

Report on: “**A Generalized Unification Theorem for Choice Theoretic Foundations: Avoiding the Necessity of Pairs and Triplets**” (MS722, by Junnan He)

This paper studies the axiomatic structure of the revealed preference theory by relaxing the requirement that choice functions be defined on all the (budget) sets containing 2 or 3 elements. More specifically, the paper presents a new requirement: Assumption 1 and shows that Sen’s (1971) results can be extended to more general environments.

The choice-based approach to rational choice behavior is traditional in economics and goes back to the early work of Paul Samuelson (1938). Exploring the axiomatic structure of the revealed preference theory is clearly important, fundamental, and intriguing in economic theory. This paper can help to better understand Sen’s (1971) results on choice functions and revealed preference in general situations. Therefore, I think that a revised version of this paper is worthy to be published in *e-Economics*.

As far as I see, the results presented in the paper are technically correct. There are no mistakes in the proofs, nor inappropriate or misleading notation. However, this paper, in its present form, is not well written and organized; there is still much room to be improved before it can be accepted for publication. I also suggest that the author should make a careful and thorough proofreading.

**Comment:**

Assumption 1 is critical in the analysis of this paper. This domain restriction condition *depend explicitly on the underlying choice function* – that is, “any bundle  $x \in X$ , there exists a budget  $B_x \in \mathbb{B}_1$  such that  $x \in C(B_x)$ .” The author should provide more discussion and justification for this sort of key assumption. It would be helpful if the author can relate this assumption to the questions raised in Sen (1971, Sec 6). The author may also consider moving Examples 1 and 2 in Section 3 to Section 2; it seems to be better to let the readers understand, at the very beginning, why some equivalence results can still hold even if Sen’s requirements fail to be satisfied.

### Other Minor Comments:

1. Page 1, line 7: "... in literature ..." should be "... in the literature ...".
2. Page 2, line 5: "theoriests" should be "theorists".
3. Page 2, line 20: "pp.776" should be "p.776"
4. Page 2, line -3: "This paper, ..." should be "In this paper, ...".
5. Page 3, line 1: The notation of " $\subset$ " is not very clear (" $\subseteq$ " or " $\subsetneq$ "?).
6. Page 3, lines 17 & 19: The notation of " $\mathbb{N}^+$ " is not defined.
7. Page 3, line -3: "... some author refers to as ..." should be "... some author refers to as ...".
8. Page 4, line -6: "... let the domain  $\mathbb{B}$  to include ..." should be "... let the domain  $\mathbb{B}$  include ...".
9. Page 5, line 1: "we make the following assumption on  $\mathbb{B}$  as below" should be "we make the following assumption on  $\mathbb{B}$ ".
10. Page 5, line 3: "... disposable income ..." should be "... disposable income ..."
11. Page 6: The notation of " $\omega(i)$ " is not very clear.
12. Page 6, line 6: "noted" should be "denoted".
13. Page 7, line 4: "purpose" should be "the purpose".
14. Page 7, line 15: "sinigleton" should be "singleton".
15. Page 8, line 6: "nomality" should be "normality".
16. Page 9, line 8: "... equivalencies still holds ..." should be "... equivalencies still hold ...".
17. Page 9, line 9: "... some proves are more technical then the original ones ..." should be "... some proofs are more technical than the original ones ...".
18. Page 9, line 12: "... is brodened to ..." should be "... is broadened to ...".
19. Page 12, line -11: "adapeted" should be "adapted".
20. Page 14, line 10: "follws" should be "follows".
21. Page 15, line -6: "Sen, Amartya K. (July, 1997)" should be "Sen, Amartya K. (July, 1973)".