to *self-employment* if it is categorized as (3), and is attached to *paid-employment* if it is categorized as (1) or (2). Category (4) will not be considered as "worked/works."

Not all the jobs listed in the NLSY79 can be identified either as self-employed or as paid-employed. This is because the "Class of Worker" information is collected only for the current (the CPS item) jobs[80] and ones for which the respondent worked for more than 10 (after 1988) or 20 (prior to 1988) hours a week and for more than 9 weeks since the last interview. This limited form of information should be innocuous for this study, however, because in the actual estimation these "temporary" jobs will not be counted as worked due to the discretization of the variable "hours worked." in B.4.2.[81]

For each job, we also have information (if provided) on labor market opportunities (the weekly average of hours worked[82] and the weekly average of hourly rate of pay). These items are used in the following calculation of the actual hours worked and the diecretization.

One caveat is that owners of incorporated businesses may or may be excluded if they draw a salary from their businesses and interpret this behavior as the one of a wage worker. Thus, the above definition of self-employers refers essentially to sole proprietors and partners of unincorporated businesses.

B.4.2 Mode of Employment and Work Intensity, $(l^s_{i,t}, l^w_{i,t})$

I look at the "Weekly Labor Force Status" Section and the "Dual Jobs" Section (1979-2000)[83] and the job characteristics information obtained above. For each individual, information on weekly labor force status is available up to the date that the last interview that he responded covers. So, the last year when the information is available is the one right before the year when "0" ("no info reported for week") appears in an array.

For each individual $i \in \{1, ..., N\}$, I know (if information is provided) whether job j ($j = 101$, ..., 105, 201, ..., 1905, 2001, ..., 2005)[84] is attached to self-employment or to paid-employment. I compute i's total hours worked for job j in calender year t, $total\_hours\_worked^j_{i,t}$, by

$$total\_hours\_worked^j_{i,t}, = weekly\_hours\_worked^j_i \times weeks^j_{i,t},$$

where $weekly\_hours\_worked^j_i$ is individual i's weekly average of hours worked and $weeks^j_{i,t}$ is the number of weeks he worked for job j in year t. Both of them are available in the NLSY79.

I then aggregate jobs according to whether they are attached to self- or to paid-employment. I calculate total hours worked for m-mode employment ($m \in \{self, paid\}$) in year t,

[80] In 1994, the occupation, industry and class of worker information for 353 CPS employers were not collected. This error would be innocuous for my study because these CPS employers were either less than 9 weeks in duration since the last interview, or were employers for whom the respondent worked less than 10 hours per week. For more information on this editing error, see http://www.nlsinfo.org/nlsy79/nlsy79_errata.php3.

[81] Note that week-by-week information on hours worked and hourly rate of pay is collected for almost all jobs appearing in the data. So, if we do not care about the class of worker, we can well grasp total hours worked and wage earnings in any week.

[82] In the 1988 survey round, the NLSY79 started asking hours worked at home separately for each job. By hours worked, I mean the sum of hours worked at workplace home and those at home.

[83] "Weekly Labor Force Status" information is available (since January 1, 1978) on whether a respondent was (a) working, (b) associated with an employer, (c) unemployed, (d) out of the labor force, (e) not working, or (f) in active military duty.

[84] Remember each calender year covers up to 5 jobs and we have 20 calender years; the first one or two digits correspond to survey years and the last digit to the job number.

$total\_hours\_worked^{l}_{i,t}$, by

$$total\_hours\_worked^{m}_{i,t} = \sum_{j \in m} total\_hours\_worked^{j}_{i,t}.$$

Remember that I assume that the individual in the model chooses descretized hours worked. Specifically, I employ the following descretization that allows natural interpretation: in year t, individual i

$$\begin{cases} \text{did } \textit{not} \text{ work as a self-employer if } 0 \leq total\_hours\_worked^{self}_{i,t} < 700 \ (= 20 \text{ hours} \times 35 \text{ weeks}), \\ \textit{worked} \text{ as a self-employer if } total\_hours\_worked^{self}_{i,t} \geq 700. \end{cases}$$

and he

$$\begin{cases} \text{did } \textit{not} \text{ work as a wage earner if } 0 \leq total\_hours\_worked^{paid}_{i,t} < 700, \\ \text{worked as a } \textit{part-time} \text{ wage earner if } 700 \leq total\_hours\_worked^{paid}_{i,t} < 1400 \\ \qquad (= 40 \text{ hours} \times 35 \text{ weeks}), \text{ and} \\ \text{worked as a } \textit{full-time} \text{ wage earner if } total\_hours\_worked^{self}_{i,t} \geq 1400. \end{cases}$$

I do not consider the possibility that an individual decides on how many hours he works, and assume that if he works in self-employment or in full-time paid-employment, his hours worked is 2000, and if he works as a part-time wage worker they are 1000.[85]

The reason why I do not distinguish between full-time and part-time self-employment is that the number of individuals who choose part-time self-employment is very small for each age that is covered in the data. I say that he was *non-employed* in year t if he did work in both modes of employment. Note that as Table 4 in the main text shows, "dual-employment" (worked as a self-employer and as a wage earner in the same year) is observed with small fractions. One reason why one is self-employed and is a wage worker in the same year would be that he works for an employer during the day and runs his own business in the evenings. Another possible reason is that he worked as a wage worker early in the year and worked as self-employer late in the year.

