D_i w/\rho_i)(N_i/K_i)^{1-\rho_i}$ $\qquad i = 2,\ldots,m$

Now set all prices equal to 1 in the equilibrium condition (A23), and use (A22) to obtain

(B11) $Y_i = \alpha_i^\theta (\gamma/(1-\gamma)) M^*$

Summing (B11) over all i we obtain

(B12) $\Sigma_i Y_i = (\gamma/(1-\gamma)) M^* \, \Sigma_i \alpha_i^\theta$

Now observe that with $P = P_i = 1$ for all i, equation (A4) implies that

(B13) $\Sigma_i \alpha_i^\theta = 1$

Substituting (B13) into (B12) and rearranging yields

(B14) $M^* = ((1-\gamma)/\gamma) \, \Sigma_i Y_i$

Finally, substituting (B14) into (B11) and recalling that when $P_i = P = 1$, $s^Y_i = Y_i/\Sigma Y_i$, we obtain

(B15) $\alpha_i^\theta = s^Y_i$ $\qquad i = 1,\ldots,m.$

Exhibit 7

| | 1991 Pay-As-You-Go Expense ($000's) | | |
|---|---|---|---|
| | Total Company | Subject To Separations | Interstate |
| 1. Medical/Dental-Retiree | 136,785 | 130,530 | 27,783 |
| 2. Contributions to VEBA for Active Employees | | | |
| a. Expense | 86,182 | 82,241 | 17,505 |
| b. Capital | 8,572 | 8,504 | 2,013 |
| c. Depreciation | 306 | 303 | 73 |
| 3. Medicare Part B | 14,271 | 13,618 | 2,899 |
| 4. Group Life | 108 | 103 | 22 |
| 5. Total Pay-As-You-Go Operating Expense (Ln 1 + Ln 2a + 2c + Ln 3 + Ln 4) | 237,652 | 226,795 | 48,282 |
| 6. Total Pay-As-You-Go Capital (Ln 2b) | 8,572 | 8,504 | 2,013 |

| | 1992 Pay-As-You-Go Expense ($000's) | | |
|---|---|---|---|
| | Total Company | Subject To Separations | Interstate |
| 1. Medical/Dental-Retiree | 159,971 | 152,656 | 32,493 |
| 2. Contributions to VEBA for Active Employees | | | |
| a. Expense | 72,030 | 68,736 | 14,630 |
| b. Capital | 6,936 | 6,881 | 1,629 |
| c. Depreciation | 247 | 245 | 59 |
| 3. Medicare Part B | 14,669 | 13,998 | 2,979 |
| 4. Group Life | 135 | 129 | 27 |
| 5. Total Pay-As-You-Go Operating Expense (Ln 1 + Ln 2a + 2c + Ln 3 + Ln 4) | 247,052 | 235,764 | 50,188 |
| 6. Total Pay-As-You-Go Capital (Ln 2b) | 6,936 | 6,881 | 1,629 |

Notes: 1) Subject to Separations amounts were calculated by study area by applying ARMIS 43-01 regulated ratios to total company amounts.

2) Interstate amounts were calculated by study area by applying ARMIS 43-01 interstate ratios to subject to separations amounts.

Exhibit 8

| | 7/1/90 to 6/30/91 Pay-As-You-Go Expense ($000's) | | |
|---|---|---|---|
| | Total Company | Subject To Separations | Interstate |
| 1. Medical/Dental-Retiree | 125,044 | 119,516 | 25,567 |
| 2. Contributions to VEBA for Active Employees | | | |
| a. Expense | 91,535 | 87,488 | 18,715 |
| b. Capital | 9,332 | 9,098 | 2,163 |
| c. Depreciation | 334 | 331 | 80 |
| 3. Medicare Part B | 14,100 | 13,477 | 2,883 |
| 4. Group Life | 97 | 93 | 20 |
| 5. Total Pay-As-You-Go Operating Expense (Ln 1 + Ln 2a + 2c + Ln 3 + Ln 4) | 231,110 | 220,905 | 47,265 |
| 6. Total Pay-As-You-Go Capital (Ln 2b) | 9,332 | 9,098 | 2,163 |

Exhibit 9

# 1991 POSTRETIREMENT

# MEDICAL VALUATION

# ASSUMPTIONS

Summary

## 1991 Postretirement Medical Valuation Assumptions

| ITEM | ASSUMPTION | JUSTIFICATION |
|---|---|---|
| Discount Rate | 7.50% | The discount rate was selected after a review of Treasury bond rates during 1991 |
| Health Care Cost Trend | See Table 1 | The 1991 trend rate was based on recent Ameritech experience and near term expectations. The ultimate rate in year 2006 was selected to be consistent with the underlying inflation in the discount rate and to reflect the extension of manageed care to retirees. |
| Medicare Reimbursement Trend Rate | See Table 2 | The increase rates were selected to be consistent with health care cost trend rate and current Medicare law. |
| Per Capita Claims | See Table 3 | The costs were based on an analysis of Ameritech experience for 1990 for each of the plans. Average costs were spread by age using standard Towers Perrin age factors. |
| Turnover | See Tables 4, 5, 6, and 7 | The tables were based on telephone industry experience. |
| Retirement Age | See Tables 9, 10, 11, and 12 | The tables were based on telephone industry experience. |
| Mortality | See Tables 13 and 14 | The tables were based on telephone industry experience. |
| Percentage with Eligible Spouses | See Table 15 | The table was based on telephone industry experience. |
| Percentage Participating | 100% | These are non-contributory plans, thus all retirees and eligible spouses automatically participate. |
| Disablement | None assumed | No significant effect on costs. |

Table 1

## 1991 Health Care Trend Rates

| YEAR | INCREASE |
|---|---|
| 1991 | 10.0% |
| 1992 | 9.6% |
| 1993 | 9.2% |
| 1994 | 8.8% |
| 1995 | 8.4% |
| 1996 | 8.0% |
| 1997 | 7.6% |
| 1998 | 7.2% |
| 1999 | 6.8% |
| 2000 | 6.4% |
| 2001 | 6.0% |
| 2002 | 5.6% |
| 2003 | 5.2% |
| 2004 | 4.8% |
| 2005 | 4.4% |
| 2006 and later | 4.0% |

Table 2

## 1991 Medicare Reimbursement Trend Rates

| YEAR | INCREASE |
|---|---|
| 1991 | 10.0% |
| 1992 | 9.6% |
| 1993 | 9.2% |
| 1994 | 8.8% |
| 1995 | 8.4% |
| 1996 | 8.0% |
| 1997 | 7.6% |
| 1998 | 7.2% |
| 1999 | 6.8% |
| 2000 | 6.4% |
| 2001 | 6.0% |
| 2002 | 5.6% |
| 2003 | 5.2% |
| 2004 | 4.8% |
| 2005 | 4.4% |
| 2006 and later | 4.0% |

