Tables of Inter-year Labor Force Status of the U.S. Population (1998-2004) to Operate the Markov Model of Worklife Expectancy

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Introduction

In tort litigation, plaintiffs often claim multi-year earnings losses and forensic economists are called on to calculate those losses at their expected discounted value. To make those calculations, forensic economists must determine the probabilities that plaintiffs would be able to or would choose to work and have earnings—referred to in the forensic economic literature as the determination of worklife expectancy. In this paper, under the Markov increment-decrement demographic model, we provide the theory, estimating equations, and data necessary to compute worklife probabilities for the U.S. population of males and females for five levels of educational attainment. The particular focus of the paper extends the worklife expectancy literature to the data tables necessary to produce age-based labor force participation probability estimates under the popular Markov increment-decrement model.

To date, the Markov-based literature has presented its empirical estimates of worklife expectancy as the sums of unpublished age-based labor force participation probabilities. That literature shows worklife expectancy computed beginning at each age in a table through a common terminal age where worklife is assumed to end for all persons. For example, the worklife expectancies are estimated from ages 18 to 80, ages 19 to 80, ages 20 to 80,…, ages 78 to 80, and ages 79 to 80 where at age 80 all living persons are assumed to not be in the labor force. When worklife expectancy is used in forensic economics as the sum of age-based probabilities of labor force participation, at least two serious problems are created: (1) the problem of "front-loading"[1] and (2) the problem of mismatching labor force participation probability estimates with estimates of earning capability. For example, assume that an

[1] Ciecka and Goldman (1995) and Ireland (2002) introduce the problem of front-loading. Skoog and Ciecka (2004c) provide some estimates of front-loading affects under the restrictive assumption of constant earnings throughout working years which is unrealistic in most forensic economic problems.

estimated worklife expectancy sum is 30 years utilizing labor force data from persons ages 25 to 80. For each age, the Markov model produces a probability of labor force participation within the range of $0 < w_p < 1$ and the sum of those fractional year probabilities from age 25 to age 80 equals 30 whole years. Since the user of such worklife expectancy data has no information other than labor force participation will occur for a total of 30 years sometime between age 25 and age 80, he or she usually front-loads all labor force attachment years to the first 30 years beyond age 25 with 100 percent probability of labor force participation (e.g., earnings are calculated with 100 percent probability of labor force participation from age 25 through age 54). The front-load assumption is contrary to the structure of the Markov model and it is unreasonable when compared to the work experience of populations of people that includes periods of disability, discouragement, voluntary labor force withdrawal, etc.[2] Since earnings are recorded and then forecasted by age or tenure in an occupation, a second problem of mismatching labor force participation probability estimates to earning capability estimates is also created when worklife expectancy is presented as a sum of labor force participation probabilities. For example, earnings are generally higher from age 25 through age 54 than at ages 55 and over since youthful people generally have higher levels of innate ability and human capital than aged people. When worklife is estimated from age 25 to age 80, a portion of the 30 years of worklife occurs before age 55 and the remaining portion afterwards. If lifetime earnings are based only on earnings data and information of persons ages 25 through 54, lifetime expected earnings would be overstated by failing to consider the expected lower earnings from age 55 to 80 that lie within the 30 year worklife expectancy estimate.

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[2] An alternative to front-loading is "even-loading" or to disperse worklife expectancy across the entire worklife period. For example, every age from age 25 to age 80 is given a weight of thirty-fifty-fifths (30/55) to equally spread out the 30 years of worklife across ages 25 to 80. This tactic suffers the same problems of front-loading in that it divorces itself from the probabilities produced by the Markov model and the patterns of labor force attachment observed in the U.S. population.

In this paper, we publish the necessary U.S. labor force data to operate the Markov increment-decrement model to produce labor force participation probabilities by age to eliminate the problems of front-loading and the mismatching of labor force participation probability with earning capability. With the data in this paper, forensic economists can make consistent and reasonable expected value calculations of plaintiff-claimed multi-year earning losses by matching labor force attachment probabilities estimates to wage earnings estimates by age and then discounting age-based expected earnings from the time that they are expected to occur to a present value.

In order to inform readers not familiar with the history of the Markov model for making worklife expectancy calculations, we begin the paper with a literature review of the life table method of modeling transitions within states (notably labor force participation) and the existing studies and data used to operate the Markov worklife expectancy model. Next, we present the general structure of the Markov model and show the equations to construct a worklife probability table by age. We then present how we calculated the labor force transition data tables and how those tables operate of the Markov model of worklife expectancy. Using these tables, the reader can construct his or her own Markov labor force attachment probabilities for each demographic group and age.[3] So the reader can check their calculations or provide quick comparison of these data tables to other worklife expectancy estimates, we also provide the traditional tables which show worklife expectancy as the sum of age-based labor force participation probabilities from the Markov model.

[3] The presentation of series of work probabilities calculated from the Markov model would consume a great amount of printed space. For example, if the three relevant worklife estimates (all, inactive, or active) were published for each age from age 18 to 75, the number of printed columns would be $3 \times 58 = 174$ columns for each demographic group studied.

History of Life and Worklife Tables

Life tables model the activity or state transitions made within populations of people by age or time and they produce the expected number of persons in each modeled state at each age or time within the table. Life tables are used to monitor health conditions, to compare mortality experience across countries or regions, to determine the cost of life insurance, to study migration, and to evaluate societal norms such as length of marriage or working life. When the number of activities or states considered by the life table is equal to two, the life table is called a basic life table; and, when the number of activities or states is greater than two, the life table is called a multi-state life table.

The Basic Life Table

It is consistently reported that the idea behind the life table model dates back to 1662 when John Graunt, a London haberdasher, studied the London 'Bills of Mortality' (burial records) to make inferences about the distribution of death in large populations. The life table of mortality models survivorship of a hypothetical cohort and it is estimated from empirically-viewed rates of death by age that occurred during a fixed time period. Generally, death certificates for a relevant time period are compiled to find the number of deaths by age within the population and then those figures are cross-tabulated with the number of people alive in the population to compute the probability of death at each age in the population. Using the probability of death by age, we estimate a life table of survivors beginning with a synthetic

number of live births (most often assumed at 100,000) and continuously apply the computed probabilities of death by age through the life table until the cohort is exhausted by death.[4]

Multi-State Life Tables

Multi-state life tables, also known as increment-decrement life tables, model at least two living states that allow movement from one state to the other and an absorbing or death state from which there is no exit. The movements between states and time are presented as transition probabilities that give the probability of being in state i at time t and in state j at time $t + n$ where n is some interval of time following time t. The earliest work in multi-state life table analysis is credited to DuPasquier (1912) who studied the pricing of disability insurance using a model of two living states, healthy and disabled, along with the death state. Although a few citations relevant to multi-state life table analysis appear through the 1960's, it was in the late 1970's that the literature blossomed when academic computing became commonplace to carry out the lengthy series of calculations necessary to compute multi-state life tables. In 1981, the interest in multi-state life table analysis was at a sufficient level to warrant the National Science Foundation to sponsor the conference "Multidimensional Mathematical Demography" (Land and Rogers, 1982).

Since the 1981 NSF conference, the theoretical literature in multi-state life tables has been in the exposition of the mathematics of the life tables, Markov processes, and interpretation and variation of life table statistics. Noteworthy examples of these works include Chiang (1984), Heckman and Singer (1985), Hoem and Funck-Jension (1982), Namboodiri (1991), Rogers

[4] The beginning number of live births is called the radix value. For example, when the synthetic number of live births begins with the radix value of 100,000, if the probability of death estimated from exact age 0 to exact age 1 is 1%, then at exact age 1 there are 99,000 survivors. If the probability of death from exact age 1 to exact age 2 is 0.5%, then at exact age 2 there are 99,000 less 0.5% of 99,000, or 98,505 survivors. The life table is filled out by continually applying the probability of death by advancing age until the synthetic number of 100,000 live births reaches zero.

(1995), Rogers and Willekens (1986), Schoen and Land (1979), Schoen (1988), and Skoog and Ciecka (2001-2005). The advantages cited in the literature of multi-state life tables are that (1) they model lifetime activity as a dynamic process where multiple entries and exits into a variety of states occur over a lifetime; (2) they require few arbitrary assumptions regarding the stability or stationarity of population activity participation rates;[5] and, (3) they provide detailed accession and separation activity participation probabilities as well as summary indices of lifetime activity participation. The multi-state theoretical literature also addresses limits imposed by the Markov model that are also prevalent in other demographic and economic models such as (1) the model characterizes lifetime homogeneous populations where any person aged x in state i has the same probability as any other person age x to transfer to another state j, (2) the model fully determines lifetime activity for the population (e.g., it does not include random variations within the population over time or trends in activity participation outside the data time frame under which the model is estimated), and (3) the model recognizes a limited history of state participation (that would likely influence future state participation) associated with the length of the Markov process.

Conventional Labor Force Status Life Tables

The first published worklife tables for the United States, called conventional worklife tables, were created using the population rate of labor force participation and mortality by age and demographic feature. These tables were computed as the joint probability of age-specific rates of survival from mortality tables and assumed stationary rates of labor force participation by age. For example, if at age 25 the probability of survival to age 26 is 0.990 and the labor

[5] For example, constant labor force participation rates do not necessarily imply constant labor force transition probabilities, and vice versa.

force participation rate of all living 25 year olds is 0.90, then the probability of living and participating in the labor force from ages 25 to 26 is 0.990 × 0.90, or 0.891. The probability of survival is figured from each age 25 through each advancing age and then multiplied by the population labor force participation rate for each advancing age. The living and labor force participating joint probabilities are summed, say through age 80, to give the conventional worklife expectancy estimate for persons now aged 25.

The conventional worklife model is criticized for its unrealistic unimodal expectation of labor force participation (i.e., a single entry into and exit from the labor force which is contrary to expected lifetime flows in and out of the labor force). Conventional tables are also unable to use actual information about current labor force status that would likely control future labor force activity (i.e., they are unable to model the labor force participation of those persons currently in the labor force as opposed to those persons not currently in the labor force without some qualifying assumptions (see Skoog and Ciecka, 2005)). The earliest conventional life tables of labor force participation in the United States were published by the Bureau of Labor Statistics (BLS) beginning over fifty years ago as "working life tables" (Wolfbein 1949; BLS Bulletin 1001, 1950; BLS Bulletin 1204, 1957; Garfinkle 1963, Fullerton 1971; Fullerton and Byrne, 1976).

First Labor Force Participation Based Increment Decrement Life Tables

Hoem and Fong (1976) and Hoem (1977) are the earliest cited multistate life tables directed at studying lifetime labor force activity. These Danish demographers computed years of lifetime labor force activity estimates for males in Denmark using the Danish panel labor force surveys from 1972-74. That data source contained the labor force status of males ages 15 to 75 and provided 150,000 observations. Labor force participation was not considered after age 75

and the Markov labor force transition probabilities[6] were smoothed with a moving average. Hoem estimated the years of lifetime labor force participation of 17-year-old males active in the labor force as 42.97 years and for those 17-year-old males that were inactive in the labor force, the years of lifetime labor force participation was estimated as 41.58 years.

In 1980, Willekens used Hoem & Fong's data and recomputed the multistate labor force activity participation model but simplified the mathematics of the model's calculations while essentially computing the same results.

First Labor Force Participation Increment Decrement Life Tables for the U.S. Population

In 1980, the American sociologists Schoen and Woodrow provided the first Markov increment decrement model based estimates of lifetime labor force participation in the U.S. They used the January 1972 and January 1973 CPS data files to compute labor force activity status and transition probabilities and they used the U.S. Life Tables for 1972 from the U.S. Department of Health and Human Services for mortality data. They did not report their sample size from the CPS data. Labor force participation was not considered after age 80. They used a 9th -order centered moving average to smooth male transition probabilities and a 7th -order centered moving average to smooth female transition probabilities. The total years of lifetime labor force participation of 17-year-old males active in the labor force were estimated as 39.07 years and for 17-year-old active females lifetime labor force participation years were estimated as 23.78 years. They did not report lifetime labor force participation years for persons that were inactive in the labor force.

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[6] Transition probabilities in the two-state Markov life table of labor force participation are based on active or inactive participation in the labor force by age and the exit to death by age. The transition probabilities age-to-age are active-to-active, active-to-inactive, active-to-dead, inactive-to-inactive, inactive-to-active, and inactive-to-dead.

BLS Worklife Tables, 1982, 1986

Led by Shirley Smith, the BLS published two Markov increment decrement studies of lifetime labor force participation. The first study was published in 1982 (BLS Bulletin 2135) and the second study was published in 1986 (BLS Bulletin 2254). Both of the BLS studies utilized the multi-state life table methodology of Schoen (1975).

In the 1982 BLS report, life tables were estimated for 1970 and 1977 using January 1970/1971 CPS data and January 1977/1978 data. Sample sizes were "approximately 40,000" in 1970/1971 and 1977/1978 and the methods of transition probability smoothing were not reported. The mortality data are reported from the U.S. Department of Health and Human Services. For active in the labor force males and females at age 17, years of lifetime labor force participation were reported in 1977 as 39.2 years for males and 28.5 years for females. The corresponding active years data for 1970 was reported at age 17 as 39.5 for active males and 23.5 for active females. For inactives at age 17, male labor force participation was reported in 1977 as 37.5 years for inactive males and 26.8 years for inactive females. The corresponding active years data for 1970 was reported at age 17 as 37.8 for inactive males and 21.9 for inactive females.

In BLS Bulletin 2254, Smith extended the BLS analysis to include for the first time lifetime labor force participation estimates by gender, race, and education. She used CPS data for January, March, May, July, September, and November 1979/1980 with a reported sample of "nearly 255,000 matched responses." Labor force participation was not considered after age 78. Transition probabilities were smoothed using a 9th -order centered moving average. Mortality data are reported from the U.S. Department of Health and Human Services. For active in the labor force males and females at age 17, lifetime years of labor force participation were reported

in 1979-80 as 39.3 years for males and 29.6 years for females. For inactives at age 17, lifetime years of labor force participation were reported in 1979-80 as 37.7 years for inactive males and 28.0 years for inactive females.

Ciecka et al. 1995-2001

Ciecka et al. re-estimated the labor force activity participation Markov increment decrement tables duplicating the methodology of Smith with the exception of extending consideration of labor force participation to age 80. They estimated tables using CPS data for 1992-93, 1994-95, and 1997-98 using the same months of observation as Smith for her 1979-80 tables. Transition probabilities were smoothed using a 9th -order centered moving average. For their latest tables, 1997-98, the sample size was 116,782 unique persons. Smith also used 1-year apart data but she included multiple observations by CPS respondent inflating her sample to 255,000 observations. Mortality data are reported from the U.S. Department of Health and Human Services. For active in the labor force males and females at age 17, years of lifetime labor force participation were reported in 1997-98 as 39.01 years for males and 33.87 years for females. For inactives at age 17, years of lifetime male labor force participation were reported in 1997-98 as 37.88 years for inactive males and 32.77 years for inactive females.

Richards & Abele, 1999

Richards and Abele re-estimated the labor force activity participation Markov increment-decrement tables following the methodology of Smith and Ciecka et al. with the exceptions of extending consideration of labor force participation to age 85 and using all CPS months during their data time frame instead of just selected months per Smith and Ciecka et al. They estimated tables using monthly CPS data for 1996 to 1998 giving a unique respondent sample size of

248,977. Their method to smooth transition probabilities was unreported. Mortality data are reported from the U.S. Department of Health and Human Services. For active in the labor force males and females at age 18, years of lifetime labor force participation were reported in 1996-98 as 38.4 years for active males and 33.0 years for active females. For inactives at age 18, lifetime years of male labor force participation were reported in 1996-98 as 37.3 years for inactive males and 32.0 years for inactive females. Richards and Abele also presented their tables of the transition probabilities that were used to estimate their Markov worklife expectancy model.[7]

Millimet et al., 2002

Millimet et al. re-estimated the labor force activity participation Markov increment decrement tables following the methodology of Smith with the exceptions of extending consideration of labor force participation to age 85 and they used 1992-2000 March Supplement CPS data for calculating transition probabilities. Their unique respondent sample size was 200,916. The method to smooth transition probabilities was a 9th -order centered moving average. Mortality data are reported from the U.S. Department of Health and Human Services. Worklife expectancy tables were not published for all males or all females. For active in the labor force males and females at age 17 with a high school education, years of lifetime labor force participation were reported in 1992-2000 as 38.8 years for active males and 33.8 years for active females. For inactives at age 17 with a high school education, years of lifetime male labor force participation were reported in 1992-2000 as 37.2 years for inactive males and 31.9 years for inactive females.

[7] The Richards and Abele work was published in book form giving plenty of publication room for tables of transition probabilities.

In addition to duplicating the methodology of Smith, Millimet et al. performed the Markov increment decrement model calculations using a logit model to estimate transition probabilities instead of the traditional relative frequency approach. The differences in comparable results from the relative frequency and logit estimation of transition probabilities were found to be minimal.

Skoog & Ciecka Variants, 2001-2005

Relying on the structure of the Markov increment-decrement model (and the 1997-98 Ciecka et al. data), Skoog and Ciecka have presented a series of articles exploring the statistical properties of the Markov increment-decrement worklife expectancy model. They have also provided a comparison of multi-state Markov model results to other worklife expectancy approaches such as the conventional worklife table and years to final labor force separation.

Summary

Multi-state life table analysis cited within forensic economics has been limited to the above authors and references. The publication record for American worklife expectancy (1) has relied upon the CPS data source and uses the same source for mortality data over time, (2) has calculated the Markov transition probabilities in the same manner, and (3) presents results by age in the form of the sum of the probable (or partial) years of labor force participation following an exact age.

The Markov Increment Decrement Worklife Model

In the following sub-sections, we first present the standard life table model equations from the Markov life table model promulgated by Schoen (1988). Second, we show the algebraic Markov model used in the publication record as cited within forensic economics.

The Markov Process

The Markov multi-state lifetime activity theoretical model rests on the existence of a process that controls activity participation which is described as a collection of stochastic transition forces that evolve over a lifetime. Since there are many events that shape movements from activity-to-activity before death, the Markov model is time-inhomogeneous—the forces of transition which move people from activity to activity vary by age. Related to our abilities for observation, we limit the model to a finite number of activities ("states") delineated by age. We specify the finite state space of the model as containing $k + 1$ states, where k is a positive integer greater than or equal to 2.[8] The $(k + 1)^{st}$ state is an "absorbing" state. An absorbing state is a dead state from which there are no decrements (exits). At least two of the other k states have common flows with each other so that there are increments (entrants) in at least one case. To specify the calculus of the model, age is held in continuous-time.

Within the state space described above containing k activities and age, we define the Markov stochastic process $\{S(x): x \geq 0\}$, where the continuous time parameter x is exact age. The continuous probabilities of transition between the $k + 1$ states within S are

$$(1) \qquad \pi_{ij}(x,n) = \text{prob}\{S(x+n) = j \mid S(x) = i\}$$

where $\pi_{ij}(x,n)$ is the probability that people in state i and exact age x will be in state j at exact age $x + n$ where n defines the length of the time interval between ages. The instantaneous probabilities of transition between states i and j, μ_{ij}, appear as n approaches zero as

$$(2) \qquad \mu_{ij}(x) = \lim_{n \to 0} \pi_{ij}(x,n)/n \text{ for } i \text{ unequal to } j$$

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[8] Although the general model structure has been essentially invariant, beginning at this point in the paper we follow the notation given by Schoen (1988).

where $\mu_{ij}(x)$ represents the force of transfers *away from* state *i* to state *j* at exact age *x*. Oppositely, the force of retention of *staying within* state *i* at exact age *x* is

$$(3) \qquad \mu_{ii}(x) = \lim_{n \to 0} \left[1 - \pi_{ii}(x,n)\right] / n = -\sum_{j \neq i}^{k+1} \mu_{ij}(x) .$$

Equations (2) and (3) specify the rate of flow or movement in the stochastic process transition probabilities between the states by age. The probabilities that a person leaves a state are dependent only on the state occupied by the person at a particular age and the probability that a person stays within a state is the opposite of the probabilities that he or she leaves the state.

A Markov chain process is a sequence of random values whose probabilities at one time interval depend upon the state participation at a previous time. Under this definition, equations (1) through (3) present a Markov chain process where the time controlling factors are the conditional transition probabilities which allow movement to a new state, given the current state. The memory of the Markov process, *n*-1, is the amount of history of activities that governs the transition probabilities resulting in the state at age *x*.

Multi-State Life Table Equation based on the Markov Process

Equations (1), (2) and (3) form a Markov chain process across all ages *x* in a synthetic population lifetime giving the portion of the population occupying each state *k* at each age *x*. Using equations (1), (2), and (3), we can create the multi-state life table from which the probability of participating in each of the *k* activities can be computed beginning at each age *x* and then continuing through the ending age in the stochastic process. For example, beginning with a population whose members are recorded by activity participation, we multiply the transition probabilities by activity by the population numbers by age *x* to find the number of persons participating in each activity after age *x*. Knowing the number of persons participating

in each activity after age x, we divide the number of those persons into the number of persons at age x to compute the probability of participating in each activity after age x.

If we arrange all of the Markov probabilities (for multi-state life table creation) defined in equation (1) by age x and age-increment t, we form the matrix $\mathbf{\Pi}(x, t)$ of size $(k + 1)$ by $(k + 1)$ at each time t as:

$$(4) \qquad \mathbf{\Pi}(x,t) = \begin{pmatrix} \pi_{11}(x,t) & \pi_{12}(x,t) & \cdots & \pi_{1,k+1}(x,t) \\ \pi_{21}(x,t) & \pi_{22}(x,t) & \cdots & \pi_{2,k+1}(x,t) \\ \vdots & \vdots & & \vdots \\ \pi_{k+1,1}(x,t) & \pi_{k+1,2}(x,t) & \cdots & \pi_{k+1,k+1}(x,t) \end{pmatrix}.$$

Likewise, the arrangement of the instantaneous transition probabilities defined in equations (2) and (3) forms the matrix $\boldsymbol{\mu}(x, t)$ of size $(k + 1)$ by $(k + 1)$ where the instantaneous transition probabilities (the forces moving the transition probabilities from age x to age $x + t$) are

$$(5) \qquad \boldsymbol{\mu}(x+t) = \begin{pmatrix} \mu_{11}(x+t) & \mu_{12}(x+t) & \cdots & \mu_{1,k+1}(x+t) \\ \mu_{21}(x+t) & \mu_{22}(x+t) & \cdots & \mu_{2,k+1}(x+t) \\ \vdots & \vdots & & \vdots \\ \mu_{k+1,1}(x+t) & \mu_{k+1,2}(x+t) & \cdots & \mu_{k+1,k+1}(x+t) \end{pmatrix}$$

Given that each member of each row in the $\mathbf{\Pi}$ matrix is a transition probability at a certain age x, each row in the $\mathbf{\Pi}$ matrix sums to 1 (i.e., the model is fully determined). Since the instantaneous transition probabilities represent the force of moving the transition probabilities from age x to age $x + t$, each row in the $\boldsymbol{\mu}$ matrix sums to zero.[9]

[9] This result flows from equation (3) being the opposite of equation (2). Also remember that t creates the sequence of ages studied and n shifts ages some number forward for the creation of the transit probabilities. For example, if $t = 5$, $n = 10$, and the beginning age x is 20, then the baseline ages x are 20, 25, 30, etc. and the transition probabilities show movement from ages 20 to 30, 25 to 35, 30 to 40, etc.

