Growth and Development Economics

Homework 2

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1 Praying for Rain: The Welfare Cost of Seasons

1.1 Question 1-(a)

Table 1
Welfare gains of removing the seasonal component, $\eta = 1$

degree of seasonality	middle	high	low
average welfare gain	0.0085	0.0437	0.0020

1.2 Question 1-(b)

Table 2
Welfare gains of removing the nonseasonal consumption risk, $\eta = 1$

degree of seasonality	middle	high	low
average welfare gain	0.1088	0.1088	0.1088
standard deviation	0.0799	0.0799	0.0799

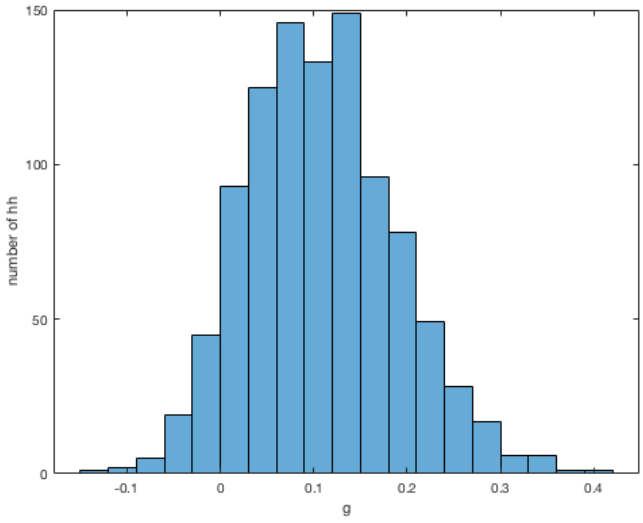

Figure 1: Distribution of welfare gains of removing nonseasonal consumption risk, $\eta = 1$

1.3 Question 1-(c)

Comparing results in (a) and (b), we could draw conclusions below:

- When removing seasonal components, all households get the same welfare gain. The reason is that seasonality affects every household to the same extent.
- Households will get higher welfare gain from removing higher degree of seasonality. This is because people suffer from seasonality. Higher the seasonality is, more loss there will be.
- When removing nonseasonal consumption risk, households get different welfare gain because of random draw for the risk.
- Households get same average welfare gains from removing nonseasonal consumption risk, although there are different degrees of seasonality. Because the only source from welfare gain here is removing of risk, which is independent with seasonality.

1.4 Question 1-(d)

Redo for $\eta = \{2, 4\}$

Table 3
Welfare gains of removing the seasonal component, $\eta = \{2, 4\}$

degree of seasonality	middle	high	low
average welfare gain($\eta = 2$)	0.0184	0.1115	0.0041
average welfare gain($\eta = 4$)	0.0425	0.3465	0.0087

Table 4
Welfare gains of removing the nonseasonal consumption risk, $\eta = \{2, 4\}$

degree of seasonality	middle	high	low
average welfare gain($\eta = 2$)	0.2227	0.2227	0.2227
average welfare gain($\eta = 4$)	0.4771	0.4771	0.4771
standard deviation($\eta = 2$)	0.0919	0.0919	0.0919
standard deviation($\eta = 4$)	0.1598	0.1598	0.1598

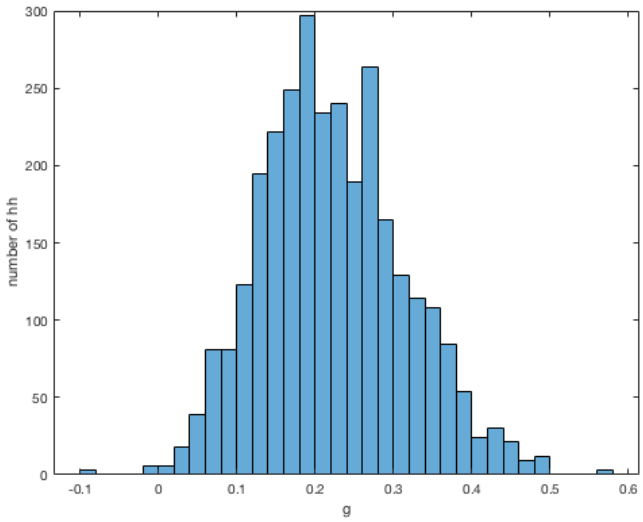

Figure 2: Distribution of welfare gains of removing nonseasonal consumption risk, $\eta = 2$