B.4.3 Net Worth, $a_{i,t}$

Collecting information on assets began in survey year 1985,[86] with exceptions of survey years 1991 and 2002. Assets are measured at interview dates. To calculate financial net worth, I follow Keane and Wolpin (2001), Imai and Keane (2004) and many others who use asset information in the NLSY79: I first add up the following variables to construct total positive assets:[87],[88]

(1) "Market value of residential property the respondent or his spouse (R/S) owns"
(2) "Total market value of vehicles including automobiles R/S owns"
(3) "Total amount of money assets like savings accounts of R/S"
(4) "Total market value of all other assets each worth more than \$500" and
(5) "Total market value of farm/business/other property the R/S owns".

[85] Under this categoralization, the mean hours worked for self-employment, for full-time paid-employment, and for part-time paid-employment over the ages covered in the data (20-39) are, 2056.2, 2315.5, and 1061.4, respectively. The hours worked for and for full-time paid-employment increase moderately over age, and the ones for part-time paid-employment are stable. This assumption thus seems innocuous.

[86] Remember that this implies that the earliest age at which I have information on assets is essentially 20.

[87] For Item (3), the total market value of stocks/bonds/mutual funds became distinguishable in 1988, and the total amount of money holdings like IRA/Keogh, 401k/403b and CDs became distinguishable in 1994.

[88] If the respondent does not report at least one of the items, I set the assets variable to "missing." I do the same to the debts items.

Then, to construct total debts, I add up the following items:

$$\begin{cases} \text{(1) "Amount of mortgages \& back taxes R/S owes on residential property"} \\ \text{(2) "Amount of other debts R/S owes on residential property"} \\ \text{(3) "Total amount of money R/S owes on vehicles including automobiles"} \\ \text{(4) "Total amount of other debts over \$500 R/S owes" and} \\ \text{(5) "Total amount of debts on farm/business/other property R/S owes".} \end{cases}$$

I subtract the total debts from the total assets and call it *net worth.* I exclude top and bottom 1% of financial net worth (greater than \$653,755.7 and less than -72,600, respectively). The numbers of excluded observations are 181 and 180, respectively.

B.4.4 Income in Self-Employment and Wage in Paid-Employment, $(y^s_{i,t}, w_{i,t})$

Difficulties in measuring and interpreting income from self-employment are well known. If an individual i works for self-employment ($l^s_{i,t} > 0$) with a positive amount of business capital ($k_{i,t} > 0$), then his income both from his entrepreneurial production function should be a combination of income from labor and from capital. The issue is whether or not the self-reported income from self-employment includes the returns to business capital, $k_{t,t}$. In the following, I explain the problem and how I mitigate it.

First, there are two sources of information on income in the NSLY79:

(1) Information on "wage/salary" is obtained from the event history (in the Employer Supplement Section) on reported jobs. For each reported job, the respondent is asked wage and the time unit of the wage.

(2) In addition, the NLSY79 has global questions on the amounts of various types of "annual income" in the previous year. These are summarized in the Income Section. In particular, the Income Section asks separately about "wage/salary income" and "business or farm income (after expense)."

At first, it would seem that information source (2) works better than source (1) because the distinction between "wage/salary income" and "business or farm" is explicit in (2) while it is obscure in (1). So, suppose that I use information source (2). It is unclear, however, what corresponds to $y^s_{i,t}$. It seems safe to assume neither "wage/salary income" nor "business or farm" contains the depreciated capital, $(1-\delta)k_t$. The reason is shown in Table B-3 for my final person-year observations: "(Business income)/k_t" does not seem constant over changes in percentiles.

Some respondents are still likely to mix the returns to labor and the returns to capital, even though the Income Section asks about both income sources separately. As Fairlie (2005, pp.43-44) points out, and as is verified with my final sample, about half of the self-employed with positive earnings report wage/salary income, but do not report business income. Fairlie (2005) ascribes this problem to the ordering of questions. In the NLSY79, respondents are asked, (1) "How much money did you get from the military?"; (2) "Excluding military pay, how much money did you get from wages, salary, commissions, or tips?"; and (3) "Excluding anything you already mentioned, did you receive any business income?" Some of the self-employed thus may have reported their income in the second question and did not correct their mistake.[89]

[89] Another issue is on the accuracy or the reliability of the question. The exact sentence of the question is: "How much did you receive *after expences* from your farm or business in the past calender year?" One odd thing is that we have no observations with negative business income.

To overcome this issue, I decided to use *the sum of "salary/wage income" and "business income" in the Income Section as income from self-employment,* $y^s_{i,t}$. I trim outliers of the income observations to remove their effects on the results. Note here that I do not drop entire persons with outliers from the sample, but in estimation I treat outliers as missing values. Specifically, if the sum of wage/salary and business incomes from the Income Section exceeds $1,000,000, I treat *both* wage/salary and business incomes as missing. The number of such observations is 16.

For wage from paid-employment, $w_{i,t}$, I use information source (1).