Within the multi-state life table analysis, our goal is to find the number of survivors in each state k at each time period t. We use $l_i(x)$ to represent the number of persons in state i at exact age x and use $l_{ij}(x + t)$ to represent the number of persons, or survivors, in state i at exact age x who are also in state j at exact age $x + t$. When i is unequal to j, $l_{ij}(x)$ is zero because a person cannot be in both state i and state j at age x. The l_{ij} can be thought of as representing gross flows within the population at time t because they represent the outcome of many individual movements between the states. All of the survivors l_{ij} at age x at the time interval t can be aggregated into the matrix $\mathbf{l}$ as

$$\mathbf{l}(x,t) = \begin{pmatrix} l_{11}(x,t) & l_{12}(x,t) & \cdots & l_{1,k+1}(x,t) \\ l_{21}(x,t) & l_{22}(x,t) & \cdots & l_{2,k+1}(x,t) \\ \vdots & \vdots & & \vdots \\ l_{k+1,1}(x,t) & l_{k+1,2}(x,t) & \cdots & l_{k+1,k+1}(x,t) \end{pmatrix} \tag{6}$$

Finding the number of survivors at age $x + n$ is a matter of applying the standard life table equation

$$\mathbf{l}(x,t+n) = \mathbf{\Pi}(x,t)\mathbf{l}(x,t)\,. \tag{7}$$

Equation (7) is called the standard life table equation because it says that at each forward age under the interval n, the number of persons within $\mathbf{l}$ in each state is dependent upon the number of persons in the k states at age x times the transition probabilities within the k states between ages x and $x + n$. The number of persons within $\mathbf{l}$ in each state can increase with increment probabilities and decrease with decrement probabilities. Once the number of persons across time in each state i is determined by equation (7), l_i, we can divide the number of those persons into the number of persons at age x to compute the probability of participating in each state after age x.

One Period, Three-State Markov Model of Worklife Expectancy

The one-period Markov increment-decrement life table (MID_1) is the prominent model in the forensic economic literature to calculate worklife expectancy. Above, we presented a *k*-state model with a *n*-1 period memory. In the MID_1 model, we restrict the general Markov process to a three state model of the increments and decrements between "active" and "inactive" states of labor force participation and the absorption state of death which is unspecific to mortality experienced from active or inactive labor force participation states.[10] Memory of how the present labor force status at age *x* was reached is removed from the model because we use a single-age interval.[11]

The MID_1 model handles the flows between active and inactive labor force participation throughout a synthetic population lifetime. Population members of the active and inactive labor force states are assumed to move back and forth among participating and not-participating in he labor force according to age-specific transition probabilities before exiting to the absorbing state of death. The number of persons active and inactive in the labor force at each age following *x* can be used to produce labor force attachment probabilities by age and the sum of those probabilities by age produces lifetime worklife expectancy in total years of attachment to the labor force. Below, we present the algebra for computing the MID_1 model in discrete single-age-interval time. After specifying the model, we work through a table calculation of MID_1 labor force attachment probability by age.

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[10] Mortality data are not readily available to compute active-to-dead and inactive-to-dead transition probabilities. We would not expect these probabilities to be equal under the expectation that morbidity leads to exit from the active state before death at a rate greater than the transition from active to dead.

[11] The MID_1 worklife expectancy model is said to be without a memory because the labor force status in the future period depends only on the labor force status in the current period. In other words, the MID_1 worklife expectancy model has no memory of how the present labor force status at age *x* was reached (e.g., it has no memory of labor force status at age *x*–1). Stating that the MID_1 worklife expectancy model does not have a memory does not mean that it is autoregressive of order zero, i.e. white noise.

The MID_1 model was first used by demographers and sociologists, not economists, to study worklife through labor force participation. Avoiding the notation of demography, we follow the notation of Ciecka et al. and Smith (BLS Bulletin 2254). We specify two fluid living states with regards to labor force participation, active and inactive, using the annotations *a* and *i* respectively, and we annotate the absorbing state death with the letter *d*. The active state is labor force attachment and the inactive state is not in the labor force. Following equation (1), we let ${}^{m}p_x^n$ denote the transition probability that a person in state *m* at age *x* will be in state *n* at age *x*+1 where $m \in \{a,i\}$ and $n \in \{a,i,d\}$. As in matrix equation (4), the sums of transitions probabilities for our two rows of transition probabilities equal 1:

(8) $${}^{a}p_x^a + {}^{a}p_x^i + {}^{a}p_x^d = 1$$

(9) $${}^{i}p_x^i + {}^{i}p_x^a + {}^{i}p_x^d = 1$$

Unfortunately, mortality data by activity state are not available, so we assume that

(10) $${}^{a}p_x^d = {}^{i}p_x^d = {}^{\bullet}p_x^d$$

which states that the transition probabilities from active to death and inactive to death are identical and marked with a • to represent either active or inactive.

Similar to equation (7), the number of active and inactive labor force survivors at each age *x* is calculated recursively from the equation

(11) $${}^{\bullet}l_x = {}^{\bullet}l_{x-1}(1 - {}^{\bullet}p_{x-1}^d)$$

where the beginning life table radix value of l_x is set to a positive number (usually 100,000). The number of survivors at any age is equal to

(12) ${}^{\bullet}l_x = {}^{a}l_x + {}^{i}l_x$

Following the standard life table equation, the active and inactive labor force survivors at age x are determined recursively on the transition probabilities and survivors at age x-1 as

(13) ${}^{a}l_x = {}^{a}l_{x-1} + {}^{i}p^{a}_{x-1}\,{}^{i}l_{x-1} - {}^{a}p^{i}_{x-1}\,{}^{a}l_{x-1} - {}^{\bullet}p^{d}_{x-1}\,{}^{a}l_{x-1}$

(14) ${}^{i}l_x = {}^{i}l_{x-1} + {}^{a}p^{i}_{x-1}\,{}^{a}l_{x-1} - {}^{i}p^{a}_{x-1}\,{}^{i}l_{x-1} - {}^{\bullet}p^{d}_{x-1}\,{}^{i}l_{x-1}$

Equation (13) states that the number of active labor force survivors at age x equals the number of actives at x-1 plus those leaving the inactive state in x-1 and becoming active minus those leaving the active state in x-1 and transferring to the inactive state or death. Equation (14) states that the number of inactive labor force survivors at age x equals the number of inactives at x-1 plus those leaving the active state in x-1 and becoming inactive minus those leaving the inactive state in x-1 and transferring to the active state or death.

We assume that all transitions occur evenly through the year, so that the number of person years of life, activity, and inactivity at age x are given by

(15) ${}^{\bullet}L^{d}_{x} = \dfrac{{}^{\bullet}l_x + {}^{\bullet}l_{x+1}}{2}$

(16) ${}^{\bullet}L^{a}_{x} = \dfrac{{}^{a}l_x + {}^{a}l_{x+1}}{2}$

(17) ${}^{\bullet}L^{i}_{x} = \dfrac{{}^{i}l_x + {}^{i}l_{x+1}}{2}$

Survival and labor force attachment probabilities to any mid-year-age after age x are computed as ${}^{\bullet}\ell^{\bullet}_{x} = {}^{\bullet}L^{\bullet}_{x} / {}^{\bullet}l_{\bar{x}}$ where ℓ is a probability and $\bar{x}$ is the age beginning the relevant synthetic lifetime of a sub-cohort in the life table (e.g., if we want probabilities of state participation

beyond the exact age of 35, then $\bar{x}$ equals exact age 35). In our MID_1 table, from equations (15) to (17), we calculate living, active, and inactive labor force participation probabilities for each mid-year-age after age x as:

$$(18) \quad {}^{\bullet}\ell_x^d = {}^{\bullet}L_x^{\bullet} \big/ {}^{\bullet}l_{\bar{x}}$$

$$(19) \quad {}^{\bullet}\ell_x^a = {}^{\bullet}L_x^a \big/ {}^{\bullet}l_{\bar{x}}$$

$$(20) \quad {}^{\bullet}\ell_x^i = {}^{\bullet}L_x^i \big/ {}^{\bullet}l_{\bar{x}}$$

Equation (18) states that no matter the labor force state participation of those alive at exact age x, the probability of living in each mid-year-age beyond exact age x is equal to the number living at each mid-year-age beyond exact age x divided by the number of persons living at exact age x. Equation (19) states that no matter the labor force state participation of those alive at exact age x, the probability of living in the active state in each mid-year-age beyond exact age x is equal to the number living in the active state at each mid-year-age beyond exact age x divided by the number of persons living at exact age x. Equation (20) states that no matter the labor force state participation of those alive at exact age x, the probability of living in the inactive state in each mid-year-age beyond exact age x is equal to the number living in the inactive state at each mid-year-age beyond exact age x divided by the number of persons living at exact age x.

A feature of the Markov model in computing labor force attachment probabilities is that we can change the radix or beginning value of state participation at each age x to be comprised entirely of actives or inactives in the labor force to re-estimate the synthetic lifetime labor force attachment probabilities for actives and inactives after that one age x. For example, suppose the life table for the entire population opens at age x. For conformity with the life table model, the radix value of ${}^{\bullet}l_x$ is equal to the number of survivors at age x from the mortality table. The radix

values of the active labor force population is ${}^{a}l_x$ which is computed as ${}^{\bullet}l_x$ times the percentage of the population that is active in the labor force at age x and the radix value of ${}^{i}l_x$ is ${}^{\bullet}l_x$ minus ${}^{a}l_x$. All of the remaining values of the life table are dependent upon these radix values to compute the expected probabilities of active and inactive labor force participation. However, if we changed the radix values to ${}^{a}l_x = {}^{\bullet}l_x$ and ${}^{i}l_x = 0$, we could compute the active and inactive labor force attachment probabilities by age for only those who were active at age x. Likewise, if we change the radix values to ${}^{i}l_x = {}^{\bullet}l_x$ and ${}^{a}l_x = 0$, we could compute the active and inactive labor force probabilities for only those who were inactive at age x. Following equations (19) and (20) which do not depend on beginning labor force state participation, by changing radix values at the beginning exact age x, we calculate active and inactive labor force participation probabilities for each mid-year-age after age x as:

(22) ${}^{a}\ell^{a}_{x} = {}^{a}L^{a}_{x} \big/ {}^{\bullet}l_{\bar{x}}$, where at $\bar{x}$, ${}^{a}l_x = {}^{\bullet}l_x$

(23) ${}^{a}\ell^{i}_{x} = {}^{a}L^{i}_{x} \big/ {}^{\bullet}l_{\bar{x}}$, where at $\bar{x}$, ${}^{a}l_x = {}^{\bullet}l_x$

(24) ${}^{i}\ell^{i}_{x} = {}^{i}L^{i}_{x} \big/ {}^{\bullet}l_{\bar{x}}$, where at $\bar{x}$, ${}^{i}l_x = {}^{\bullet}l_x$

(25) ${}^{i}\ell^{a}_{x} = {}^{i}L^{a}_{x} \big/ {}^{\bullet}l_{\bar{x}}$, where at $\bar{x}$, ${}^{i}l_x = {}^{\bullet}l_x$

Equation (22) states that for those persons in the active labor force state participation at age $\bar{x}$, the probability of living in the active labor force state in each mid-year-age beyond age $\bar{x}$ is equal to the number living in the active labor force state at each mid-year-age beyond age $\bar{x}$ divided by the number of persons living at exact age $\bar{x}$. Equation (23) states that for those persons in the active labor force state participation at age $\bar{x}$, the probability of living in the inactive labor force state in each mid-year-age beyond age $\bar{x}$ is equal to the number living in the inactive labor force state at each mid-year-age beyond age $\bar{x}$ divided by the number of persons

living at exact age $\bar{x}$. Equation (24) states that for those persons in the inactive labor force state participation at age $\bar{x}$, the probability of living in the inactive labor force state in each mid-year-age beyond age $\bar{x}$ is equal to the number living in the inactive labor force state at each mid-year-age beyond age $\bar{x}$ divided by the number of persons living at exact age $\bar{x}$. Equation (25) states that for those persons in the inactive labor force state participation at age $\bar{x}$, the probability of living in the active labor force state in each mid-year-age beyond age $\bar{x}$ is equal to the number living in the active labor force state at each mid-year-age beyond age $\bar{x}$ divided by the number of persons living at exact age $\bar{x}$.

Another feature of the Markov model in computing labor force attachment probabilities by age is that we can change the probabilities of death, q_x, to be equal to zero if portions of the worklife estimation includes periods where we want to assume that nobody exits to death. This adjustment and assumption is relevant in the case of associating an individual's worklife probabilities with those of the cohort, however, we want to assume survival for a number of years associated with a valuation date splitting the past from the future. For example, suppose that a plaintiff suffers an on-the-job injury at age 30 which rendered him to be permanently unable to work and that plaintiff today is 35 years old. If we set the probability of death equal to zero from age 30 to 35, we can account for the fact of the plaintiff's survival to date while at the same time account for transit probabilities in and out of the labor force from ages 30 and beyond and the probability of death beyond age 35.

The Source of the Labor Force Transition Table Data for MID_1 Analysis

In order to produce reliable transition probabilities for a variety of population cross-sections, the MID_1 model of worklife expectancy requires a large number of one-time-increment-apart observations of the labor force participation status.[12] The only current survey of the U.S. population that can produce a large number of longitudinal observations of its respondents' labor force participation status is the Current Population Survey (CPS) of the United States' non-institutional population.[13] The CPS is one of the oldest, largest, and most recognized surveys of the non-institutional population in the United States and it is geared towards providing the official estimates of labor force participation and unemployment in the United States. It is published by the U.S. Department of Labor's Bureau of Labor Statistics (BLS) using data collected by the U.S. Census Bureau. Because the CPS is an on-going survey that maintains consistent observation of the labor force status of the U.S. population, the CPS is an ideal data source to track trends in lifetime labor force participation by re-computing the MID_1 model at regular intervals using the latest CPS data. For these reasons, the CPS is the preferred data source to implement MID_1 worklife expectancy analysis.

The CPS survey has the ability to produce one, two, three, twelve, thirteen, fourteen, or fifteen months of longitudinal labor force participation data per respondent[14] based upon each

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[12] A longitudinal database of 10,000 persons by age for one demographic, say males with a high school education, might seem a large enough database to compute worklife expectancy; however, it is not the case when estimating worklife from ages 18 to 80. For those estimates, 216 transition probabilities are needed leaving a meager average of 46 observations to estimate each transition probability (10,000 ÷ 215 transition probabilities).

[13] We are restricted to the U.S. non-institutional population because longitudinal surveys of the entire U.S. population do not exist that would produce a large enough sample size to compute reliable transition probabilities by age, gender, and any other demographic characteristic.

[14] The CPS interview is usually completed by one person called the "household respondent." The household respondent identifies the "household roster" which is a listing of all of the persons living within the household during the CPS reference week. The "household respondent" is asked to begin the household roster with the person(s) who own or rent the household unit. The first person mentioned in the household roster becomes the household's "reference person." The "household respondent" proceeds to give proxy demographic and labor force status responses for all of the members of the household roster. To avoid confusion about person-level, we label a "respondent" or "person" as any one member of the household roster. Hence, a

CPS respondent's participation level in the CPS in a 4-8-4 survey month pattern. CPS selected household units are interviewed for four consecutive months, cease participation for the next sequential eight months, and then participate for four more consecutive months beginning twelve months later from the first interview. For example, residents of a CPS selected household unit would face monthly interviews from January through April of 2001, be left alone from May through December 2001, and then face interviews from January through April of 2002. In this example, a household unit's first CPS month-in-sample (MIS1) would be January 2001, MIS2 would be February 2001, …, MIS7 would be March 2002, and MIS8 would be April 2002. With this survey pattern, the CPS has the ability to produce a variety of time-unit-separated observations of respondent activity including up to four one-age-apart observations. In the worklife expectancy literature, researchers have not explored the use of the CPS to produce longitudinal data with increments other than one-year-apart ages.

Existing MID_1 research studies giving worklife expectancy estimates have used one-year-apart data from the CPS, but they do not specifically addressed the issue of a consistent method to choose one observation per CPS respondent from the possible four one-year-apart observations within the CPS. In selecting one observation per CPS respondent, researchers have either (1) deleted any excess one-year-apart respondent interview pairs they sequentially found in the CPS files, (2) chose a limited number of months that in combination with the 4-8-4 CPS rotation pattern and the household MIS in those selected months that would not allow duplicate CPS person interviews, or (3) chose a limited number of months within the 4-8-4 CPS rotation pattern and sequentially deleted any duplicate CPS person interviews found in the selected

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"respondent interview" or "person interview" contains the sum of the CPS recorded information regarding each member of the household roster. The CPS data files are also organized in this manner—one record for the demographic and labor force status of each household roster member.

months. Those data selection methods are incompatible and they do not address the issue of consistency in estimates across time.[15]

Minimal Biased Population Estimates

When selecting a sub-sample of the CPS to represent the labor force participation status of demographic subsets of the U.S. population, the data selection process must be consistent with the data collection and reporting process used by the Census. It is important to understand that the CPS is designed as an aggregated rotating survey of eight independent surveys of the population. The CPS sample rotation scheme is a compromise between a permanent sample (from which a high response rate would be difficult to maintain) and a completely new sample each month (which increases the variance in estimates of change).

For each incoming rotation group to the CPS, the Census uses the same methodology to select an unbiased sample of household units from pre-determined areas around the U.S.[16] In order to produce estimates of labor force and demographic status of the U.S. population, the Census uses an estimation procedure which weights the data from each sample person by the inverse of the probability of the person being in the sample. The weight gives a rough measure of the number of actual persons that the sample person represents. The weight given to each CPS respondent is estimated through a series of steps which account for non-sampling errors and uniform coverage by gender, age, race, and Hispanic origin. A final composite estimate, which is used to form official labor force estimates, incorporates data from previous months to control

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[15] There are other factors creating biased estimates of labor force participation. For example, Bailar (1975) references a variety of studies that have found that the data reported by CPS respondents is conditional on the number of times respondents have been exposed to the survey which breeds a level of familiarity with the study and the responses sought within the survey. The BLS notes that historically, the incoming parts of the CPS sample (the rotation groups in MIS1 or MIS5) have tended to have higher labor force participation and unemployment rates than the continuing parts (BLS TP63RV, page 10-9).

[16] The procedures are presented in detail in chapters 3 and 4 of BLS TP63RV.

the variance in estimates between months and within the month by MIS. It is important to understand that with the application of composite weights, each rotation group is no longer an independent, representative sample of the U.S. non-institutional population. If we used the composite weight, which is used to produce official BLS labor force estimates, with a variety of MIS one-year-apart data for the MID_1 model, the stratification mechanisms of the CPS are destroyed because the composite weight adjusts the final weight by a flow of labor force estimates from previous months plus current month adjustment for response patterns by MIS, seasonality, weather patterns, etc.[17]

There are an extremely large number of combinations of paired interview respondent data that can be culled from the CPS survey based upon the algorithm used to select matched interviews. A unique characteristic of CPS MIS4,8 data is its outgoing rotation weight which has been computed by the BLS/Census since 1994. The outgoing rotation weight forces the combined MIS4,8 sub-sample of the CPS to sum to the composited, or official, estimates of employment, unemployment, and not in labor force for each month by gender, age, race and Hispanic origin. With the application of the outgoing rotation weights to matched MIS4,8 data, any problems of using a sub-sample of the CPS with matched respondents to construct U.S. population estimates are removed because the MIS4,8 data, as a pair, have a known correspondence to the entire, official CPS composite estimates for each month of the CPS. Using the CPS outgoing rotation weights, which force MIS4,8 rotation data to match the composite weighted CPS population results by month, we can adjust the outgoing weights on the matched interviews from found in MIS4,8 by month to match the outgoing rotation weights by

[17] Other MID_1 researchers evaluated the representativeness of their selected sub-sample of matched interview pair CPS data by putting side-by-side for visual inspection the labor force participation rate data computed from their matched person sub-sample with the official labor force participation estimates published by the BLS for the same period. This sort of comparison is relevant, but it introduces a bias as mentioned here.

month which equal the composite CPS weights by month. This process eliminates any differences of the labor force participation, unemployment, and non labor force participation activity between the matched sample and the entire CPS sample. It is such an application of adjusted outgoing rotation weights that allows us to construct labor force transition tables that match the population estimates provided by the CPS. Therefore, we can be confident that labor force status within the matched sample corresponds to the labor force status within the entire CPS sample.[18]

Extracting the Labor Force Transition Table from the CPS Data

To construct our labor force transition tables from the CPS, we utilized the 84 months (seven years) of CPS files from January 1998 to December 2004. We do so for several reasons. First, we want to have a large number of one-year apart matched CPS interviews to ensure that our transition probability tables are completely and reliably filled-in by age for males and females for five levels of educational attainment. Second, the frequently cited Ciecka, et al. worklife expectancy studies ended with 1998 data, so 1998 seems a logical starting point for updated worklife expectancy results. The CPS also last underwent a major revision in 1998 and labor force data since 1998 have been consistently collected by the CPS. We also want to avoid short-term movements in labor force participation that might influence labor force transition probabilities. Lastly, we want to provide timely estimates, so we use the last full year of currently available labor force data which is 2004. In figures 1, 2, and 3, we show the trends in U.S. labor force data over the last 20 years to put the 1998 through 2004 data into perspective.

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[18] It is this direct correspondence that also allows us to use the same data tables presented in this paper to compute MID_l and conventional models of work probability such as LP (living and participating) and median years to final labor force separation. Using the same population-representative data with different worklife expectancy models allows a direct comparison of the effect of model choice on the length of worklife calculated.

In Figure 1, we see that the overall downward movement in male labor force participation rates continues through the 1998 to 2003 period (we reference the 1998 to 2003 period because those years form the base period for the transition probabilities at age *x*) and female labor force participation rates have essentially leveled after their long climb upwards. The data in Figure 2 are interesting because they show that when we split the population by age (under 45 and 45 and over), male and female labor force participation rates for persons under 45 are falling and labor force participation rates for persons ages 45 years and over are rising. Regarding unemployment rates, Figure 3 exhibits that unemployment from 1998 to 2003 has experienced a down then up cycle with a mid-point of approximately 1.5% lower than the previous complete cycle of unemployment from 1984 to 1993.

To create a CPS person-level interview-pair matched data file to construct labor force transition tables, we started by reading the January 1998 CPS data file extracting all MIS4 respondent-level data and then we moved one-year later to January 1999 and extracted all MIS8 respondent-level data. Comparing these MIS one-year apart paired data files, we found the matching one-year-apart person interviews by matching household identification number, household serial suffix, household replacement number, person line number, gender, race, and age within a zero to two-year positive difference.[19] We continued this process monthly through the December 2003 / December 2004 MIS4,8 one-year-apart paired data files. Out of the 898,541 MIS4 respondents to the CPS during these survey months, we were able to find 673,715

[19] After matching on household identifier, household serial suffix, household replacement number, person line number, gender, and race, the number of persons with a two-year differential in age was few. We checked for a change in the line number of the person in the household answering the CPS interview and found that many of the two-year differentials in age occurred when between years different persons answered the CPS for the household which sometimes creates error when ages are not reported exactly due to a error of inaccurate recall of a birthday. Additionally, it is possible with correct reporting to have a two year age interval between matched interviews based upon the survey date. For example, a person could be interviewed on January 17th, have a birthday on January 18th, and then surveyed a year later on January 19th. In this example, between the interviews the person's age would increase by two years. Our sample is limited to persons ages 16 and over, and because of this limitation, matching on 16 year olds is not complete.

matching MIS4,8 records in the public-use CPS Microdata for a match rate of 75.0 percent.[20] Our sample of 673,715 matched CPS person interviews is substantial larger than any previous Markov worklife expectancy study.

Population Weighting the Matched Sub-Sample

A unique characteristic of MIS4,8 data is its outgoing rotation weight which has been computed on CPS files since 1994. The outgoing rotation weight forces the combined MIS4,8 sub-sample of the CPS by month to sum to the composited, or official, estimates of wage and salary employment, other employment, unemployment, and not in labor force for each month by gender, age, race. With the existence of the outgoing rotation weights which force MIS4,8 rotation data to match the composite weighted CPS population results, we can adjust the weights on the matched interviews from MIS4,8 to match the entire composited weighted CPS data estimates eliminating any differences of the labor force participation, unemployment, and non labor force participation activity representation by the stratification controls of the CPS population weights.[21]

The weight adjustment process begins by obtaining the size of the population contained within matched MIS4 records as weighted by the outgoing population weight. In computing population estimates, we follow the final stratification controls of the CPS of wage and salary employment, other employment, unemployment, and not in labor force for by gender, age group,

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[20] The match rates were fairly consistent throughout the sample with the exception of February 2001 to January 2002 MIS4 respondents when the match rate fell to 72.2%. This match rate decline is associated with actions by the U.S. Census Bureau in February 2002 in recoding the ages of persons aged 65 and over in the public-use microdata CPS files which they felt might be vulnerable to public identification through the CPS interview responses. The change made by the Census in order to dissuade possible contact with CPS interviewees was to change the reported age of the respondent to some other age greater or equal to age 65 and to reduce the topcode on age from age 90 to age 80 (i.e., beginning in February 2002 we do not know the exact age of persons ages 80 and over).

