

Development Economics

Homework 2

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Q1 Welfare gains by seasonality level

1.1 Only deterministic seasonality

a. In table 1 we see the welfare gains of removing the seasonal component. These gains are the same for all individuals, since they get rid of a risk that affected all of the equally, and this effects are positive because agents are risk averse. Note also that the gains increase with the degree of seasonality.

b. When we remove the non-seasonal consumption risk (table 2), welfare gains are different across individuals but equal across seasonality levels. The fact that some negative values appear in a small fraction of the population reflects that this risk can also have positive consequences for some if they get a good enough succession of shocks.

c. Most agents experience much higher gains from removing the non-seasonal risk than the seasonal one, thing that suggests the main source of losses in welfare is pure consumption risk. However, seasonality amplifies this effect, as seen in table 3, although not by much.

d. When agents are more risk averse they suffer more from risk and, thus, they get much higher gains from removing seasonal and consumption risk, as seen in tables 4-6 and 7-9. When risk aversion is very high, seasonality can play a very important role amplifying the effect of consumption risk, even doubling it in some cases.

$$\eta = 1$$

Table 1: Seasonal component

	Mean	Median	5%	20%	40%	60%	80%	95%
Low	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
Middle	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008
High	0.044	0.044	0.044	0.044	0.044	0.044	0.044	0.044

Table 2: Risk component

	Mean	Median	5%	20%	40%	60%	80%	95%
Low	0.111	0.107	-0.013	0.046	0.086	0.127	0.174	0.249
Middle	0.111	0.107	-0.013	0.046	0.086	0.127	0.174	0.249
High	0.111	0.107	-0.013	0.046	0.086	0.127	0.174	0.249

Table 3: Both seasons and risk

	Mean	Median	5%	20%	40%	60%	80%	95%
Low	0.113	0.109	-0.011	0.048	0.088	0.129	0.177	0.251
Middle	0.120	0.116	-0.005	0.054	0.095	0.136	0.184	0.259
High	0.159	0.155	0.030	0.091	0.133	0.176	0.225	0.303

$$\eta = 2$$

Table 4: Seasonality component

	Mean	Median	5%	20%	40%	60%	80%	95%
Low	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004
Middle	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
High	0.111	0.111	0.111	0.111	0.111	0.111	0.111	0.111

Table 5: Risk component

	Mean	Median	5%	20%	40%	60%	80%	95%
Low	0.224	0.218	0.083	0.148	0.198	0.241	0.301	0.384
Middle	0.224	0.218	0.083	0.148	0.198	0.241	0.301	0.384
High	0.224	0.218	0.083	0.148	0.198	0.241	0.301	0.384

Table 6: Both seasonality and risk components

	Mean	Median	5%	20%	40%	60%	80%	95%
Low	0.229	0.223	0.088	0.153	0.203	0.246	0.306	0.389
Middle	0.247	0.240	0.103	0.169	0.220	0.263	0.324	0.409
High	0.361	0.354	0.204	0.276	0.331	0.379	0.445	0.538

$$\eta = 4$$

Table 7: Seasonality component

	Mean	Median	5%	20%	40%	60%	80%	95%
Low	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009
Middle	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042
High	0.347	0.347	0.347	0.347	0.347	0.347	0.347	0.347

Table 8: Risk component

	Mean	Median	5%	20%	40%	60%	80%	95%
Low	0.474	0.461	0.257	0.344	0.422	0.498	0.588	0.749
Middle	0.474	0.461	0.257	0.344	0.422	0.498	0.588	0.749
High	0.474	0.461	0.257	0.344	0.422	0.498	0.588	0.749

Table 9: Both seasonality and risk components

	Mean	Median	5%	20%	40%	60%	80%	95%
Low	0.487	0.473	0.268	0.356	0.434	0.511	0.602	0.764
Middle	0.536	0.522	0.310	0.401	0.482	0.562	0.656	0.823
High	0.984	0.967	0.692	0.810	0.914	1.017	1.139	1.355

1.2 With stochastic seasonality

a. When removing seasonality, in table 10 we observe that the losses in welfare mainly come from the stochastic component of seasonality, whereas the deterministic part barely has any impact. This is again because, since agents are risk averse, stochastic processes increase the welfare losses for them. As before, the higher the degree of seasonality, the higher the gains in welfare.

b. Gains from removing consumption risk are constant across seasonality levels, as in part 1.

c. When combining the two gains, welfare gains skyrocket. It is interesting to see that consumption risk is the predominant force when seasonality is low, but it is relegated to the second place when seasonality is stronger.

d. When repeating the same exercise for higher degrees of risk aversion, we find that the gains increase and the patterns described above hold. Note that with high risk aversion, stochastic seasonality can explain most of the welfare gains in the high seasonality scenario. This would be an ideal setting for the implementation of a system that would reduce this variability, like irrigation if we assume the stochastic component is rain.

$$\eta = 1$$

Table 10: Median welfare gains

	Low	Middle	High
No deterministic seasonality	0.002	0.008	0.044
No stochastic seasonality	0.083	0.326	0.961
No seasonality	0.086	0.337	1.047
No risk	0.109	0.109	0.109
No seasonality and no risk	0.205	0.483	1.271

$$\eta = 2$$

Table 11: Median welfare gains

	Low	Middle	High
No deterministic seasonality	0.002	0.003	0.037
No stochastic seasonality	0.128	0.476	1.044
No seasonality	0.132	0.503	1.271
No risk	0.218	0.218	0.218
No seasonality and no risk	0.379	0.830	1.766

$$\eta = 4$$

Table 12: Median welfare gains

	Low	Middle	High
No deterministic seasonality	0.027	0.031	0.053
No stochastic seasonality	0.096	0.192	0.864
No seasonality	0.105	0.242	1.510
No risk	0.461	0.461	0.461
No seasonality and no risk	0.614	0.814	2.666

Q2 Welfare gains with labor supply

Table 13 shows the results for Q2, where *Corr* stands for the correlation between the consumption and labor processes and *Stoch* for whether this correlation is also on the non-seasonal stochastic component of consumption.

With higher seasonality, the welfare effects are higher, as it was the case in all other parts of the assignment. It is also noticeable that the leisure contribution grows more than the consumption, that is, the main gains from removing seasonality when it is higher come from the fact that people can avoid spending so many hours working.

When the seasonal components of consumption and labor are instead negatively correlated, gains on leisure are even higher, since it impedes labor to have an insuring effect from the shocks.

Adding correlation in the non-seasonal stochastic component doesn't vary the results, and thus nor the answers.

Table 13: Median welfare gains

	Corr	Stoch	Low	Middle	High
Consumption Contribution			0.0528	0.1137	0.2734
Leisure Contribution	1	No	0.0629	0.1614	0.4867
Total			0.1225	0.2961	0.8842
Consumption Contribution			0.0528	0.1137	0.2734
Leisure Contribution	-1	No	0.0712	0.1825	0.8333
Total			0.1285	0.3198	1.3475
Consumption Contribution			0.0528	0.1137	0.2734
Leisure Contribution	1	Yes	0.0675	0.1633	0.4835
Total			0.1244	0.2974	0.8679
Consumption Contribution			0.0528	0.1137	0.2734
Leisure Contribution	-1	Yes	0.0660	0.1790	0.8232
Total			0.1255	0.3163	1.3334