```
Real Instanteneous Utility=
      "Utility ( u )" * Exponential Discounting t
       ~ Util / Year
Chge in Cummulative Consumption=
       "Consumption ( C )" / Time to Chge Cumulative Consumption
       ~ Dollar/Year/Year
Chge in Cummulative Income=
       "Labor Income ( Y )" / Time to Chge Cummulative Income
       ~ Dollar/(Year*Year)
Chge in Cumulative Saving=
      Saving / Time to Total Saving
      ~ Dollar/(Year*Year)
                    "Labor Income ( Y )" - "Consumption ( C )"
       ~ Dollar/Year
Time to Chge Cummulative Income=
      1
            Year
              1
"Consumption ( C )"=
      IF THEN ELSE(Time = INTEGER(Time), "Current Consumption ( C )" + (Last Consumption *\
       TIME STEP)/Time to Chge Last Consumption
, "Current Consumption ( C )"
      )
            Dollar/Year
Cummulative Income = INTEG (
      Chge in Cummulative Income,
            Initial Cummulative Income)
            Dollar/Year
                          :SUPPLEMENTARY
       Cumulative Consumption= INTEG (
      Chge in Cummulative Consumption,
            Initial Cumulative Consumption)
            Dollar/Year
Cumulative Consumption plus Saving=
      Cumulative Saving + Cumulative Consumption
       ~ Dollar/Year
                          :SUPPLEMENTARY
       Cumulative Saving= INTEG (
      Chge in Cumulative Saving,
             Initial Total Saving)
            Dollar/Year
Initial Total Saving=
            Dollar/Year
```

```
"Current Consumption ( C ) "=
       "Marginal Propensity to Consume out of Labor Income = alpha" * "Labor Income ( Y )" \
        + "Marginal Propensity to Consume out of Wealth = beta"
       * "Wealth ( W )"
       ~ Dollar/Year
Initial Cumulative Consumption=
             Dollar/Year
Time to Total Saving=
      1
             Year
Initial Cummulative Income=
            Dollar/Year
              Time to Chge Cumulative Consumption=
      1
            Year
Time to Chge Last Consumption=
      1
       ~
             Year
                    Current Consumption=
       IF THEN ELSE(Time <= FINAL TIME - 2*TIME STEP, ("Consumption ( C )" ) , 0)
       ~ Dollar/Year
"Labor Income ( Y )"=
       "Normal Labor Income (Y)" * (1 - Retirement Switch) * (1 + 0*STEP(0.1,30))
       ~ Dollar/Year
             "Marginal Propensity to Consume out of Labor Income = alpha"=
      0.2
       ~
             Dmnl
                   - 1
"Marginal Propensity to Consume out of Wealth = beta"=
       0.2
              Dmnl/Year
       ~
"Wealth ( W )"= INTEG (