[21] Previous Markov worklife expectancy studies did not have matched data files that directly corresponded to the composite CPS files with regards to labor force participation or any other stratification control system of the CPS to the U.S. population.

and race grouping.[22] Next, we compute the size of the population contained within the total MIS4,8 outgoing rotation records as weighted by the outgoing population weight. These figures tally to the official composite labor force participation status estimates of the U.S. population as produced by the CPS. Next, we compute a weight adjustment ratio for all of the cells in the stratification control system of the CPS to the U.S. population. For example, for each gender, age-group, and race combination, we find the ratio of the size of the complete U.S. population to that of the matched sub-sample U.S. population by wage and salary employment, other employment, unemployment, and not in the labor force. The last step is to multiply each matched record by ratio produced by its corresponding demographic variables of gender, age, race, wage and salary employment, other employment, unemployment, and not in the labor force. At the end of the process, we have a MID_1 dataset that matches the labor force status distribution and size of the U.S. population by gender, age, race, wage & salary employment, other employment, unemployment, and not in the labor force as measured by the complete CPS.

Tables of Inter-year Labor Force Status

In tables 1-10, we present the tables of inter-year labor force status necessary to compute the Markov worklife expectancy model based on labor force participation. We show data for males and females by educational attainment at the time of the MIS4 CPS interview. Column B of the tables shows the average monthly size of the living U.S. population from January 1998 through December 2003. Column C gives the average monthly number of persons inactive from the labor force from January 1998 through December 2003. Column D gives the average monthly number of persons active in the labor force from January 1998 through December 2003.

[22] The stratification procedure is discussed in BLS' TP63RV, Chapter 10. The initial cell values for gender, age, and race are shown on page 10-6 of TP63RV.

Of those persons that were inactive from the labor force from January 1998 through December 2003, column E gives the number of persons still inactive one-year later from January 1999 through December 2004; column F gives the number of January through December 2003 inactives turning to active one year later in January 1999 through December 2004. Of those persons that were active from January 1998 through December 2003, column G gives the number of persons turning inactive one-year later from January 1999 through December 2004; and, column H gives the number remaining active in January 1999 through December 2004.

Estimating the Increment-Decrement One Period Markov Model

Having specified the framework of the MID_1 model and supplying the data to input to the model, we now show the process of estimating the model. Using any stable cohort[23] of persons by age x (e.g., the data in tables 1-10), we need to find

a) The number of persons active and inactive in the labor force at age x, ${}^{a}N_x$ and ${}^{i}N_x$, with the total population being ${}^{\bullet}N_x$
b) The number of persons who are inactive from the labor force at age x and inactive from the labor force at age $x + 1$, ${}^{i}N^{i}$
c) The number of persons who are inactive from the labor force at age x and active in the labor force at age $x + 1$, ${}^{i}N^{a}$
d) The number of persons who are active in the labor force at age x and inactive from the labor force at age $x + 1$, ${}^{a}N^{i}$
e) The number of persons who are active in the labor force at age x and active in the labor force at age $x + 1$, ${}^{a}N^{a}$

We also require the input of the proportion of persons dying between ages x and $x + 1$, q_x, and the number of survivors in the population at each age x, l_x,[24] which is computed from q_x. In theory, the survivor data does not necessarily have to come from a different source than the

[23] Here we refer to a population that we can fix by comparable traits over a remaining lifetime such as gender and education.
[24] Given q_x, we could use any radix value of l_x, however, we considered it more informative to use the actual l_x values from the life table.

population activity data, but practical data availability demands that it does. In columns B through I of Table 11, we show the required data to estimate the MID_1 model of labor force activity (the data are from Table 1 for all males). In columns B through H, we show the size of the U.S. male population and labor force status by age (inactive: not in the labor force; active: in the labor force).[25] In column I, we show the proportion of males in the U.S. dying between ages x and $x + 1$ as taken from *U.S. Life Tables 2002* (Centers for Disease Control, 2004).

Taking advantage of the identities in equations (8)-(10), since ${}^{\bullet}p_x^d$ is supplied from an external life table source, only two of the four transition probabilities require computation from the data in columns B through H. Conventionally, from the population data we compute the inactive-to-inactive and active-to-active transition probabilities because these two population groups are significantly larger than the inactive-to-active and active-to-inactive population groups. Life table calculations focus on persons at exact age x. The mortality data as published are computed for exact ages x—they represent the probability of survival from one exact age to the next age. However, since the population activity data are based on surveyed age reported in single-digit values only, age in that data has an expected value as $x + ½$. Therefore, when we compute the transition probabilities, we need to re-center the survey data to exact ages by taking the average of the surveyed population size data across the range of $x \pm ½$ by combining two ages from survey data (e.g., for exact age 17 transition probabilities, we use the average survey data from 16.5 and 17.5). The two transition probabilities computed from the survey data for exact age x are:

[25] These U.S. population data are from the *Current Population Survey* and the method of computing the population data is discussed earlier in the paper.

(26) $${}^{i}p_{x}^{i} = \left[\frac{{}^{i}N_{x-1}^{i} + {}^{i}N_{x}^{i}}{{}^{i}N_{x-1} + {}^{i}N_{x}} \right] \times (1 - {}^{\bullet}p_{x}^{d})$$

(27) $${}^{a}p_{x}^{a} = \left[\frac{{}^{a}N_{x-1}^{a} + {}^{a}N_{x}^{a}}{{}^{a}N_{x-1} + {}^{a}N_{x}} \right] \times (1 - {}^{\bullet}p_{x}^{d})$$

If we were to think of Table 11 as a computer spreadsheet using the letter headings as columns and the ages as the rows, the formulas for equations (26) and (27) at age 17 would be entered as

(28) $${}^{i}p_{17}^{i} \rightarrow$$ J17=PRODUCT(SUM(E16:E17)/SUM(C16:C17),1-I17)

(29) $${}^{a}p_{17}^{a} \rightarrow$$ K17=PRODUCT(SUM(H16:H17)/SUM(D16:D17),1-I17)

and those formulas would be copied down columns J and K for each age (row).[26]

We solve for the remaining two transition probabilities—inactive-to-active and active-to-inactive—using the identities shown in equations (8) and (9). Thinking of tables 11 and 12 as a computer spreadsheet, columns N and O beginning at age (row) 17 would have the following equations copied and pasted down the columns:

(30) $${}^{i}p_{17}^{a} \rightarrow$$ N17=1-M17-I17

(31) $${}^{a}p_{17}^{i} \rightarrow$$ O17=1-P17-I17

With the one-period Markov model, the first usable age in Table 12 is age 17. The radix value of ${}^{\bullet}l_{x}$ (column Q) at the beginning table age can be set to a positive number or, as in the case in Table 12, the number of survivors by x from the supplied mortality table.[27] To "open" the life table at age 17 for the entire population regardless of initial participation state, the radix

[26] These transition probabilities can be smoothed, if necessary, before proceeding through the rest of the table.
[27] Column Q can simply be copied for the l_x column of the U.S Life Table.

values of ${}^{i}l_{17}$ and ${}^{a}l_{17}$ are computed by multiplying ${}^{\bullet}l_{17}$ by the activity participation rates $N_{17}^{i}/(N_{17}^{i}+N_{17}^{a})$ and $N_{17}^{a}/(N_{17}^{i}+N_{17}^{a})$, respectively. Again, thinking of tables 11 and 12 as a computer spreadsheet, columns R and S at age (row) 17 would have the following equations:

(32) ${}^{i}l_{17} \rightarrow$ R17=Q17*(C17/B17)

(33) ${}^{a}l_{17} \rightarrow$ S17=Q17*(D17/B17)

After age 17 through the end of the table (age 80 in this example), ${}^{i}l_{x}$ and ${}^{a}l_{x}$ can be computed recursively using equations (13) and (14). Again, thinking of Table 12 as a computer spreadsheet, using a simpler form of equations (13) and (14) calculated by substituting equation (11) into (13) and (14), beginning at age (row) 18 columns R and S we would have the following equations copied and pasted down the columns:

(34) ${}^{i}l_{18} \rightarrow$ R18=SUM(PRODUCT(M17,R17),PRODUCT(O17,S17))

(35) ${}^{a}l_{18} \rightarrow$ S18=SUM(PRODUCT(N17,R17),PRODUCT(P17,S17))

Under the assumption of mid-age transition, the ${}^{\bullet}L_{x}^{\bullet}$ columns T, U, and V are next computed using equations (15) to (17). Again, thinking of Table 12 as a computer spreadsheet, using equations (15) to (17), beginning at age (row) 17 columns T, U, and V would have the following equations copied and pasted down the columns to age (row) 79:

(36) ${}^{\bullet}L_{17} \rightarrow$ T17=AVERAGE(Q17:Q18)

(37) ${}^{i}L_{17} \rightarrow$ U17=AVERAGE(R17:R18)

(38) ${}^{a}L_{17} \rightarrow$ V17=AVERAGE(S17:S18)

The "closing" values for ${}^{\bullet}L_x^{\bullet}$ are manually set at age 80, the assumed closing age of this worklife expectancy table.[28] In the last row for ${}^{\bullet}L_{80}$, the data are supplied from the external mortality table as the total remaining number of years yet to be lived by those surviving to age 80. We "close" the table by assuming that beginning at the age in the last row in the life table, all persons are inactive from the labor force. Therefore, $L_{80}^{i} = {}^{\bullet}L_{80}$ and $L_{80}^{a} = 0$.

Column W of Table 12 shows the probabilities of survival from exact age 17 to the middle of each age x (${}^{\bullet}L_x \div {}^{\bullet}l_{17}$). The sum of the probabilities in column W equals the life expectancy of all males alive at exact age 17. Column X shows the probabilities of all males being inactive during each age x for all of those males alive at exact age 17 (${}^{i}L_x \div {}^{\bullet}l_{17}$). The sum of the probabilities in column X equals the traditional worklife expectancy table value for the inactive years of all males alive at exact age 17. Column Y shows the probabilities of all males being active in the labor force during each age x for those alive at exact age 17 (${}^{a}L_x \div {}^{\bullet}l_{17}$). The sum of the probabilities in column (25) equals the traditional worklife expectancy table value for the active years of all males alive at exact age 17. Thinking of Table 12 as a computer spreadsheet, beginning at age (row) 17 columns W, X, and Y would have the following equations copied and pasted down the columns:

(31) ${}^{\bullet}p_{17} \rightarrow$ W17=T17/Q$17

(32) ${}^{i}p_{17} \rightarrow$ X17=U17/Q$17

(33) ${}^{a}p_{17} \rightarrow$ Y17=V17/Q$17

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[28] The closing value at age 80 corresponds with the top-coding of age in the CPS at age 80.

At the end of columns W, X, and Y we show the sums of the columns. The sum of column W is life expectancy, 58.4155 years; the sum of column X is lifetime inactive labor force participation, 19.4150 years; and, the sum of column Y is lifetime active labor force participation, 39.005 years.

In Table 13, columns AA, AB, and AC we show the sum of the remaining number of person-years yet to be lived from the bottom of the life table to each age *x* to arrive at the traditional ${}^{\bullet}T_x$ values found in life tables. Column AA presents the bottom-up sum of ${}^{\bullet}L_x$, column AB presents the bottom-up sum of ${}^{i}L_x$, and column AC presents the bottom-up sum of ${}^{a}L_x$. The expected years of lifetime activity participation for all males can be computed as $e_x^{\bullet} = \frac{{}^{\bullet}T_x}{{}^{\bullet}l_x}$ (expected remaining years to be lived), $e_x^{i} = \frac{{}^{i}T_x}{{}^{\bullet}l_x}$ (expected remaining inactive years to be lived), and $e_x^{a} = \frac{{}^{a}T_x}{{}^{\bullet}l_x}$ (expected remaining active years to be lived); where, $e_x^{\bullet} = e_x^{a} + e_x^{i}$. For example, the traditional life and worklife expectancy table statistics are computed by dividing the values for ${}^{\bullet}T_{17}$ by the values for ${}^{\bullet}l_{17}$. For example, $e_{17}^{\bullet} = \frac{{}^{\bullet}T_{17}}{{}^{\bullet}l_{17}} = \frac{5{,}770{,}456}{98{,}783} = 58.4155$, and $e_{17}^{i} = \frac{{}^{i}T_{17}}{{}^{\bullet}l_{17}} = \frac{1{,}917{,}870}{98{,}783} = 19.4150$, and $e_{17}^{a} = \frac{{}^{a}T_{17}}{{}^{\bullet}l_{17}} = \frac{3{,}852{,}586}{98{,}783} = 39.0005$, and 58.4155 = 19.4150 + 39.0005. In Table 13 columns AD, AE, and AF, we show $e_{17}^{\bullet}, e_{17}^{a}, \text{and } e_{17}^{i}$. Note that this form of calculating remaining lifetime years of activity participation yields the same figures as the sums of the probabilities in columns W, X, and Y. To calculate worklife expectancy for each remaining age *x* in the worklife table, the beginning values for ${}^{i}l_x$ and ${}^{a}l_x$ would be set to their opening values at age *x* per equations (32) and (33). In Tables 16 and 17, we show

$e_x^{\bullet}, e_x^{a}$, and e_x^{i} for each age x in the worklife table by sex and gender calculated from the data in tables 1 to 10. We provide these tables so the reader can check their calculations based on age-probabilities or to provide quick comparison of the worklife expectancy sums from the 1998-2004 labor force data tables to other published worklife expectancy estimates using earlier data and methods.

Working through tables 11, 12, and 13, we have demonstrated the MID_1 calculation of expected years of active and inactive labor force participation for the male population in the United States. Using the same table structure, we can compute the expected years of active and inactive lifetime labor force participation for persons that are inactive at age 25, for example, or active at age 25 (or any other age) by changing the values of ${}^{i}l_{25}$ and ${}^{a}l_{25}$. To compute lifetime MID_1 active and inactive probabilities for inactive males currently aged 25, we change the value of ${}^{i}l_{25}$ to be equal to ${}^{\bullet}l_{25}$ (hence ${}^{a}l_{25} = 0$) and re-compute the table (see Table 14). Likewise, to compute lifetime MID_1 active and inactive probabilities for active males currently aged 25, we change the value of ${}^{a}l_{25}$ to be equal to ${}^{\bullet}l_{25}$ (hence ${}^{i}l_{25} = 0$) and re-compute the table (see Table 15). We can follow the same procedure for any other beginning age in the life table.

Conclusion

We began this paper stating that forensic economists have not had an empirical reference giving the necessary labor force data to compute worklife probability by age under the popular Markov Increment-Decrement population model. We discussed the worklife expectancy research published to date and the Markov model. We presented ten tables of inter-year labor force status of the U.S. population by gender and educational attainment to estimate the Markov worklife expectancy model. These labor force tables along with the Markov model will produce labor force participation probability forecasts under a known distribution applicable to earning

capacity forecasts by age to compute the expected present value of plaintiffs claimed multi-year earnings losses.

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Figure 1. U.S. Civilian Labor Force Participation Rate, by sex, January 1984 to April 2005

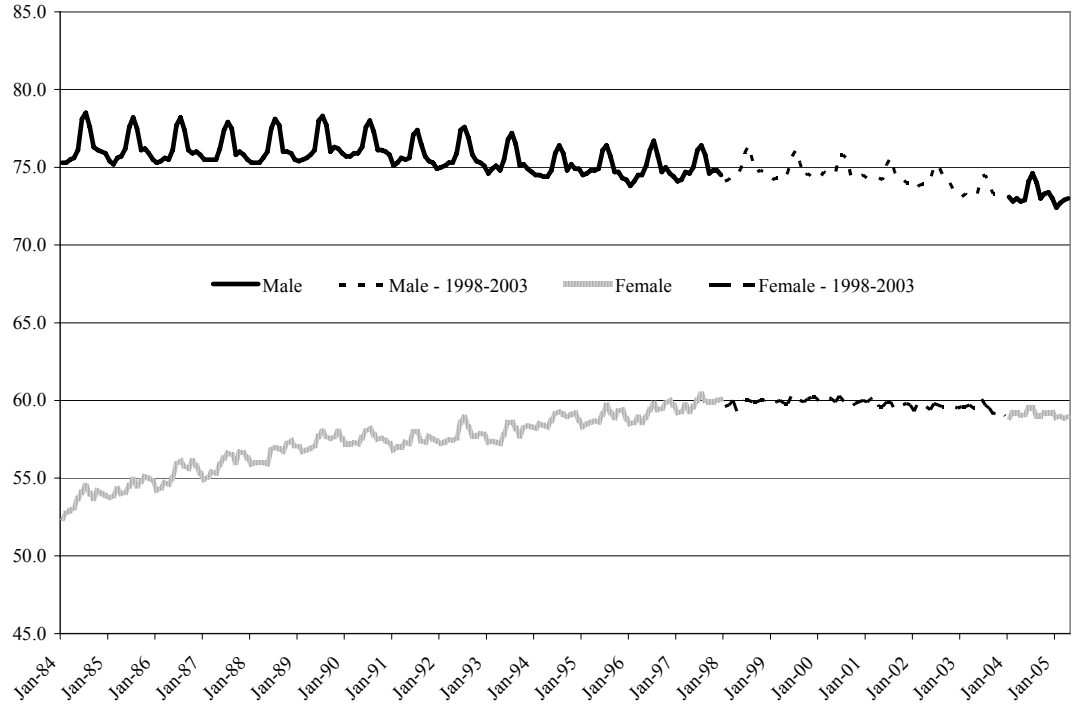

Figure 2. U.S. Civilian Labor Force Participation Rate, by sex and age, January 1984 to April 2005

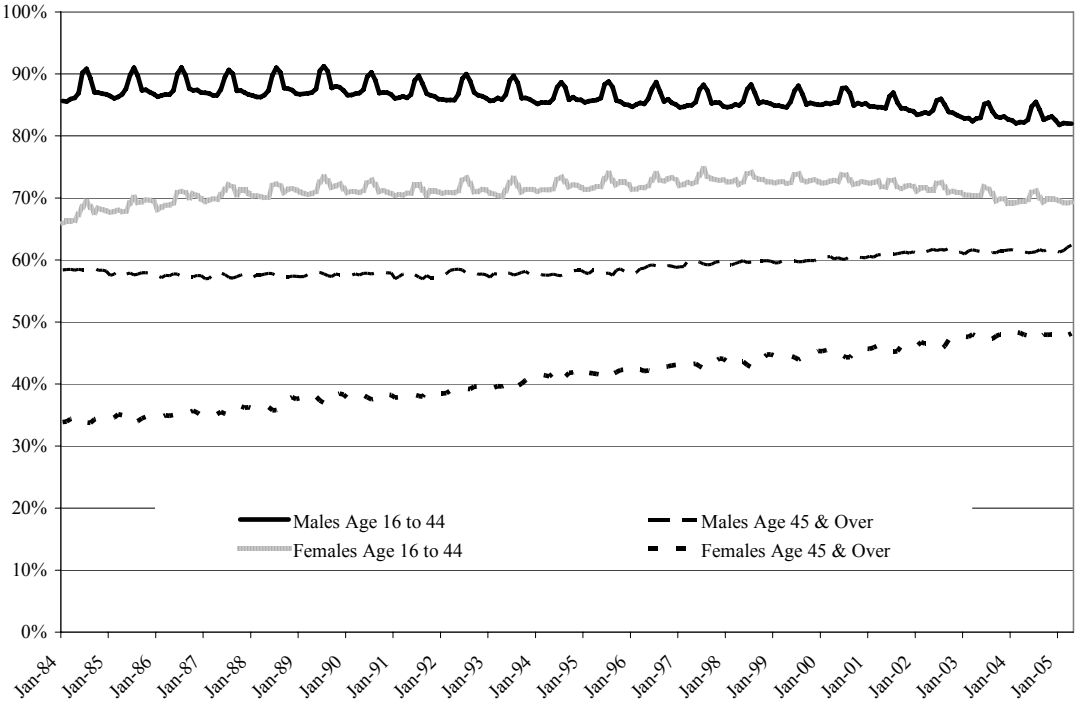

Figure 3. U.S. Civilian Unemployment Rate, by sex, January 1984 to April 2005

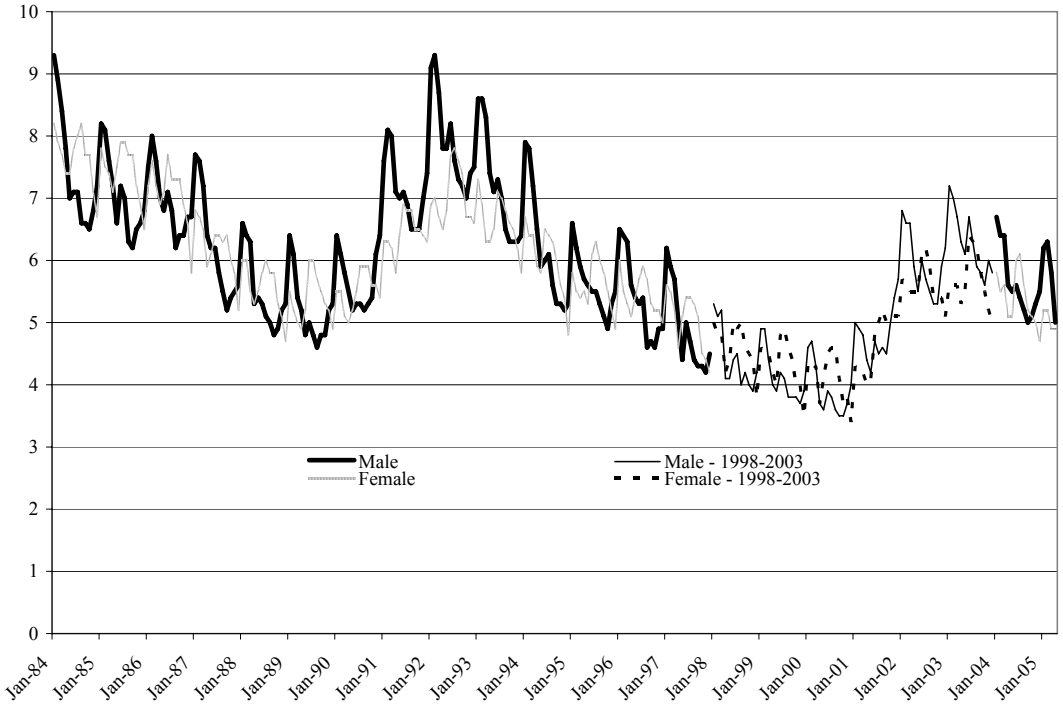

Table 1. Inter-year Work Status (Active=In the Labor Force, Inactive=Not in the Labor Force), All Males in United States 1998-2004