Table 3

## 1991 Per Capita Claims Costs -- Management Plans

### COMPREHENSIVE HEALTH CARE PLAN

| AGE | RETIREE | SPOUSE |
|---|---|---|
| 45-49 | $1,701 | $1,349 |
| 50-54 | 1,971 | 1,564 |
| 55-59 | 2,378 | 1,886 |
| 60-64 | 2,874 | 2,280 |
| 65-69* | 1,034 | 861 |
| 70-74* | 1,157 | 963 |
| 75-79* | 1,296 | 1,079 |
| 80-84* | 1,420 | 1,182 |
| 85 and older* | 1,471 | 1,225 |

### MEDICAL EXPENSE PLAN

| AGE | RETIREE | SPOUSE |
|---|---|---|
| 45-49 | $3,797 | $2,972 |
| 50-54 | 4,402 | 3,445 |
| 55-59 | 5,309 | 4,155 |
| 60-64 | 6,418 | 5,023 |
| 65-69* | 1,126 | 976 |
| 70-74* | 1,261 | 1,093 |
| 75-79* | 1,411 | 1,224 |
| 80-84* | 1,546 | 1,340 |
| 85 and older* | 1,602 | 1,389 |

* Net of Medicare

Table 3

## 1991 Per Capita Claims Costs -- Non-Management Plans

### COMPREHENSIVE HEALTH CARE PLAN

| AGE | RETIREE | SPOUSE |
|---|---|---|
| 45-49 | $1,656 | $1,029 |
| 50-54 | 1,920 | 1,192 |
| 55-59 | 2,316 | 1,438 |
| 60-64 | 2,800 | 1,738 |
| 65-69* | 1,074 | 907 |
| 70-74* | 1,202 | 1,016 |
| 75-79* | 1,346 | 1,137 |
| 80-84* | 1,474 | 1,246 |
| 85 and older* | 1,528 | 1,291 |

### MEDICAL EXPENSE PLAN

| AGE | RETIREE | SPOUSE |
|---|---|---|
| 45-49 | $3,823 | $2,279 |
| 50-54 | 4,431 | 2,642 |
| 55-59 | 5,345 | 3,186 |
| 60-64 | 6,461 | 3,852 |
| 65-69* | 1,143 | 1,032 |
| 70-74* | 1,279 | 1,155 |
| 75-79* | 1,433 | 1,293 |
| 80-84* | 1,570 | 1,416 |
| 85 and older* | 1,627 | 1,468 |

* Net of Medicare

TABLE 4

**1991 ACTUARIAL ASSUMPTIONS**

**AMERITECH MANAGEMENT MALE EMPLOYEES**

**ANNUAL RATES OF SEPARATION BEFORE RETIREMENT**

| service in year t | rates of separation during year t + 1/2 to t + 1 1/2 for employees entering service at age: | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 |
| 0 | 0.105 | 0.105 | 0.105 | 0.102 | 0.096 | 0.091 | 0.088 | 0.089 |
| 1 | 0.074 | 0.072 | 0.070 | 0.066 | 0.062 | 0.059 | 0.058 | 0.059 |
| 2 | 0.046 | 0.045 | 0.044 | 0.042 | 0.040 | 0.037 | 0.035 | 0.036 |
| 3 | 0.020 | 0.026 | 0.032 | 0.032 | 0.025 | 0.025 | 0.031 | 0.031 |
| 4 | 0.018 | 0.019 | 0.027 | 0.025 | 0.018 | 0.020 | 0.022 | 0.026 |
| 5 | 0.014 | 0.016 | 0.024 | 0.021 | 0.016 | 0.016 | 0.019 | 0.022 |
| 6 | 0.012 | 0.014 | 0.021 | 0.018 | 0.016 | 0.015 | 0.016 | 0.020 |
| 7 | 0.011 | 0.013 | 0.018 | 0.016 | 0.016 | 0.013 | 0.014 | 0.024 |
| 8 | 0.009 | 0.011 | 0.016 | 0.015 | 0.016 | 0.013 | 0.013 | 0.028 |
| 9 | 0.009 | 0.010 | 0.013 | 0.014 | 0.013 | 0.011 | 0.014 | 0.032 |
| 10 | 0.008 | 0.008 | 0.012 | 0.013 | 0.012 | 0.010 | 0.017 | 0.036 |
| 11 | 0.008 | 0.008 | 0.010 | 0.011 | 0.010 | 0.009 | 0.020 | 0.040 |
| 12 | 0.008 | 0.008 | 0.009 | 0.009 | 0.009 | 0.010 | 0.024 | 0.046 |
| 13 | 0.007 | 0.007 | 0.008 | 0.008 | 0.009 | 0.012 | 0.028 | 0.052 |
| 14 | 0.007 | 0.007 | 0.008 | 0.007 | 0.009 | 0.014 | 0.032 | |
| 15 | 0.006 | 0.006 | 0.006 | 0.006 | 0.009 | 0.017 | 0.036 | |
| 16 | 0.005 | 0.005 | 0.006 | 0.006 | 0.009 | 0.020 | 0.040 | |
| 17 | 0.005 | 0.005 | 0.005 | 0.006 | 0.010 | 0.024 | 0.046 | |
| 18 | 0.004 | 0.004 | 0.005 | 0.006 | 0.012 | 0.028 | 0.052 | |
| 19 | 0.004 | 0.004 | 0.005 | 0.007 | | | | |
| 20 | 0.004 | 0.004 | 0.005 | 0.008 | | | | |
| 21 | 0.004 | 0.004 | 0.006 | 0.009 | | | | |
| 22 | 0.004 | 0.004 | 0.006 | 0.010 | | | | |
| 23 | 0.004 | 0.004 | 0.006 | 0.012 | | | | |
| 24 | 0.004 | 0.004 | | | | | | |
| 25 | 0.004 | 0.005 | | | | | | |
| 26 | 0.004 | 0.005 | | | | | | |
| 27 | 0.005 | 0.006 | | | | | | |
| 28 | 0.005 | 0.006 | | | | | | |