       "Labor Income ( Y )"- Current Consumption - Last Consumption,
            "Initial Wealth ( W )")
            Dollar
Lifetime Utility=
       IF THEN ELSE(Time >= FINAL TIME, "Real Lifetime Utility ( U )",0)
                     ~ :SUPPLEMENTARY
```

```
"Real Lifetime Utility ( U )"= INTEG (
       Real Instanteneous Utility,
             "Initial Real Lifetime Utility (U)")
              Util
"Utility ( u )"=
       IF THEN ELSE ("Coefficient of Relative Risk Aversion ( \rho )" = 1, IF THEN
ELSE("Consumption ( C )"
        = 0, 0, ln (
        "Consumption ( C )" / Normal Consumption)
       ) * Util per Year
        , ((( "Consumption ( C )"
        / Normal Consumption) ^ (1 - "Coefficient of Relative Risk Aversion ( \rho )" )) / (1\setminus
               - "Coefficient of Relative Risk Aversion ( \rho )"
       )) * Util per Year )
       ~ Util / Year
Chge in Exponential Discounting t 1=
      -IF THEN ELSE (Time = INTEGER (Time), (Exponential Discounting t - Exponential
Discounting t 1\
            ) / TIME STEP, 0)
              Dmnl/Year
"Coefficient of Relative Risk Aversion ( \rho )"=
       0.67
       ~ Dmnl
                     "delta (δ)"=
      0.99
              Dmn1
                     "Exponential Discounting t - 1"=
       IF THEN ELSE(Time = INTEGER(Time), Exponential Discounting t 1, Lagged Exponential
Discounting t 1\
              )
              Dmnl
Exponential Discounting t=
       "delta ( \delta )" * "Exponential Discounting t - 1"
       ~ Dmnl
Exponential Discounting t 1= INTEG (
       -Chge in Exponential Discounting t 1,
              Initial Exponential Discounting t 1)
              Dmnl
Initial Exponential Discounting t 1=
       1
             Dmnl
       ~
                     "Initial Real Lifetime Utility (U)"=
      1
             Util
                    "Initial Wealth ( W )"=
       1000
```

```
~ Dollar
Lagged Exponential Discounting t 1=
      DELAY FIXED( Exponential Discounting t 1, 1, Exponential Discounting t 1)
           Dmnl
Last Consumption=
      IF THEN ELSE(Time = FINAL TIME - TIME STEP, "Wealth ( W )" / TIME STEP, 0)
         Dollar/Year
Normal Consumption=
      1
           Dollar/Year
              "Normal Labor Income (Y)"=
     1000
             Dollar/Year
              Retirement Switch=
      STEP (1, Retirement Time + TIME STEP)
           Dmnl
Retirement Time=
      58
           Year
Util per Year=
             Util/Year
     .Control
************
          Simulation Control Parameters