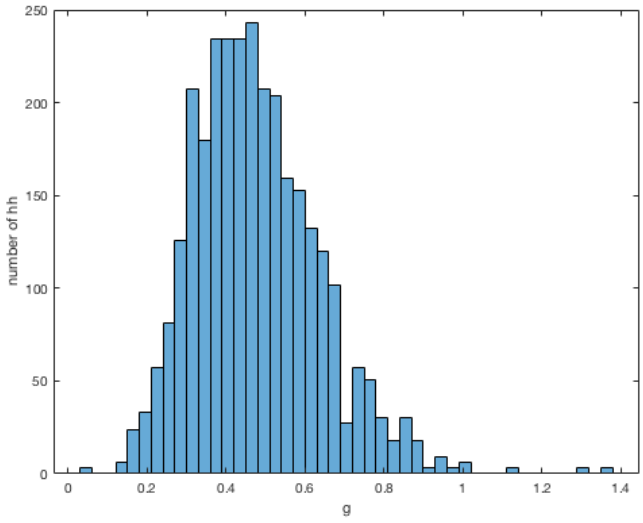

Figure 3: Distribution of welfare gains of removing nonseasonal consumption risk, $\eta = 4$

With larger η, households will get higher welfare gains by removing either seasonality or nonseasonal consumption risk. The reason is that, from the utility function we know households are more risk adverse with larger η. Hence when removing uncertainty for larger η, households will get higher gains.

1.5 Question 2-(a)

Table 5
Welfare gains of removing the seasonal component, $\eta = 1$

degree of seasonality	middle	high	low
average welfare gain	0.0840	0.1351	0.0601

1.6 Question 2-(b)

Table 6
Welfare gains of removing the nonseasonal consumption risk, $\eta = 1$

degree of seasonality	middle	high	low
average welfare gain	0.1088	0.1088	0.1088
standard deviation	0.0799	0.0799	0.0799

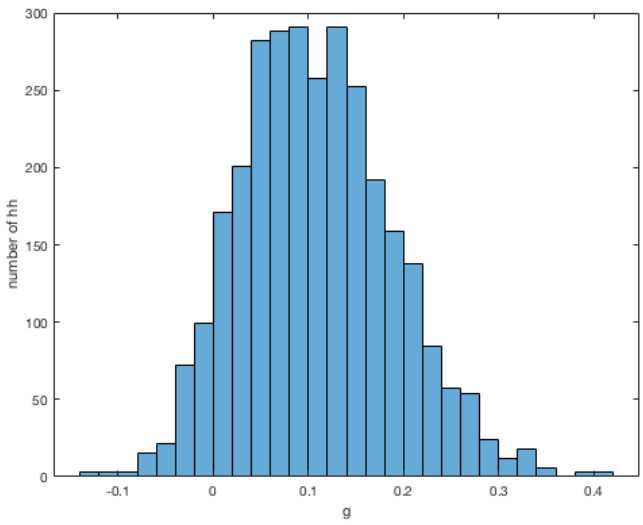

Figure 4: Distribution of welfare gains of removing nonseasonal consumption risk, $\eta = 1$

1.7 Question 2-(c)

Comparing results in (a) and (b), we could draw conclusions below:

- When removing seasonal components, all households get the same welfare gain. The reason is that seasonality affects every household to the same extent.

- Households will get higher welfare gain from removing higher degree of seasonality. This is because people suffer from seasonality. Higher the seasonality is, more loss there will be.
- When removing nonseasonal consumption risk, households get different welfare gain because of random draw for the risk.
- Households get same average welfare gains from removing nonseasonal consumption risk, although there are different degrees of seasonality. Because the only source from welfare gain here is removing of risk, which is independent with seasonality.