**Source:** Industry-wide management experience

**Note:** Based on separations for all causes.

TABLE 5

**1991 ACTUARIAL ASSUMPTIONS**

**AMERITECH MANAGEMENT FEMALE EMPLOYEES**

**ANNUAL RATES OF SEPARATION BEFORE RETIREMENT**

| service in years t | rates of separation during year t + 1/2 to t + 1 1/2 for employees entering service at age: | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 |
| 0 | 0.095 | 0.095 | 0.094 | 0.092 | 0.088 | 0.084 | 0.080 | 0.080 |
| 1 | 0.083 | 0.082 | 0.077 | 0.072 | 0.068 | 0.064 | 0.064 | 0.066 |
| 2 | 0.070 | 0.069 | 0.065 | 0.057 | 0.047 | 0.039 | 0.033 | 0.032 |
| 3 | 0.058 | 0.058 | 0.056 | 0.046 | 0.029 | 0.025 | 0.027 | 0.032 |
| 4 | 0.050 | 0.051 | 0.052 | 0.038 | 0.020 | 0.019 | 0.021 | 0.031 |
| 5 | 0.042 | 0.044 | 0.047 | 0.032 | 0.017 | 0.014 | 0.016 | 0.030 |
| 6 | 0.040 | 0.040 | 0.042 | 0.027 | 0.015 | 0.013 | 0.014 | 0.029 |
| 7 | 0.040 | 0.038 | 0.031 | 0.024 | 0.015 | 0.013 | 0.013 | 0.022 |
| 8 | 0.039 | 0.034 | 0.024 | 0.017 | 0.015 | 0.013 | 0.013 | 0.025 |
| 9 | 0.036 | 0.030 | 0.021 | 0.014 | 0.014 | 0.013 | 0.013 | 0.030 |
| 10 | 0.034 | 0.027 | 0.018 | 0.013 | 0.014 | 0.014 | 0.014 | 0.030 |
| 11 | 0.030 | 0.023 | 0.016 | 0.010 | 0.013 | 0.014 | 0.015 | 0.030 |
| 12 | 0.026 | 0.020 | 0.016 | 0.010 | 0.011 | 0.015 | 0.016 | 0.030 |
| 13 | 0.023 | 0.019 | 0.015 | 0.010 | 0.010 | 0.016 | 0.016 | 0.030 |
| 14 | 0.020 | 0.018 | 0.014 | 0.010 | 0.009 | 0.016 | 0.020 | |
| 15 | 0.017 | 0.016 | 0.013 | 0.010 | 0.010 | 0.017 | 0.022 | |
| 16 | 0.013 | 0.012 | 0.012 | 0.009 | 0.011 | 0.017 | 0.023 | |
| 17 | 0.011 | 0.010 | 0.010 | 0.009 | 0.011 | 0.017 | 0.024 | |
| 18 | 0.009 | 0.009 | 0.009 | 0.009 | 0.012 | 0.017 | 0.027 | |
| 19 | 0.007 | 0.008 | 0.009 | 0.009 | | | | |
| 20 | 0.007 | 0.008 | 0.009 | 0.010 | | | | |
| 21 | 0.007 | 0.008 | 0.009 | 0.011 | | | | |
| 22 | 0.007 | 0.007 | 0.008 | 0.011 | | | | |
| 23 | 0.007 | 0.007 | 0.008 | 0.012 | | | | |
| 24 | 0.007 | 0.007 | | | | | | |
| 25 | 0.007 | 0.007 | | | | | | |
| 26 | 0.006 | 0.007 | | | | | | |
| 27 | 0.006 | 0.008 | | | | | | |
| 28 | 0.006 | 0.008 | | | | | | |

**Source:** Industry-wide management experience

**Note:** Based on separations for all causes.

TABLE 6

**1991 ACTUARIAL ASSUMPTIONS**

**AMERITECH NON-MANAGEMENT MALE EMPLOYEES**

**ANNUAL RATES OF SEPARATION BEFORE RETIREMENT**

| service in years t | rates of separation during year t + 1/2 to t + 1 1/2 for employees entering service at age | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 |
| 0 | 0.198 | 0.186 | 0.158 | 0.135 | 0.120 | 0.115 | 0.117 | 0.120 |
| 1 | 0.121 | 0.111 | 0.087 | 0.068 | 0.053 | 0.044 | 0.045 | 0.046 |
| 2 | 0.079 | 0.070 | 0.056 | 0.046 | 0.042 | 0.040 | 0.039 | 0.040 |
| 3 | 0.059 | 0.051 | 0.037 | 0.034 | 0.029 | 0.030 | 0.030 | 0.028 |
| 4 | 0.040 | 0.035 | 0.026 | 0.026 | 0.021 | 0.026 | 0.026 | 0.025 |
| 5 | 0.029 | 0.026 | 0.019 | 0.021 | 0.017 | 0.022 | 0.022 | 0.025 |
| 6 | 0.023 | 0.021 | 0.016 | 0.017 | 0.013 | 0.019 | 0.020 | 0.024 |
| 7 | 0.020 | 0.019 | 0.015 | 0.015 | 0.012 | 0.017 | 0.019 | 0.024 |
| 8 | 0.017 | 0.016 | 0.013 | 0.014 | 0.011 | 0.015 | 0.018 | 0.028 |
| 9 | 0.014 | 0.014 | 0.012 | 0.012 | 0.011 | 0.015 | 0.018 | 0.032 |
| 10 | 0.012 | 0.012 | 0.011 | 0.011 | 0.010 | 0.015 | 0.020 | 0.037 |
| 11 | 0.010 | 0.010 | 0.010 | 0.011 | 0.010 | 0.015 | 0.026 | 0.040 |
| 12 | 0.009 | 0.010 | 0.009 | 0.010 | 0.011 | 0.017 | 0.029 | 0.046 |
| 13 | 0.009 | 0.010 | 0.009 | 0.010 | 0.011 | 0.017 | 0.030 | 0.053 |
| 14 | 0.009 | 0.010 | 0.008 | 0.010 | 0.012 | 0.019 | 0.032 | |
| 15 | 0.009 | 0.009 | 0.008 | 0.010 | 0.012 | 0.020 | 0.036 | |
| 16 | 0.008 | 0.008 | 0.008 | 0.010 | 0.013 | 0.022 | 0.040 | |
| 17 | 0.007 | 0.008 | 0.008 | 0.009 | 0.013 | 0.025 | 0.046 | |
| 18 | 0.007 | 0.008 | 0.008 | 0.009 | 0.013 | 0.028 | 0.053 | |
| 19 | 0.006 | 0.008 | 0.008 | 0.010 | | | | |
| 20 | 0.006 | 0.008 | 0.008 | 0.011 | | | | |
| 21 | 0.006 | 0.008 | 0.008 | 0.011 | | | | |
| 22 | 0.006 | 0.008 | 0.008 | 0.011 | | | | |
| 23 | 0.006 | 0.008 | 0.008 | 0.012 | | | | |
| 24 | 0.007 | 0.008 | 0.008 | | | | | |
| 25 | 0.007 | 0.008 | 0.008 | | | | | |
| 26 | 0.008 | 0.008 | 0.008 | | | | | |
| 27 | 0.008 | 0.008 | 0.008 | | | | | |
| 28 | 0.008 | 0.008 | 0.008 | | | | | |

