ABSTRACT. This note explores the consequence of hidden information acquisition for static choice theory. We show that any choice function in the observable problem can be consistent with some well-behaved choice function in a metaproblem with unobservable costly information acquisition. This illustrates how choices may not satisfy consistency conditions because a decision maker’s decision process (in this case, information acquisition) depends on her feasible set. It also illustrates the importance of modeling the source of violations of consistency conditions, rather than simply weakening axioms on preferences.

KEY WORDS: Static choice, information acquisition, consistency, intransitivity.

1. INTRODUCTION

A finite static choice problem is a pair \( (X, \mathcal{A}) \), where \( X \) is a finite set of alternatives and \( \mathcal{A} \) is a set of non-empty subsets of \( X \), called feasible sets. A decision maker’s choice function \( C : \mathcal{A} \rightarrow 2^X \) for \( (X, \mathcal{A}) \) associates with each \( A \in \mathcal{A} \) the non-empty set \( C(A) \subseteq A \) of alternatives the decision maker might choose if \( A \) is the set of feasible alternatives.

Assume that \( \mathcal{A} \) contains all subsets of \( X \) with one or two elements. Let \( \succsim \) be the binary relation on \( X \) defined by

\[
\forall x, y \in X \quad x \succsim y \quad \iff \quad x \in C(\{x, y\}).
\]

\( \succsim \) is called the (weak revealed) preference relation.

Since we have assumed that \( C \) has non-empty values, \( \succsim \) is complete and reflexive. Two basic assumptions of most normative and description decision theories, including “conventional” expected utilities theories such as Savage (1954) and some “non-conventional” theories such as Machina (1982), are:

**Axiom 1.** \( \succsim \) is transitive.
Axiom 2 (Extendibility Principle or IIA.) For $A \in \mathcal{A}$, $C(A)$ consists of the $\succeq$-maximal elements of $A$.

These are often referred to as 'rationality' or 'consistency' axioms. In this setting, they are equivalent to Houthakker's axiom of revealed preference. Given Axiom 1, Axiom 2 is equivalent to the axiom of independence of irrelevant alternatives (IIA), also known as the 'Chernoff condition' or 'property $\alpha$' (Sen (1971)). In models with additional structure, such as choices among lotteries or state-contingent outcomes, the list of assumptions on the binary preferences may grow, but Axioms 1 and 2 are usually maintained.

In practice, experimenters observe that binary preferences do not satisfy transitivity, or other assumptions imposed in more structured models. An early example of a violation of transitivity is May (1954). See, for example, Thaler (1991) for a discussion of more recent results. It is often said that these inconsistencies have to do with bounded rationality or unobserved decision processes. For example, Slovak and Lichtenstein (1983) give such an explanation for the preference reversal phenomenon, and framing effects (Tversky and Kahneman (1981)) are certainly the result of unobserved decision processes.

The empirical violations of the standard models have lead to a small industry of alternative models in which axioms on preferences are weakened, but the extendibility principle is maintained. See Fishburn (1991) for a review of some models in which preferences are intransitive, and see Machina (1987) for a review of some generalizations of Savage's expected utility theory. Some of these alternate theories are put forth as normative theories, but they are nonetheless motivated by the empirical violations. For example, Machina (1989) states that an important task of researchers of non-expected utility models is "to show that [they] fit the data better than the standard expected utility model" (p. 1622).

The purpose of this paper is to explore what restrictions on choices in the observable problem can be generated for a highly structured and rational, but abstract, specification of decision processes. Suppose that the decision processes take the form of uncertainty with state-dependent preferences and costly information acquisition, and that the choices of information and alternatives in this extended framework satisfy Axioms 1 and 2 and have an additively separable