      FINAL TIME = 78
          Year
The final time for the simulation.
      ~
      INITIAL TIME = 18
      ^{\sim} Year ^{\sim} The initial time for the simulation.
SAVEPER =
     TIME STEP
      ~ Year [0,?]
            The frequency with which output is stored.
TIME STEP = 0.0625
           Year [0,?]
            The time step for the simulation.
\\\---/// Sketch information - do not modify anything except names
```

```
V300 Do not put anything below this section - it will be ignored
*View 1
$192-192-192,0,0pen Sans|10||0-0-0|0-0-0|0-0-255|-1--1--1|255-255-255|96,96,80,0
10,1,"Wealth ( W )",817,238,41,26,3,131,0,0,0,0,0,0,0,0,0,0,0
12,2,48,594,243,10,8,0,3,0,40,-1,0,0,0,0-0-0,0-0-0,0 Sans |10| | 0-0-0,0,0,0,0,0
1,3,5,1,4,0,0,22,0,0,0,-1--1-1,1|(731,243)|
1, 4, 5, 2, 100, 0, 0, 22, 0, 0, 0, -1 --1 --1, 1 | (639, 243) |
11,5,48,681,243,6,8,34,3,0,0,1,0,0,0,0,0,0,0,0,0
10,6,"Labor Income (Y)",681,261,56,10,40,3,0,40,-1,0,0,0,0-0-0,0-0-0,0pen Sans|10||0-0-
0,0,0,0,0,0,0
12,7,48,1030,249,10,8,0,3,0,40,-1,0,0,0,0-0-0,0-0-0,0pen Sans|10||0-0-0,0,0,0,0,0
1,8,10,7,4,0,0,22,0,0,0,-1--1--1,,1|(977,244)|
1,9,10,1,100,0,0,22,0,0,0,-1--1--1,,1|(890,244)|
11,10,48,928,244,6,8,34,3,0,0,1,0,0,0,0,0,0,0,0,0
10,11,Current Consumption,928,270,52,18,40,3,0,0,-1,0,0,0,0,0,0,0,0,0
1, 13, 12, 1, 0, 1, 0, 0, 0, 128, 1, -1--1-1, 1 | (808, 200) |
10,14,Normal Consumption,1295,451,44,18,8,3,0,40,-1,0,0,0,0-0-0,0-0-0,Open Sans|10||0-0-
0,0,0,0,0,0,0
10,15,Util per Year,1059,559,38,10,8,3,0,40,-1,0,0,0,0-0-0,0-0-0,0pen Sans|10||0-0-0,0,0,0,0,0
10,16, Retirement Time, 700,406,52,10,8,131,0,40,0,0,0,0,0-0-0,0-0-0,0pen Sans | 10 | | 0-0-
0,0,0,0,0,0,0
0,0,0,0,0,0,0
1,18,17,6,1,0,0,0,0,64,0,-1--1-1,1|(615,293)|
10,19,TIME STEP,1651,259,40,10,8,2,1,43,-1,0,0,0,128-128-128,0-0-0,Open Sans|10||128-128-
128.0.0.0.0.0.0
10,20,TIME STEP,884,-155,40,10,8,2,1,43,-1,0,0,0,128-128-128,0-0-0,Open Sans|10||128-128-
128,0,0,0,0,0,0
10,21,"Current Consumption ( C )",1120,140,57,18,8,3,0,0,0,0,0,0,0,0,0,0,0,0,0
10,22, "Consumption ( C )",1040,382,56,10,8,131,0,0,0,0,0,0,0,0,0,0,0,0,0
10,23,TIME STEP,989,550,40,10,8,2,1,43,-1,0,0,0,128-128-128,0-0-0,Open Sans|10||128-128-
128,0,0,0,0,0,0
1,24,22,11,1,0,0,0,0,128,0,-1--1--1,,1|(955,329)|
10,25, Retirement Switch,716,336,57,10,8,131,0,0,0,0,0,0,0,0,0,0,0,0
1,26,16,25,1,0,0,0,64,0,-1--1--1,,1|(714,383)|
1,27,25,6,1,0,0,0,128,0,-1--1--1,,1|(709,295)|
10,28,Time,1061,313,24,10,8,2,1,3,-1,0,0,0,128-128-128,0-0-0,|12||128-128-128,0,0,0,0,0,0