B.4.5 Education ($educ_i$)

Each respondent's highest grade completed as of May 1 of each year is also available.[90] I keep an individual's year of education constant through his decision periods.[91] After imputation, I collapse "Highest Grade Completed" into:

$$\begin{cases} \text{High-school Dropout } (HD)\text{: education } < 12 \\ \text{High-school Graduate } (HG)\text{: education } = 12 \\ \text{Some College } (SC)\text{: } 13 \leq \text{ education } \leq 15 \\ \text{College Graduate } (CG)\text{: education } \geq 16. \end{cases}$$

In the actual implementation, I consider two levels of schooling: schooling H (HD or HG) and schooling C (SC or CG). I define the education dummy by

$$educ_i = \begin{cases} 0 & \text{if } i \text{ is a high-school dropout or graduate} \\ 1 & \text{otherwise.} \end{cases}$$

Appendix C Details on the Construction of the Log Likelihood

C.1 Classification Error for Hours Worked, E^s and E^w (2 Parameters)

The classification error for self-employment is characterized by parameter E^s in the following way:

$$\Pr((l^s_{i,t})^{obs} = 1 | \widetilde{l^s}^{sim}_{i,type,t} = 1) = E^s + (1 + E^s)\widehat{\Pr}((l^s_{i,t})^{obs} = 1)$$
$$\Pr((l^s_{i,t})^{obs} = 1 | \widetilde{l^s}^{sim}_{i,type,t} \neq 1) = (1 - E^s)\widehat{\Pr}((l^s_{i,t})^{obs} = 1)$$

where

$$E^s = \frac{\exp(E^s_0)}{1 + \exp(E^s_0)}$$

[90] I do not use AFQT in this study because among the 1916 individuals in the Restriction CS-4, scores of 154 individuals are missing.

[91] It is known that there are issues of inconsistencies on information on the highest grade completed in the NLSY79. For example, we sometimes observe an individual's "Highest Grade Completed" suddenly jumps even if his "School Enrollment Status"s are zero around that year. See the NLSY79 User's Guide (p.143) for details. I used my own judgment to determine one's highest grade completed when I saw inconsistensies.

and

$$\widehat{\Pr}((l^s_{i,t})^{obs} = 1) = \frac{1}{N}\sum_{i=1}^{N} I((l^s_{i,t})^{obs} = 1).$$

Note here that

$$\begin{aligned}
&\Pr((l^s_{i,t})^{obs} = 1) \\
&= \Pr((l^s_{i,t})^{obs} = 1 | \widetilde{l^s}^{sim}_{i,type,t} = 1)\widehat{\Pr}((l^s_{i,t})^{obs} = 1) + \Pr((l^s_{i,t})^{obs} = 1 | \widetilde{l^s}^{sim}_{i,type,t} \neq 1)[1 - \widehat{\Pr}((l^s_{i,t})^{obs} = 1)],
\end{aligned}$$

which is equal to $\widehat{\Pr}((l^s_{i,t})^{obs} = 1)$. The classification error for full-, part- and zero-time paid employment, E^w, is constructed similarly. That is,

$$E^w = \frac{\exp(E^w_0)}{1 + \exp(E^w_0)}.$$

C.2 Measurement Error for the Continuous Variables, $\sigma^2_{\xi,\cdot}$ (4 Parameters)

First, the measurement error in *financial net worth* is modeled as

$$(a_{i,t})^{obs} = \widetilde{a}^{sim}_{i,type,t} + \xi^a_t$$

where $\xi^a_t \sim N(0, \sigma^2_{\xi,a})$ and $\sigma_{\xi,a} = \sigma_{\xi,a,0} + \sigma_{\xi,a,1}|(a_{i,t})^{obs}|$. Similarly, the measurement error in *income* from self-employment is modeled in

$$\exp(\xi^{y^s}_t) = |(y^s_{i,t})^{obs} - \widetilde{y^s}^{sim}_{i,type,t}|$$

where $\xi^{y^s}_t \sim N(0, \sigma^2_{\xi,y^s})$, and the the one from j-time paid-employment is modeled in

$$\exp(\xi^{y^w}_t) = |(y^w_{i,t})^{obs} - \widetilde{y^w}^{sim}_{i,type,t}|$$

where $\xi^{y^w}_t \sim N(0, \sigma^2_{\xi,y^w})$.

C.3 Parametric Form of the Likelihood Contribution

With the given specification of classification/measurement errors, the actual expression for the likelihood contribution for individual i in mth simulation is given by