**Source:** Industry-wide non-management experience

**Note:** Based on separations for all causes.

TABLE 7

**1991 ACTUARIAL ASSUMPTIONS**

**AMERITECH NON-MANAGEMENT FEMALE EMPLOYEES**

**ANNUAL RATES OF SEPARATION BEFORE RETIREMENT**

| service in years t | rates of separation during year t + 1/2 to t + 1 1/2 for employees entering service at age: | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 |
| 0 | 0.208 | 0.194 | 0.164 | 0.136 | 0.113 | 0.096 | 0.087 | 0.088 |
| 1 | 0.148 | 0.139 | 0.115 | 0.094 | 0.075 | 0.063 | 0.057 | 0.061 |
| 2 | 0.116 | 0.107 | 0.087 | 0.067 | 0.051 | 0.039 | 0.032 | 0.034 |
| 3 | 0.079 | 0.081 | 0.072 | 0.056 | 0.040 | 0.034 | 0.035 | 0.032 |
| 4 | 0.071 | 0.071 | 0.058 | 0.045 | 0.033 | 0.031 | 0.030 | 0.032 |
| 5 | 0.066 | 0.064 | 0.048 | 0.037 | 0.029 | 0.029 | 0.029 | 0.031 |
| 6 | 0.062 | 0.057 | 0.044 | 0.029 | 0.026 | 0.027 | 0.028 | 0.031 |
| 7 | 0.057 | 0.050 | 0.037 | 0.025 | 0.024 | 0.025 | 0.028 | 0.031 |
| 8 | 0.053 | 0.046 | 0.030 | 0.023 | 0.022 | 0.024 | 0.028 | 0.033 |
| 9 | 0.049 | 0.042 | 0.026 | 0.023 | 0.022 | 0.024 | 0.028 | 0.033 |
| 10 | 0.044 | 0.039 | 0.026 | 0.022 | 0.022 | 0.023 | 0.028 | 0.035 |
| 11 | 0.040 | 0.035 | 0.026 | 0.022 | 0.021 | 0.023 | 0.028 | 0.041 |
| 12 | 0.035 | 0.031 | 0.024 | 0.022 | 0.021 | 0.023 | 0.028 | 0.046 |
| 13 | 0.031 | 0.027 | 0.022 | 0.022 | 0.021 | 0.023 | 0.028 | 0.055 |
| 14 | 0.029 | 0.026 | 0.020 | 0.022 | 0.021 | 0.022 | 0.030 | |
| 15 | 0.026 | 0.024 | 0.020 | 0.022 | 0.021 | 0.021 | 0.030 | |
| 16 | 0.022 | 0.021 | 0.020 | 0.021 | 0.020 | 0.021 | 0.030 | |
| 17 | 0.020 | 0.020 | 0.020 | 0.020 | 0.020 | 0.020 | 0.030 | |
| 18 | 0.018 | 0.018 | 0.020 | 0.020 | 0.018 | 0.020 | 0.030 | |
| 19 | 0.018 | 0.018 | 0.019 | 0.020 | | | | |
| 20 | 0.017 | 0.018 | 0.019 | 0.020 | | | | |
| 21 | 0.017 | 0.018 | 0.018 | 0.018 | | | | |
| 22 | 0.016 | 0.017 | 0.017 | 0.016 | | | | |
| 23 | 0.016 | 0.016 | 0.016 | 0.017 | | | | |
| 24 | 0.015 | 0.015 | | | | | | |
| 25 | 0.015 | 0.015 | | | | | | |
| 26 | 0.015 | 0.015 | | | | | | |
| 27 | 0.014 | 0.015 | | | | | | |
| 28 | 0.013 | 0.014 | | | | | | |

**Source:** Industry-wide non-management experience

**Note:** Based on separations for all causes.

TABLE 9

**1991 ACTUARIAL ASSUMPTIONS**

**AMERITECH MANAGEMENT MALE EMPLOYEES**

**ANNUAL RATES OF RETIREMENT ON SERVICE PENSION**

| service in years t | rates of retirement during year t + 1/2 to t + 1 1/2 for employees entering service at age: | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 |
| 14 | | | | | | | | 0.5000 |
| 15 | | | | | | | | 0.3000 |
| 16 | | | | | | | | 0.3000 |
| 17 | | | | | | | | 0.3000 |
| 18 | | | | | | | | 0.3000 |
| 19 | | | | | 0.0600 | 0.0860 | 0.5000 | 0.9903 |
| 20 | | | | | 0.0360 | 0.0500 | 0.3000 | |
| 21 | | | | | 0.0320 | 0.1350 | 0.3000 | |
| 22 | | | | | 0.0340 | 0.2110 | 0.3000 | |
| 23 | | | | | 0.0410 | 0.1680 | 0.3000 | |
| 24 | | | 0.0160 | 0.0310 | 0.0630 | 0.5000 | 0.9903 | |
| 25 | | | 0.0150 | 0.0260 | 0.0720 | 0.3000 | | |
| 26 | | | 0.0160 | 0.0340 | 0.1860 | 0.3000 | | |
| 27 | | | 0.0180 | 0.0460 | 0.2610 | 0.3000 | | |
| 28 | | | 0.0210 | 0.0610 | 0.2180 | 0.3000 | | |
| 29 | 0.0130 | 0.0130 | 0.0340 | 0.0970 | 0.5000 | 0.9903 | | |
| 30 | 0.0120 | 0.0130 | 0.0410 | 0.1260 | 0.3000 | | | |
| 31 | 0.0120 | 0.0180 | 0.0480 | 0.2350 | 0.3000 | | | |
| 32 | 0.0120 | 0.0220 | 0.0630 | 0.3070 | 0.3000 | | | |
| 33 | 0.0140 | 0.0240 | 0.0810 | 0.2640 | 0.3000 | | | |
| 34 | 0.0150 | 0.0530 | 0.1170 | 0.5000 | 0.9903 | | | |
| 35 | 0.0160 | 0.0620 | 0.1610 | 0.3000 | | | | |
| 36 | 0.0190 | 0.0710 | 0.2700 | 0.3000 | | | | |
| 37 | 0.0240 | 0.0900 | 0.3400 | 0.3000 | | | | |
| 38 | 0.0270 | 0.1100 | 0.2890 | 0.3000 | | | | |
| 39 | 0.0740 | 0.1480 | 0.5000 | 0.9903 | | | | |
| 40 | 0.0850 | 0.1960 | 0.3000 | | | | | |
| 41 | 0.0950 | 0.3030 | 0.3000 | | | | | |
| 42 | 0.1140 | 0.3620 | 0.3000 | | | | | |
| 43 | 0.1420 | 0.2970 | 0.3000 | | | | | |
| 44 | 0.1800 | 0.5000 | 0.9903 | | | | | |
| 45 | 0.2200 | 0.3000 | | | | | | |
| 46 | 0.3260 | 0.3000 | | | | | | |
| 47 | 0.3740 | 0.3000 | | | | | | |
| 48 | 0.3030 | 0.3000 | | | | | | |
| 49 | 0.5000 | 0.9903 | | | | | | |
| 50 | 0.3000 | | | | | | | |
| 51 | 0.3000 | | | | | | | |
| 52 | 0.3000 | | | | | | | |
| 53 | 0.3000 | | | | | | | |
| 54 | 0.9903 | | | | | | | |