10,29,TIME STEP,738,78,40,10,8,2,1,3,-1,0,0,0,128-128-128,0-0-0,|12||128-128-128,0,0,0,0,0,0
1, 30, 28, 11, 1, 1, 0, 0, 0, 128, 0, -1 --1 --1, , 1 \mid (1000, 313) \mid
12,31,48,813,398,10,8,0,3,0,0,-1,0,0,0,0,0,0,0,0,0
1,32,34,31,4,0,0,22,0,0,0,-1--1--1,,1|(815,359)|
1,33,34,1,100,0,0,22,0,0,0,-1--1--1,,1|(815,290)|
11,34,48,815,323,8,6,33,3,0,0,4,0,0,0,0,0,0,0,0,0
10,35,Last Consumption,875,323,44,18,40,131,0,0,-1,0,0,0,0,0,0,0,0,0,0
1,36,1,34,1,0,0,0,0,128,0,-1--1--1,,1|(766,285)|
10,37,"delta (\delta)",695,920,30,10,8,131,0,0,0,0,0,0,0,0,0,0,0
10,38,Time,847,-8,24,10,8,2,1,3,-1,0,0,0,128-128-128,0-0-0,|10||128-128-128,0,0,0,0,0
1,39,28,22,1,1,0,0,0,128,0,-1--1--1,,1|(1046,342)|
10,41,FINAL TIME,1010,158,44,10,8,2,1,3,-1,0,0,0,128-128-128,0-0-0,|10||128-128-128,0,0,0,0,0
10,42,FINAL TIME,920,417,44,10,8,2,1,3,-1,0,0,0,128-128-128,0-0-0,|10||128-128-128,0,0,0,0,0
1,43,42,35,0,1,0,0,0,64,0,-1--1--1,,1|(902,380)|
10,44,Time,934,368,24,10,8,2,1,3,-1,0,0,0,128-128-128,0-0-0,|10||128-128-128,0,0,0,0,0,0
1,45,44,35,0,1,0,0,0,64,0,-1--1--1,,1|(915,353)|
10,46,TIME STEP,817,426,40,10,8,2,1,3,-1,0,0,0,128-128-128,0-0-0,|10||128-128-128,0,0,0,0,0
1,47,46,35,0,1,0,0,0,64,0,-1--1--1,,1|(839,384)|
1,48,46,25,1,1,0,0,0,128,0,-1--1--1,,1|(778,384)|
10,49,"Initial Real Lifetime Utility (U)",1391,572,55,17,8,3,0,8,0,0,0,0,0-0-0,0-0-0,|9||0-0-
0,0,0,0,0,0,0
10,50,Exponential Discounting t 1,757,665,50,28,3,131,0,0,0,0,0,0,0,0,0,0,0
12,51,48,511,662,10,8,0,3,0,0,-1,0,0,0,0,0,0,0,0,0
1,52,54,50,36,0,0,22,2,0,0,-1--1--1,|10||0-0-0,1|(662,663)|
1,53,54,51,68,0,0,22,2,0,0,-1--1--1,|10||0-0-0,1|(563,663)|
11,54,48,611,663,6,8,34,3,0,0,3,0,0,0,0,0,0,0,0,0
10,55,Chge in Exponential Discounting t 1,611,637,62,18,40,3,0,0,-1,0,0,0,0,0,0,0,0
```

```
10,56,Lagged Exponential Discounting t 1,810,767,62,18,8,3,0,0,0,0,0,0,0,0,0,0,0
10,57, "Exponential Discounting t - 1",1020,688,51,18,8,3,0,0,0,0,0,0,0,0,0,0,0,0
10,58,Exponential Discounting t,774,847,42,18,8,3,0,0,0,0,0,0,0,0,0,0,0,0
1,59,50,54,1,0,0,0,0,128,0,-1--1--1,,1|(669,709)|
1,60,50,56,1,0,0,0,0,128,0,-1--1--1,,1|(762,719)|
1,61,56,57,1,0,0,0,0,128,0,-1--1--1,,1|(925,752)|
1,62,50,57,1,0,0,0,0,128,0,-1--1--1,,1|(889,634)|
1,63,57,58,1,0,0,0,0,128,0,-1--1--1,,1|(915,803)|
1,64,58,54,1,0,0,0,0,128,0,-1--1--1,,1|(659,792)|
10,65,Initial Exponential Discounting t 1,757,579,57,18,8,3,0,0,0,0,0,0,0,0,0,0,0
1,66,65,50,0,1,0,0,0,128,1,-1--1--1,,1|(757,610)|
10,67,Time,935,980,24,10,8,2,1,3,-1,0,0,0,128-128-128,0-0-0,|10||128-128-128,0,0,0,0,0