$$
\begin{aligned}
&\Pr(X_i|\widetilde{X}^{sim}_{i,type},\theta) \\
&= \left[\frac{1}{\sqrt{2\pi\sigma^2_{\xi,a}}}\exp\left[-\frac{[(a_{i,t})^{obs}-\widetilde{a}^{sim}_{i,type,1}]^2}{2\sigma^2_{\xi,a}}\right]\right] I(a_{i,1} \textit{ is observed}) \\
&\times \prod_{t|l^s_{i,t}=1 \text{ is observed}} \Pr((l^s_t)^{obs} \textit{ is self-employment}) \\
&\times \prod_{t|l^s_{i,t}=0 \text{ is observed}} \Pr((l^s_t)^{obs} \textit{ is zero self-employment}) \\
&\times \prod_{t|\text{``}l^s_{i,t}=\text{full-time'' is observed}} \Pr((l^s_t)^{obs} \textit{ is full-time paid-employment}) \\
&\times \prod_{t|\text{``}l^s_{i,t}=\text{ part-time'' is observed}} \Pr((l^s_t)^{obs} \textit{ is part-time paid-employment}) \\
&\times \prod_{t|\text{``}l^s_{i,t}=0\text{'' is observed}} \Pr((l^s_t)^{obs} \textit{ is zero paid-employment}) \\
&\times \prod_{t|y^s_{i,t} \text{ is observed}} \left[\frac{1}{|(y^s_{i,t})^{obs}-\widetilde{y^s}^{sim}_{i,type,t}|\sqrt{2\pi\sigma^2_{\xi,y^s}}}\exp\left[-\frac{[\log((y^s_{i,t})^{obs})-\log(\widetilde{y^s}^{sim}_{i,type,t})]^2}{2\sigma^2_{\xi,y^s}}\right]\right] \\
&\times \prod_{t|y^w_{i,t} \text{ is observed}} \left[\frac{1}{|(y^w_{i,t})^{obs}-\widetilde{y^w}^{sim}_{i,type,t}|\sqrt{2\pi\sigma^2_{\xi,y^w}}}\exp\left[-\frac{[\log((y^w_{i,t})^{obs})-\log(\widetilde{y^w}^{sim}_{i,type,t})]^2}{2\sigma^2_{\xi,y^w}}\right]\right] \\
&\times \prod_{t|a_{i,t+1} \text{ is observed}} \left[\frac{1}{\sqrt{2\pi\sigma^2_{\xi,a}}}\exp\left[-\frac{[(a_{i,t+1})^{obs}-\widetilde{a}^{sim}_{i,type,t+1}]^2}{2\sigma^2_{\xi,a}}\right]\right].
\end{aligned}
$$

Appendix D Parameter Estimates

All the parameter estimates are presented below. The number of estimated parameters is 64. Numerical values in parentheses are standard errors.[92] The maximized value for the log likelihood is −4886.575.

D.1 Preference: Time Discount Factor, β, and the Utility Function, $u(\cdot;\mu)$ (16 Parameters)

D.1.1 Time Discount Factor (β)

- (Parameter #1) $\beta = \underset{(0.0061353226)}{0.9755769}$

[92] Standard errors of the parameters that are transformed from the estimated parameters are calculated by the delta method.

D.1.2 CRRA Constant (μ_0)

- (#2) $\mu_{00} = \underset{(0.0002139242)}{0.4826716}$
- (#3) $\mu_{01} = \underset{(0.0038772353)}{-0.0125118}$ (dummy for Type 2)

$$\rightarrow \text{(CRRA constant)} \begin{cases} \mu_0(type = 1) = \mu_{00} = 0.4826716 \\ \mu_0(type = 2) = \mu_{00} + \mu_{01} = 0.4701598 \end{cases}$$

D.1.3 Labor Disutility (μ_1 and μ_2)

- (#4) $\mu_{10,s} = \underset{(0.0000680669)}{317.2780}$
- (#5) $\mu_{11,s} = \underset{(0.0002151270)}{17.59601}$
- (#6) $\mu_{12,s} = \underset{(0.8354703000)}{-3.305609}$

$$\rightarrow \begin{cases} \mu_{1,s}(type = 1, \tau_t^s) = \mu_{10,s} + \mu_{12,s} \cdot \tau_t^s = 317.2780 - 3.305609 \cdot \tau_t^s \\ \mu_{1,s}(type = 2, \tau_t^s) = \mu_{10,s} + \mu_{11,s} + \mu_{12,s} \cdot \tau_t^s = 334.87401 - 3.305609 \cdot \tau_t^s \end{cases}$$

- (#7) $\mu_{10,w} = \underset{(0.0024144244)}{164.8727}$
- (#8) $\mu_{11,w} = \underset{(0.0003711260)}{14.99203}$

$$\rightarrow \begin{cases} \mu_{1,w}(type = 1) = \mu_{10,w} = 164.8727 \\ \mu_{1,w}(type = 2) = \mu_{10,w} + \mu_{11,w} = 179.86473 \end{cases}$$

- (#9) $\mu_{10,w,part} = \underset{(0.0000569326)}{0.5377413}$

$$\rightarrow \begin{cases} [\mu_{1,w}(type) + \epsilon_t^{lw}] \cdot [I(l_t^w \text{ is } \textit{full-time}) + \mu_{1,w,part} \cdot I(l_t^w \text{ is } \textit{part-time})] \\ = 0.5377413 \cdot [\mu_{1,w}(type) + \epsilon_t^{lw}] \end{cases}$$

- (#10) $\mu_{20,full} = \underset{(0.0001590083)}{1822.401}$
- (#11) $\mu_{21,full} = \underset{(0.0018489889)}{220.5993}$

$$\rightarrow \begin{cases} \mu_{2,full}(type = 1) = \mu_{20,full} = 1822.401 \\ \mu_{2,full}(type = 2) = \mu_{20,full} + \mu_{21,full} = 2043.0003 \end{cases}$$

