Notes from MWG's *Microeconomic Theory*

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Brief Introduction

The following are select notes from *Micoreconomic Theory* by Mas-Colell, Whinston, and Green. I have tried to synthesize these into the key axioms, theorems, propositions, and proofs introduced in the text. Examples and notes are provided where needed. Some proofs are my own work and thus prone to error. Notice this is an individual effort and very much a work in progress. It should not be viewed as a replacement for the original work.

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Ch. 1 Preference and Choice

0.1 Preference Relations

Axioms of Preference:

i. $x \succ y$. x is "strictly" preferred to y *if and only if (iff)* $x \succeq y$ but $y \not\succeq x$. *Note:* $x \succeq y$ is an at least as good as relation. That is, x is at least as good as y.

ii. $x \sim y$. Then, x is indifferent to y. Thus, $x \succeq y$ and $y \succeq x$.

Definition: We call a relation *rational* if it is both **complete** and **transitive**. Consider the set of goods, X.

i. Completeness: $\forall\, x, y \in X$ either $x \succeq y$ or $y \succeq x$ or both.

ii. Transitivity: $\forall\, x, y, z \in X$ if $x \succeq y$ and $y \succeq z$ then $x \succeq z$.

Proposition 1.B.1: It follows that if $\succeq$ is rational then:

i. $\succ$ is irreflexive and transitive

ii. $\sim$ is reflexive and transitive

iii. If $x \succ y \succeq z$ then $x \succ z$

Proof. **Proposition 1.B.1**
Consider the set of goods X. Then take $x, y, z \in X$.
Let $\succeq$ be rational so it is both complete and transitive.

i. Suppose by contradiction that $x \succ x$. Then, since $x \succeq x$ and $x \not\succeq x$. Both these facts cannot be true by the def of a strict pref relation. relation, so $\succ$ is irreflexive. Furthermore, consider $x \succ y$ and $y \succ x$. Then, $x \succeq y$ and $y \not\succeq x$. Also, $y \succeq z$ and $z \not\succeq y$. So, since $\succeq$ is rational, by transitivity we have $x \succ z$.

ii. Consider $x \sim x$. Then, $x \succeq x$ and $x \succeq x$. If condition one holds than condition two must hold. So, $\sim$ is reflexive. Also, if $x \sim y$ and $y \sim z$ then, $x \succeq y$ and $y \succeq x$, and $z \succeq y$ and $y \succeq z$. So, by transitivity $x \sim z$.

iii. If $x \succ y$ then $x \succeq y$ and $y \not\succeq x$. Also, $y \succeq z$. Then, by transitivity $x \succeq z$. But, since $y \not\succeq x$ then by transitivity $z \not\succeq x$. So, $x \succ z$.

□

Ch. 2 Consumer Choice

Walrasian budget set, $X = \mathbb{R}^L_+$