1.8 Question 2-(d)

Redo for $\eta = \{2, 4\}$

Table 7
Welfare gains of removing the seasonal component, $\eta = \{2, 4\}$

degree of seasonality	middle	high	low
average welfare gain($\eta = 2$)	0.2273	0.3650	0.1065
average welfare gain($\eta = 4$)	0.6141	0.7503	0.2038

Table 8
Welfare gains of removing the nonseasonal consumption risk, $\eta = \{2, 4\}$

degree of seasonality	middle	high	low
average welfare gain($\eta = 2$)	0.2227	0.2227	0.2227
average welfare gain($\eta = 4$)	0.4771	0.4771	0.4771
standard deviation($\eta = 2$)	0.0919	0.0919	0.0919
standard deviation($\eta = 4$)	0.1598	0.1598	0.1598

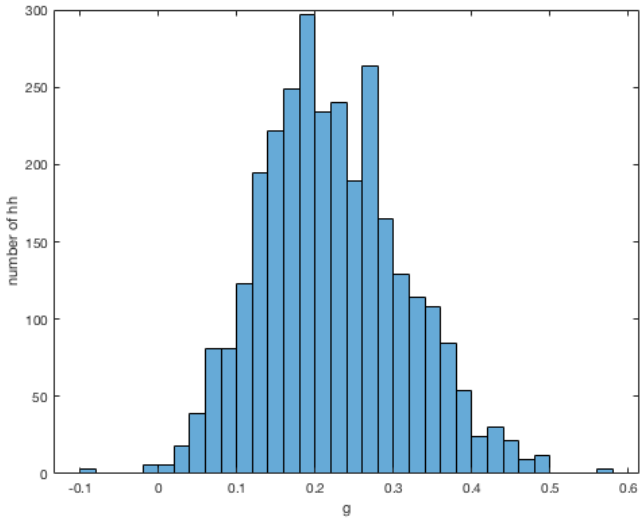

Figure 5: Distribution of welfare gains of removing nonseasonal consumption risk, $\eta = 2$

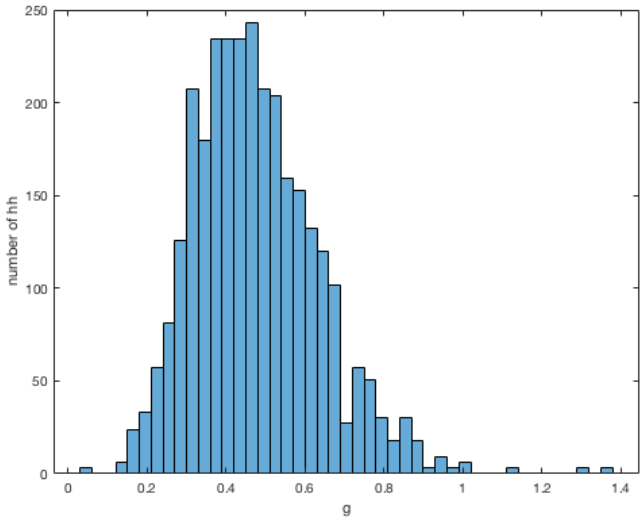

Figure 6: Distribution of welfare gains of removing nonseasonal consumption risk, $\eta = 4$

With larger η, households will get higher welfare gains by removing either seasonality or nonseasonal consumption risk. The reason is that, from the utility function we know households are more risk adverse with larger η. Hence when removing uncertainty for larger η, households will get higher gains.

2 Adding Seasonal Labor Supply

2.1 Question (a) highly positively correlated

Table 9
Welfare gains of removing the seasonal component

degree of seasonality	middle	high	low
effects of consumption	0.0840	0.1351	0.0601
effects of leisure	0.0009	0.0067	0.0002

2.2 Question (b) highly negatively correlated

Table 10
Welfare gains of removing the seasonal component

degree of seasonality	middle	high	low
effects of consumption	0.0840	0.1351	0.0601
effects of leisure	0.0009	0.0067	0.0002

2.3 Question (c)

From results in (a) and (b), we see welfare gains are almost the same no matter the correlation is highly positive or negative. Hence we could draw the conclusion that consumption and labor affect welfare gains independently, which is also suggested by the function of utility(consumption and labor are separable).
Therefore, when the nonseasonal stochastic component of consumption and leisure are correlated, we could expect similar results as above.