- (#12) $\mu_{20,part} = \underset{(0.0494701270)}{1424.098}$
- (#13) $\mu_{21,part} = \underset{(0.0009061550)}{197.5852}$

$$\rightarrow \begin{cases} \mu_{2,part}(type = 1) = \mu_{20,part} = 1424.098 \\ \mu_{2,part}(type = 2) = \mu_{20,part} + \mu_{21,part} = 1621.6832 \end{cases}$$

D.1.4 Benefits from Staying in the Same Mode of Employment (μ_3)

- (#14) $\mu_{40,s\to s} = \underset{(0.0003087667)}{159.9276}$
- (#15) $\mu_{41,s\to s} = \underset{(0.0025971585)}{23.56863}$
- (#16) $\mu_{42,s\to s} = \underset{(0.0098452289)}{9.834752}$

$$\to \begin{cases} \mu_{4,s\to s}(type = 1, \tau_t^s) = \mu_{40,s\to s} + \mu_{42,s\to s} \cdot \tau_t^s = 159.9276 - 9.834752 \cdot \tau_t^s \\ \mu_{4,s\to s}(type = 2, \tau_t^s) = \mu_{40,s\to s} + \mu_{41,s\to s} + \mu_{42,s\to s} \cdot \tau_t^s = 183.49623 - 9.834752 \cdot \tau_t^s \end{cases}$$

D.2 Lower Bound for Net Worth, $\underline{a}(\cdot;\zeta)$, and the Consumption Floor, $c_{\min}$ (8 Parameters)

D.2.1 Lower Bound for Net Worth ($\underline{a}(\cdot;\zeta)$)

- (#17) $\zeta_0 = \underset{(0.0008765895)}{9.256721}$ (constant term)
- (#18) $\zeta_1 = \underset{(0.0002339659)}{-0.001713}$ (dummy for the college-educated)
- (#19) $\zeta_2 = \underset{(0.0002433008)}{0.353281}$ (dummy for experience of self-employment)
- (#20) $\varsigma_3 = \underset{(0.0006186087)}{0.060926}$ (accumulated years of paid-employment)
- (#21) $\zeta_4 = \underset{(0.0000981532)}{-0.358549}$ (accumulated years of paid-employment squared, divided by 100)
- (#22) $\zeta_5 = \underset{(0.0009014859)}{-0.029473}$ (age)
- (#23) $\zeta_6 = \underset{(0.0003437550)}{0.205846}$ (age squared, divided by 100)

D.2.2 Consumption Floor ($c_{\min}$)

- (#24) $c_{\min} = \underset{(0.0003918820)}{129.3269}$

D.3 Human Capital, $\overline{\Psi}^m(\cdot;\gamma^m)$, $m = w, s$, and the Rental Price for Part-time Paid-Employment, R^p (17 Parameters)

D.3.1 Paid-Employment ($\overline{\Psi}^w(\cdot;\gamma^w)$)

- (#25) $\gamma_0^w = \underset{(0.0000893260)}{2.311925}$ (constant term)
- (#26) $\gamma_1^w = \underset{(0.0004235156)}{0.240281}$ (dummy for the college-educated)
- (#27) $\gamma_2^w = \underset{(0.0001987118)}{0.006273}$ (dummy for Type 2)

- (#28) $\gamma_3^w = \underset{(0.0005028620)}{0.086725}$ (accumulated years of paid-employment)
- (#29) $\gamma_4^w = \underset{(0.0010253931)}{-0.272293}$ (accumulated years of paid-employment squared, divided by 100)
- (#30) $\gamma_5^w = \underset{(0.0000324085)}{-0.003291}$ (dummy for experience of self-employment))
- (#31) $\gamma_6^w = \underset{(0.0013710919)}{0.007934}$ (age)

D.3.2 Rental Price for Part-time Paid-Employment (R^p)

- (#32) $R^p = \underset{(0.0002607080)}{1.1647760}$

D.3.3 Self-Employment ($\overline{\Psi}^s(\cdot;\gamma^s)$)

- (#33) $\gamma_0^s = \underset{(0.0021833163)}{2.444152}$ (constant term)
- (#34) $\gamma_1^s = \underset{(0.0004054129)}{0.280044}$ (dummy for the college-educated)
- (#35) $\gamma_2^s = \underset{(0.0000675430)}{0.008961}$ (dummy for Type 2)
- (#36) $\gamma_3^s = \underset{(0.0001483043)}{0.008406}$ (dummy for experience of self-employment)
- (#37) $\gamma_4^s = \underset{(0.0017562581)}{0.096725}$ (accumulated years of self-employment in a row)
- (#38) $\gamma_5^s = \underset{(0.0012691955)}{-0.170103}$ (accumulated years of self-employment in a row squared, divided by 100)
- (#39) $\gamma_6^s = \underset{(0.0291003160)}{0.028571}$ (accumulated years of paid-employment)
- (#40) $\gamma_7^s = \underset{(0.0040131691)}{-0.110880}$ (accumulated years of paid-employment squared, divided by 100)
- (#41) $\gamma_8^s = \underset{(0.0000230824)}{0.0655306}$ (age)