A	B	C	D	E	F	G	H
Age	Population Counts at age x			Population transitions during age interval x to x+1			
	$Population_x$	$Inactive_x$	$Active_x$	$Inactive_x$ $Inactive_{x+1}$	$Inactive_x$ $Active_{x+1}$	$Active_x$ $Inactive_{x+1}$	$Active_x$ $Active_{x+1}$
x	N_x	${}^{i}N_x$	${}^{a}N_x$	${}^{i}N^{i}_x$	${}^{i}N^{a}_x$	${}^{a}N^{i}_x$	${}^{a}N^{a}_x$
16	2,141,615	1,480,170	661,445	1,071,799	408,371	191,795	469,650
17	2,080,631	1,132,800	947,830	716,626	416,175	251,517	696,313
18	2,015,743	858,632	1,157,111	506,950	351,682	241,129	915,982
19	1,965,196	634,858	1,330,338	377,405	257,453	202,503	1,127,835
20	2,053,626	578,690	1,474,935	355,655	223,036	184,625	1,290,311
21	1,880,889	409,011	1,471,878	228,523	180,488	137,152	1,334,726
22	1,796,135	331,995	1,464,141	183,737	148,258	118,497	1,345,644
23	1,693,167	209,491	1,483,676	101,178	108,312	86,309	1,397,368
24	1,759,586	181,531	1,578,055	113,789	67,742	77,750	1,500,305
25	1,674,707	163,761	1,510,945	91,382	72,379	67,028	1,443,918
26	1,728,723	143,225	1,585,497	83,178	60,047	74,977	1,510,520
27	1,676,776	131,986	1,544,790	76,939	55,047	55,894	1,488,897
28	1,764,313	124,866	1,639,447	78,512	46,354	52,795	1,586,653
29	1,934,544	138,492	1,796,052	90,683	47,809	49,246	1,746,807
30	1,831,226	122,455	1,708,771	77,254	45,201	49,047	1,659,724
31	1,919,373	116,499	1,802,874	70,652	45,847	54,280	1,748,594
32	1,906,375	121,637	1,784,738	83,333	38,304	52,367	1,732,371
33	1,944,953	119,936	1,825,017	80,018	39,918	44,465	1,780,553
34	2,078,385	130,398	1,947,987	84,273	46,125	41,296	1,906,692
35	2,023,268	135,953	1,887,315	101,331	34,622	49,645	1,837,670
36	2,093,644	156,884	1,936,760	108,004	48,880	53,372	1,883,388
37	2,117,708	134,937	1,982,772	92,016	42,921	50,821	1,931,951
38	2,250,559	166,591	2,083,969	120,209	46,382	49,210	2,034,759
39	2,274,554	162,999	2,111,556	116,229	46,769	50,052	2,061,504
40	2,274,355	171,104	2,103,251	124,961	46,143	50,804	2,052,447
41	2,174,499	166,868	2,007,631	124,384	42,484	53,298	1,954,334
42	2,210,618	161,172	2,049,445	122,380	38,792	56,303	1,993,142
43	2,272,424	198,820	2,073,604	151,551	47,269	56,434	2,017,170
44	2,251,375	195,454	2,055,921	153,036	42,418	60,267	1,995,654
45	2,065,240	188,743	1,876,497	155,816	32,926	41,016	1,835,482
46	1,989,670	186,741	1,802,929	152,545	34,196	44,881	1,758,048
47	1,969,402	198,206	1,771,196	159,789	38,417	50,643	1,720,553
48	1,938,591	198,695	1,739,896	163,994	34,701	47,261	1,692,635
49	1,915,548	203,750	1,711,798	165,701	38,049	56,503	1,655,295
50	1,845,282	215,964	1,629,318	181,179	34,785	61,123	1,568,195
51	1,759,413	211,003	1,548,410	179,518	31,485	57,434	1,490,976
52	1,707,365	241,228	1,466,137	207,874	33,354	55,127	1,411,011
53	1,595,254	218,371	1,376,883	185,065	33,306	70,067	1,306,817
54	1,510,003	228,634	1,281,370	200,430	28,204	66,050	1,215,320
55	1,501,636	275,928	1,225,708	241,650	34,278	71,125	1,154,583
56	1,380,969	265,539	1,115,431	232,310	33,229	73,585	1,041,846
57	1,277,367	285,536	991,831	252,032	33,504	68,538	923,293
58	1,229,960	299,571	930,388	266,341	33,231	67,794	862,595
59	1,164,814	329,837	834,977	295,140	34,697	72,370	762,607
60	1,090,016	345,091	744,925	312,408	32,683	71,881	673,044
61	1,057,251	358,538	698,713	335,297	23,241	129,438	569,275
62	1,038,991	484,701	554,290	452,227	32,473	92,789	461,501
63	978,532	531,263	447,269	497,887	33,376	76,266	371,003
64	966,976	546,286	420,689	516,812	29,474	84,741	335,948
65	980,613	612,522	368,091	575,481	37,041	77,312	290,779
66	932,310	633,953	298,357	594,136	39,817	62,049	236,308
67	835,041	587,130	247,910	555,900	31,230	52,260	195,650
68	845,595	616,071	229,524	588,112	27,959	54,109	175,415
69	808,751	618,999	189,752	595,499	23,500	43,636	146,117
70	817,519	649,133	168,387	617,547	31,586	37,814	130,572
71	764,053	621,189	142,864	604,151	17,038	35,288	107,576
72	734,875	602,088	132,787	587,093	14,995	34,881	97,907
73	709,585	599,182	110,402	582,445	16,737	30,474	79,928
74	696,805	598,264	98,541	586,079	12,185	25,887	72,654
75	751,906	660,215	91,691	642,692	17,522	20,171	71,521
76	651,251	581,752	69,500	571,618	10,134	17,233	52,267
77	675,529	610,203	65,327	601,064	9,138	15,023	50,304
78	632,571	576,610	55,961	568,181	8,429	16,452	39,509
79	510,485	469,493	40,991	463,071	6,422	11,412	29,579
80+	2,619,987	2,488,838	131,149	2,465,011	23,826	36,071	95,078
16+	101,738,123	26,120,477	75,617,646	22,038,081	4,082,396	4,491,577	71,126,069

Table 2. Inter-year Work Status (Active=In the Labor Force, Inactive=Not in the Labor Force), Males with Less than a High School Education in United States 1998-2004

A	B	C	D	E	F	G	H
Age	Population Counts at age x			Population transitions during age interval x to x+1			
	$Population_x$	$Inactive_x$	$Active_x$	$Inactive_x$ $Inactive_{x+1}$	$Inactive_x$ $Active_{x+1}$	$Active_x$ $Inactive_{x+1}$	$Active_x$ $Active_{x+1}$
x	N_x	^iN_x	^aN_x	$^iN^i_x$	$^iN^a_x$	$^aN^i_x$	$^aN^a_x$
16	2,132,017	1,473,897	658,120	1,067,150	406,748	190,650	467,470
17	2,008,193	1,099,833	908,360	698,123	401,710	244,577	663,783
18	1,149,926	522,372	627,554	290,614	231,758	151,156	476,398
19	405,098	149,295	255,802	81,394	67,901	49,301	206,501
20	319,300	94,416	224,884	57,047	37,369	21,293	203,591
21	258,117	55,020	203,097	34,483	20,537	19,473	183,624
22	255,711	42,397	213,314	28,039	14,358	18,613	194,701
23	245,393	33,392	212,001	19,484	13,908	16,792	195,209
24	221,337	32,512	188,825	23,522	8,989	11,861	176,964
25	234,122	38,157	195,965	25,039	13,118	12,160	183,805
26	229,366	24,819	204,548	13,303	11,516	17,171	187,376
27	218,560	30,445	188,115	20,738	9,707	11,950	176,165
28	207,770	28,637	179,133	19,720	8,918	8,771	170,362
29	214,001	30,708	183,293	21,849	8,860	7,338	175,955
30	226,200	32,074	194,127	23,160	8,913	9,304	184,823
31	245,566	33,802	211,765	24,964	8,837	13,249	198,516
32	220,140	36,371	183,768	26,787	9,584	6,985	176,784
33	250,278	34,309	215,969	26,260	8,049	7,469	208,500
34	252,650	35,157	217,493	25,681	9,476	7,341	210,152
35	246,443	37,725	208,717	31,119	6,607	9,272	199,445
36	268,126	45,358	222,768	33,375	11,983	12,422	210,346
37	252,392	44,740	207,651	32,842	11,898	6,420	201,231
38	252,316	46,276	206,040	37,337	8,939	13,146	192,893
39	287,833	49,143	238,690	40,109	9,034	11,911	226,780
40	255,039	51,668	203,371	39,512	12,156	11,475	191,896
41	247,396	50,611	196,785	40,051	10,560	11,181	185,604
42	255,460	45,993	209,467	38,785	7,208	9,651	199,816
43	252,663	50,757	201,905	43,800	6,957	14,119	187,787
44	254,288	62,237	192,050	54,309	7,928	12,619	179,431
45	222,292	52,199	170,093	46,096	6,103	6,862	163,231
46	188,749	42,834	145,915	38,699	4,136	5,437	140,477
47	217,607	53,097	164,510	44,116	8,980	9,803	154,707
48	209,080	52,241	156,839	45,644	6,597	8,625	148,214
49	198,529	50,546	147,983	43,098	7,449	9,564	138,419
50	183,020	50,251	132,769	43,068	7,182	9,105	123,664
51	189,165	47,874	141,292	42,652	5,222	8,766	132,525
52	200,635	58,936	141,699	53,459	5,477	9,699	132,001
53	177,331	54,449	122,882	49,209	5,240	11,155	111,727
54	188,638	60,015	128,623	52,305	7,710	13,433	115,190
55	191,934	70,727	121,207	62,920	7,808	7,576	113,631
56	191,148	63,200	127,947	58,380	4,820	11,124	116,823
57	184,276	66,675	117,601	63,647	3,028	9,081	108,519
58	191,930	76,228	115,701	67,564	8,664	10,436	105,265
59	213,170	89,040	124,130	82,168	6,872	12,275	111,855
60	190,788	82,268	108,520	74,337	7,931	11,728	96,792
61	190,959	85,050	105,909	80,609	4,440	23,555	82,354
62	211,046	122,235	88,811	114,812	7,423	23,808	65,003
63	203,841	136,133	67,708	130,903	5,230	15,903	51,805
64	202,189	130,231	71,958	125,026	5,205	15,472	56,486
65	224,516	156,631	67,886	150,132	6,499	16,383	51,503
66	221,504	170,366	51,138	162,295	8,071	12,014	39,123
67	197,161	156,127	41,034	150,425	5,703	10,366	30,667
68	199,159	164,119	35,040	158,823	5,295	9,085	25,955
69	203,790	170,501	33,289	163,905	6,596	9,990	23,299
70	231,890	196,882	35,008	188,681	8,200	7,120	27,888
71	211,410	183,112	28,298	179,654	3,458	7,620	20,678
72	214,888	187,721	27,167	182,343	5,378	8,125	19,041
73	222,137	200,365	21,772	195,714	4,651	5,513	16,259
74	225,172	201,305	23,867	198,481	2,824	8,759	15,107
75	226,800	207,111	19,689	203,366	3,745	3,957	15,732
76	214,184	196,308	17,875	191,893	4,415	5,091	12,784
77	204,877	188,846	16,031	185,929	2,917	2,065	13,967
78	193,530	182,694	10,836	179,328	3,366	3,120	7,717
79	162,285	154,281	8,004	151,980	2,301	3,170	4,834
80+	977,256	946,290	30,967	941,134	5,156	9,200	21,767
16+	19,942,585	9,419,010	10,523,576	7,821,389	1,597,620	1,292,657	9,230,919

Table 3. Inter-year Work Status (Active=In the Labor Force, Inactive=Not in the Labor Force), Males with a High School Education in United States 1998-2004

A	B	C	D	E	F	G	H
Age	Population Counts at age x			Population transitions during age interval x to x+1			
	$Population_x$	$Inactive_x$	$Active_x$	$Inactive_x$ $Inactive_{x+1}$	$Inactive_x$ $Active_{x+1}$	$Active_x$ $Inactive_{x+1}$	$Active_x$ $Active_{x+1}$
x	N_x	^iN_x	^aN_x	$^iN^i_x$	$^iN^a_x$	$^aN^i_x$	$^aN^a_x$
16	7,210	3,987	3,224	2,363	1,623	1,145	2,078
17	62,257	26,698	35,558	14,106	12,592	6,222	29,337
18	626,087	217,777	408,310	134,543	83,234	64,736	343,574
19	755,404	178,700	576,704	94,923	83,777	70,711	505,993
20	666,608	115,657	550,951	59,372	56,284	53,885	497,065
21	654,081	83,057	571,024	41,081	41,976	34,348	536,676
22	623,997	79,035	544,962	47,927	31,108	41,798	503,164
23	600,066	48,531	551,535	25,563	22,968	23,816	527,719
24	617,508	58,473	559,036	36,354	22,119	29,534	529,502
25	558,108	45,534	512,575	25,862	19,671	19,720	492,854
26	569,245	46,480	522,765	29,996	16,484	25,066	497,699
27	549,205	39,347	509,858	23,003	16,345	22,817	487,041
28	585,773	42,965	542,808	29,293	13,672	22,478	520,329
29	590,645	50,626	540,019	33,991	16,635	18,405	521,614
30	576,616	45,978	530,637	30,808	15,170	17,530	513,108
31	604,571	35,856	568,715	24,128	11,728	20,637	548,078
32	609,921	45,249	564,671	32,235	13,015	21,999	542,672
33	639,629	47,952	591,677	30,856	17,096	20,636	571,041
34	677,730	55,045	622,685	34,082	20,963	15,833	606,852
35	666,767	59,188	607,579	44,389	14,799	23,054	584,525
36	710,009	62,521	647,488	43,030	19,491	16,360	631,128
37	751,456	53,459	697,997	37,966	15,493	23,727	674,270
38	787,657	68,008	719,649	48,766	19,243	21,237	698,412
39	766,243	60,570	705,673	42,161	18,410	21,304	684,369
40	793,237	70,706	722,531	52,919	17,787	21,278	701,253
41	735,591	62,453	673,138	46,779	15,674	21,735	651,404
42	746,274	68,785	677,489	52,147	16,637	22,577	654,912
43	780,653	74,884	705,769	57,578	17,305	20,950	684,820
44	720,106	71,647	648,459	53,253	18,394	26,279	622,180
45	681,856	76,741	605,115	65,231	11,510	14,014	591,101
46	659,082	76,025	583,057	63,137	12,888	18,379	564,678
47	592,441	69,393	523,048	58,124	11,268	20,696	502,352
48	563,576	68,548	495,029	56,346	12,201	15,678	479,351
49	553,889	78,478	475,411	66,528	11,950	17,675	457,735
50	521,098	77,819	443,278	66,444	11,375	21,367	421,911
51	484,080	72,535	411,546	60,121	12,414	17,250	394,295
52	454,105	80,754	373,351	72,463	8,291	18,222	355,129
53	431,633	70,938	360,694	61,611	9,327	19,224	341,470
54	451,757	81,021	370,736	73,793	7,228	18,654	352,082
55	446,487	90,472	356,016	80,312	10,159	27,632	328,383
56	416,276	89,342	326,934	77,762	11,580	25,108	301,827
57	392,488	96,177	296,310	87,494	8,683	21,803	274,507
58	398,392	112,005	286,387	100,424	11,581	21,839	264,548
59	363,373	102,435	260,938	92,285	10,150	23,501	237,437
60	359,376	118,025	241,351	109,508	8,517	22,824	218,528
61	358,155	129,204	228,952	120,378	8,825	54,924	174,027
62	358,668	176,115	182,553	165,544	10,571	32,177	150,376
63	328,582	194,524	134,058	182,031	12,493	26,400	107,659
64	318,480	194,297	124,183	184,100	10,198	28,129	96,054
65	312,455	211,944	100,510	200,412	11,532	22,818	77,693
66	294,827	206,766	88,061	194,964	11,802	20,158	67,904
67	274,006	204,503	69,503	192,050	12,453	16,032	53,471
68	292,473	211,724	80,750	201,322	10,402	20,568	60,182
69	246,970	193,860	53,109	186,596	7,264	13,203	39,907
70	237,051	187,108	49,943	179,118	7,989	14,664	35,279
71	241,061	200,894	40,167	197,208	3,687	11,301	28,866
72	231,866	194,481	37,385	190,341	4,141	8,942	28,443
73	208,236	177,805	30,431	173,053	4,752	8,838	21,593
74	200,303	173,508	26,795	171,138	2,370	5,587	21,207
75	228,308	200,808	27,501	197,655	3,152	3,513	23,988
76	198,956	180,790	18,166	178,772	2,018	5,755	12,410
77	212,983	194,869	18,114	193,092	1,777	5,340	12,773
78	195,196	180,110	15,086	177,820	2,290	5,821	9,265
79	152,057	140,400	11,657	138,152	2,247	2,526	9,132
80+	746,357	714,352	32,005	708,043	6,309	9,515	22,489
16+	31,439,552	7,547,937	23,891,615	6,552,849	995,088	1,389,893	22,501,722

Table 4. Inter-year Work Status (Active=In the Labor Force, Inactive=Not in the Labor Force), Males with Some College but without a Four Year Degree in United States 1998-2004

A	B	C	D	E	F	G	H
Age	Population Counts at age x			Population transitions during age interval x to x+1			
	$Population_x$	$Inactive_x$	$Active_x$	$Inactive_x$ $Inactive_{x+1}$	$Inactive_x$ $Active_{x+1}$	$Active_x$ $Inactive_{x+1}$	$Active_x$ $Active_{x+1}$
x	N_x	${}^{i}N_x$	${}^{a}N_x$	${}^{i}N^{i}_x$	${}^{i}N^{a}_x$	${}^{a}N^{i}_x$	${}^{a}N^{a}_x$
16	2,388	2,286	102	2,286	0	0	102
17	9,486	5,574	3,912	3,910	1,664	718	3,194
18	239,105	117,859	121,247	81,265	36,593	25,238	96,009
19	800,939	305,374	495,565	200,170	105,204	81,890	413,675
20	1,061,517	366,365	695,152	237,342	129,022	108,786	586,366
21	942,629	263,265	679,364	149,909	113,356	82,535	596,829
22	777,727	184,613	593,114	93,618	90,995	51,476	541,638
23	597,949	92,273	505,676	38,183	54,090	32,170	473,506
24	540,191	53,562	486,629	28,878	24,684	19,658	466,971
25	522,299	46,292	476,007	23,161	23,131	20,637	455,369
26	516,098	41,536	474,562	22,801	18,736	22,032	452,530
27	464,218	36,162	428,056	17,097	19,064	13,231	414,825
28	479,571	28,172	451,398	15,904	12,268	11,897	439,501
29	554,350	37,647	516,703	22,931	14,715	10,801	505,902
30	506,430	23,622	482,807	12,798	10,824	13,181	469,626
31	500,477	29,228	471,248	15,571	13,658	10,912	460,336
32	483,662	21,237	462,425	14,404	6,833	15,509	446,916
33	488,628	23,572	465,056	15,779	7,794	10,529	454,527
34	532,894	26,833	506,061	17,189	9,644	11,629	494,432
35	500,297	21,700	478,596	16,395	5,306	9,205	469,392
36	512,559	36,972	475,586	25,572	11,400	13,704	461,882
37	502,045	22,409	479,636	16,368	6,041	9,991	469,644
38	567,048	36,959	530,089	23,565	13,394	7,980	522,109
39	584,774	35,235	549,539	22,442	12,794	10,441	539,098
40	554,610	29,223	525,386	19,414	9,809	10,376	515,011
41	563,098	39,022	524,076	27,732	11,290	13,984	510,091
42	576,260	32,763	543,496	23,460	9,303	15,487	528,009
43	580,482	46,216	534,267	31,416	14,800	15,980	518,286
44	602,572	42,331	560,240	32,162	10,169	11,077	549,163
45	549,773	40,903	508,870	30,349	10,554	15,270	493,600
46	537,106	51,377	485,729	38,830	12,547	15,023	470,706
47	526,616	47,103	479,513	36,924	10,179	11,303	468,210
48	539,209	52,039	487,169	43,838	8,201	13,256	473,913
49	532,526	48,543	483,982	38,644	9,899	16,722	467,261
50	506,427	51,988	454,439	44,134	7,854	19,396	435,044
51	486,568	60,256	426,312	53,990	6,266	18,628	407,684
52	489,043	62,913	426,130	52,053	10,860	16,586	409,544
53	431,019	56,999	374,020	46,794	10,205	19,851	354,169
54	355,440	51,296	304,144	44,732	6,565	15,466	288,678
55	366,775	63,757	303,018	56,491	7,266	14,606	288,413
56	315,957	60,465	255,492	51,093	9,372	19,009	236,483
57	297,084	67,598	229,487	57,049	10,549	18,585	210,902
58	279,297	59,075	220,223	52,521	6,554	16,738	203,485
59	252,583	72,470	180,113	65,082	7,388	17,870	162,244
60	229,818	68,023	161,794	61,141	6,882	20,400	141,394
61	219,143	68,472	150,671	65,579	2,893	29,845	120,826
62	198,521	88,117	110,404	81,243	6,874	16,807	93,597
63	195,889	99,058	96,831	92,312	6,746	17,438	79,393
64	194,860	110,085	84,774	104,619	5,467	20,011	64,764
65	200,460	119,482	80,977	110,581	8,901	19,116	61,862
66	192,410	129,701	62,709	119,689	10,012	12,311	50,398
67	162,320	107,472	54,848	101,720	5,752	10,527	44,321
68	155,296	110,980	44,317	105,419	5,561	11,817	32,500
69	156,876	118,700	38,177	114,656	4,043	10,109	28,068
70	155,403	120,858	34,545	113,673	7,185	7,970	26,574
71	143,220	117,039	26,181	112,607	4,432	6,280	19,902
72	134,585	106,570	28,015	104,814	1,756	6,421	21,594
73	120,912	101,202	19,710	97,627	3,576	3,857	15,853
74	115,228	98,562	16,666	96,579	1,983	3,684	12,982
75	133,744	113,922	19,822	111,088	2,835	6,250	13,572
76	102,002	89,130	12,872	86,350	2,780	2,913	9,959
77	117,926	105,514	12,412	103,679	1,835	3,569	8,843
78	117,990	106,422	11,568	105,179	1,243	2,124	9,444
79	86,534	78,854	7,680	78,274	580	2,418	5,262
80+	424,529	401,291	23,238	397,411	3,880	6,473	16,766
16+	25,587,390	5,354,541	20,232,849	4,328,485	1,026,057	1,129,702	19,103,147

Table 5. Inter-year Work Status (Active=In the Labor Force, Inactive=Not in the Labor Force), Males with at Least a Four Year College Degree in United States 1998-2004

