HOMEWORK 2

Professor: Carter Braxton
Zachary Orlando and Cutberto Frias Sarraf
April 8, 2025

1 Part 1: Data

1.1 Earnings gains while employed

We want to estimate the average change in earnings for individuals who have been working full-time in two consecutive years using PSID data. First, we imposed the following sample selection criteria on the PSID dataset:

1. We drop all individuals from the SEO oversample.
2. We consider only observations of individuals who are aged between 25 and 55.
3. Observations must be between years 1978 and 1997 of the PSID.

A full-time job in the U.S. requires 40 hours per week. Over the course of a full year (52 weeks) we obtain that the amount of working hours should be 2,080. Now if we consider vacations and holidays we could set a lower bound of 1,850 hours. We use this as a threshold to determine if a worker is working full-time in some year. Table 1 shows the mean and standard deviation of the change in labor earnings between two consecutive years for full-time workers.

Table 1: Summary Statistics: Change in Labor Earnings

	Value
Average	1,511.28
Standard Deviation	20,457.26

1.2 Earnings losses while unemployed

In Table 3 we report the coefficient estimates from estimating the following distributed lag specification.

$$Y_{i,t} = \alpha_i + \gamma_t + \sum_{k=-5}^{5} \beta_k D_{i,k} + \epsilon_{i,t} \tag{1}$$

The dummy variable associated with $D_{i,-1}$ is dropped from the specification. Notice that the coefficients associated with years are increasing by a number close to 1000 as we should expect. Further, notice that the estimates of the coefficients associated with D_{ik} are statistically not different from zero for years $t \in \{-5, -4, -3, -2\}$. However, we can reject the null hypothesis that the coefficients β_k associated to the dummy variables D_i, k for $k = 0, 1, 2, 3, 4, 5$ are equal to β_{-1}. In particular, we observe that β_k for $k = 0, 1, 2, 3, 4, 5$ is close to the $-10,000$ we would expected.

Table 2: Fixed Effects Regression Summary Statistics

Statistic	**Value**
Number of observations	11,000
Number of groups (individuals)	1,000
R-squared (within)	0.9515
R-squared (between)	0.8156
R-squared (overall)	0.0282

Variable	**Estimate**	**Std. Error**	**t-stat**	**Pr(>|t|)**	**Lower 95%**	**Upper 95%**
Year: -5	-3967.868	43.57955	-91.05	< 0.0001	-4053.386	-3882.35
Year: -4	-2945.606	38.37642	-76.76	<0.0001	-3020.914	-2870.298
Year: -3	-1967.264	30.68679	-64.11	<0.0001	-2027.482	-1907.046
Year: -2	-985.5263	21.64132	-45.54	<0.0001	-1027.994	-943.0586
Year: 0	990.3151	22.13075	44.75	<0.0001	946.887	1033.743
Year: 1	1963.04	29.71449	66.06	<0.0001	1904.73	2021.35
Year: 2	2935.907	37.29823	78.71	<0.0001	2862.715	3009.098
Year: 3	3874.615	44.25289	87.56	<0.0001	3787.776	3961.453
Year: 4	4864.696	49.13617	99.00	<0.0001	4768.274	4961.118
Year: 5	5851.452	54.17839	108.00	<0.0001	5745.136	5957.769
JL & Year: -5	-9.185664	62.97082	-0.15	0.884	-132.7559	114.3846
JL & Year: -4	-43.48981	55.7297	-0.78	0.435	-152.8505	65.8709
JL & Year: -3	24.57907	45.11868	0.54	0.586	-63.95919	113.1173
JL & Year: -2	17.692	31.11057	0.57	0.570	-43.35737	78.74136
JL & Year: 0	-10025.85	30.42379	-329.54	<0.0001	-10085.56	-9966.152
JL & Year: 1	-10002.07	42.20636	-236.98	<0.0001	-10084.89	-9919.245
JL & Year: 2	-9941.054	53.15655	-187.01	<0.0001	-10045.45	-9836.722
JL & Year: 3	-9894.838	63.19467	-156.52	<0.0001	-10018.45	-9771.222
JL & Year: 4	-9902.49	69.88432	-141.70	<0.0001	-10039.63	-9765.353
JL & Year: 5	-9907.042	75.82839	-130.65	<0.0001	-10055.84	-9758.24
Constant	33971.08	15.7077	2162.70	<0.0001	33940.26	34001.9

Figure 1: **Earnings Loss**

2 Part 2: Model

To solve the model we pick $\psi_u = 0.50$ and $\psi_e = 0.05$. The following figures show the search policy functions, reservation wage, value function in unemployment and value function in employment for different selected ages, and conditioning also on median wage for the value function in employment.