D.4 Entrepreneurial Production Function, $f(\cdot;\alpha)$ (2 Parameters)

- (#42) $\alpha_0 = \underset{(0.0007083222)}{0.1744350}$ (capital returns)
- (#43) $\alpha_1 = \underset{(0.0000490642)}{-0.0123996}$ (dummy for the college-educated)

$$\rightarrow \text{(capital returns)}\begin{cases} \alpha(educ = \textit{non-college}) = \widehat{\alpha_0} = 0.1744350 \\ \alpha(educ = \textit{college}) = \widehat{\alpha_0} + \widehat{\alpha_1} = 0.1620354 \end{cases}$$

D.5 Type Proportions, $\Pr(\cdot;\eta)$ (4 Parameters)

- (#44) $\eta_{0,2} = \underset{(0.0022314987)}{-0.8543712}$ (constant term)
- (#45) $\eta_{1,2} = \underset{(0.0000527258)}{0.4519807}$ (dummy for the college-educated)
- (#46) $\eta_{2,2} = \underset{(0.0443405550)}{0.0000025}$ (net worth)
- (#47) $\eta_{3,2} = \underset{(0.0000398636)}{0.6448548}$ (dummy for age when started working being greater than or equal to 23)

$$\rightarrow \begin{cases} \Pr(type = 1) = 0.3658664 \\ \Pr(type = 2) = 0.6341336 \end{cases}$$

D.6 Variances and the Covariances of the Period-by-Period Disturbance, $\sigma^2_{\epsilon,\cdot}$ (6 Parameters)

- (#48) $\sigma_{\epsilon,ls} = \underset{(0.0002412930)}{136.69850}$ (disutility from self-employed work)
- (#49) $\sigma_{\epsilon,lw} = \underset{(0.0128387660)}{47.039350}$ (disutility from paid-employed work)
- (#50) $\sigma_{\epsilon,(ls,lw)} = \underset{(0.3296192000)}{2.6065150}$ (disutility correlation between self- and paid-employed)
- (#51) $\sigma_{\epsilon,ys} = \underset{(0.0000738572)}{0.6260160}$ (income from self-employed work)
- (#52) $\sigma_{\epsilon,yw} = \underset{(0.0001690397)}{0.2127060}$ (income from paid-employed work)
- (#53) $\sigma_{\epsilon,(ys,yw)} = \underset{(0.0013701618)}{0.0823533}$ (income correlation between self- and paid-employed)

D.7 Quasi-Terminal *Emax* Function, $Emax_{T^*}(\cdot;\kappa_{T^*})$ (5 Parameters)

- (#54) $\kappa_{T^*,1} = \underset{(0.0920327680)}{0.0218159}$ (net worth)
- (#55) $\kappa_{T^*,2} = \underset{(0.0000859060)}{-0.0004184}$ (net worth squared, divided by 10000)
- (#56) $\kappa_{T^*,3} = \underset{(0.0001891246)}{13662.890}$ (dummy for college-educated)
- (#57) $\kappa_{T^*,4} = \underset{(0.0021382151)}{4946.5890}$ (dummy for experience of self-employment)
- (#58) $\kappa_{T^*,5} = \underset{(0.0000701953)}{306.77500}$ (accumulated years of paid-employment)

D.8 Measurement Error (6 Parameters)

- (#59) $E_0^s = \underset{(0.0003832295)}{2.0010930}$ (whether self-employed or not)
- (#60) $E_0^w = \underset{(0.0003898737)}{2.8493010}$ (whether paid-employed or not)
- (#61) $\sigma_{\xi,a,0} = \underset{(0.0015494599)}{0.9165500}$ (net worth)
- (#62) $\sigma_{\xi,a,1} = \underset{(0.0011238761)}{0.8819036}$ (coefficient for the absolute value of net worth)
- (#63) $\sigma_{\xi,y^s} = \underset{(0.0063716951)}{28.736100}$ (income from self-employment)
- (#64) $\sigma_{\xi,y^w} = \underset{(0.0077598407)}{26.189700}$ (income from paid-employment)

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2009.6.26 （統計研究会） 未定稿

なぜ年齢別所得格差の拡大は観察されないのか？*

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第1節　はじめに

日本における所得格差は趨勢的に拡大傾向にあるが、世帯主年齢別の所得格差の拡大は見られないことが知られている。そして、世帯主年齢が高くなるほど年齢別の所得格差は大きくなり、近年の人口高齢化により所得格差の大きい年齢層が人口に占める割合が高くなることにより総世帯で見た所得格差は拡大しているとされる。すなわち、日本における所得格差の拡大は年齢構造の変化が引き起こしたものであるとされる(大竹　2005 ほか)。実際に、図 1 にあるように、世帯主年齢でみた 30 歳代から 50 歳代にかけての所得格差は 1994 年から 2004 年にかけて広がっていないと言える。

しかしながら、近年の所得格差の拡大が高齢化によるものであるという議論に対して、2 点の疑問が投げかけられている。1 点目は、所得格差の拡大には、人口高齢化だけではなく、世帯構造の変化などの要因も存在するというものである。舟岡(2001)は、世帯所得の不平等化に親と子の同居率の低下が影響していることを指摘している。また、茂木(1999)は、世帯人員数の変化による世帯所得の不平等に対する影響を検討している。