A	B	C	D	E	F	G	H
Age	Population Counts at age x			Population transitions during age interval x to x+1			
	$Population_x$	$Inactive_x$	$Active_x$	$Inactive_x$ $Inactive_{x+1}$	$Inactive_x$ $Active_{x+1}$	$Active_x$ $Inactive_{x+1}$	$Active_x$ $Active_{x+1}$
x	N_x	${}^{i}N_x$	${}^{a}N_x$	${}^{i}N^{i}_x$	${}^{i}N^{a}_x$	${}^{a}N^{i}_x$	${}^{a}N^{a}_x$
16	0	0	0	0	0	0	0
17	695	695	0	487	208	0	0
18	624	624	0	528	96	0	0
19	3,755	1,488	2,266	918	570	601	1,666
20	6,202	2,253	3,949	1,893	360	660	3,289
21	26,061	7,669	18,392	3,050	4,619	796	17,597
22	138,701	25,950	112,751	14,153	11,797	6,610	106,142
23	249,758	35,294	214,464	17,949	17,345	13,531	200,933
24	380,550	36,984	343,566	25,035	11,949	16,697	326,869
25	360,178	33,778	326,399	17,320	16,458	14,510	311,890
26	414,014	30,390	383,623	17,079	13,311	10,708	372,915
27	444,792	26,031	418,761	16,101	9,931	7,896	410,865
28	491,200	25,091	466,109	13,595	11,497	9,648	456,461
29	575,548	19,511	556,038	11,912	7,599	12,702	543,336
30	521,980	20,781	501,199	10,487	10,294	9,033	492,167
31	568,759	17,612	551,146	5,989	11,624	9,483	541,663
32	592,653	18,779	573,874	9,908	8,871	7,875	565,999
33	566,418	14,103	552,315	7,123	6,980	5,831	546,484
34	615,111	13,363	601,748	7,321	6,042	6,493	595,255
35	609,762	17,339	592,422	9,428	7,911	8,114	584,308
36	602,950	12,033	590,917	6,027	6,006	10,885	580,032
37	611,816	14,329	597,487	4,840	9,489	10,682	586,805
38	643,538	15,347	628,191	10,540	4,807	6,847	621,344
39	635,704	18,050	617,654	11,518	6,532	6,397	611,257
40	671,469	19,507	651,963	13,116	6,391	7,675	644,288
41	628,414	14,782	613,632	9,822	4,960	6,398	607,234
42	632,625	13,631	618,993	7,988	5,644	8,589	610,405
43	658,626	26,963	631,663	18,757	8,207	5,385	626,278
44	674,410	19,239	655,172	13,312	5,927	10,292	644,880
45	611,319	18,899	592,420	14,140	4,759	4,870	587,550
46	604,733	16,504	588,229	11,879	4,625	6,042	582,187
47	632,738	28,613	604,125	20,625	7,989	8,841	595,284
48	626,727	25,867	600,859	18,166	7,701	9,702	591,157
49	630,604	26,182	604,422	17,432	8,750	12,542	591,880
50	634,737	35,906	598,831	27,532	8,374	11,255	587,576
51	599,600	30,339	569,261	22,756	7,583	12,789	556,471
52	563,582	38,625	524,957	29,898	8,727	10,620	514,337
53	555,272	35,985	519,287	27,451	8,534	19,836	499,450
54	514,168	36,301	477,866	29,600	6,701	18,497	459,369
55	496,439	50,972	445,467	41,927	9,045	21,310	424,157
56	457,588	52,532	405,057	45,075	7,457	18,344	386,713
57	403,519	55,086	348,433	43,842	11,244	19,069	329,365
58	360,341	52,264	308,077	45,832	6,432	18,780	289,297
59	335,687	65,892	269,795	55,605	10,287	18,724	251,071
60	310,034	76,775	233,259	67,422	9,353	16,929	216,330
61	288,994	75,813	213,182	68,730	7,083	21,113	192,068
62	270,756	98,235	172,522	90,629	7,605	19,997	152,525
63	250,220	101,548	148,672	92,642	8,906	16,525	132,146
64	251,447	111,673	139,774	103,067	8,605	21,129	118,645
65	243,182	124,465	118,718	114,355	10,109	18,996	99,721
66	223,569	127,120	96,450	117,188	9,932	17,566	78,884
67	201,554	119,028	82,526	111,705	7,323	15,335	67,191
68	198,667	129,249	69,418	122,548	6,701	12,639	56,779
69	201,115	135,938	65,177	130,343	5,596	10,335	54,843
70	193,176	144,286	48,891	136,074	8,211	8,060	40,831
71	168,361	120,143	48,217	114,683	5,461	10,087	38,130
72	153,536	113,316	40,220	109,595	3,721	11,393	28,828
73	158,300	119,811	38,489	116,052	3,759	12,266	26,223
74	156,102	124,889	31,213	119,881	5,008	7,856	23,358
75	163,054	138,374	24,680	130,583	7,791	6,451	18,228
76	136,110	115,523	20,587	114,603	920	3,473	17,114
77	139,744	120,974	18,770	118,364	2,610	4,049	14,721
78	125,854	107,384	18,471	105,854	1,530	5,388	13,083
79	109,608	95,959	13,650	94,665	1,293	3,298	10,351
80+	471,844	426,905	44,940	418,424	8,481	10,883	34,057
16+	24,768,596	3,798,989	20,969,607	3,335,358	463,631	679,326	20,290,281

Table 6. Inter-year Work Status (Active=In the Labor Force, Inactive=Not in the Labor Force), All Females in United States 1998-2004

A	B	C	D	E	F	G	H
Age	Population Counts at age x			Population transitions during age interval x to x+1			
	$Population_x$	$Inactive_x$	$Active_x$	$Inactive_x$ $Inactive_{x+1}$	$Inactive_x$ $Active_{x+1}$	$Active_x$ $Inactive_{x+1}$	$Active_x$ $Active_{x+1}$
x	N_x	^iN_x	^aN_x	$^iN^i_x$	$^iN^a_x$	$^aN^i_x$	$^aN^a_x$
16	2,006,267	1,377,542	628,724	949,602	427,941	166,833	461,891
17	1,980,413	1,071,837	908,576	691,425	380,412	252,317	656,259
18	1,964,278	870,828	1,093,450	529,993	340,835	236,591	856,859
19	1,937,841	693,511	1,244,330	428,174	265,336	214,845	1,029,485
20	1,992,998	625,905	1,367,093	392,635	233,270	226,405	1,140,689
21	1,843,936	565,169	1,278,767	334,812	230,358	202,845	1,075,922
22	1,732,494	449,243	1,283,251	272,553	176,690	174,258	1,108,993
23	1,821,318	442,937	1,378,381	292,240	150,697	168,613	1,209,767
24	1,883,514	450,796	1,432,718	302,762	148,034	158,659	1,274,060
25	1,704,074	407,931	1,296,143	271,947	135,985	122,525	1,173,618
26	1,789,795	429,991	1,359,803	302,116	127,875	136,650	1,223,153
27	1,762,436	423,316	1,339,120	297,589	125,727	142,178	1,196,943
28	1,900,441	426,040	1,474,401	307,101	118,939	146,999	1,327,402
29	1,984,374	493,168	1,491,206	354,792	138,376	135,310	1,355,895
30	1,936,386	469,341	1,467,045	347,311	122,030	131,423	1,335,623
31	1,925,484	460,352	1,465,133	337,908	122,444	131,262	1,333,871
32	1,984,471	506,109	1,478,362	388,695	117,413	134,621	1,343,741
33	2,043,287	523,482	1,519,804	396,821	126,661	119,843	1,399,961
34	2,167,693	540,246	1,627,447	405,163	135,083	124,794	1,502,653
35	2,094,749	546,273	1,548,476	417,602	128,671	119,208	1,429,269
36	2,145,520	511,716	1,633,805	395,005	116,711	118,358	1,515,447
37	2,250,055	566,658	1,683,396	437,249	129,409	107,062	1,576,334
38	2,312,572	550,112	1,762,460	430,540	119,572	117,468	1,644,992
39	2,330,191	540,849	1,789,342	423,095	117,753	118,194	1,671,149
40	2,370,128	535,553	1,834,575	424,831	110,722	109,658	1,724,917
41	2,249,232	521,311	1,727,921	410,874	110,437	96,635	1,631,285
42	2,301,155	494,583	1,806,572	390,602	103,981	111,671	1,694,902
43	2,347,192	497,428	1,849,764	396,318	101,110	105,628	1,744,137
44	2,257,361	474,357	1,783,004	377,896	96,461	90,880	1,692,124
45	2,155,838	454,218	1,701,621	361,224	92,993	102,591	1,599,030
46	2,118,262	446,233	1,672,029	378,098	68,135	93,563	1,578,467
47	2,027,885	420,504	1,607,380	341,835	78,669	81,941	1,525,439
48	2,014,568	430,683	1,583,884	357,152	73,532	77,587	1,506,298
49	1,976,017	439,685	1,536,331	371,705	67,981	93,344	1,442,987
50	1,935,424	437,982	1,497,442	364,680	73,302	98,123	1,399,318
51	1,864,729	463,357	1,401,372	402,768	60,589	86,736	1,314,637
52	1,762,837	433,517	1,329,319	377,513	56,005	81,692	1,247,627
53	1,697,523	475,324	1,222,199	413,414	61,909	88,410	1,133,790
54	1,623,862	489,047	1,134,815	432,807	56,240	92,221	1,042,594
55	1,563,095	505,920	1,057,175	447,996	57,924	96,597	960,578
56	1,520,499	534,426	986,073	473,776	60,650	87,175	898,898
57	1,381,610	505,868	875,742	458,337	47,531	72,985	802,756
58	1,328,217	534,448	793,770	491,075	43,373	78,500	715,270
59	1,280,568	559,920	720,648	519,337	40,582	83,729	636,918
60	1,226,217	575,894	650,323	537,684	38,210	81,034	569,290
61	1,158,974	612,442	546,532	579,525	32,917	112,237	434,295
62	1,107,960	660,281	447,678	617,398	42,884	81,120	366,559
63	1,124,255	742,444	381,811	703,744	38,700	74,894	306,917
64	1,059,546	715,869	343,677	687,159	28,710	81,842	261,835
65	1,086,455	820,646	265,810	784,065	36,581	54,576	211,234
66	1,018,001	789,129	228,873	760,965	28,164	51,603	177,270
67	993,252	801,668	191,584	773,901	27,767	39,715	151,869
68	1,017,274	843,476	173,798	819,440	24,036	38,696	135,102
69	969,094	830,904	138,190	811,314	19,590	31,893	106,297
70	991,317	863,371	127,945	846,169	17,202	30,419	97,526
71	977,162	861,528	115,633	841,318	20,210	28,434	87,199
72	961,264	863,141	98,123	849,321	13,819	27,222	70,901
73	924,266	846,692	77,574	834,503	12,189	22,589	54,985
74	893,082	827,973	65,109	815,468	12,505	21,050	44,059
75	1,011,296	949,679	61,618	936,820	12,859	16,031	45,586
76	980,990	927,600	53,390	919,182	8,418	18,683	34,707
77	965,596	920,599	44,997	914,284	6,315	12,536	32,460
78	933,359	891,890	41,469	885,882	6,008	12,394	29,076
79	804,921	781,908	23,012	776,025	5,883	7,078	15,934
80+	4,400,529	4,314,423	86,107	4,299,642	14,781	29,972	56,134
16+	109,875,399	44,039,273	65,836,126	37,893,177	6,146,096	6,410,946	59,425,180

Table 7. Inter-year Work Status (Active=In the Labor Force, Inactive=Not in the Labor Force), Females with Less than a High School Education in United States 1998-2004

A	B	C	D	E	F	G	H
Age	Population Counts at age x			Population transitions during age interval x to x+1			
	$Population_x$	$Inactive_x$	$Active_x$	$Inactive_x$ $Inactive_{x+1}$	$Inactive_x$ $Active_{x+1}$	$Active_x$ $Inactive_{x+1}$	$Active_x$ $Active_{x+1}$
x	N_x	${}^{i}N_x$	${}^{a}N_x$	${}^{i}N^{i}_x$	${}^{i}N^{a}_x$	${}^{a}N^{i}_x$	${}^{a}N^{a}_x$
16	1,994,293	1,371,377	622,916	944,857	426,520	163,900	459,016
17	1,885,765	1,027,962	857,802	663,290	364,672	239,860	617,943
18	890,230	424,359	465,871	252,391	171,968	127,679	338,192
19	276,038	130,425	145,613	84,428	45,997	36,543	109,070
20	238,090	113,091	124,999	79,855	33,235	29,898	95,101
21	209,955	99,532	110,423	73,666	25,865	24,722	85,701
22	206,137	92,076	114,061	67,544	24,533	31,168	82,892
23	194,360	89,053	105,308	71,600	17,453	27,005	78,303
24	234,508	110,030	124,478	87,147	22,883	31,242	93,235
25	191,513	91,379	100,134	66,792	24,586	19,421	80,713
26	197,800	97,914	99,886	73,228	24,686	21,291	78,595
27	198,310	101,270	97,040	76,820	24,450	21,038	76,003
28	199,786	95,631	104,155	73,347	22,284	21,803	82,351
29	209,419	105,544	103,875	81,556	23,988	23,484	80,390
30	197,114	93,318	103,796	69,577	23,741	19,799	83,997
31	183,309	80,292	103,017	61,721	18,571	17,779	85,238
32	214,342	106,402	107,940	85,921	20,481	12,665	95,275
33	217,568	99,542	118,026	80,287	19,255	20,226	97,800
34	228,765	98,444	130,322	73,040	25,404	20,958	109,364
35	230,478	103,911	126,567	85,533	18,378	21,990	104,578
36	226,017	92,012	134,005	72,331	19,681	20,129	113,876
37	227,823	96,827	130,997	76,901	19,925	18,655	112,342
38	216,424	85,666	130,758	68,580	17,086	19,654	111,104
39	213,991	88,369	125,621	75,671	12,698	19,281	106,341
40	260,565	114,087	146,478	93,587	20,500	18,901	127,577
41	218,119	100,104	118,015	83,018	17,085	13,629	104,386
42	221,272	89,201	132,070	71,483	17,719	14,458	117,613
43	235,793	102,789	133,003	82,590	20,199	19,783	113,221
44	214,575	94,923	119,652	80,727	14,197	10,828	108,824
45	203,909	89,518	114,391	72,793	16,725	13,033	101,358
46	213,191	89,467	123,724	77,961	11,506	19,398	104,325
47	200,600	89,559	111,041	77,596	11,963	13,628	97,413
48	182,971	85,899	97,071	75,329	10,570	9,283	87,788
49	188,051	89,880	98,171	77,912	11,968	12,307	85,864
50	207,510	102,476	105,034	91,219	11,258	16,629	88,405
51	195,480	99,722	95,757	92,636	7,087	13,541	82,216
52	197,329	96,781	100,549	91,302	5,479	11,662	88,886
53	209,970	108,613	101,356	98,116	10,497	14,336	87,021
54	208,484	112,687	95,797	101,368	11,320	12,862	82,934
55	194,102	108,651	85,451	100,020	8,632	11,466	73,985
56	212,740	127,535	85,205	120,718	6,817	10,437	74,769
57	213,874	121,203	92,671	113,221	7,982	13,046	79,625
58	212,122	133,086	79,036	125,892	7,194	10,509	68,527
59	213,777	130,468	83,309	124,000	6,467	14,376	68,932
60	213,799	138,923	74,877	132,105	6,817	14,373	60,504
61	224,122	157,796	66,326	150,862	6,934	19,550	46,776
62	228,391	170,847	57,544	162,002	8,844	12,479	45,065
63	243,277	191,068	52,209	184,723	6,345	14,382	37,827
64	232,536	180,344	52,192	174,175	6,169	15,731	36,460
65	257,328	217,487	39,841	212,311	5,176	9,462	30,379
66	239,727	202,872	36,855	197,256	5,616	7,812	29,043
67	246,982	218,940	28,042	216,251	2,689	9,225	18,817
68	243,329	216,877	26,452	211,968	4,909	9,087	17,365
69	246,574	224,705	21,869	222,151	2,554	5,138	16,731
70	269,721	242,546	27,176	238,590	3,956	6,859	20,317
71	274,451	256,059	18,392	252,188	3,871	5,700	12,692
72	278,180	259,877	18,303	255,791	4,085	5,846	12,457
73	269,838	256,812	13,026	254,190	2,621	4,217	8,810
74	269,136	257,717	11,418	255,061	2,657	3,570	7,848
75	284,731	272,279	12,451	270,125	2,154	3,330	9,122
76	275,551	266,331	9,220	264,781	1,550	4,265	4,954
77	290,090	279,903	10,187	279,226	677	3,235	6,951
78	285,065	276,073	8,992	274,279	1,794	4,332	4,660
79	244,717	239,358	5,359	238,388	970	1,031	4,328
80+	1,688,576	1,669,810	18,767	1,666,364	3,445	6,115	12,651
16+	20,292,585	13,177,698	7,114,887	11,410,360	1,767,338	1,450,042	5,664,845

Table 9. Inter-year Work Status (Active=In the Labor Force, Inactive=Not in the Labor Force), Females with a High School Education in United States 1998-2004

A	B	C	D	E	F	G	H
Age	Population Counts at age x			Population transitions during age interval x to x+1			
	$Population_x$	$Inactive_x$	$Active_x$	$Inactive_x$ $Inactive_{x+1}$	$Inactive_x$ $Active_{x+1}$	$Active_x$ $Inactive_{x+1}$	$Active_x$ $Active_{x+1}$
x	N_x	^iN_x	^aN_x	$^iN^i_x$	$^iN^a_x$	$^aN^i_x$	$^aN^a_x$
16	8,923	4,483	4,441	3,593	890	2,017	2,424
17	80,839	35,854	44,985	22,661	13,192	11,190	33,795
18	690,357	277,270	413,087	170,284	106,986	72,127	340,959
19	625,741	189,509	436,232	106,941	82,567	62,174	374,058
20	534,381	124,899	409,482	71,122	53,777	55,010	354,472
21	549,141	143,179	405,962	87,576	55,603	51,168	354,794
22	507,868	120,657	387,212	79,382	41,275	54,859	332,353
23	559,971	150,184	409,788	104,242	45,942	56,515	353,273
24	560,670	146,933	413,737	99,901	47,032	52,038	361,699
25	498,834	144,498	354,336	97,420	47,077	39,022	315,314
26	514,926	155,141	359,785	108,691	46,450	39,499	320,286
27	495,147	148,295	346,853	106,721	41,574	43,520	303,332
28	515,324	134,604	380,720	100,844	33,761	50,109	330,610
29	579,674	167,876	411,798	114,872	53,004	45,071	366,727
30	561,745	150,320	411,425	111,128	39,192	41,052	370,373
31	530,246	148,778	381,468	111,556	37,222	39,938	341,530
32	570,084	149,961	420,124	113,747	36,214	41,991	378,132
33	586,959	159,301	427,658	119,621	39,680	39,797	387,861
34	639,842	163,929	475,912	120,559	43,370	39,240	436,672
35	640,134	176,152	463,982	133,466	42,685	33,630	430,352
36	665,789	159,859	505,930	124,099	35,760	38,559	467,371
37	721,136	178,874	542,263	136,141	42,733	38,518	503,745
38	725,422	178,524	546,898	137,581	40,943	37,183	509,715
39	743,289	179,338	563,950	134,215	45,124	42,554	521,397
40	785,654	174,180	611,474	137,067	37,112	38,206	573,268
41	721,369	174,227	547,141	134,034	40,194	33,311	513,831
42	780,042	173,955	606,088	144,136	29,819	47,057	559,031
43	755,034	161,856	593,178	126,428	35,429	36,321	556,857
44	720,573	157,962	562,612	127,691	30,271	32,612	529,999
45	711,321	166,241	545,080	134,379	31,862	39,957	505,123
46	678,999	154,957	524,042	132,345	22,612	28,713	495,329
47	668,291	148,140	520,151	120,184	27,957	27,686	492,465
48	659,294	154,088	505,206	129,079	25,010	24,151	481,056
49	645,708	165,597	480,111	141,199	24,398	31,930	448,181
50	611,703	149,361	462,343	125,689	23,671	38,346	423,997
51	604,652	166,006	438,647	146,680	19,326	27,967	410,679
52	593,910	160,836	433,074	136,248	24,587	30,506	402,569
53	593,630	184,977	408,654	158,441	26,535	30,463	378,191
54	570,102	187,264	382,839	167,610	19,653	32,087	350,752
55	554,110	195,335	358,775	173,649	21,686	34,799	323,976
56	551,685	192,216	359,469	169,185	23,031	37,414	322,055
57	521,576	195,819	325,757	179,265	16,554	28,142	297,615
58	523,885	220,957	302,929	200,900	20,057	30,200	272,729
59	504,753	227,472	277,282	212,578	14,894	35,927	241,355
60	489,778	235,602	254,176	222,084	13,518	31,290	222,886
61	466,880	244,747	222,134	232,741	12,006	48,728	173,406
62	436,669	266,595	170,074	251,319	15,276	30,017	140,058
63	468,352	312,621	155,730	299,085	13,536	32,007	123,724
64	446,837	309,473	137,364	296,641	12,832	29,599	107,765
65	449,777	340,838	108,939	326,807	14,031	24,582	84,357
66	429,724	327,831	101,894	315,792	12,038	24,371	77,522
67	420,714	343,006	77,708	331,003	12,004	15,728	61,980
68	419,256	355,349	63,906	345,620	9,729	12,794	51,113
69	415,855	357,281	58,574	348,021	9,260	12,047	46,527
70	409,129	362,814	46,316	355,548	7,266	9,989	36,326
71	388,724	340,383	48,341	331,994	8,389	9,952	38,390
72	390,407	350,779	39,629	346,876	3,902	10,148	29,481
73	370,230	341,180	29,050	337,118	4,063	7,555	21,494
74	355,168	329,441	25,728	325,614	3,827	7,001	18,726
75	403,913	379,336	24,577	373,941	5,395	7,767	16,810
76	398,710	377,450	21,260	373,457	3,993	6,673	14,587
77	384,678	367,291	17,387	364,320	2,971	4,014	13,372
78	370,640	355,911	14,729	353,926	1,986	3,092	11,638
79	328,641	322,488	6,153	318,825	3,663	2,454	3,699
80+	1,545,489	1,515,449	30,040	1,510,624	4,825	10,631	19,410
16+	35,652,311	15,235,724	20,416,587	13,474,505	1,761,219	2,033,014	18,383,573

Table 9. Inter-year Work Status (Active=In the Labor Force, Inactive=Not in the Labor Force), Females with Some College but without a Four Year Degree in United States 1998-2004

A	B	C	D	E	F	G	H
Age	Population Counts at age x			Population transitions during age interval x to x+1			
	$Population_x$	$Inactive_x$	$Active_x$	$Inactive_x$ $Inactive_{x+1}$	$Inactive_x$ $Active_{x+1}$	$Active_x$ $Inactive_{x+1}$	$Active_x$ $Active_{x+1}$
x	N_x	^iN_x	^aN_x	$^iN^i_x$	$^iN^a_x$	$^aN^i_x$	$^aN^a_x$
16	2,729	1,683	1,046	1,152	531	916	130
17	13,809	8,021	5,788	5,474	2,547	1,267	4,522
18	382,366	168,730	213,637	106,849	61,880	36,237	177,400
19	1,032,323	371,873	660,450	235,101	136,772	116,128	544,322
20	1,203,637	378,875	824,762	234,713	144,161	139,490	685,272
21	1,041,975	313,845	728,129	169,157	144,688	123,900	604,229
22	774,657	187,755	586,903	92,513	95,241	70,550	516,353
23	681,379	139,189	542,191	80,151	59,037	56,887	485,304
24	626,650	132,298	494,352	77,385	54,913	55,198	439,154
25	553,511	124,567	428,944	79,929	44,638	41,216	387,728
26	530,496	111,264	419,232	77,253	34,010	38,504	380,729
27	556,383	107,125	449,259	72,601	34,524	45,278	403,981
28	589,250	114,116	475,134	77,913	36,203	42,274	432,860
29	575,122	114,503	460,619	78,985	35,518	39,784	420,835
30	558,237	123,066	435,171	91,904	31,162	35,475	399,696
31	561,299	119,283	442,016	81,729	37,554	35,666	406,350
32	568,596	124,107	444,489	90,854	33,252	38,885	405,604
33	606,492	130,852	475,639	93,366	37,486	34,978	440,661
34	613,632	133,230	480,402	98,813	34,417	31,064	449,338
35	599,210	137,051	462,158	96,854	40,198	31,762	430,396
36	642,899	125,764	517,135	91,256	34,509	30,947	486,187
37	635,808	140,891	494,917	101,585	39,307	27,476	467,441
38	719,418	145,883	573,535	113,662	32,220	31,489	542,046
39	717,660	142,981	574,678	110,400	32,582	30,852	543,826
40	681,935	124,157	557,778	92,517	31,640	29,163	528,615
41	651,595	121,684	529,911	93,641	28,043	27,436	502,475
42	668,961	120,716	548,245	90,481	30,235	32,700	515,545
43	697,664	125,659	572,005	102,241	23,417	27,475	544,530
44	668,041	115,777	552,264	92,172	23,604	24,332	527,932
45	621,808	101,148	520,660	77,514	23,634	27,395	493,265
46	601,265	105,144	496,120	88,306	16,838	28,376	467,744
47	564,426	106,682	457,743	84,423	22,260	21,780	435,964
48	574,941	103,325	471,616	86,772	16,553	24,819	446,797
49	550,507	104,568	445,938	89,316	15,252	25,556	420,383
50	557,726	104,531	453,194	84,533	19,998	22,791	430,403
51	524,398	110,455	413,943	92,192	18,263	21,438	392,505
52	456,571	101,428	355,143	88,648	12,780	20,431	334,713
53	455,259	100,221	355,038	88,115	12,105	25,933	329,106
54	431,294	114,989	316,306	102,798	12,190	21,891	294,415
55	405,722	115,852	289,870	104,126	11,726	21,252	268,618
56	374,625	116,957	257,667	103,157	13,801	18,277	239,391
57	337,341	103,000	234,341	90,102	12,897	15,346	218,995
58	313,886	106,783	207,103	97,644	9,139	21,890	185,213
59	300,312	118,650	181,662	106,972	11,678	18,671	162,991
60	283,977	112,328	171,649	103,869	8,459	16,682	154,967
61	245,368	117,333	128,035	110,500	6,833	22,798	105,237
62	258,706	136,239	122,467	123,932	12,307	23,857	98,610
63	235,510	141,223	94,287	130,837	10,386	14,561	79,726
64	214,397	132,727	81,670	126,411	6,315	19,009	62,661
65	215,338	152,880	62,457	144,655	8,226	12,925	49,532
66	203,997	155,524	48,473	147,885	7,639	9,808	38,665
67	181,622	135,124	46,498	128,768	6,356	9,209	37,289
68	207,813	158,852	48,961	153,784	5,069	8,802	40,159
69	182,112	146,791	35,321	141,979	4,812	8,521	26,800
70	182,831	151,013	31,818	148,193	2,820	7,679	24,140
71	183,159	156,790	26,369	151,281	5,509	6,447	19,922
72	176,015	152,191	23,824	147,780	4,411	6,008	17,817
73	177,061	158,383	18,678	154,888	3,495	5,318	13,360
74	165,961	149,077	16,884	146,549	2,527	7,114	9,771
75	207,624	193,805	13,819	190,007	3,798	2,069	11,750
76	197,405	185,807	11,598	183,517	2,290	3,029	8,569
77	184,006	176,086	7,921	174,717	1,369	2,239	5,682
78	174,486	163,169	11,318	161,924	1,245	3,082	8,236
79	143,760	136,595	7,164	135,901	695	2,203	4,962
80+	698,070	678,550	19,520	675,782	2,768	7,594	11,926
16+	29,945,031	9,509,162	20,435,868	7,798,430	1,710,732	1,812,123	18,623,745