Source: Industry-wide management experience

TABLE 10

**1991 ACTUARIAL ASSUMPTIONS**

**AMERITECH MANAGEMENT FEMALE EMPLOYEES**

**ANNUAL RATES OF RETIREMENT ON SERVICE PENSION**

| service in years t | rates of retirement during year t + 1/2 to t + 1 1/2 for employees entering service at age: | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 |
| 14 | | | | | | | | 0.5000 |
| 15 | | | | | | | | 0.3000 |
| 16 | | | | | | | | 0.3000 |
| 17 | | | | | | | | 0.3000 |
| 18 | | | | | | | | 0.3000 |
| 19 | | | | | 0.1800 | 0.3540 | 0.5000 | 0.9949 |
| 20 | | | | | 0.1260 | 0.1360 | 0.3000 | |
| 21 | | | | | 0.1260 | 0.2850 | 0.3000 | |
| 22 | | | | | 0.1290 | 0.3240 | 0.3000 | |
| 23 | | | | | 0.1330 | 0.2700 | 0.3000 | |
| 24 | | | 0.0610 | 0.1040 | 0.1340 | 0.5000 | 0.9949 | |
| 25 | | | 0.0400 | 0.0960 | 0.1460 | 0.3000 | | |
| 26 | | | 0.0420 | 0.1210 | 0.2870 | 0.3000 | | |
| 27 | | | 0.0460 | 0.1290 | 0.3270 | 0.3000 | | |
| 28 | | | 0.0470 | 0.1310 | 0.2770 | 0.3000 | | |
| 29 | 0.0400 | 0.0450 | 0.0690 | 0.1390 | 0.5000 | 0.9949 | | |
| 30 | 0.2900 | 0.0320 | 0.0790 | 0.1610 | 0.3000 | | | |
| 31 | 0.0340 | 0.0400 | 0.1010 | 0.2900 | 0.3000 | | | |
| 32 | 0.0380 | 0.0440 | 0.1250 | 0.3350 | 0.3000 | | | |
| 33 | 0.0460 | 0.0460 | 0.1340 | 0.2920 | 0.3000 | | | |
| 34 | 0.0490 | 0.0930 | 0.1520 | 0.5000 | 0.9949 | | | |
| 35 | 0.0520 | 0.1010 | 0.1810 | 0.3000 | | | | |
| 36 | 0.0540 | 0.1200 | 0.3000 | 0.3000 | | | | |
| 37 | 0.0560 | 0.1320 | 0.3490 | 0.3000 | | | | |
| 38 | 0.0590 | 0.1360 | 0.3150 | 0.3000 | | | | |
| 39 | 0.1030 | 0.1640 | 0.5000 | 0.9949 | | | | |
| 40 | 0.1160 | 0.2040 | 0.3000 | | | | | |
| 41 | 0.1290 | 0.3200 | 0.3000 | | | | | |
| 42 | 0.1350 | 0.3750 | 0.3000 | | | | | |
| 43 | 0.1450 | 0.3440 | 0.3000 | | | | | |
| 44 | 0.1740 | 0.5000 | 0.9949 | | | | | |
| 45 | 0.2120 | 0.3000 | | | | | | |
| 46 | 0.3490 | 0.3000 | | | | | | |
| 47 | 0.3980 | 0.3000 | | | | | | |
| 48 | 0.3680 | 0.3000 | | | | | | |
| 49 | 0.5000 | 0.9949 | | | | | | |
| 50 | 0.3000 | | | | | | | |
| 51 | 0.3000 | | | | | | | |
| 52 | 0.3000 | | | | | | | |
| 53 | 0.3000 | | | | | | | |
| 54 | 0.9949 | | | | | | | |

**Source:** Industry-wide management experience

TABLE 11

**1991 ACTUARIAL ASSUMPTIONS**

**AMERITECH NON-MANAGEMENT MALE EMPLOYEES**

**ANNUAL RATES OF RETIREMENT ON SERVICE PENSION**

| service in years t | rates of retirement during year t + 1/2 to t + 1 1/2 for employees entering service at age: | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 |
| 14 | | | | | | | | 0.5000 |
| 15 | | | | | | | | 0.3000 |
| 16 | | | | | | | | 0.3000 |
| 17 | | | | | | | | 0.3000 |
| 18 | | | | | | | | 0.3000 |
| 19 | | | | | 0.0550 | 0.0900 | 0.5000 | 0.9903 |
| 20 | | | | | 0.0420 | 0.0650 | 0.3000 | |
| 21 | | | | | 0.0300 | 0.2090 | 0.3000 | |
| 22 | | | | | 0.0330 | 0.2790 | 0.3000 | |
| 23 | | | | | 0.0410 | 0.2060 | 0.3000 | |
| 24 | | | 0.0160 | 0.0330 | 0.0440 | 0.5000 | 0.9903 | |
| 25 | | | 0.0150 | 0.0260 | 0.0560 | 0.3000 | | |
| 26 | | | 0.0160 | 0.0280 | 0.2270 | 0.3000 | | |
| 27 | | | 0.0170 | 0.0360 | 0.2930 | 0.3000 | | |
| 28 | | | 0.0190 | 0.0430 | 0.2200 | 0.3000 | | |
| 29 | 0.0210 | 0.0225 | 0.0320 | 0.0500 | 0.5000 | 0.9903 | | |
| 30 | 0.0180 | 0.0195 | 0.0390 | 0.0700 | 0.3000 | | | |
| 31 | 0.0195 | 0.0270 | 0.0430 | 0.2540 | 0.3000 | | | |
| 32 | 0.0210 | 0.0345 | 0.0460 | 0.3190 | 0.3000 | | | |
| 33 | 0.0225 | 0.0390 | 0.0540 | 0.2350 | 0.3000 | | | |
| 34 | 0.0225 | 0.0460 | 0.0670 | 0.5000 | 0.9903 | | | |
| 35 | 0.0270 | 0.0530 | 0.0880 | 0.3000 | | | | |
| 36 | 0.0315 | 0.0590 | 0.2850 | 0.3000 | | | | |
| 37 | 0.0375 | 0.0640 | 0.3540 | 0.3000 | | | | |
| 38 | 0.0405 | 0.0730 | 0.2520 | 0.3000 | | | | |
| 39 | 0.0520 | 0.0910 | 0.5000 | 0.9903 | | | | |
| 40 | 0.0580 | 0.1080 | 0.3000 | | | | | |
| 41 | 0.0620 | 0.3300 | 0.3000 | | | | | |
| 42 | 0.0680 | 0.3930 | 0.3000 | | | | | |
| 43 | 0.0790 | 0.2720 | 0.3000 | | | | | |
| 44 | 0.0980 | 0.5000 | 0.9903 | | | | | |
| 45 | 0.1160 | 0.3000 | | | | | | |
| 46 | 0.3510 | 0.3000 | | | | | | |
| 47 | 0.4110 | 0.3000 | | | | | | |
| 48 | 0.2830 | 0.3000 | | | | | | |
| 49 | 0.5000 | 0.9903 | | | | | | |
| 50 | 0.3000 | | | | | | | |
| 51 | 0.3000 | | | | | | | |
| 52 | 0.3000 | | | | | | | |
| 53 | 0.3000 | | | | | | | |
| 54 | 0.9903 | | | | | | | |