2 点目は、世帯主年齢別にみた所得格差の拡大は観察されないが、世帯主の収入の格差拡大が観察される一方、配偶者と他の世帯員の収入により世帯単位の所得格差の拡大が相殺されることで世帯所得での所得格差が現れないのではないかという指摘である(四方 2009)。

そこで、本研究では年齢階層内の所得格差自体が、親と子の同居などの変化や配偶関係の変化といった家族の変化に影響を受けていないか、また、世帯員の所得源泉は総世帯所得にどのように影響を与えているかについての検討を行う。

第2節　分析手法

本稿では、2 つの分析手法による格差の分解を行う。1 つは、全体集団の格差を部分集団の格差と部分集団の構成割合に分解する方法であり、もう 1 つは、世帯所得の格差を所得源泉により分解する方法である。前者の方法を用いた近年の研究として、大竹・斉藤(1999)、舟岡(2001)、茂木(1999)、大竹(2005)、小塩(2006)などの研究がある。これらの研究では、世帯主年齢、世帯人員数などの世帯属性により所得格差の寄与度分解を行い、所得格差の小さい若年層の構成比が低下し、格差の大きい高齢層の構成割合が上昇したことにより近年の所得格差の拡大が生じていることなどが明らかにされてきた。

後者の所得源泉別の寄与度分解の先行研究として跡田・橘木(1985)、松浦(1993)などの研究があり、世帯所得を世帯主の収入、他の世帯員の収入、社会保障給付や財産所得などさまざまな所得源泉により要因分解が行われてきた。

本稿では、2 時点間の格差の変化分についての寄与度分解を行う。全体集団の格差を部分集団の格差と部分集団の構成割合に分解する方法は、対数標準偏差による格差指標を用い、

世帯所得の格差を所得源泉により分解する方法では、平方変動係数による寄与度分解を行う。それぞれ、Jenkins(1995)の手法を用いており、以下で説明を行う。

まず、yi を第 i 世帯の総所得、μ をその平均値とする。そして、第 i 世帯の第 f 要素所得を y_{fi} とする。したがって、$\Sigma_f y_{fi} = yi$ となる。そして、n が全人口であり、第 k グループの人口を n_k とすし、その他以下のように定義する。

$\sigma^2{}_f$: 第f要素の分散

κ_f : 第f要素の平均

$\chi_f \equiv \kappa_f / \mu$, 第f要素のシェア

C_f : 第f要素と総所得の共分散

ρ_f : 第f要素と総所得の相関係数

$v_k \equiv n_k / n$: 第kグループの割合

$\lambda_k \equiv \mu_k / \mu$: 第kグループの所得の全体の平均との相対所得

$\theta_k \equiv v_k \lambda_k$: 第kグループの合計所得の合計総所得に占めるシェア

ここで平均対数偏差は(MLD)は、

$$(1) \qquad I_0 = (1/n)\Sigma_i \log(\mu / y_i),$$

と定義することができる。

次に、変動係数の 2 分の 1 は、

$$(2) \qquad I_2 = (1/n)\Sigma_i[(y_i/\mu)^2 - 1]/2 = \sigma^2/2\mu^2.$$

となる。

そして、(1)と(2)は、以下のように書き換えることができる。

$$(3) \qquad I_0 = \Sigma_k v_k I_{0k} \qquad + \Sigma_k v_k \log(1/\lambda_k)$$

$$(4) \qquad I_2 = \Sigma_k v_k (\lambda_k)^2 I_{2k} + \Sigma_k v_k [(\lambda_k)^2 - 1].$$

(3)と(4)は、グループ内格差とグループ間格差による格差指標の分解である。そして、I_0 について、時点 t と t+1 の間での階差とをΔI_0すると(5)式が得られる。

$$(5) \qquad \Delta I_0 \equiv I_0(t+1) - I_0(t) = \Sigma_k \bar{v}_k \Delta I_{0k} + \Sigma_k \bar{I}_{0k} \Delta v_k - \Sigma_k [\overline{\log(\lambda_k)}] \Delta v_k - \Sigma_k \bar{v}_k \Delta \log(\lambda_k)$$

$$\approx \underbrace{\Sigma_k \bar{v}_k \Delta I_{0k}}_{[\text{term } A]} + \underbrace{\Sigma_k \bar{I}_{0k} \Delta v_k}_{[\text{term } B]} + \underbrace{\Sigma_k [\bar{\lambda}_k - \overline{\log(\lambda_k)}] \Delta v_k}_{[\text{term } C]} + \underbrace{\Sigma_k (\bar{\theta}_k - \bar{v}_k) \Delta \log(\mu_k)}_{[\text{term } D]},$$

(5)は、ΔI_0 を、各グループ内での格差の寄与度(term A)と、各グループのシェアの変化分(term B と term C)および、各グループの相対所得の変化分(term D)に寄与度分解したも