Table 10. Inter-year Work Status (Active=In the Labor Force, Inactive=Not in the Labor Force), Females with at Least a Four Year College Degree in United States 1998-2004

A	B	C	D	E	F	G	H
Age	Population Counts at age x			Population transitions during age interval x to x+1			
	$Population_x$	$Inactive_x$	$Active_x$	$Inactive_x$ $Inactive_{x+1}$	$Inactive_x$ $Active_{x+1}$	$Active_x$ $Inactive_{x+1}$	$Active_x$ $Active_{x+1}$
x	N_x	${}^{i}N_x$	${}^{a}N_x$	${}^{i}N^{i}_x$	${}^{i}N^{a}_x$	${}^{a}N^{i}_x$	${}^{a}N^{a}_x$
16	321	0	321	0	0	0	321
17	0	0	0	0	0	0	0
18	1,325	469	856	469	0	548	308
19	3,739	1,704	2,035	1,704	0	0	2,035
20	16,891	9,041	7,850	6,945	2,096	2,007	5,843
21	42,866	8,614	34,253	4,413	4,201	3,055	31,197
22	243,831	48,755	195,076	33,114	15,641	17,681	177,395
23	385,606	64,512	321,094	36,247	28,265	28,206	292,888
24	461,686	61,534	400,151	38,329	23,205	20,181	379,971
25	460,216	47,488	412,729	27,805	19,683	22,866	389,863
26	546,573	65,674	480,900	42,944	22,729	37,357	443,543
27	512,595	66,626	445,969	41,447	25,179	32,342	413,627
28	596,082	81,689	514,393	54,997	26,692	32,812	481,581
29	620,159	105,245	514,914	79,379	25,866	26,972	487,943
30	619,291	102,637	516,653	74,702	27,935	35,097	481,556
31	650,630	111,999	538,632	82,901	29,097	37,879	500,752
32	631,448	125,639	505,809	98,174	27,466	41,080	464,729
33	632,268	133,787	498,481	103,547	30,240	24,842	473,639
34	685,454	144,643	540,811	112,751	31,892	33,532	507,279
35	624,928	129,159	495,768	101,749	27,410	31,827	463,942
36	610,816	134,080	476,735	107,320	26,761	28,723	448,012
37	665,287	150,067	515,220	122,623	27,444	22,413	492,807
38	651,309	140,039	511,269	110,717	29,323	29,143	482,127
39	655,252	130,160	525,093	102,810	27,350	25,507	499,585
40	641,974	123,129	518,845	101,660	21,469	23,387	495,457
41	658,149	125,296	532,853	100,181	25,115	22,260	510,594
42	630,880	110,711	520,169	84,502	26,208	17,456	502,714
43	658,702	107,124	551,578	85,058	22,066	22,050	529,528
44	654,172	105,695	548,476	77,305	28,390	23,108	525,368
45	618,801	97,311	521,490	76,538	20,772	22,206	499,284
46	624,808	96,664	528,144	79,485	17,178	17,076	511,068
47	594,567	76,123	518,445	59,633	16,490	18,847	499,597
48	597,362	87,371	509,991	65,972	21,399	19,334	490,657
49	591,751	79,640	512,111	63,277	16,364	23,551	488,560
50	558,486	81,614	476,871	63,239	18,375	20,358	456,513
51	540,199	87,174	453,025	71,260	15,914	23,789	429,236
52	515,026	74,473	440,553	61,315	13,159	19,093	421,459
53	438,664	81,513	357,151	68,742	12,772	17,678	339,473
54	413,981	74,107	339,874	61,030	13,077	25,381	314,493
55	409,162	86,082	323,080	70,201	15,881	29,080	293,999
56	381,449	97,717	283,732	80,716	17,001	21,048	262,684
57	308,820	85,847	222,973	75,749	10,098	16,452	206,521
58	278,324	73,622	204,702	66,639	6,983	15,901	188,801
59	261,725	83,330	178,395	75,787	7,543	14,755	163,640
60	238,663	89,042	149,621	79,625	9,416	18,688	130,933
61	222,604	92,566	130,037	85,422	7,144	21,161	108,876
62	184,194	86,601	97,593	80,144	6,457	14,767	82,826
63	177,116	97,531	79,585	89,099	8,433	13,944	65,641
64	165,776	93,325	72,451	89,931	3,394	17,504	54,948
65	164,013	109,441	54,573	100,292	9,149	7,606	46,966
66	144,553	102,902	41,651	100,031	2,871	9,611	32,040
67	143,933	104,597	39,336	97,879	6,718	5,553	33,784
68	146,876	112,398	34,478	108,069	4,329	8,013	26,465
69	124,553	102,127	22,426	99,163	2,964	6,187	16,239
70	129,635	106,999	22,636	103,839	3,160	5,892	16,744
71	130,828	108,297	22,531	105,855	2,442	6,336	16,195
72	116,661	100,294	16,367	98,873	1,421	5,221	11,147
73	107,137	90,317	16,820	88,307	2,010	5,498	11,321
74	102,817	91,738	11,079	88,245	3,494	3,364	7,714
75	115,028	104,259	10,769	102,746	1,513	2,865	7,904
76	109,324	98,012	11,312	97,427	585	4,716	6,596
77	106,822	97,319	9,503	96,021	1,298	3,048	6,455
78	103,167	96,736	6,431	95,753	983	1,888	4,543
79	87,803	83,467	4,336	82,911	556	1,391	2,946
80+	468,394	450,614	17,780	446,872	3,743	5,633	12,147
16+	23,985,473	6,116,689	17,868,784	5,209,882	906,807	1,115,767	16,753,017

Table 11. Labor Force Attachment and Transit Probabilties, All Males in United States 1998-2004

A	B	C	D	E	F	G	H	I	J	K
Age	Population Counts at age x			Population transitions during age interval x to x+1				Probability of transition between specified status during age interval x to x+1		
	$Population_x$	$Inactive_x$	$Active_x$	$Inactive_x$ $Inactive_{x+1}$	$Inactive_x$ $Active_{x+1}$	$Active_x$ $Inactive_{x+1}$	$Active_x$ $Active_{x+1}$	$Living_x$ $Dead_{x+1}$	$Inactive_x$ $Inactive_{x+1}$	$Active_x$ $Active_{x+1}$
x	N_x	${}^{i}N_x$	${}^{a}N_x$	${}^{i}N^{i}_{x}$	${}^{i}N^{a}_{x}$	${}^{a}N^{i}_{x}$	${}^{a}N^{a}_{x}$	${}_{\cdot}p^{d}_{x}$	${}^{i}p^{i}_{x}$	${}^{a}p^{a}_{x}$
16	2,141,615	1,480,170	661,445	1,071,799	408,371	191,795	469,650	0.00075		
17	2,080,631	1,132,800	947,830	716,626	416,175	251,517	696,313	0.00091	0.68382	0.72387
18	2,015,743	858,632	1,157,111	506,950	351,682	241,129	915,982	0.00121	0.61368	0.76503
19	1,965,196	634,858	1,330,338	377,405	257,453	202,503	1,127,835	0.00140	0.59131	0.82051
20	2,053,626	578,690	1,474,935	355,655	223,036	184,625	1,290,311	0.00139	0.60322	0.86080
21	1,880,889	409,011	1,471,878	228,523	180,488	137,152	1,334,726	0.00145	0.59060	0.88952
22	1,796,135	331,995	1,464,141	183,737	148,258	118,497	1,345,644	0.00139	0.55558	0.91166
23	1,693,167	209,491	1,483,676	101,178	108,312	86,309	1,397,368	0.00142	0.52543	0.92920
24	1,759,586	181,531	1,578,055	113,789	67,742	77,750	1,500,305	0.00139	0.54899	0.94510
25	1,674,707	163,761	1,510,945	91,382	72,379	67,028	1,443,918	0.00134	0.59340	0.95185
26	1,728,723	143,225	1,585,497	83,178	60,047	74,977	1,510,520	0.00138	0.56784	0.95282
27	1,676,776	131,986	1,544,790	76,939	55,047	55,894	1,488,897	0.00131	0.58104	0.95694
28	1,764,313	124,866	1,639,447	78,512	46,354	52,795	1,586,653	0.00130	0.60443	0.96461
29	1,934,544	138,492	1,796,052	90,683	47,809	49,246	1,746,807	0.00138	0.64157	0.96896
30	1,831,226	122,455	1,708,771	77,254	45,201	49,047	1,659,724	0.00141	0.64266	0.97059
31	1,919,373	116,499	1,802,874	70,652	45,847	54,280	1,748,594	0.00145	0.61807	0.96916
32	1,906,375	121,637	1,784,738	83,333	38,304	52,367	1,732,371	0.00139	0.64573	0.96892
33	1,944,953	119,936	1,825,017	80,018	39,918	44,465	1,780,553	0.00158	0.67513	0.97164
34	2,078,385	130,398	1,947,987	84,273	46,125	41,296	1,906,692	0.00164	0.65521	0.97566
35	2,023,268	135,953	1,887,315	101,331	34,622	49,645	1,837,670	0.00178	0.69560	0.97455
36	2,093,644	156,884	1,936,760	108,004	48,880	53,372	1,883,388	0.00187	0.71351	0.97124
37	2,117,708	134,937	1,982,772	92,016	42,921	50,821	1,931,951	0.00201	0.68404	0.97146
38	2,250,559	166,591	2,083,969	120,209	46,382	49,210	2,034,759	0.00222	0.70227	0.97324
39	2,274,554	162,999	2,111,556	116,229	46,769	50,052	2,061,504	0.00240	0.71565	0.97400
40	2,274,355	171,104	2,103,251	124,961	46,143	50,804	2,052,447	0.00266	0.71999	0.97348
41	2,174,499	166,868	2,007,631	124,384	42,484	53,298	1,954,334	0.00283	0.73568	0.97192
42	2,210,618	161,172	2,049,445	122,380	38,792	56,303	1,993,142	0.00297	0.75000	0.97010
43	2,272,424	198,820	2,073,604	151,551	47,269	56,434	2,017,170	0.00328	0.75844	0.96946
44	2,251,375	195,454	2,055,921	153,036	42,418	60,267	1,995,654	0.00358	0.76976	0.96826
45	2,065,240	188,743	1,876,497	155,816	32,926	41,016	1,835,482	0.00384	0.80081	0.97051
46	1,989,670	186,741	1,802,929	152,545	34,196	44,881	1,758,048	0.00425	0.81775	0.97250
47	1,969,402	198,206	1,771,196	159,789	38,417	50,643	1,720,553	0.00446	0.80775	0.96893
48	1,938,591	198,695	1,739,896	163,994	34,701	47,261	1,692,635	0.00495	0.81174	0.96730
49	1,915,548	203,750	1,711,798	165,701	38,049	56,503	1,655,295	0.00528	0.81491	0.96482
50	1,845,282	215,964	1,629,318	181,179	34,785	61,123	1,568,195	0.00570	0.82176	0.95930
51	1,759,413	211,003	1,548,410	179,518	31,485	57,434	1,490,976	0.00618	0.83957	0.95675
52	1,707,365	241,228	1,466,137	207,874	33,354	55,127	1,411,011	0.00643	0.85112	0.95647
53	1,595,254	218,371	1,376,883	185,065	33,306	70,067	1,306,817	0.00702	0.84896	0.94925
54	1,510,003	228,634	1,281,370	200,430	28,204	66,050	1,215,320	0.00732	0.85608	0.94185
55	1,501,636	275,928	1,225,708	241,650	34,278	71,125	1,154,583	0.00842	0.86879	0.93733
56	1,380,969	265,539	1,115,431	232,310	33,229	73,585	1,041,846	0.00832	0.86805	0.93039
57	1,277,367	285,536	991,831	252,032	33,504	68,538	923,293	0.00947	0.87058	0.92373
58	1,229,960	299,571	930,388	266,341	33,231	67,794	862,595	0.01038	0.87675	0.91943
59	1,164,814	329,837	834,977	295,140	34,697	72,370	762,607	0.01176	0.88159	0.90978
60	1,090,016	345,091	744,925	312,408	32,683	71,881	673,044	0.01210	0.88927	0.89770
61	1,057,251	358,538	698,713	335,297	23,241	129,438	569,275	0.01351	0.90809	0.84892
62	1,038,991	484,701	554,290	452,227	32,473	92,789	461,501	0.01488	0.92003	0.81040
63	978,532	531,263	447,269	497,887	33,376	76,266	371,003	0.01611	0.92012	0.81781
64	966,976	546,286	420,689	516,812	29,474	84,741	335,948	0.01738	0.92531	0.80034
65	980,613	612,522	368,091	575,481	37,041	77,312	290,779	0.01891	0.92477	0.77953
66	932,310	633,953	298,357	594,136	39,817	62,049	236,308	0.02037	0.91922	0.77478
67	835,041	587,130	247,910	555,900	31,230	52,260	195,650	0.02241	0.92071	0.77303
68	845,595	616,071	229,524	588,112	27,959	54,109	175,415	0.02434	0.92766	0.75829
69	808,751	618,999	189,752	595,499	23,500	43,636	146,117	0.02674	0.93271	0.74637
70	817,519	649,133	168,387	617,547	31,586	37,814	130,572	0.02922	0.92862	0.75000
71	764,053	621,189	142,864	604,151	17,038	35,288	107,576	0.03197	0.93097	0.74067
72	734,875	602,088	132,787	587,093	14,995	34,881	97,907	0.03405	0.94065	0.72006
73	709,585	599,182	110,402	582,445	16,737	30,474	79,928	0.03802	0.93657	0.70346
74	696,805	598,264	98,541	586,079	12,185	25,887	72,654	0.04121	0.93563	0.70016
75	751,906	660,215	91,691	642,692	17,522	20,171	71,521	0.04519	0.93227	0.72364
76	651,251	581,752	69,500	571,618	10,134	17,233	52,267	0.04957	0.92927	0.72989
77	675,529	610,203	65,327	601,064	9,138	15,023	50,304	0.05357	0.93113	0.72001
78	632,571	576,610	55,961	568,181	8,429	16,452	39,509	0.05842	0.92764	0.69723
79	510,485	469,493	40,991	463,071	6,422	11,412	29,579	0.06498	0.92174	0.66629
80+	2,619,987	2,488,838	131,149	2,465,011	23,826	36,071	95,078	0.07028	0.92022	0.67327
16+	101,738,123	26,120,477	75,617,646	22,038,081	4,082,396	4,491,577	71,126,069			

Table 12. Markov Model of Labor Force Attachment, All 17-year-old Males in United States 1998-2004

L	M	N	O	P	Q	R	S	T	U	V	W	X	Y
Age	Probability of transition between specified status during age interval x to x+1				Stationary population living in each status at exact age x, per 100,000 born			Person years lived in each status during age x			Probability of state participation for all persons alive at exact age 17		
	$Inactive_x$ $Inactive_{x+1}$	$Inactive_x$ $Active_{x+1}$	$Active_x$ $Inactive_{x+1}$	$Active_x$ $Active_{x+1}$	Total	Inactive	Active	Total	Inactive	Active	Total	Inactive	Active
x	${}^{i}p^{i}_{x}$	${}^{i}p^{a}_{x}$	${}^{a}p^{i}_{x}$	${}^{a}p^{a}_{x}$	${}^{\cdot}l_x$	${}^{i}l_x$	${}^{a}l_x$	${}^{\cdot}L_x$	${}^{i}L_x$	${}^{a}L_x$	${}^{\cdot}p_x$	${}^{i}p_x$	${}^{a}p_x$
16					98,857								
17	0.68382	0.31527	0.27522	0.72387	98,783	53,782	45,001	98,738	51,473	47,266	0.9995	0.5211	0.4785
18	0.61368	0.38511	0.23376	0.76503	98,693	49,163	49,531	98,633	45,455	53,178	0.9985	0.4602	0.5383
19	0.59131	0.40729	0.17810	0.82051	98,574	41,748	56,826	98,505	38,278	60,227	0.9972	0.3875	0.6097
20	0.60322	0.39539	0.13781	0.86080	98,436	34,807	63,629	98,368	32,286	66,082	0.9958	0.3268	0.6690
21	0.59060	0.40796	0.10904	0.88952	98,299	29,765	68,534	98,228	27,408	70,820	0.9944	0.2775	0.7169
22	0.55558	0.44303	0.08695	0.91166	98,157	25,052	73,105	98,089	22,663	75,426	0.9930	0.2294	0.7635
23	0.52543	0.47315	0.06938	0.92920	98,021	20,275	77,746	97,951	18,161	79,790	0.9916	0.1838	0.8077
24	0.54899	0.44962	0.05351	0.94510	97,882	16,047	81,835	97,814	14,618	83,196	0.9902	0.1480	0.8422
25	0.59340	0.40526	0.04681	0.95185	97,746	13,189	84,557	97,680	12,486	85,194	0.9888	0.1264	0.8624
26	0.56784	0.43078	0.04580	0.95282	97,614	11,784	85,830	97,547	11,203	86,344	0.9875	0.1134	0.8741
27	0.58104	0.41766	0.04175	0.95694	97,479	10,622	86,857	97,416	10,210	87,206	0.9862	0.1034	0.8828
28	0.60443	0.39427	0.03409	0.96461	97,352	9,798	87,554	97,289	9,353	87,936	0.9849	0.0947	0.8902
29	0.64157	0.35705	0.02966	0.96896	97,225	8,907	88,318	97,158	8,621	88,537	0.9836	0.0873	0.8963
30	0.64266	0.35593	0.02801	0.97059	97,091	8,334	88,757	97,023	8,088	88,935	0.9822	0.0819	0.9003
31	0.61807	0.38047	0.02938	0.96916	96,954	7,842	89,113	96,884	7,653	89,230	0.9808	0.0775	0.9033
32	0.64573	0.35288	0.02969	0.96892	96,813	7,465	89,348	96,746	7,469	89,277	0.9794	0.0756	0.9038
33	0.67513	0.32329	0.02678	0.97164	96,678	7,473	89,206	96,602	7,453	89,149	0.9779	0.0755	0.9025
34	0.65521	0.34315	0.02269	0.97566	96,526	7,434	89,092	96,447	7,163	89,283	0.9763	0.0725	0.9038
35	0.69560	0.30262	0.02367	0.97455	96,367	6,893	89,475	96,282	6,902	89,379	0.9747	0.0699	0.9048
36	0.71351	0.28461	0.02689	0.97124	96,196	6,912	89,284	96,106	7,123	88,983	0.9729	0.0721	0.9008
37	0.68404	0.31395	0.02653	0.97146	96,016	7,333	88,683	95,919	7,351	88,569	0.9710	0.0744	0.8966
38	0.70227	0.29551	0.02454	0.97324	95,823	7,369	88,454	95,716	7,357	88,359	0.9690	0.0745	0.8945
39	0.71565	0.28195	0.02360	0.97400	95,610	7,346	88,264	95,495	7,343	88,152	0.9667	0.0743	0.8924
40	0.71999	0.27736	0.02387	0.97348	95,381	7,340	88,041	95,254	7,363	87,891	0.9643	0.0745	0.8897
41	0.73568	0.26149	0.02525	0.97192	95,128	7,386	87,742	94,993	7,518	87,475	0.9616	0.0761	0.8855
42	0.75000	0.24703	0.02693	0.97010	94,859	7,649	87,209	94,718	7,868	86,850	0.9588	0.0796	0.8792
43	0.75844	0.23828	0.02725	0.96946	94,577	8,086	86,491	94,422	8,288	86,134	0.9559	0.0839	0.8719
44	0.76976	0.22666	0.02816	0.96826	94,266	8,490	85,776	94,098	8,720	85,378	0.9526	0.0883	0.8643
45	0.80081	0.19536	0.02566	0.97051	93,929	8,951	84,979	93,749	9,149	84,600	0.9490	0.0926	0.8564
46	0.81775	0.17800	0.02325	0.97250	93,569	9,348	84,221	93,370	9,475	83,895	0.9452	0.0959	0.8493
47	0.80775	0.18779	0.02661	0.96893	93,171	9,602	83,569	92,963	9,791	83,172	0.9411	0.0991	0.8420
48	0.81174	0.18331	0.02775	0.96730	92,755	9,980	82,775	92,525	10,189	82,337	0.9367	0.1031	0.8335
49	0.81491	0.17982	0.02990	0.96482	92,296	10,398	81,898	92,052	10,660	81,392	0.9319	0.1079	0.8240
50	0.82176	0.17254	0.03501	0.95930	91,809	10,922	80,887	91,547	11,364	80,183	0.9268	0.1150	0.8117
51	0.83957	0.15425	0.03708	0.95675	91,286	11,807	79,479	91,004	12,333	78,670	0.9212	0.1249	0.7964
52	0.85112	0.14245	0.03710	0.95647	90,722	12,860	77,862	90,430	13,347	77,084	0.9154	0.1351	0.7803
53	0.84896	0.14402	0.04373	0.94925	90,138	13,834	76,305	89,822	14,457	75,365	0.9093	0.1464	0.7629
54	0.85608	0.13660	0.05083	0.94185	89,505	15,081	74,425	89,178	15,887	73,291	0.9028	0.1608	0.7419
55	0.86879	0.12279	0.05425	0.93733	88,850	16,693	72,157	88,476	17,555	70,920	0.8957	0.1777	0.7179
56	0.86805	0.12364	0.06130	0.93039	88,102	18,418	69,684	87,736	19,338	68,397	0.8882	0.1958	0.6924
57	0.87058	0.11995	0.06681	0.92373	87,369	20,259	67,110	86,956	21,190	65,766	0.8803	0.2145	0.6658
58	0.87675	0.11287	0.07019	0.91943	86,542	22,120	64,422	86,093	23,018	63,075	0.8715	0.2330	0.6385
59	0.88159	0.10665	0.07846	0.90978	85,644	23,916	61,728	85,140	24,921	60,219	0.8619	0.2523	0.6096
60	0.88927	0.09862	0.09020	0.89770	84,637	25,927	58,710	84,124	27,139	56,985	0.8516	0.2747	0.5769
61	0.90809	0.07841	0.13757	0.84892	83,612	28,352	55,261	83,048	30,850	52,198	0.8407	0.3123	0.5284
62	0.92003	0.06509	0.17472	0.81040	82,483	33,348	49,135	81,869	36,307	45,562	0.8288	0.3675	0.4612
63	0.92012	0.06377	0.16607	0.81781	81,255	39,266	41,990	80,601	41,184	39,417	0.8159	0.4169	0.3990
64	0.92531	0.05731	0.18228	0.80034	79,946	43,102	36,844	79,251	44,850	34,401	0.8023	0.4540	0.3482
65	0.92477	0.05631	0.20156	0.77953	78,556	46,599	31,958	77,814	48,067	29,747	0.7877	0.4866	0.3011
66	0.91922	0.06040	0.20485	0.77478	77,071	49,535	27,536	76,286	50,354	25,931	0.7723	0.5097	0.2625
67	0.92071	0.05688	0.20457	0.77303	75,501	51,174	24,327	74,655	51,634	23,021	0.7557	0.5227	0.2330
68	0.92766	0.04800	0.21737	0.75829	73,809	52,093	21,716	72,911	52,569	20,342	0.7381	0.5322	0.2059
69	0.93271	0.04055	0.22689	0.74637	72,012	53,045	18,967	71,050	53,412	17,637	0.7192	0.5407	0.1785
70	0.92862	0.04217	0.22078	0.75000	70,087	53,779	16,307	69,063	53,660	15,403	0.6991	0.5432	0.1559
71	0.93097	0.03705	0.22736	0.74067	68,039	53,541	14,499	66,951	53,341	13,610	0.6778	0.5400	0.1378
72	0.94065	0.02529	0.24589	0.72006	65,864	53,141	12,722	64,742	53,128	11,614	0.6554	0.5378	0.1176
73	0.93657	0.02541	0.25852	0.70346	63,621	53,116	10,505	62,411	52,789	9,622	0.6318	0.5344	0.0974
74	0.93563	0.02316	0.25863	0.70016	61,202	52,462	8,740	59,941	51,904	8,037	0.6068	0.5254	0.0814
75	0.93227	0.02254	0.23117	0.72364	58,680	51,346	7,334	57,354	50,455	6,899	0.5806	0.5108	0.0698
76	0.92927	0.02116	0.22054	0.72989	56,028	49,563	6,465	54,639	48,523	6,116	0.5531	0.4912	0.0619
77	0.93113	0.01530	0.22642	0.72001	53,251	47,483	5,767	51,824	46,501	5,323	0.5246	0.4707	0.0539
78	0.92764	0.01394	0.24435	0.69723	50,398	45,519	4,879	48,926	44,468	4,458	0.4953	0.4502	0.0451
79	0.92174	0.01327	0.26873	0.66629	47,454	43,418	4,036	45,912	42,261	3,651	0.4648	0.4278	0.0370
80+	0.92022	0.00951	0.25645	0.67327	44,370	41,104	3,266	345,924	345,924	0	3.5019	3.5019	0.0000
											58.4155	19.4150	39.0005