**Source:** Industry-wide non-management experience

TABLE 12

**1991 ACTUARIAL ASSUMPTIONS**

**AMERITECH NON-MANAGEMENT FEMALE EMPLOYEES**

**ANNUAL RATES OF RETIREMENT ON SERVICE PENSION**

| service in years t | rates of retirement during year t + 1/2 to t + 1 1/2 for employees entering service at age: | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 |
| 14 | | | | | | | | 0.5000 |
| 15 | | | | | | | | 0.3000 |
| 16 | | | | | | | | 0.3000 |
| 17 | | | | | | | | 0.3000 |
| 18 | | | | | | | | 0.3000 |
| 19 | | | | | 0.1830 | 0.2500 | 0.5000 | 0.9949 |
| 20 | | | | | 0.1090 | 0.1260 | 0.3000 | |
| 21 | | | | | 0.0950 | 0.2840 | 0.3000 | |
| 22 | | | | | 0.0950 | 0.3030 | 0.3000 | |
| 23 | | | | | 0.0980 | 0.2640 | 0.3000 | |
| 24 | | | 0.0900 | 0.1300 | 0.1070 | 0.5000 | 0.9949 | |
| 25 | | | 0.0510 | 0.0850 | 0.1100 | 0.3000 | | |
| 26 | | | 0.0520 | 0.0900 | 0.2880 | 0.3000 | | |
| 27 | | | 0.0550 | 0.0950 | 0.3100 | 0.3000 | | |
| 28 | | | 0.0580 | 0.1000 | 0.2700 | 0.3000 | | |
| 29 | 0.0600 | 0.0775 | 0.0800 | 0.1110 | 0.5000 | 0.9949 | | |
| 30 | 0.0513 | 0.0550 | 0.0870 | 0.1160 | 0.3000 | | | |
| 31 | 0.0513 | 0.0650 | 0.0930 | 0.2960 | 0.3000 | | | |
| 32 | 0.0525 | 0.0700 | 0.0990 | 0.3220 | 0.3000 | | | |
| 33 | 0.0588 | 0.0825 | 0.1050 | 0.2790 | 0.3000 | | | |
| 34 | 0.0650 | 0.0990 | 0.1180 | 0.5000 | 0.9949 | | | |
| 35 | 0.0713 | 0.1040 | 0.1260 | 0.3000 | | | | |
| 36 | 0.0788 | 0.1100 | 0.3120 | 0.3000 | | | | |
| 37 | 0.0863 | 0.1140 | 0.3460 | 0.3000 | | | | |
| 38 | 0.0963 | 0.1200 | 0.2930 | 0.3000 | | | | |
| 39 | 0.1170 | 0.1320 | 0.5000 | 0.9949 | | | | |
| 40 | 0.1160 | 0.1430 | 0.3000 | | | | | |
| 41 | 0.1210 | 0.3400 | 0.3000 | | | | | |
| 42 | 0.1270 | 0.3810 | 0.3000 | | | | | |
| 43 | 0.1330 | 0.3120 | 0.3000 | | | | | |
| 44 | 0.1460 | 0.5000 | 0.9949 | | | | | |
| 45 | 0.1550 | 0.3000 | | | | | | |
| 46 | 0.3660 | 0.3000 | | | | | | |
| 47 | 0.4080 | 0.3000 | | | | | | |
| 48 | 0.3280 | 0.3000 | | | | | | |
| 49 | 0.5000 | 0.9949 | | | | | | |
| 50 | 0.3000 | | | | | | | |
| 51 | 0.3000 | | | | | | | |
| 52 | 0.3000 | | | | | | | |
| 53 | 0.3000 | | | | | | | |
| 54 | 0.9949 | | | | | | | |

**Source:** Industry-wide non-management experience

TABLE 13

**1991 ACTUARIAL ASSUMPTIONS**

**AMERITECH ACTIVE EMPLOYEES**

**ANNUAL RATES OF MORTALITY**

| Age x | rates of mortality during year of age x + 1/2 to x + 1 1/2 | | Age x | rates of mortality during year of age x + 1/2 to x + 1 1/2 | |
|---|---|---|---|---|---|
| | Male | Female | | Male | Female |
| 15 | 0.0011 | 0.0003 | 43 | 0.0021 | 0.0013 |
| 16 | 0.0011 | 0.0003 | 44 | 0.0024 | 0.0015 |
| 17 | 0.0011 | 0.0003 | 45 | 0.0027 | 0.0017 |
| 18 | 0.0011 | 0.0003 | 46 | 0.0030 | 0.0019 |
| 19 | 0.0010 | 0.0003 | 47 | 0.0034 | 0.0021 |
| 20 | 0.0010 | 0.0003 | 48 | 0.0038 | 0.0022 |
| 21 | 0.0009 | 0.0003 | 49 | 0.0041 | 0.0024 |
| 22 | 0.0009 | 0.0004 | 50 | 0.0045 | 0.0025 |
| 23 | 0.0008 | 0.0004 | 51 | 0.0050 | 0.0026 |
| 24 | 0.0008 | 0.0004 | 52 | 0.0055 | 0.0027 |
| 25 | 0.0008 | 0.0004 | 53 | 0.0061 | 0.0030 |
| 26 | 0.0008 | 0.0004 | 54 | 0.0068 | 0.0033 |
| 27 | 0.0008 | 0.0004 | 55 | 0.0075 | 0.0037 |
| 28 | 0.0007 | 0.0005 | 56 | 0.0083 | 0.0040 |
| 29 | 0.0007 | 0.0005 | 57 | 0.0092 | 0.0044 |
| 30 | 0.0007 | 0.0006 | 58 | 0.0102 | 0.0049 |
| 31 | 0.0007 | 0.0005 | 59 | 0.0111 | 0.0053 |
| 32 | 0.0007 | 0.0007 | 60 | 0.0121 | 0.0058 |
| 33 | 0.0007 | 0.0007 | 61 | 0.0132 | 0.0063 |
| 34 | 0.0008 | 0.0008 | 62 | 0.0143 | 0.0068 |
| 35 | 0.0008 | 0.0008 | 63 | 0.0154 | 0.0074 |
| 36 | 0.0009 | 0.0008 | 64 | 0.0165 | 0.0080 |
| 37 | 0.0011 | 0.0009 | 65 | 0.0177 | 0.0086 |
| 38 | 0.0012 | 0.0009 | 66 | 0.0190 | 0.0093 |
| 39 | 0.0013 | 0.0010 | 67 | 0.0202 | 0.0101 |
| 40 | 0.0015 | 0.0010 | 68 | 0.0215 | 0.0110 |
| 41 | 0.0016 | 0.0011 | 69 | 0.0228 | 0.0119 |
| 42 | 0.0018 | 0.0012 | | | |