10,68,Time,1437,729,24,10,8,2,1,3,-1,0,0,0,128-128-128,0-0-0,|10||128-128-128,0,0,0,0,0
1,69,68,55,1,1,0,0,0,64,0,-1--1-1,,1|(981,718)|
1,70,67,57,1,1,0,0,0,128,0,-1--1--1,,1|(945,979)|
1,72,71,55,1,1,0,0,0,64,0,-1--1-1,1|(956,746)|
1,73,37,58,1,0,0,0,0,128,0,-1--1--1,,1|(711,888)|
10,74,"Utility ( u )",1222,522,58,10,8,3,0,0,0,0,0,0,0,0,0,0,0,0
1,75,14,74,1,0,0,0,128,0,-1--1--1,,1|(1267,490)|
1,76,40,74,1,0,0,0,0,128,0,-1--1--1,,1|(1128,494)|
1,77,15,74,1,0,0,0,0,128,0,-1--1--1,,1|(1138,555)|
1,78,22,74,1,0,0,0,64,0,-1--1--1,,1|(1159,441)|
10,79, "Real Lifetime Utility ( U )",1385,626,45,24,3,131,0,0,0,0,0,0,0,0,0,0,0
12,80,48,1141,633,10,8,0,3,0,0,-1,0,0,0,0,0,0,0,0,0
1,81,83,79,4,0,0,22,0,0,0,-1--1--1,,1|(1296,629)|
1,82,83,80,100,0,0,22,0,0,0,-1--1--1,,1|(1196,629)|
11,83,48,1247,629,5,8,34,3,0,0,1,0,0,0,0,0,0,0,0,0
10,84,Real Instanteneous Utility,1247,664,46,27,40,131,0,0,-1,0,0,0,0,0,0,0,0,0
1,85,74,83,1,0,0,0,0,128,0,-1--1--1,,1|(1235,549)|
1,86,49,79,0,1,0,0,0,64,1,-1--1--1,,1|(1390,588)|
10,87,Lifetime Utility,1557,575,53,18,8,3,1,0,0,0,0,0,0,0,0,0,0,0
10,88,FINAL TIME,1198,523,44,10,8,2,1,3,-1,0,0,0,128-128-128,0-0-0,|10||128-128-128,0,0,0,0,0,0
1,89,88,87,0,1,0,0,0,64,0,-1--1--1,,1|(1366,546)|
1,90,79,87,0,1,0,0,0,64,0,-1--1--1,,1|(1460,603)|
1,92,91,87,0,1,0,0,0,64,0,-1--1--1,,1|(1409,550)|
10,93, "Marginal Propensity to Consume out of Labor Income =
alpha",1308,78,72,27,8,131,0,0,0,0,0,0,0,0,0,0,0,0
10,94,"Marginal Propensity to Consume out of Wealth =
beta",1299,223,80,27,8,131,0,0,0,0,0,0,0,0,0,0,0,0
1,95,93,21,1,0,0,0,0,128,0,-1--1--1,,1|(1189,95)|
1,96,94,21,1,0,0,0,0,128,0,-1--1--1,,1|(1217,161)|
1,97,1,21,1,0,0,0,0,128,0,-1--1--1,,1|(926,142)|
1,98,35,22,1,0,0,0,128,0,-1--1--1,,1|(905,361)|
10,99,TIME STEP,1069,301,40,10,8,2,1,3,-1,0,0,0,128-128-128,0-0-0,|10||128-128-128,0,0,0,0,0,0
1,100,99,11,1,1,0,0,0,64,0,-1--1--1,,1|(1012,276)|
1,101,21,22,1,0,0,0,128,0,-1--1--1,,1|(1151,274)|
1,102,99,22,1,1,0,0,0,128,0,-1--1--1,,1|(1065,333)|
1,103,6,21,1,0,0,0,0,128,0,-1--1--1,,1|(804,126)|
1,105,104,11,0,1,0,0,0,64,0,-1--1--1,,1|(934,224)|
10,106,Cummulative Income,1891,297,45,24,3,131,0,0,0,0,0,0,0,0,0,0,0,0
12,107,48,1643,297,10,8,0,3,0,0,-1,0,0,0,0,0,0,0,0,0
1,108,110,106,4,0,0,22,0,0,0,-1--1--1,,1|(1800,297)|
1,109,110,107,100,0,0,22,0,0,0,-1--1--1,,1|(1698,297)|
11,110,48,1749,297,6,8,34,3,0,0,1,0,0,0,0,0,0,0,0,0
10,111,Chge in Cummulative Income,1749,323,67,18,40,3,0,0,-1,0,0,0,0,0,0,0,0,0
