Complexity Aversion in Labor Choice Under Demand Uncertainties

1 Model Set Up

- An individual i has 1 unit of labor supply.
- She has access to a set J of finitely-many job types from a distribution of job types. Each job j has a random payoff $v_j \sim F(j)$ per unit of time.
  - She knows $F(j)$ $\forall j \in J$
- She chooses an allocation $x \in \Phi(J) \subseteq \Delta(J)$ to maximize expected utility

$$EU_i = \int_J \dots \int u\left(\sum_{j \in J} v_j x_j\right) dF(j_1)...dF(j_{|J|}) - g(|J_i|) \quad (1)$$

  where g is a disutility from allocation and $J_i = \{j \in J : x_j \neq 0\}$.

- i's problem is thus:

$$\max_{x \in \Phi(J)} \int_J \dots \int u\left(\sum_{j \in J} v_j x_j\right) dF(j_1)...dF(j_{|J|}) - g(|J_i|) \quad (2)$$

- if the individual is **complexity averse**, then we have that:
  1. $g(\cdot) > 0$ for $|J_i| > 1$
     - Ex: $g(\cdot) = \theta(|J_i|)^2$ where θ is the *complexity aversion coefficient*.
  2. $\Phi(J) \subseteq \Delta(J)$ is restricted to a subset of simple allocations (with $\Phi(J) \subseteq \Phi(J')$ if $J \subseteq J'$).
     - Ex: a "simple" allocation could only allow for numbers with one digit after the decimal.
- Suppose she (costlessly) learns (i.e., $\bar{v}_{new}(h)$) about a new job opportunity and can choose to add this j_{new} to J_i so that $J_i' = \{J_i, j_{new}\}$.
  - if she is complexity averse, adding this j_{new} will incur a disutility of allocation. Thus, she will add j_{new} if, given $\Phi(J')$:

$$\int_{J'} \dots \int u\left(\sum_{j \in J'} v_j x_j\right) dF(j_1)...dF(j_{|J'|}) - g(|J_i'|) > \int_J \dots \int u\left(\sum_{j \in J} v_j x_j\right) dF(j_1)...dF(j_{|J|}) - g(|J_i|)$$

2 Predictions

Complexity aversion will lead to:

1. rigid hour allocations. I.e., small changes in payoff distributions will lead to no changes in hour allocations.
2. smaller menus J_i.
3. less take-up (undervaluation) of profitable opportunities.

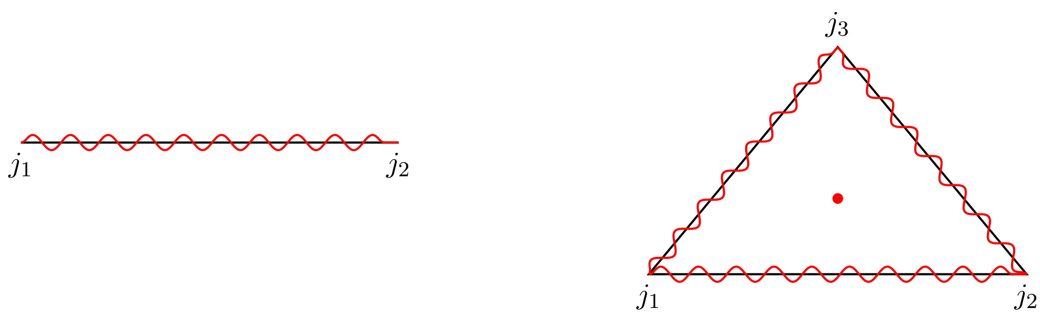
3 Motivating Simple Example

Consider two risk-averse individuals, a and b, both with Bernouilli utility $u(c) = \sqrt{c}$, and the same set of job type options J with $|J| = 3$. In particular, for each job let $F(j)$ be such that individuals get v_j with probability p_j and 0 otherwise. So, the expected wage for supplying x_j hours to job j is $v_j \cdot x_j \cdot p_j$.

Let a be *not complexity averse*; $g_a(|J_b|) = 0$ and $\Phi_a(J) = \Delta(J)$. Let b be *complexity averse*; $g_b(|J_b|) = \theta_b|J_b|^2$ with $\theta_b > 0$ and $\Phi_b(J) \subset \Delta(J)$. In particular, we restrict $\Phi_b(J)$ so that b can either:

1. perfectly optimize over any 2 jobs ($|J_b| = 2$) or
2. evenly allocate over > 2 jobs ($|J_b| > 2$).

Figure 1: Visualization of $\Phi_b(J)$



Notes: The line on the left represents b's options when $|J| = 2$ and the triangle on the right represents b's options when $|J| > 2$

a, then, solves the following problem:

$$\max_{x\in\Delta(J)} \int_{J}^{\dots}\int u\left(\sum_{j\in J} v_j x_j\right) dF(j_1)\dots dF(j_3)$$

and b solves:

$$\max_{x\in\Phi(J)} \int_{J}^{\cdots}\int u\left(\sum_{j\in J} v_j x_j\right) dF(j_1)...dF(j_3) - g(|J_i|)$$