1 Pareto Efficiency Recap

1.1 Pareto Dominance

If for all people in a model, if $x \succsim_i y$ then we say x pareto dominates y. We write xPy.

1.1.1 Example 1

$$Alice : a \succ b \succ c$$

$$Bob : a \sim b \succ c$$

$$Camden : a \sim b \succ c$$

$$bPc, aPc, aPb, aPa, bPb, cPc$$

1.1.2 Example 2

$$Alice : a \sim b \succ c$$

$$Bob : a \sim b \succ c$$

$$Camden : a \sim b \succ c$$

$$bPc, aPc, aPb, \boldsymbol{bPa}, aPa, bPb, cPc$$

Notice in both example 1 and 2, Pareto dominance is complete.

1.1.3 Example 3

$$Alice : a \succ b \succ c$$

$$Bob : b \succ a \succ c$$

$$Camden : b \succ a \succ c$$

$$bPc, aPc, aPa, bPb, cPc$$

This is not a complete relation.

1.2 Strict Pareto Dominance

Notice in the example above. aPc but $c \not P a$. In this case, we say that a **strictly pareto dominates** c**.**

In example 1, a strictly Pareto dominates b and c. b strictly Pareto dominates c.

In example 2, a and b strictly Pareto dominate c. a and b Pareto dominate each other, but not strictly.

In example 3, a and b strictly Pareto dominate c.

1.3 Strictly Pareto Dominance in Terms of Preferences– Two Definitions

Suppose we have strict pareto dominance between two outcomes.

$$xPy, y \not P x$$

1.4 Definitions of Pareto Dominance Terms of Preference of Individuals

What does this mean in terms of preference over x and y?

xPy- x is at least as good for everyone as y

$y \not P x$- It is not true that everyone likes y at least as well as x. Thus, there must be someone who does not like y at least as much as x. For that person: $y \not\succsim x$. For this person it must be $x \succsim y$. Thus: $x \succ y$. To summarize, someone must like x strictly better than y.

Alternative definition of pareto dominance in terms of preferences. *Everyone likes x at least as well as y and at least one person like x strictly more.*

1.5 Pareto Efficiency

Definition of Pareto Efficiency: x is Pareto efficient if there is no y that strictly Pareto dominates it.

Another way to look at this:

Alternative Definition of Pareto Efficiency: x is Pareto efficient if there is no other outcome that makes everyone at least as well off and at least someone strictly better off.

Another way to write this:

Alternative Definition of Pareto Efficiency: you can't make anyone strictly better off without making someone strictly worse off.

1.6 Geometry of Pareto Efficiency

2 Social Preferences

2.1 Social Preference Relation $\succsim^*$

A social preference relation is a complete and transitive relation on the set of outcomes (that may be different from any individual's preference in the model). It represents the preference of the *administrator* among the outcomes.