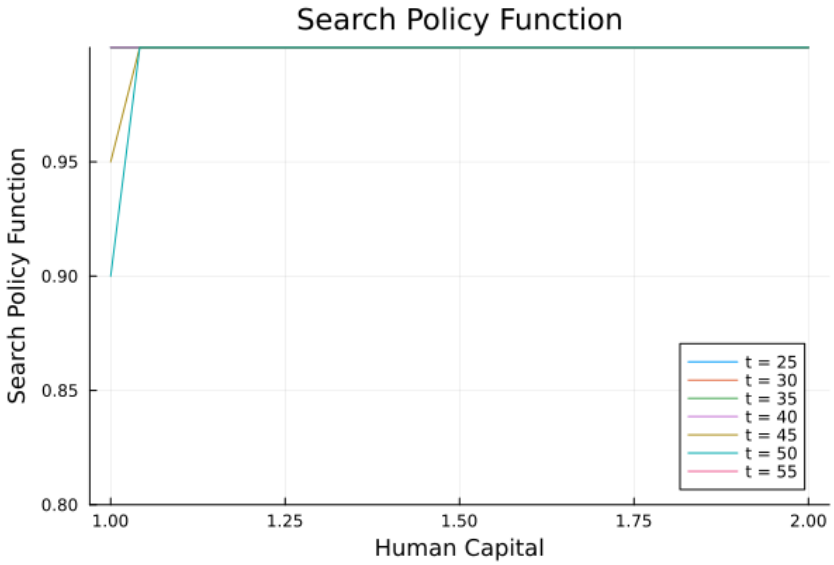

Figure 2: **Search Policy Function**

Figure 3: **Reservation Wage**

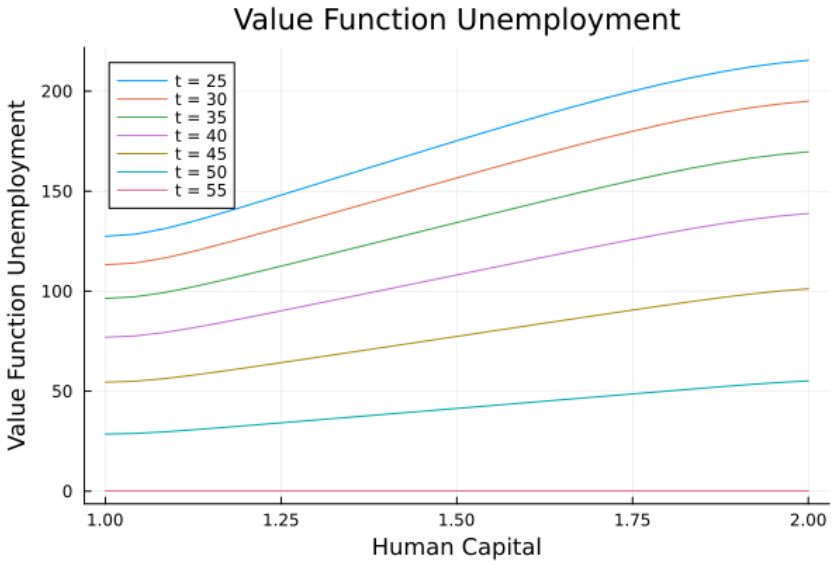

Figure 4: **Value Function Unemployment**

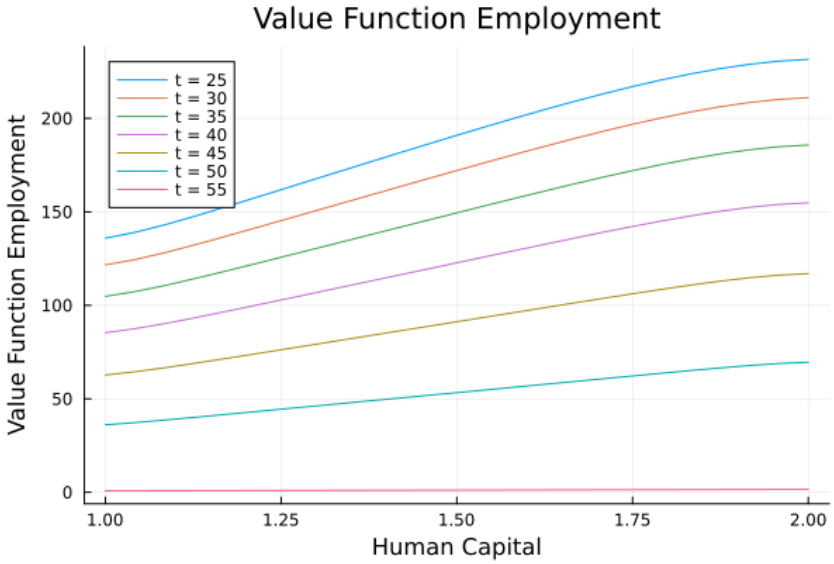

Figure 5: **Value Function Employment**

Figure 6 shows the distribution of human capital among the employed and unemployed using the observations from the simulation. Since search intensity is quite high, and the probability of being laid off is relatively low it seems reasonable to observe more individuals in employment. Also, since human capital accumulates slowly due to $\psi_e = 0.05$, and drop fast due to $\psi_u = 0.50$, then it is not surprising to observe that the distribution of human capital is not highly concentrated in some values.