Table 13. Markov Model of Labor Force Attachment, All 17-year-old Males in United States 1998-2004

Z	AA	AB	AC	AD	AE	AF
Age	Person years lived in each status beyond exact age x			Life expectancy	Expectation of active and inactive life	
	Total	Inactive	Active	Total	Inactive	Active
x	${}^{\cdot}T_x$	${}^{i}T_x$	${}^{a}T_x$	${}^{\cdot}e_x$	${}^{i}e_x$	${}^{a}e_x$
16						
17	5,770,456	1,917,870	3,852,586	58.4155	19.4150	39.0005
18	5,671,718	1,866,398	3,805,321	57.4682		
19	5,573,085	1,820,942	3,752,143	56.5372		
20	5,474,580	1,782,665	3,691,915	55.6155		
21	5,376,212	1,750,379	3,625,833	54.6922		
22	5,277,984	1,722,970	3,555,013	53.7706		
23	5,179,895	1,700,307	3,479,588	52.8448		
24	5,081,943	1,682,146	3,399,797	51.9193		
25	4,984,130	1,667,528	3,316,602	50.9909		
26	4,886,450	1,655,042	3,231,408	50.0588		
27	4,788,903	1,643,839	3,145,064	49.1273		
28	4,691,487	1,633,629	3,057,858	48.1909		
29	4,594,199	1,624,276	2,969,923	47.2532		
30	4,497,041	1,615,656	2,881,385	46.3178		
31	4,400,018	1,607,568	2,792,450	45.3824		
32	4,303,134	1,599,914	2,703,220	44.4478		
33	4,206,388	1,592,446	2,613,943	43.5090		
34	4,109,786	1,584,992	2,524,794	42.5770		
35	4,013,340	1,577,829	2,435,511	41.6463		
36	3,917,058	1,570,926	2,346,132	40.7196		
37	3,820,952	1,563,804	2,257,148	39.7950		
38	3,725,033	1,556,453	2,168,580	38.8742		
39	3,629,316	1,549,096	2,080,221	37.9596		
40	3,533,821	1,541,753	1,992,068	37.0496		
41	3,438,567	1,534,390	1,904,177	36.1469		
42	3,343,574	1,526,872	1,816,702	35.2480		
43	3,248,856	1,519,004	1,729,851	34.3514		
44	3,154,434	1,510,716	1,643,718	33.4630		
45	3,060,336	1,501,996	1,558,340	32.5813		
46	2,966,588	1,492,847	1,473,741	31.7049		
47	2,873,218	1,483,372	1,389,846	30.8381		
48	2,780,255	1,473,581	1,306,674	29.9742		
49	2,687,729	1,463,392	1,224,337	29.1208		
50	2,595,677	1,452,733	1,142,944	28.2727		
51	2,504,130	1,441,368	1,062,762	27.4318		
52	2,413,126	1,429,035	984,091	26.5992		
53	2,322,696	1,415,689	907,007	25.7681		
54	2,232,874	1,401,232	831,643	24.9468		
55	2,143,696	1,385,345	758,352	24.1272		
56	2,055,220	1,367,789	687,431	23.3278		
57	1,967,485	1,348,451	619,034	22.5192		
58	1,880,529	1,327,261	553,268	21.7297		
59	1,794,436	1,304,243	490,193	20.9523		
60	1,709,296	1,279,322	429,974	20.1957		
61	1,625,172	1,252,182	372,989	19.4370		
62	1,542,124	1,221,332	320,792	18.6963		
63	1,460,255	1,185,026	275,230	17.9712		
64	1,379,655	1,143,841	235,813	17.2573		
65	1,300,403	1,098,991	201,412	16.5537		
66	1,222,590	1,050,924	171,665	15.8632		
67	1,146,304	1,000,570	145,734	15.1827		
68	1,071,649	948,936	122,713	14.5192		
69	998,738	896,367	102,371	13.8690		
70	927,688	842,955	84,734	13.2363		
71	858,626	789,295	69,331	12.6196		
72	791,674	735,954	55,720	12.0199		
73	726,932	682,825	44,106	11.4260		
74	664,521	630,037	34,484	10.8578		
75	604,580	578,133	26,447	10.3030		
76	547,226	527,678	19,548	9.7670		
77	492,586	479,154	13,432	9.2503		
78	440,762	432,653	8,109	8.7456		
79	391,836	388,185	3,651	8.2572		
80+	345,924	345,924	0	7.7963		

Table 14. Markov Model of Labor Force Attachment, Inactive 25-year-old Males in United States 1998-2004

L	M	N	O	P	Q	R	S	T	U	V	W	X	Y
Age	Probability of transition between specified status during age interval x to x+1				Stationary population living in each status at exact age x, per 100,000 born			Person years lived in each status during age x			Probability of state participation for all persons alive at exact age 25		
	$Inactive_x$ $Inactive_{x+1}$	$Inactive_x$ $Active_{x+1}$	$Active_x$ $Inactive_{x+1}$	$Active_x$ $Active_{x+1}$	Total	Inactive	Active	Total	Inactive	Active	Total	Inactive	Active
x	${}^{i}p^{i}_{x}$	${}^{i}p^{a}_{x}$	${}^{a}p^{i}_{x}$	${}^{a}p^{a}_{x}$	${}^{\cdot}l_x$	${}^{i}l_x$	${}^{a}l_x$	${}^{\cdot}L_x$	${}^{i}L_x$	${}^{a}L_x$	${}^{\cdot}p_x$	${}^{i}p_x$	${}^{a}p_x$
16													
17	0.68382	0.31527	0.27522	0.72387									
18	0.61368	0.38511	0.23376	0.76503									
19	0.59131	0.40729	0.17810	0.82051									
20	0.60322	0.39539	0.13781	0.86080									
21	0.59060	0.40796	0.10904	0.88952									
22	0.55558	0.44303	0.08695	0.91166									
23	0.52543	0.47315	0.06938	0.92920									
24	0.54899	0.44962	0.05351	0.94510									
25	0.59340	0.40526	0.04681	0.95185	97,746	97,746	0	97,680	77,874	19,806	0.9993	0.7967	0.2026
26	0.56784	0.43078	0.04580	0.95282	97,614	58,002	39,612	97,547	46,376	51,171	0.9980	0.4745	0.5235
27	0.58104	0.41766	0.04175	0.95694	97,479	34,750	62,730	97,416	28,780	68,636	0.9966	0.2944	0.7022
28	0.60443	0.39427	0.03409	0.96461	97,352	22,810	74,542	97,289	19,569	77,719	0.9953	0.2002	0.7951
29	0.64157	0.35705	0.02966	0.96896	97,225	16,328	80,897	97,158	14,602	82,556	0.9940	0.1494	0.8446
30	0.64266	0.35593	0.02801	0.97059	97,091	12,875	84,216	97,023	11,754	85,269	0.9926	0.1203	0.8724
31	0.61807	0.38047	0.02938	0.96916	96,954	10,633	86,321	96,884	9,870	87,013	0.9912	0.1010	0.8902
32	0.64573	0.35288	0.02969	0.96892	96,813	9,108	87,705	96,746	8,797	87,949	0.9898	0.0900	0.8998
33	0.67513	0.32329	0.02678	0.97164	96,678	8,485	88,194	96,602	8,288	88,315	0.9883	0.0848	0.9035
34	0.65521	0.34315	0.02269	0.97566	96,526	8,090	88,436	96,447	7,699	88,748	0.9867	0.0788	0.9079
35	0.69560	0.30262	0.02367	0.97455	96,367	7,308	89,060	96,282	7,250	89,032	0.9850	0.0742	0.9109
36	0.71351	0.28461	0.02689	0.97124	96,196	7,191	89,005	96,106	7,358	88,748	0.9832	0.0753	0.9080
37	0.68404	0.31395	0.02653	0.97146	96,016	7,524	88,492	95,919	7,509	88,410	0.9813	0.0768	0.9045
38	0.70227	0.29551	0.02454	0.97324	95,823	7,495	88,328	95,716	7,463	88,254	0.9792	0.0763	0.9029
39	0.71565	0.28195	0.02360	0.97400	95,610	7,431	88,179	95,495	7,415	88,080	0.9770	0.0759	0.9011
40	0.71999	0.27736	0.02387	0.97348	95,381	7,399	87,982	95,254	7,413	87,841	0.9745	0.0758	0.8987
41	0.73568	0.26149	0.02525	0.97192	95,128	7,427	87,700	94,993	7,553	87,440	0.9718	0.0773	0.8946
42	0.75000	0.24703	0.02693	0.97010	94,859	7,679	87,180	94,718	7,893	86,825	0.9690	0.0807	0.8883
43	0.75844	0.23828	0.02725	0.96946	94,577	8,107	86,470	94,422	8,306	86,115	0.9660	0.0850	0.8810
44	0.76976	0.22666	0.02816	0.96826	94,266	8,505	85,761	94,098	8,734	85,364	0.9627	0.0894	0.8733
45	0.80081	0.19536	0.02566	0.97051	93,929	8,962	84,967	93,749	9,159	84,589	0.9591	0.0937	0.8654
46	0.81775	0.17800	0.02325	0.97250	93,569	9,357	84,212	93,370	9,483	83,887	0.9552	0.0970	0.8582
47	0.80775	0.18779	0.02661	0.96893	93,171	9,609	83,562	92,963	9,797	83,166	0.9511	0.1002	0.8508
48	0.81174	0.18331	0.02775	0.96730	92,755	9,985	82,770	92,525	10,193	82,332	0.9466	0.1043	0.8423
49	0.81491	0.17982	0.02990	0.96482	92,296	10,402	81,894	92,052	10,664	81,389	0.9418	0.1091	0.8327
50	0.82176	0.17254	0.03501	0.95930	91,809	10,925	80,883	91,547	11,367	80,180	0.9366	0.1163	0.8203
51	0.83957	0.15425	0.03708	0.95675	91,286	11,809	79,476	91,004	12,336	78,668	0.9310	0.1262	0.8048
52	0.85112	0.14245	0.03710	0.95647	90,722	12,862	77,860	90,430	13,348	77,082	0.9252	0.1366	0.7886
53	0.84896	0.14402	0.04373	0.94925	90,138	13,835	76,303	89,822	14,459	75,363	0.9189	0.1479	0.7710
54	0.85608	0.13660	0.05083	0.94185	89,505	15,082	74,423	89,178	15,888	73,290	0.9123	0.1625	0.7498
55	0.86879	0.12279	0.05425	0.93733	88,850	16,694	72,156	88,476	17,556	70,919	0.9052	0.1796	0.7256
56	0.86805	0.12364	0.06130	0.93039	88,102	18,419	69,683	87,736	19,339	68,396	0.8976	0.1979	0.6997
57	0.87058	0.11995	0.06681	0.92373	87,369	20,260	67,110	86,956	21,190	65,765	0.8896	0.2168	0.6728
58	0.87675	0.11287	0.07019	0.91943	86,542	22,121	64,421	86,093	23,019	63,074	0.8808	0.2355	0.6453
59	0.88159	0.10665	0.07846	0.90978	85,644	23,916	61,728	85,140	24,922	60,218	0.8710	0.2550	0.6161
60	0.88927	0.09862	0.09020	0.89770	84,637	25,927	58,709	84,124	27,140	56,985	0.8606	0.2777	0.5830
61	0.90809	0.07841	0.13757	0.84892	83,612	28,352	55,260	83,048	30,850	52,197	0.8496	0.3156	0.5340
62	0.92003	0.06509	0.17472	0.81040	82,483	33,348	49,135	81,869	36,307	45,562	0.8376	0.3714	0.4661
63	0.92012	0.06377	0.16607	0.81781	81,255	39,266	41,989	80,601	41,184	39,416	0.8246	0.4213	0.4033
64	0.92531	0.05731	0.18228	0.80034	79,946	43,102	36,844	79,251	44,851	34,401	0.8108	0.4588	0.3519
65	0.92477	0.05631	0.20156	0.77953	78,556	46,599	31,958	77,814	48,067	29,747	0.7961	0.4918	0.3043
66	0.91922	0.06040	0.20485	0.77478	77,071	49,535	27,536	76,286	50,355	25,931	0.7805	0.5152	0.2653
67	0.92071	0.05688	0.20457	0.77303	75,501	51,174	24,327	74,655	51,634	23,021	0.7638	0.5282	0.2355
68	0.92766	0.04800	0.21737	0.75829	73,809	52,093	21,716	72,911	52,569	20,341	0.7459	0.5378	0.2081
69	0.93271	0.04055	0.22689	0.74637	72,012	53,045	18,967	71,050	53,412	17,637	0.7269	0.5464	0.1804
70	0.92862	0.04217	0.22078	0.75000	70,087	53,779	16,307	69,063	53,660	15,403	0.7066	0.5490	0.1576
71	0.93097	0.03705	0.22736	0.74067	68,039	53,541	14,498	66,951	53,341	13,610	0.6850	0.5457	0.1392
72	0.94065	0.02529	0.24589	0.72006	65,864	53,141	12,722	64,742	53,128	11,614	0.6624	0.5435	0.1188
73	0.93657	0.02541	0.25852	0.70346	63,621	53,116	10,505	62,411	52,789	9,622	0.6385	0.5401	0.0984
74	0.93563	0.02316	0.25863	0.70016	61,202	52,462	8,740	59,941	51,904	8,037	0.6132	0.5310	0.0822
75	0.93227	0.02254	0.23117	0.72364	58,680	51,346	7,334	57,354	50,455	6,899	0.5868	0.5162	0.0706
76	0.92927	0.02116	0.22054	0.72989	56,028	49,564	6,465	54,639	48,523	6,116	0.5590	0.4964	0.0626
77	0.93113	0.01530	0.22642	0.72001	53,251	47,483	5,767	51,824	46,501	5,323	0.5302	0.4757	0.0545
78	0.92764	0.01394	0.24435	0.69723	50,398	45,519	4,879	48,926	44,468	4,458	0.5005	0.4549	0.0456
79	0.92174	0.01327	0.26873	0.66629	47,454	43,418	4,036	45,912	42,261	3,651	0.4697	0.4324	0.0374
80+	0.92022	0.00951	0.25645	0.67327	44,370	41,104	3,266	345,924	345,924	0	3.5390	3.5390	0.0000
											50.9909	18.5435	32.4473

Table 15. Markov Model of Labor Force Attachment, Active 25-year-old Males in United States 1998-2004

L	M	N	O	P	Q	R	S	T	U	V	W	X	Y
Age	Probability of transition between specified status during age interval x to x+1				Stationary population living in each status at exact age x, per 100,000 born			Person years lived in each status during age x			Probability of state participation for all persons alive at exact age 25		
	$Inactive_x$ $Inactive_{x+1}$	$Inactive_x$ $Active_{x+1}$	$Active_x$ $Inactive_{x+1}$	$Active_x$ $Active_{x+1}$	Total	Inactive	Active	Total	Inactive	Active	Total	Inactive	Active
x	${}^{i}p^{i}_{x}$	${}^{i}p^{a}_{x}$	${}^{a}p^{i}_{x}$	${}^{a}p^{a}_{x}$	${}^{\cdot}l_x$	${}^{i}l_x$	${}^{a}l_x$	${}^{\cdot}L_x$	${}^{i}L_x$	${}^{a}L_x$	${}^{\cdot}p_x$	${}^{i}p_x$	${}^{a}p_x$
16													
17	0.68382	0.31527	0.27522	0.72387									
18	0.61368	0.38511	0.23376	0.76503									
19	0.59131	0.40729	0.17810	0.82051									
20	0.60322	0.39539	0.13781	0.86080									
21	0.59060	0.40796	0.10904	0.88952									
22	0.55558	0.44303	0.08695	0.91166									
23	0.52543	0.47315	0.06938	0.92920									
24	0.54899	0.44962	0.05351	0.94510									
25	0.59340	0.40526	0.04681	0.95185	97,746	0	97,746	97,680	2,288	95,392	0.9993	0.0234	0.9759
26	0.56784	0.43078	0.04580	0.95282	97,614	4,575	93,039	97,547	5,717	91,830	0.9980	0.0585	0.9395
27	0.58104	0.41766	0.04175	0.95694	97,479	6,859	90,621	97,416	7,314	90,102	0.9966	0.0748	0.9218
28	0.60443	0.39427	0.03409	0.96461	97,352	7,769	89,583	97,289	7,759	89,529	0.9953	0.0794	0.9159
29	0.64157	0.35705	0.02966	0.96896	97,225	7,750	89,476	97,158	7,688	89,470	0.9940	0.0786	0.9153
30	0.64266	0.35593	0.02801	0.97059	97,091	7,626	89,465	97,023	7,516	89,507	0.9926	0.0769	0.9157
31	0.61807	0.38047	0.02938	0.96916	96,954	7,406	89,548	96,884	7,307	89,576	0.9912	0.0748	0.9164
32	0.64573	0.35288	0.02969	0.96892	96,813	7,209	89,605	96,746	7,262	89,484	0.9898	0.0743	0.9155
33	0.67513	0.32329	0.02678	0.97164	96,678	7,315	89,364	96,602	7,323	89,279	0.9883	0.0749	0.9134
34	0.65521	0.34315	0.02269	0.97566	96,526	7,332	89,194	96,447	7,080	89,367	0.9867	0.0724	0.9143
35	0.69560	0.30262	0.02367	0.97455	96,367	6,828	89,539	96,282	6,848	89,433	0.9850	0.0701	0.9150
36	0.71351	0.28461	0.02689	0.97124	96,196	6,869	89,327	96,106	7,086	89,020	0.9832	0.0725	0.9107
37	0.68404	0.31395	0.02653	0.97146	96,016	7,303	88,713	95,919	7,326	88,593	0.9813	0.0749	0.9064
38	0.70227	0.29551	0.02454	0.97324	95,823	7,349	88,474	95,716	7,341	88,376	0.9792	0.0751	0.9041
39	0.71565	0.28195	0.02360	0.97400	95,610	7,332	88,278	95,495	7,332	88,164	0.9770	0.0750	0.9020
40	0.71999	0.27736	0.02387	0.97348	95,381	7,331	88,050	95,254	7,355	87,899	0.9745	0.0752	0.8993
41	0.73568	0.26149	0.02525	0.97192	95,128	7,380	87,748	94,993	7,512	87,481	0.9718	0.0769	0.8950
42	0.75000	0.24703	0.02693	0.97010	94,859	7,645	87,214	94,718	7,864	86,854	0.9690	0.0805	0.8886
43	0.75844	0.23828	0.02725	0.96946	94,577	8,083	86,494	94,422	8,285	86,137	0.9660	0.0848	0.8812
44	0.76976	0.22666	0.02816	0.96826	94,266	8,487	85,779	94,098	8,718	85,380	0.9627	0.0892	0.8735
45	0.80081	0.19536	0.02566	0.97051	93,929	8,949	84,980	93,749	9,148	84,601	0.9591	0.0936	0.8655
46	0.81775	0.17800	0.02325	0.97250	93,569	9,347	84,222	93,370	9,474	83,896	0.9552	0.0969	0.8583
47	0.80775	0.18779	0.02661	0.96893	93,171	9,601	83,570	92,963	9,790	83,173	0.9511	0.1002	0.8509
48	0.81174	0.18331	0.02775	0.96730	92,755	9,979	82,776	92,525	10,188	82,338	0.9466	0.1042	0.8424
49	0.81491	0.17982	0.02990	0.96482	92,296	10,397	81,899	92,052	10,659	81,393	0.9418	0.1091	0.8327
50	0.82176	0.17254	0.03501	0.95930	91,809	10,922	80,887	91,547	11,364	80,183	0.9366	0.1163	0.8203
51	0.83957	0.15425	0.03708	0.95675	91,286	11,806	79,479	91,004	12,333	78,671	0.9310	0.1262	0.8049
52	0.85112	0.14245	0.03710	0.95647	90,722	12,859	77,863	90,430	13,346	77,084	0.9252	0.1365	0.7886
53	0.84896	0.14402	0.04373	0.94925	90,138	13,833	76,305	89,822	14,457	75,365	0.9189	0.1479	0.7710
54	0.85608	0.13660	0.05083	0.94185	89,505	15,080	74,425	89,178	15,887	73,291	0.9123	0.1625	0.7498
55	0.86879	0.12279	0.05425	0.93733	88,850	16,693	72,157	88,476	17,555	70,921	0.9052	0.1796	0.7256
56	0.86805	0.12364	0.06130	0.93039	88,102	18,418	69,684	87,736	19,338	68,397	0.8976	0.1978	0.6997
57	0.87058	0.11995	0.06681	0.92373	87,369	20,259	67,110	86,956	21,190	65,766	0.8896	0.2168	0.6728
58	0.87675	0.11287	0.07019	0.91943	86,542	22,120	64,422	86,093	23,018	63,075	0.8808	0.2355	0.6453
59	0.88159	0.10665	0.07846	0.90978	85,644	23,916	61,728	85,140	24,921	60,219	0.8710	0.2550	0.6161
60	0.88927	0.09862	0.09020	0.89770	84,637	25,927	58,710	84,124	27,139	56,985	0.8606	0.2777	0.5830
61	0.90809	0.07841	0.13757	0.84892	83,612	28,352	55,261	83,048	30,850	52,198	0.8496	0.3156	0.5340
62	0.92003	0.06509	0.17472	0.81040	82,483	33,348	49,135	81,869	36,307	45,562	0.8376	0.3714	0.4661
63	0.92012	0.06377	0.16607	0.81781	81,255	39,266	41,990	80,601	41,184	39,417	0.8246	0.4213	0.4033
64	0.92531	0.05731	0.18228	0.80034	79,946	43,102	36,844	79,251	44,850	34,401	0.8108	0.4588	0.3519
65	0.92477	0.05631	0.20156	0.77953	78,556	46,599	31,958	77,814	48,067	29,747	0.7961	0.4918	0.3043
66	0.91922	0.06040	0.20485	0.77478	77,071	49,535	27,536	76,286	50,354	25,931	0.7805	0.5152	0.2653
67	0.92071	0.05688	0.20457	0.77303	75,501	51,174	24,327	74,655	51,634	23,021	0.7638	0.5282	0.2355
68	0.92766	0.04800	0.21737	0.75829	73,809	52,093	21,716	72,911	52,569	20,342	0.7459	0.5378	0.2081
69	0.93271	0.04055	0.22689	0.74637	72,012	53,045	18,967	71,050	53,412	17,637	0.7269	0.5464	0.1804
70	0.92862	0.04217	0.22078	0.75000	70,087	53,779	16,307	69,063	53,660	15,403	0.7066	0.5490	0.1576
71	0.93097	0.03705	0.22736	0.74067	68,039	53,541	14,499	66,951	53,341	13,610	0.6850	0.5457	0.1392
72	0.94065	0.02529	0.24589	0.72006	65,864	53,141	12,722	64,742	53,128	11,614	0.6624	0.5435	0.1188
73	0.93657	0.02541	0.25852	0.70346	63,621	53,116	10,505	62,411	52,789	9,622	0.6385	0.5401	0.0984
74	0.93563	0.02316	0.25863	0.70016	61,202	52,462	8,740	59,941	51,904	8,037	0.6132	0.5310	0.0822
75	0.93227	0.02254	0.23117	0.72364	58,680	51,346	7,334	57,354	50,455	6,899	0.5868	0.5162	0.0706
76	0.92927	0.02116	0.22054	0.72989	56,028	49,563	6,465	54,639	48,523	6,116	0.5590	0.4964	0.0626
77	0.93113	0.01530	0.22642	0.72001	53,251	47,483	5,767	51,824	46,501	5,323	0.5302	0.4757	0.0545
78	0.92764	0.01394	0.24435	0.69723	50,398	45,519	4,879	48,926	44,468	4,458	0.5005	0.4549	0.0456
79	0.92174	0.01327	0.26873	0.66629	47,454	43,418	4,036	45,912	42,261	3,651	0.4697	0.4324	0.0374
80+	0.92022	0.00951	0.25645	0.67327	44,370	41,104	3,266	345,924	345,924	0	3.5390	3.5390	0.0000
											50.9909	16.8285	34.1624