のである。なお、$\overline{v_k}=(v_{kt}+v_{kt+1})/2$とする。

次に、各所得源泉による格差指標の寄与度分解については、まず、任意の格差指標Iについて、以下の式が成立するとする。

(6) $$I=\Sigma_f S_f,$$

S_f は、第f所得要素に対応した格差指標である。そして、

(7) $$s_f \equiv S_f/I,$$

とおくと、$\Sigma s_f=1$ となる。すなわち、S_f は、格差指標に対する第f所得源泉の寄与度となり、s_f は「分解のルール」となる。そして、

(8) $$s_f=C_f/\sigma^2=\rho_f\sigma_f/\sigma.$$

の関係が成立し、I_2の定義から、

(9) $$S_f=s_f I_2=\rho_f\chi_f\sqrt{(I_2 I_{2f})}$$

となり、I_2の2時点間の変化分は、

(10) $$\Delta I_2\equiv I_2(t+1)-I_2(t)=\Sigma_f\Delta S_f=\Sigma_f\Delta[\rho_f\chi_f\sqrt{(I_2 I_{2f})}].$$

とおくことができる。そして、変化分に対する各要素所得の寄与度を

(11) $$\%\Delta I_2\equiv\Delta I_2/I_2(t)=\Sigma_f s_f\%\Delta S_f.$$

と表記することで、格差指標の解釈が容易となる。

次に本稿の使用データは、総務省統計局『全国消費実態調査』(1994年、1999年、2004年)のリサンプリングデータの個票データである。本研究での所得の定義は以下のものとなる。

総所得＝勤労収入(勤め先からの年間収入)
＋自営収入(農林漁業収入＋農林漁業以外の事業収入＋内職などの年間収入)
＋その他収入(公的年金・恩給＋親族などからの仕送り金＋家賃・地代の年間収入
＋利子・配当金＋企業年金・個人年金受取金＋その他の年間収入)

であり、税社会保険料は引かれる前の収入に公的年金を加えた総所得である。

そして、この総所得を世帯人員数の平方根で除した等価所得を用いて分析を行う。これは吹く数人で暮らすのに必要な所得は 1 人で暮らすのに必要な所得より、共通経費などがあるので少なくて済むという規模の経済を考慮した指標であり、その世帯で各世帯員が享受する経済的厚生と解釈することができる。この場合、世帯所得が世帯員間で平等に分配されている、という暗黙の仮定が置かれている。また、等価所得を用いることで、世帯の変化の影響についての分析を行うことができる。等価所得を用いない分析では、世帯の分

離が生じるとそれだけで所得格差の拡大が生じる。

『全国消費実態調査』は世帯単位でサンプリングされたデータであるが、等価所得により個人単位のデータに変換するため、所得源泉による世帯所得の寄与度分解では世帯単位のウェイトに世帯人員数を乗じたウェイトを用いて分析を行っている（個人単位のウェイト）。

そして、総所得の上位1%ポイントのサンプルについてはトップコーディングを行い、サンプルから落としている。また、総収入がゼロとなるサンプルも分析に使用したデータから除いている。なお、世帯類型・就業状態による寄与度分解の分析においては、学生が除かれている[1]。

第3節　各集団（グループ）による所得格差の寄与度分解

年齢別にみた所得格差

図表 2 は、個人の年齢別にみた所得格差の動向である。所得格差の指標としては、Gini係数および MLD を用いている。両指標において、1994 年の時点においてすでに 20－29歳において、30－39 歳および 40－49 歳より所得格差が大きくなっている。この点は、図 1でみた世帯主年齢別所得格差と異なっている。世帯主以外の 20－29 歳の個人を含んだ所得格差においては、2004 年以前から 20－29 歳の所得格差が大きいことがわかる。次に、1994年から 2004 年における所得格差の変化については、30 歳代において所得格差の拡大がみてとれる一方で、70 歳代については 94 年から 99 年にかけて大幅な所得格差の縮小が観察される。その他の年齢階層については、所得格差の変化は小さいといえる。

では、年齢計での所得格差の変化分についての寄与度分解を行ったのが図表 3 である。ここからは、1994年から1999年および1999年から2004年にかけてのMLDの変化分を、年齢グループ内格差の変化(A)、年齢グループのシェアの変化(B と C)、年齢グループの相対所得の変化(D)に寄与度分解したものである(それぞれ%ポイントポイント表記)。1994 年から 1999 年にかけては、年齢グループ内の格差による寄与は観察されず、年齢グループのシェアの変化によってのみ所得格差の拡大が引き起こされていることがわかる。そして、1999 年から 2004 年にかけては、シェアの変化分により格差が引き起こされていると同時に、年齢グループ内での格差の変化も全体での格差を拡大させていることがわかる。

次に、男女別に年齢別所得格差の動向をみたのが図表 4 である。男性において 30 歳代から 50 歳代にかけての年齢層で、所得格差が拡大していることがわかる。女性においては 30歳代と 40 歳代では男性と同様の動きをしているが、50 歳代では所得格差が拡大傾向にあるとはいえない。これは、配偶者が 60 歳代となる女性の影響によると思われる。

以下では、男女別に各年齢階層の所得格差が、家族の変化と就業状態の変化にどのよう

[1] もともと『全国消費実態調査』においては、単身の学生世帯は含まれていない。そして、本研究の個人単位の分析では、親と同居している 20 歳以上の学生は除かれている。