**Source: Industry-wide experience**

TABLE 14

**1991 ACTUARIAL ASSUMPTIONS**

**AMERITECH SERVICE PENSIONERS**

**ANNUAL RATES OF MORTALITY**

| Age x | rates of mortality during year of age x to x + 1 | | Age x | rates of mortality during year of age x to x + 1 | |
|---|---|---|---|---|---|
| | Male | Female | | Male | Female |
| 45 | .0180 | .0090 | 78 | .0660 | .0400 |
| 46 | .0180 | .0090 | 79 | .0720 | .0440 |
| 47 | .0180 | .0090 | 80 | .0780 | .0480 |
| 48 | .0180 | .0090 | 81 | .0840 | .0530 |
| 49 | .0180 | .0090 | 82 | .0900 | .0600 |
| 50 | .0180 | .0090 | 83 | .0980 | .0680 |
| 51 | .0180 | .0090 | 84 | .1080 | .0760 |
| 52 | .0180 | .0090 | 85 | .1190 | .0880 |
| 53 | .0180 | .0090 | 86 | .1320 | .0970 |
| 54 | .0180 | .0090 | 87 | .1450 | .1060 |
| 55 | .0180 | .0090 | 88 | .1570 | .1170 |
| 56 | .0180 | .0090 | 89 | .1730 | .1270 |
| 57 | .0180 | .0090 | 90 | .1870 | .1390 |
| 58 | .0180 | .0090 | 91 | .2020 | .1510 |
| 59 | .0180 | .0090 | 92 | .2170 | .1650 |
| 60 | .0180 | .0090 | 93 | .2330 | .1800 |
| 61 | .0180 | .0090 | 94 | .2480 | .1970 |
| 62 | .0180 | .0100 | 95 | .2650 | .2160 |
| 63 | .0190 | .0100 | 96 | .2820 | .2370 |
| 64 | .0200 | .0110 | 97 | .3000 | .2580 |
| 65 | .0210 | .0120 | 98 | .3190 | .2800 |
| 66 | .0220 | .0120 | 99 | .3400 | .3050 |
| 67 | .0240 | .0130 | 100 | .3630 | .3320 |
| 68 | .0260 | .0150 | 101 | .3880 | .3610 |
| 69 | .0280 | .0160 | 102 | .4150 | .3940 |
| 70 | .0310 | .0180 | 103 | .4470 | .4300 |
| 71 | .0340 | .0200 | 104 | .4860 | .4700 |
| 72 | .0370 | .0220 | 105 | .5340 | .5190 |
| 73 | .0410 | .0250 | 106 | .5870 | .5750 |
| 74 | .0460 | .0270 | 107 | .6500 | .6350 |
| 75 | .0500 | .0300 | 108 | .7320 | .7030 |
| 76 | .0550 | .0340 | 109 | .8520 | .8060 |
| 77 | .0600 | .0370 | 110 | 1.0000 | 1.0000 |

* For ages prior to 45, the mortality rate is assumed constant at that age value.

Source: Experience of industry-wide service pensioners

TABLE 15

## 1991 ACTUARIAL ASSUMPTIONS

### PERCENTAGE OF ACTIVE AND RETIRED EMPLOYEES DYING WHO HAVE QUALIFIED BENEFICIARIES

| Attained age at beginning of year of death | % Qual. Ben. Active Employees | | Attained age at beginning of year of death | % Qual. Ben. Active Employees | | % Qual. Ben. Retired Employees | | Attained age at beginning of year of death | % Qual. Ben. Retired Employees | |
|---|---|---|---|---|---|---|---|---|---|---|
| | M | F | | M | F | M | F | | M | F |
| 15 | 0% | 0% | 40 | 94% | 76% | 83% | 65% | 70 | 82% | 29% |
| 16 | 0 | 0 | 41 | 94 | 75 | 83 | 65 | 71 | 81 | 27 |
| 17 | 0 | 13 | 42 | 94 | 74 | 83 | 65 | 72 | 80 | 25 |
| 18 | 8 | 23 | 43 | 95 | 73 | 83 | 65 | 73 | 79 | 23 |
| 19 | 18 | 33 | 44 | 95 | 72 | 83 | 65 | 74 | 78 | 21 |
| 20 | 28 | 40 | 45 | 95 | 71 | 83 | 65 | 75 | 77 | 18 |
| 21 | 37 | 46 | 46 | 95 | 70 | 83 | 65 | 76 | 75 | 16 |
| 22 | 46 | 51 | 47 | 95 | 68 | 83 | 65 | 77 | 73 | 15 |
| 23 | 53 | 56 | 48 | 94 | 67 | 83 | 65 | 78 | 71 | 13 |
| 24 | 60 | 59 | 49 | 94 | 66 | 83 | 65 | 79 | 69 | 11 |
| 25 | 66 | 62 | 50 | 94 | 64 | 83 | 65 | 80 | 68 | 10 |
| 26 | 71 | 64 | 51 | 93 | 62 | 83 | 64 | 81 | 66 | 8 |
| 27 | 75 | 66 | 52 | 93 | 60 | 83 | 63 | 82 | 64 | 7 |
| 28 | 79 | 68 | 53 | 93 | 57 | 83 | 63 | 83 | 62 | 6 |
| 29 | 82 | 70 | 54 | 92 | 54 | 83 | 62 | 84 | 59 | 6 |
| 30 | 85 | 71 | 55 | 92 | 51 | 83 | 61 | 85 | 56 | 5 |
| 31 | 87 | 73 | 56 | 92 | 48 | 83 | 60 | 86 | 53 | 5 |
| 32 | 88 | 74 | 57 | 91 | 46 | 83 | 58 | 87 | 50 | 5 |
| 33 | 90 | 76 | 58 | 91 | 43 | 83 | 56 | 88 | 46 | 4 |
| 34 | 91 | 77 | 59 | 90 | 41 | 83 | 53 | 89 | 43 | 4 |
| 35 | 91 | 78 | 60 | 90 | 38 | 84 | 51 | 90 | 40 | 4 |
| 36 | 92 | 78 | 61 | 89 | 35 | 84 | 49 | 9[illegible] | 37 | 3 |
| 37 | 92 | 78 | 62 | 89 | 32 | 84 | 46 | 9[illegible] | 33 | 3 |
| 38 | 93 | 78 | 63 | 88 | 29 | 84 | 44 | 93 | 29 | 2 |
| 39 | 93 | 77 | 64 | 87 | 26 | 84 | 41 | 94 | 25 | 2 |
| | | | 65 | 86 | 23 | 87 | 38 | 95 | 20 | 1 |
| | | | 66 | 85 | 20 | 86 | 36 | 96 | 14 | 1 |
| | | | 67 | 84 | 16 | 85 | 34 | 97 | 7 | 1 |
| | | | 68 | 83 | 12 | 84 | 32 | 98 | 1 | 1 |
| | | | 69 | 82 | 6 | 83 | 30 | 99-110 | 1 | 1 |

Source: Industry-wide experience

***Response to Paragraph 16***

***of FCC Order of Investigation and Suspension***

***CC Docket No. 92 - 101***

***May 26, 1992***

Godwins

Paragraph 16 requests information that can be used in a serious impartial evaluation of a macroeconomic model and its results. Ideally, enough information should be provided so that the numerical results produced by a macroeconomic model can be reproduced, or at least checked, by an outside reader with a professional training in economics. In writing the macroeconomic portions of the Godwins report we tried to anticipate the need for reproducibility and included in the report enough information to reproduce the numerical results of the macroeconomic model (See Appendix C of the Godwins report). However, the explanation in Appendix C of the Godwins report is relatively brief, so we will use the opportunity presented by Paragraph 16 to elaborate on various aspects of the macroeconomic model and its calibration.

Before presenting a detailed point-by-point response to items raised in Paragraph 16, it might be helpful to discuss the type of macroeconomic model used in the Godwins report and to contrast this model with conventional large-scale short-run econometric forecasting models. The reason for contrasting the two types of models is that the requests in Paragraph 16 constitute an appropriate set of questions for scrutinizing the results of a conventional large-scale econometric forecasting model. However, some of the questions are not germane for scrutinizing the macroeconomic model used in the Godwins report.

The macroeconomic model used in the Godwins report is a classical general equilibrium model. As discussed in the Godwins report on pp. 26-27, the choice of a type of macroeconomic model for examining the effect on GNP-PI of the introduction of SFAS 106 was guided by a list of five desirable characteristics for a model:

(1) The model should be a multi-sector model allowing for some firms to offer post-retirement health benefits while other firms do not offer such benefits.