10,112, Cumulative Consumption, 1913, 658, 44, 23, 3, 131, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
12,113,48,1655,664,10,8,0,3,0,0,-1,0,0,0,0,0,0,0,0,0
1,114,116,112,4,0,0,22,0,0,0,-1--1--1,,1|(1821,664)|
1,115,116,113,100,0,0,22,0,0,0,-1--1--1,,1|(1713,664)|
11,116,48,1767,664,6,8,34,3,0,0,1,0,0,0,0,0,0,0,0,0
10,118,Initial Cummulative Income,1880,207,61,18,8,3,0,0,0,0,0,0,0,0,0,0,0,0,0
10,119, Initial Cumulative Consumption, 1906,587,55,18,8,3,0,0,0,0,0,0,0,0,0,0,0,0
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1,120,118,106,0,0,0,0,128,1,-1--1-1,,1|(1884,242)|
1,121,119,112,0,0,0,0,128,1,-1--1--1,,1|(1907,613)|
10,122,"Labor Income ( Y )",1616,372,65,14,8,130,0,3,-1,0,0,0,128-128-128,0-0-0,|10||128-128-
128,0,0,0,0,0,0
128,0,0,0,0,0,0
1,124,122,111,1,0,0,0,0,128,0,-1--1--1,,1|(1655,338)|
10,125, Saving, 1535, 465, 22, 10, 8, 3, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
1,126,122,125,1,0,0,0,128,0,-1--1--1,,1|(1562,406)|
10,127, Cumulative Saving, 1904, 483, 40, 25, 3, 131, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
12,128,48,1649,477,10,8,0,3,0,0,-1,0,0,0,0,0,0,0,0,0
1,129,131,127,4,0,0,22,0,0,0,-1--1--1,,1|(1816,481)|
1,130,131,128,100,0,0,22,0,0,0,-1--1--1,,1|(1707,481)|
11,131,48,1762,481,6,8,34,3,0,0,1,0,0,0,0,0,0,0,0,0
10,132,Chge in Cumulative Saving,1762,507,58,18,40,3,0,0,-1,0,0,0,0,0,0,0,0
1,133,125,131,1,0,0,0,128,0,-1--1--1,,1|(1651,438)|
1,134,123,125,1,0,0,0,0,128,0,-1--1--1,,1|(1572,537)|
10,135,Cumulative Consumption plus Saving,2097,547,87,26,8,131,0,0,0,0,0,0,0,0,0,0,0,0
1,136,127,135,1,0,0,0,0,128,0,-1--1--1,,1|(1979,491)|
1,137,112,135,1,0,0,0,0,128,0,-1--1--1,,1|(1998,625)|
1,138,123,117,1,0,0,0,0,128,0,-1--1--1,,1|(1674,628)|
10,139, Initial Total Saving, 1911, 398, 56, 10, 8, 3, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
1,140,139,127,0,0,0,0,128,1,-1--1--1,,1|(1909,426)|
10,141, Time to Chge Last Consumption, 1254, 356, 56, 18, 8, 3, 1, 0, -1, 0, 0, 0, 0, 0, 0, 0, 0
1,142,141,22,0,1,0,0,0,64,0,-1--1--1,,1|(1154,367)|
10,143, Time to Chge Cummulative Income, 1753, 406, 68, 18, 8, 3, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
1,144,143,111,1,0,0,0,0,128,0,-1--1--1,,1|(1737,366)|
10,145, Time to Total Saving,1750,590,42,18,8,3,0,0,0,0,0,0,0,0,0,0,0,0,0
10,146, Time to Chge Cumulative Consumption, 1712, 791, 44, 27, 8, 3, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
1,147,146,117,1,0,0,0,0,128,0,-1--1--1,,1|(1723,742)|
1,148,145,132,1,0,0,0,0,128,0,-1--1--1,,1|(1743,549)|
1,149,58,84,1,0,0,0,0,128,0,-1--1--1,,1|(1003,879)|
```