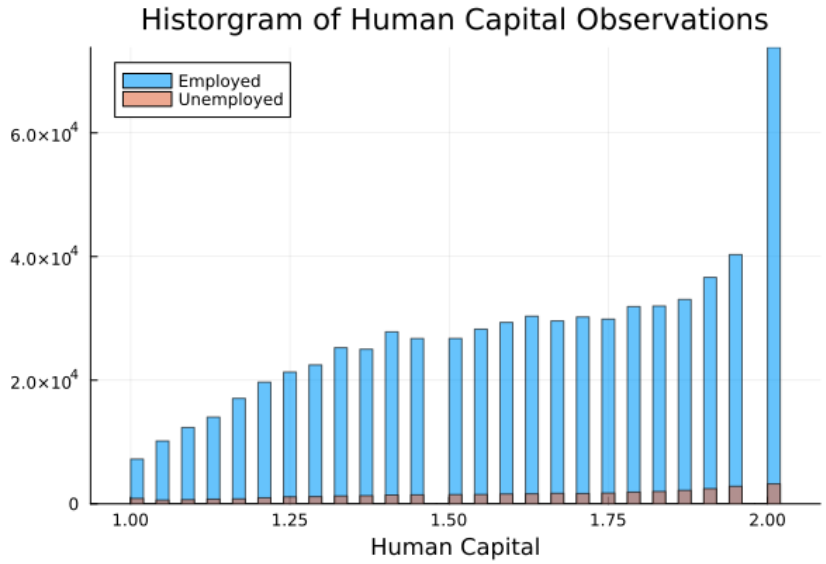

Figure 6: **Histogram of Human Capital**

We identify all 24-month employment spells for individuals in our simulations and calculate the sum of monthly income for the first 12 months and the sum for the last 12 months. Then we compute the difference between the income in the second year and the first, which we refer to as the income change. Table 4 shows the mean and standard deviation of the income change. Notice that higher ψ_e implies higher mean income changes on average for the employed.

ψ_u **and** ψ_e	**Mean Income Change**	**Standard Deviation of Income Change**
$\psi_u = 0.50$, $\psi_e = 0.05$	0.1421	0.1673
$\psi_u = 0.50$, $\psi_e = 0.20$	0.1750	0.3035

Table 4: Summary of Income Change Statistics

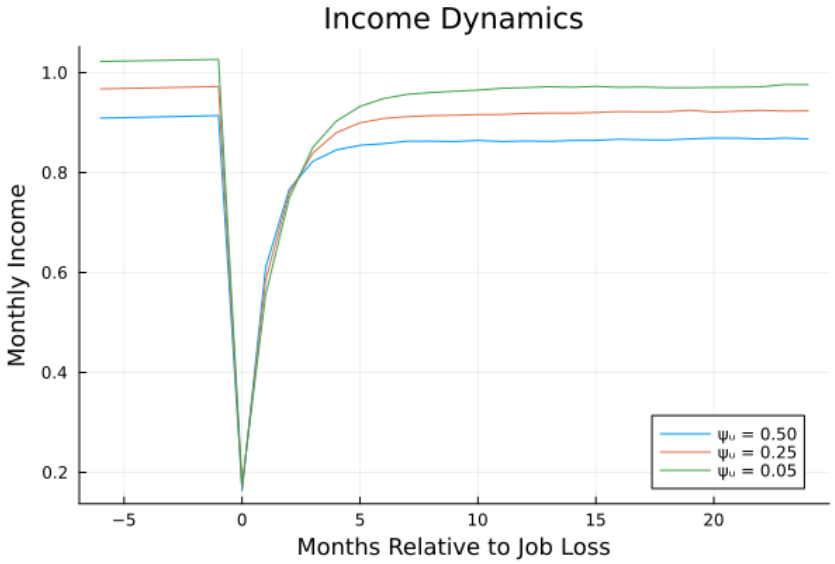

Figure 7: **Income Dynamics**

Figure 7 shows the average path of earnings from 6 months before to 2 years after an unemployment spells for different values of ψ_u. Income is 5.30% lower after 2 years with $\psi_u = 0.50$. The fall in income is higher on the layoff year and earnings recover faster than those of Davis and Von Wachter (2011) and

Jarosch (2023).

References

Steven J Davis and Till M Von Wachter. Recessions and the cost of job loss. Technical report, National Bureau of Economic Research, 2011.

Gregor Jarosch. Searching for job security and the consequences of job loss. *Econometrica*, 91(3):903–942, 2023.