(2) The model should explain how production costs are related to the costs of labor and other inputs, and should allow for the possibility of substituting capital for labor as labor becomes more expensive.

(3) The model should provide a specification of the demand for goods related to the overall price level as well as to prices of goods in each sector.

(4) The model should be tractable so that numerical solutions can be computed and readily interpreted.

(5) The model should be internally consistent and based on sound economic foundations.

The classical general equilibrium model used in the Godwins report meets all five of these criteria. However, large-scale commercial econometric models do not meet all of these criteria. In particular, most large-scale commercial econometric models do not meet criteria (4)

and (5). These models typically contain several hundred, or even over a thousand, equations and variables to be forecast. In addition to the sheer difficulty of tracing the effects of so many variables, the forecasts produced by commercial forecasters generally are based also on other factors such as time-series analysis, current data analysis, and "judgment". The fact that the forecasts of these models are based significantly on judgment and current data analysis makes it very difficult for an impartial observer to reproduce the results of these models and obscures the ability to readily interpret the forecasts produced by these commercial forecasters. Commercial large-scale econometric models in general have also been criticized for failure to satisfy criterion (5) that they be internally consistent and based on sound economic foundations. In light of the five desirable characteristics listed above, it was decided that a classical general equilibrium model would be preferable to a large-scale commercial econometric model for the purpose of evaluating the effect on GNP-PI of the introduction of SFAS 106.

An additional consideration that led to the choice of the classical general equilibrium model is related to the timing of the responses to the introduction of SFAS 106. The classical general equilibrium model is intended to gauge the effects of changes after the economy has returned to equilibrium, which may take several calendar quarters or years. This model does not address the extremely difficult task of predicting the dynamic responses over the short-run. By contrast, large-scale econometric models deliver a series of quarterly forecasts of GNP and other macroeconomic variables. However, in our judgment, short-run dynamic behavior is extremely difficult to forecast. Although these models do produce short-run forecasts, we would be cautious in interpreting the timing implied by these short-run forecasts. We decided to sidestep this difficult problem by using the conservative approach of calculating the impact on the macroeconomy after the economy fully responds to SFAS 106. The sense in which this approach is conservative is that it probably will overstate the short-run impact on macroeconomic variables, and thus helps guard against understating the impact on GNP-PI.

Now we will present a detailed point-by-point response to the issues raised in paragraph 16. We will structure the responses according to the following list of requests in Paragraph 16:

(1) fully describe and document the macroeconomic model, including

(a) the method of estimation
(b) parameter estimates
(c) summary statistics

(2) provide the same information as in (1) for any alternate functional forms that were used

(3) provide the data used to estimate the model

(4) provide the data used in making forecasts from the model

(5) provide the results of any sensitivity analyses performed to determine the effect of using different assumptions.

Response to request (1): fully describe and document the macroeconomic model, including the method of estimation, parameter estimates, and summary statistics.

The macroeconomic model used in the Godwins report is described verbally on pp. 27-28 of the Godwins report, and a complete mathematical derivation and description of the model is presented in Part I of Appendix C, pp. 54-57. In order to apply this mathematical model to the United States, numerical values of the parameters need to be selected. In a conventional large-scale commercial econometric model, the numerical values of the parameters are typically estimated econometrically. For these models, it is important to ask about the method of estimation, the parameter estimates, and summary statistics describing the statistical properties of the parameter estimates and the model forecasts. However, the values of the parameters used in the classical general equilibrium model in the Godwins report were not econometrically estimated in the course of the preparation of the Godwins report. Instead, the numerical values of the model were calibrated so that in the baseline calculation without SFAS 106, the numerical results produced by the model matched U.S. macroeconomic data.

The calibration procedure is described in Part II of Appendix C, pp. 58-59, but here we will present a verbal description of the calibration. The utility function of households contains the following parameters:

$\alpha_1$ and $\alpha_2$, which measure the relative desirability to consumers of the goods produced in sectors 1 and 2: The larger is $\alpha_1$ relative to $\alpha_2$, the larger is the production of good 1 relative to good 2, and the larger is the share of the labor force employed in sector 1. The values of $\alpha_1$ and $\alpha_2$ are chosen so that in the initial equilibrium (before the introduction of SFAS 106) 68% of the labor force is employed in sector 1 (which does not offer SFAS 106 benefits) and 32% of the labor force is employed in sector 2 (which offers SFAS 106 benefits). These figures for the shares of employment in sector 1 and in sector 2 match U.S. data as indicated on page 7 of the Godwins report. (Of the 95.8 million private sector employees, 30.7 million are eligible to have a proportion of their charges in retirement met by their employer's medical plan. Thus, the share of the private sector labor force employed in sector 2 is 30.7 million/95.6 million = 32%.)

$\theta$, which is the elasticity of substitution between the consumption of any two goods: The parameter $\theta$ equals the price of elasticity of the demand for goods. This parameter was not estimated nor was

it directly calibrated to data. As stated on page 29 of the Godwins report, a value of 1.5 was used for $\theta$, recognizing that this value most likely overstates the true price elasticity of demand. Experimentation with the value of $\theta$ indicated that the impact of SFAS 106 on the GNP-PI increases when the price elasticity of demand increases. (See the table on page 41 of the sensitivity analysis in the Godwins report.) Thus, using a high value of $\theta$ would guard against understating the impact of SFAS 106 on the GNP-PI.

$\eta$, which is the elasticity of labor supply: The elasticity of labor supply has been estimated econometrically in dozens of studies. Rather than try to estimate this elasticity again for the Godwins study, we referred to surveys of econometric studies of labor supply. The first complete paragraph on page 30 of the Godwins report describes the results of these studies and explains the choice of the value of zero for the labor supply elasticity.

We can amplify the discussion on page 30 by pointing out that there is an important difference between the response of labor supply to a *temporary* change in the real wage and a *permanent* change in the real wage. Economists explain the difference by using the concepts of an income effect and a substitution effect. An increase in the real wage increases the reward for working and causes people to substitute some of their time away from leisure toward working. Thus, the substitution effect of an increase in the real wage is an increase in labor supply. In addition, an increase in the real wage makes workers wealthier and reduces the need to work (or equivalently makes workers able to afford more leisure and less labor). This effect, known as the income effect, means that workers will reduce their labor supply in response to an increase in the real wage. Thus, the income effect and the substitution effect work in opposite directions: the substitution effect increases labor supply and the income effect reduces labor supply when the real wage increases. For a temporary increase in the real wage, the worker does not become very much wealthier and the income effect is relatively small. The income effect is likely to be smaller than the substitution effect and thus workers would be likely to increase labor supply in response to a temporary increase in the real wage. In contrast, for a permanent increase in the real wage, the income effect is likely to be relatively large. If the income effect is larger than the substitution effect, then workers will reduce their labor supply in response to a permanent increase in the real wage, which is a negative labor supply elasticity.

The introduction of SFAS 106 is a permanent change and thus any effects on the real wage are to be regarded as permanent effects rather than temporary effects. Thus, in choosing a value of the labor supply elasticity, it is appropriate to use the elasticity describing the response to a permanent change in the real wage. The econometric estimates described on page 30 of the Godwins