Table 16. Worklife Expectancy of Males in the United States by Level of Education Completed (Active=In the Labor Force, Inactive=Not in the Labor Force), 1998-2004

	All Males				Males with less than a High				Males with a High School		
	Beginning Labor Force State				*Beginning Labor Force State*				*Beginning Labor Force State*		
Age	All	Inactive	Active	Age	All	Inactive	Active	Age	All	Inactive	Active
17	39.00	38.46	39.64	17	34.11	33.59	34.73	17	38.38	37.74	38.86
18	38.64	37.96	39.14	18	33.71	33.13	34.20	18	37.78	36.94	38.24
19	38.19	37.32	38.60	19	33.25	32.54	33.66	19	37.26	36.29	37.57
20	37.60	36.60	38.00	20	32.72	31.73	33.14	20	36.64	35.59	36.86
21	37.00	35.89	37.31	21	32.15	30.83	32.51	21	35.94	34.75	36.12
22	36.31	35.16	36.58	22	31.48	29.99	31.77	22	35.13	33.80	35.33
23	35.62	34.34	35.80	23	30.78	29.20	31.03	23	34.39	32.87	34.52
24	34.83	33.40	34.99	24	29.99	28.33	30.27	24	33.54	31.97	33.71
25	33.99	32.44	34.16	25	29.17	27.50	29.49	25	32.72	31.03	32.86
26	33.17	31.59	33.31	26	28.48	26.79	28.68	26	31.86	30.11	32.02
27	32.32	30.62	32.46	27	27.62	25.81	27.91	27	31.03	29.16	31.17
28	31.47	29.62	31.61	28	26.83	24.70	27.17	28	30.18	28.19	30.33
29	30.59	28.63	30.74	29	26.00	23.75	26.38	29	29.30	27.21	29.49
30	29.71	27.72	29.86	30	25.17	22.81	25.56	30	28.46	26.35	28.64
31	28.84	26.82	28.97	31	24.35	21.89	24.74	31	27.63	25.46	27.77
32	27.95	25.78	28.10	32	23.48	20.98	23.97	32	26.74	24.55	26.91
33	27.07	24.77	27.22	33	22.76	20.06	23.19	33	25.88	23.72	26.05
34	26.19	23.84	26.35	34	21.92	19.17	22.36	34	25.01	22.83	25.20
35	25.28	22.79	25.46	35	21.02	18.24	21.53	35	24.10	21.72	24.34
36	24.38	21.85	24.58	36	20.16	17.44	20.71	36	23.24	20.75	23.48
37	23.54	20.96	23.72	37	19.35	16.62	19.94	37	22.43	19.87	22.63
38	22.64	19.93	22.85	38	18.50	15.57	19.16	38	21.52	18.88	21.77
39	21.77	18.91	21.99	39	17.76	14.63	18.40	39	20.69	17.92	20.93
40	20.89	17.91	21.13	40	16.91	13.85	17.69	40	19.80	16.88	20.09
41	20.02	16.87	20.28	41	16.15	12.93	16.97	41	18.97	15.84	19.26
42	19.18	15.84	19.44	42	15.50	11.87	16.30	42	18.11	14.87	18.44
43	18.28	14.82	18.61	43	14.68	10.96	15.61	43	17.27	13.86	17.63
44	17.45	13.80	17.79	44	13.80	10.23	14.96	44	16.43	12.85	16.83
45	16.60	12.77	16.99	45	13.25	9.57	14.38	45	15.57	11.71	16.06
46	15.77	11.88	16.18	46	12.63	8.96	13.71	46	14.75	10.74	15.28
47	14.92	11.08	15.35	47	11.86	8.46	12.96	47	13.95	9.99	14.48
48	14.11	10.22	14.55	48	11.15	7.82	12.26	48	13.17	9.21	13.72
49	13.29	9.37	13.76	49	10.46	7.12	11.61	49	12.31	8.39	12.96
50	12.45	8.52	12.98	50	9.73	6.48	10.96	50	11.52	7.59	12.20
51	11.68	7.70	12.22	51	9.20	5.78	10.36	51	10.80	6.87	11.49
52	10.85	6.97	11.48	52	8.41	5.17	9.75	52	9.96	6.09	10.79
53	10.13	6.30	10.74	53	7.78	4.71	9.14	53	9.33	5.43	10.09
54	9.36	5.64	10.03	54	7.21	4.29	8.57	54	8.60	4.89	9.42
55	8.55	5.02	9.35	55	6.51	3.77	8.11	55	7.85	4.39	8.73
56	7.87	4.48	8.68	56	6.14	3.23	7.58	56	7.21	3.96	8.10
57	7.12	3.94	8.03	57	5.48	2.81	6.99	57	6.52	3.44	7.52
58	6.44	3.44	7.40	58	4.89	2.58	6.41	58	5.81	2.99	6.92
59	5.71	2.98	6.78	59	4.33	2.28	5.81	59	5.26	2.61	6.30
60	5.04	2.57	6.18	60	3.81	1.95	5.23	60	4.56	2.25	5.69
61	4.46	2.22	5.61	61	3.32	1.67	4.65	61	3.96	1.97	5.09
62	3.68	1.95	5.20	62	2.63	1.45	4.25	62	3.27	1.75	4.73
63	3.19	1.73	4.93	63	2.22	1.28	4.11	63	2.77	1.55	4.53
64	2.87	1.53	4.61	64	2.17	1.14	4.04	64	2.48	1.37	4.22
65	2.47	1.35	4.32	65	1.88	1.03	3.85	65	2.10	1.20	3.98
66	2.12	1.18	4.10	66	1.54	0.91	3.65	66	1.87	1.05	3.78
67	1.86	1.00	3.88	67	1.35	0.79	3.47	67	1.58	0.90	3.57
68	1.60	0.83	3.66	68	1.14	0.68	3.30	68	1.46	0.73	3.36
69	1.34	0.69	3.47	69	1.01	0.59	3.16	69	1.14	0.58	3.18
70	1.13	0.57	3.31	70	0.89	0.49	3.11	70	1.01	0.46	3.03
71	0.95	0.45	3.11	71	0.73	0.38	2.95	71	0.79	0.35	2.95
72	0.81	0.35	2.92	72	0.61	0.31	2.71	72	0.70	0.27	2.95
73	0.67	0.28	2.77	73	0.48	0.25	2.61	73	0.60	0.22	2.85
74	0.56	0.22	2.65	74	0.43	0.19	2.47	74	0.50	0.15	2.76
75	0.44	0.16	2.51	75	0.34	0.14	2.42	75	0.40	0.10	2.63

Table 16, continued. Worklife Expectancy of Males in the United States by Level of Education Completed (Active=In the Labor Force, Inactive=Not in the Labor Force), 1998-2004

	Males with Some College				Males with a least a 4-year		
	Beginning Labor Force State				*Beginning Labor Force State*		
Age	All	Inactive	Active	Age	All	Inactive	Active
17				17			
18	38.69	37.97	39.40	18			
19	38.30	37.42	38.85	19			
20	37.75	36.83	38.23	20	40.85	39.89	41.39
21	37.20	36.25	37.58	21	40.43	39.49	40.82
22	36.58	35.62	36.87	22	39.74	38.59	40.00
23	35.92	34.89	36.10	23	38.96	37.67	39.17
24	35.16	34.00	35.29	24	38.20	36.69	38.36
25	34.31	33.01	34.44	25	37.37	35.87	37.53
26	33.45	32.11	33.57	26	36.56	35.07	36.68
27	32.59	31.20	32.70	27	35.71	34.09	35.81
28	31.73	30.21	31.83	28	34.82	33.24	34.90
29	30.81	29.13	30.94	29	33.93	32.42	33.99
30	29.95	28.23	30.03	30	33.02	31.63	33.08
31	29.02	27.29	29.13	31	32.12	30.90	32.16
32	28.14	26.11	28.24	32	31.19	29.88	31.24
33	27.24	24.98	27.36	33	30.27	28.77	30.31
34	26.36	24.07	26.48	34	29.35	27.82	29.38
35	25.48	23.06	25.59	35	28.41	26.89	28.45
36	24.52	22.16	24.70	36	27.50	26.03	27.53
37	23.71	21.36	23.82	37	26.58	25.15	26.61
38	22.78	20.55	22.94	38	25.66	23.77	25.71
39	21.90	19.65	22.04	39	24.74	22.44	24.80
40	21.01	18.59	21.14	40	23.82	21.51	23.89
41	20.07	17.49	20.26	41	22.93	20.56	22.99
42	19.23	16.49	19.40	42	22.03	19.65	22.08
43	18.31	15.53	18.55	43	21.08	18.53	21.19
44	17.49	14.42	17.72	44	20.21	17.45	20.29
45	16.62	13.32	16.88	45	19.31	16.46	19.41
46	15.69	12.32	16.05	46	18.44	15.55	18.52
47	14.90	11.24	15.26	47	17.50	14.71	17.63
48	14.04	10.20	14.45	48	16.63	13.82	16.75
49	13.25	9.36	13.64	49	15.76	12.87	15.88
50	12.42	8.54	12.86	50	14.85	11.74	15.04
51	11.58	7.73	12.12	51	14.02	10.71	14.20
52	10.85	7.18	11.40	52	13.12	9.79	13.37
53	10.12	6.59	10.65	53	12.30	8.87	12.54
54	9.34	5.83	9.94	54	11.48	7.94	11.75
55	8.54	5.16	9.24	55	10.60	7.06	11.00
56	7.80	4.68	8.53	56	9.83	6.31	10.29
57	7.01	4.16	7.85	57	9.04	5.65	9.57
58	6.47	3.54	7.25	58	8.31	4.94	8.88
59	5.61	3.02	6.65	59	7.45	4.25	8.23
60	5.05	2.65	6.06	60	6.63	3.67	7.61
61	4.53	2.30	5.55	61	5.99	3.11	7.01
62	3.81	2.07	5.20	62	5.09	2.69	6.46
63	3.37	1.88	4.90	63	4.53	2.39	5.99
64	2.91	1.67	4.53	64	4.00	2.10	5.52
65	2.62	1.50	4.28	65	3.43	1.83	5.11
66	2.24	1.33	4.13	66	2.95	1.57	4.77
67	2.06	1.10	3.94	67	2.61	1.31	4.49
68	1.69	0.91	3.64	68	2.19	1.08	4.25
69	1.42	0.77	3.44	69	1.91	0.90	4.01
70	1.26	0.65	3.38	70	1.51	0.77	3.70
71	1.02	0.52	3.28	71	1.40	0.64	3.30
72	0.95	0.38	3.13	72	1.15	0.51	2.95
73	0.74	0.30	2.97	73	0.97	0.41	2.72
74	0.60	0.24	2.71	74	0.80	0.34	2.65
75	0.50	0.17	2.37	75	0.60	0.25	2.56

Table 17. Worklife Expectancy of Females in the United States by Level of Education Completed (Active=In the Labor Force, Inactive=Not in the Labor Force), 1998-2004

	All Females				Females with less than a High				Females with a High School		
	Beginning Labor Force State				*Beginning Labor Force State*				*Beginning Labor Force State*		
Age	All	Inactive	Active	Age	All	Inactive	Active	Age	All	Inactive	Active
17	33.91	33.38	34.54	17	24.13	23.62	24.75	17	33.45	32.79	33.97
18	33.49	32.84	34.02	18	23.68	23.11	24.19	18	32.95	32.18	33.46
19	33.01	32.19	33.47	19	23.12	22.52	23.65	19	32.41	31.50	32.81
20	32.42	31.49	32.84	20	22.52	21.81	23.16	20	31.80	30.77	32.11
21	31.75	30.79	32.18	21	21.95	21.17	22.66	21	31.02	29.92	31.40
22	31.13	30.03	31.51	22	21.46	20.62	22.14	22	30.31	29.07	30.69
23	30.44	29.17	30.85	23	20.94	20.07	21.67	23	29.54	28.26	30.01
24	29.72	28.32	30.16	24	20.47	19.58	21.26	24	28.87	27.53	29.34
25	29.00	27.52	29.46	25	20.02	19.14	20.82	25	28.13	26.80	28.67
26	28.25	26.69	28.74	26	19.49	18.63	20.33	26	27.39	26.01	27.98
27	27.50	25.88	28.01	27	18.91	18.06	19.79	27	26.66	25.23	27.27
28	26.81	25.08	27.31	28	18.44	17.51	19.30	28	26.04	24.49	26.59
29	26.03	24.28	26.61	29	17.88	16.96	18.81	29	25.32	23.80	25.94
30	25.32	23.48	25.91	30	17.43	16.41	18.35	30	24.69	23.03	25.29
31	24.59	22.67	25.19	31	16.98	15.79	17.90	31	23.93	22.19	24.61
32	23.82	21.87	24.49	32	16.28	15.12	17.42	32	23.28	21.45	23.93
33	23.10	21.08	23.80	33	15.79	14.55	16.84	33	22.57	20.71	23.26
34	22.40	20.32	23.10	34	15.30	14.04	16.25	34	21.91	19.96	22.58
35	21.63	19.52	22.38	35	14.68	13.42	15.73	35	21.13	19.15	21.88
36	20.95	18.69	21.66	36	14.24	12.79	15.23	36	20.48	18.32	21.16
37	20.18	17.88	20.95	37	13.67	12.22	14.73	37	19.72	17.54	20.44
38	19.47	17.07	20.22	38	13.17	11.58	14.21	38	18.99	16.76	19.71
39	18.74	16.26	19.49	39	12.56	10.93	13.70	39	18.25	15.96	18.98
40	18.02	15.45	18.77	40	11.98	10.37	13.24	40	17.57	15.10	18.27
41	17.26	14.64	18.04	41	11.40	9.82	12.73	41	16.76	14.23	17.56
42	16.56	13.84	17.30	42	10.99	9.24	12.18	42	16.06	13.38	16.83
43	15.82	13.00	16.57	43	10.29	8.61	11.59	43	15.38	12.58	16.15
44	15.08	12.16	15.85	44	9.68	7.90	11.08	44	14.66	11.80	15.47
45	14.32	11.31	15.12	45	9.11	7.26	10.57	45	13.86	10.93	14.76
46	13.56	10.42	14.40	46	8.58	6.62	9.99	46	13.17	10.10	14.08
47	12.86	9.63	13.70	47	7.97	6.00	9.56	47	12.51	9.35	13.41
48	12.10	8.87	12.98	48	7.43	5.46	9.18	48	11.74	8.61	12.69
49	11.32	8.06	12.25	49	6.88	4.93	8.67	49	10.90	7.82	11.96
50	10.59	7.31	11.55	50	6.31	4.40	8.17	50	10.25	7.13	11.26
51	9.81	6.56	10.89	51	5.81	3.88	7.83	51	9.49	6.44	10.64
52	9.16	5.85	10.24	52	5.55	3.48	7.54	52	8.89	5.82	10.02
53	8.36	5.25	9.57	53	5.10	3.21	7.13	53	8.08	5.22	9.37
54	7.64	4.65	8.93	54	4.64	2.88	6.72	54	7.37	4.54	8.75
55	6.96	4.09	8.33	55	4.17	2.46	6.35	55	6.68	3.98	8.16
56	6.30	3.57	7.77	56	3.64	2.08	5.97	56	6.18	3.50	7.61
57	5.70	3.06	7.23	57	3.43	1.82	5.54	57	5.56	2.99	7.11
58	5.03	2.60	6.66	58	2.89	1.59	5.09	58	4.88	2.54	6.59
59	4.41	2.24	6.09	59	2.65	1.37	4.64	59	4.29	2.17	6.03
60	3.87	1.94	5.58	60	2.26	1.20	4.21	60	3.78	1.86	5.55
61	3.29	1.68	5.09	61	1.87	1.05	3.84	61	3.28	1.64	5.08
62	2.79	1.47	4.73	62	1.60	0.91	3.64	62	2.74	1.45	4.77
63	2.36	1.26	4.50	63	1.35	0.76	3.51	63	2.36	1.26	4.57
64	2.09	1.06	4.23	64	1.24	0.63	3.33	64	2.08	1.08	4.33
65	1.68	0.91	4.06	65	0.96	0.53	3.30	65	1.72	0.94	4.15
66	1.47	0.76	3.92	66	0.87	0.44	3.24	66	1.56	0.80	4.01
67	1.23	0.63	3.74	67	0.67	0.37	2.98	67	1.26	0.66	3.94
68	1.03	0.51	3.56	68	0.59	0.32	2.80	68	1.04	0.53	3.84
69	0.83	0.41	3.35	69	0.50	0.27	2.88	69	0.88	0.42	3.64
70	0.70	0.33	3.16	70	0.48	0.22	2.85	70	0.69	0.34	3.43
71	0.59	0.27	2.95	71	0.34	0.18	2.61	71	0.63	0.26	3.21
72	0.47	0.21	2.74	72	0.29	0.14	2.42	72	0.48	0.20	2.95
73	0.36	0.16	2.54	73	0.21	0.10	2.32	73	0.35	0.15	2.71
74	0.28	0.12	2.38	74	0.16	0.07	2.22	74	0.29	0.12	2.52
75	0.21	0.08	2.25	75	0.14	0.05	2.08	75	0.22	0.09	2.29

Table 17, continued. Worklife Expectancy of Females in the United States by Level of Education Completed (Active=In the Labor Force, Inactive=Not in the Labor Force), 1998-2004

	Females with Some College				Females with a least a 4-year		
	Beginning Labor Force State				*Beginning Labor Force State*		
Age	All	Inactive	Active	Age	All	Inactive	Active
17				17			
18	35.57	34.82	36.16	18			
19	35.02	34.18	35.49	19			
20	34.42	33.54	34.82	20	35.28	34.44	36.24
21	33.76	32.92	34.12	21	35.37	34.04	35.70
22	33.14	32.23	33.43	22	34.64	33.26	34.98
23	32.44	31.36	32.72	23	33.92	32.53	34.20
24	31.63	30.41	31.96	24	33.18	31.68	33.41
25	30.83	29.48	31.22	25	32.39	30.73	32.58
26	30.08	28.55	30.49	26	31.50	29.78	31.73
27	29.35	27.73	29.74	27	30.65	28.82	30.92
28	28.60	26.94	29.00	28	29.83	27.81	30.15
29	27.84	26.11	28.27	29	28.93	26.72	29.38
30	27.03	25.25	27.53	30	28.13	25.82	28.59
31	26.29	24.48	26.78	31	27.32	24.97	27.81
32	25.52	23.69	26.03	32	26.47	24.05	27.07
33	24.77	22.86	25.30	33	25.70	23.19	26.37
34	24.01	22.03	24.56	34	24.95	22.38	25.63
35	23.20	21.21	23.79	35	24.18	21.54	24.87
36	22.50	20.36	23.03	36	23.39	20.71	24.14
37	21.64	19.44	22.26	37	22.62	19.91	23.41
38	20.88	18.49	21.49	38	21.90	19.17	22.64
39	20.10	17.61	20.71	39	21.19	18.43	21.87
40	19.37	16.83	19.94	40	20.44	17.61	21.11
41	18.57	15.96	19.16	41	19.67	16.88	20.33
42	17.79	15.05	18.40	42	18.94	16.19	19.53
43	17.01	14.11	17.65	43	18.16	15.38	18.70
44	16.27	13.23	16.91	44	17.35	14.57	17.88
45	15.54	12.43	16.14	45	16.54	13.67	17.08
46	14.71	11.51	15.39	46	15.74	12.72	16.29
47	13.91	10.65	14.67	47	15.03	11.97	15.48
48	13.21	9.82	13.95	48	14.15	11.23	14.65
49	12.42	8.97	13.23	49	13.37	10.34	13.84
50	11.73	8.27	12.53	50	12.52	9.44	13.05
51	10.91	7.48	11.83	51	11.68	8.56	12.28
52	10.12	6.62	11.12	52	10.97	7.72	11.53
53	9.44	5.90	10.43	53	10.07	6.97	10.77
54	8.60	5.31	9.80	54	9.34	6.30	10.01
55	7.93	4.78	9.19	55	8.54	5.64	9.31
56	7.25	4.31	8.58	56	7.73	4.89	8.71
57	6.69	3.83	7.95	57	7.01	4.10	8.12
58	5.94	3.31	7.30	58	6.43	3.45	7.51
59	5.19	2.87	6.71	59	5.65	3.01	6.88
60	4.74	2.50	6.19	60	4.91	2.65	6.26
61	3.98	2.18	5.63	61	4.28	2.28	5.70
62	3.47	1.95	5.17	62	3.72	1.95	5.29
63	2.97	1.69	4.90	63	3.14	1.69	4.93
64	2.62	1.40	4.61	64	2.79	1.41	4.57
65	2.11	1.19	4.35	65	2.25	1.20	4.37
66	1.78	1.02	4.22	66	1.89	0.98	4.15
67	1.66	0.84	4.03	67	1.62	0.80	3.83
68	1.42	0.68	3.80	68	1.32	0.65	3.50
69	1.13	0.56	3.51	69	0.98	0.51	3.12
70	0.94	0.46	3.24	70	0.85	0.41	2.92
71	0.77	0.39	3.05	71	0.75	0.33	2.75
72	0.66	0.31	2.84	72	0.59	0.27	2.56
73	0.48	0.23	2.61	73	0.57	0.23	2.40
74	0.39	0.16	2.40	74	0.41	0.18	2.29
75	0.27	0.11	2.44	75	0.30	0.11	2.16