

Revealed preference - Handout

Felix Munoz-Garcia
School of Economic Sciences
Washington State University¹

In previous sections we analyzed how to find optimal consumption bundles assuming that we could observe the consumer's preferences represented with his utility function. But, what if we cannot observe his preferences, and only know which choices he made when facing different combinations of prices and income? Can we still say whether an individual made optimal consumption choices? The answer to this question is Yes, thanks to the so-called "Weak Axiom of Revealed Preference" or WARP. Before we state this axiom, let bundle $A \equiv (x_A, y_A)$ be the optimal consumption bundle that the individual selects when facing initial prices and income (p_x, p_y, I) and, similarly, let bundle $B \equiv (x_B, y_B)$ be his optimal consumption bundles when facing final prices and income (p'_x, p'_y, I') .

WARP. If optimal consumption bundles A and B are both affordable under initial prices and income (p_x, p_y, I) , then bundle A cannot be affordable under final prices and income (p'_x, p'_y, I') . That is,

$$\text{if } p_x x_A + p_y y_A \leq I \text{ and } p_x x_B + p_y y_B \leq I, \text{ then } p'_x x_A + p'_y y_A > I'$$

Intuitively, if both bundles A and B are initially affordable, and the consumer selects A as optimal, he is "revealing" a preference for bundle A over B . Similarly, when facing final prices and income (p'_x, p'_y, I') , he selects bundle B as optimal, thus revealing a preference for B . WARP thus requires that bundle A is not affordable under final prices and income (p'_x, p'_y, I') ; otherwise the consumer should keep selecting the original bundle A as optimal. (Recall that he chose A when both A and B were affordable.)

Hence, WARP can be interpreted as a consistency requirement in the choices that the individual makes when facing different prices and income: if he chooses bundle A when other bundles are affordable, he should keep choosing such a bundle A if it is still affordable under the new prices and income. If, instead, he chooses a different bundle B when facing new prices and income, it must be that the original bundle A is no longer affordable. We next provide an applied procedure to test for WARP.

Procedure to check for WARP. Let us follow this two-step procedure:

1. Check if bundles A and B lie on or below the initial budget line BL , that is, the budget line representing initial prices and income (p_x, p_y, I) .

¹Associate Professor, School of Economic Sciences, Washington State University, 103G Hulbert Hall, Pullman, WA 99164-6210, fmunoz@wsu.edu.

- 1a. If step (1) holds, move to step (2).
- 1b. If step (1) does not hold, then stop. We can only claim that the individual choices *do not violate* WARP.²
2. Check if bundle A lies strictly above the final budget line BL' , that is, the budget line representing final prices and income (p'_x, p'_y, I') .
 - 2a. If step (2) holds, then WARP *is satisfied*.
 - 2b. If step (2) does not hold, then WARP *is violated*.

Hence, if step (1) holds, the premise of WARP is satisfied, and we can move on to check its conclusion, as stated in step (2). In summary, WARP is either: (i) satisfied if steps (1) and (2) hold; (ii) violated if step (1) holds but (2) does not; or (iii) not violated if step (1) does not hold. The following example illustrates several consumer choices, some satisfying and some violating WARP.

Example [Testing for WARP]:

1. Figure 1 depicts a setting where WARP is satisfied. Step (1) holds since bundle A lies on the initial budget line BL , while bundle B lies strictly below BL , thus implying that both bundles are affordable under initial prices and income. We can then move on to step (2), and notice that bundle A lies strictly above the final budget line BL' , making this bundle unaffordable under the final prices and income. As a consequence, WARP is satisfied.
2. Figure 2, however, depicts choices that violate WARP. To see this, first note that the premise of WARP, as stated in step (1) holds, since bundle A lies on the initial budget line BL and bundle B lies strictly below BL . Step (2) does not hold, since bundle A lies below the final budget line BL' .
3. Figure 3 illustrates a setting in which WARP is not violated. Indeed, step (1) does not hold because, while bundle A lies on the initial budget line BL , bundle B lies strictly above BL , making the latter unaffordable under the initial prices and income. Since the step (1) does not hold, the premise of WARP does not hold either, implying that WARP is not violated.
4. A similar argument as for Figure 3 applies to figures 4 and 5. As a practice, you can check that in both of them bundle B lies strictly above BL , thus being unaffordable under the initial prices and income.

Figures 1-5 in next pages

²In this case, the premise of WARP does not hold, which entails that we cannot claim that WARP is satisfied or violated. We can only claim that WARP is satisfied if step (1) and (2) hold, and we can only claim that WARP is violated if step (1) holds but (2) does not.

Figure 1

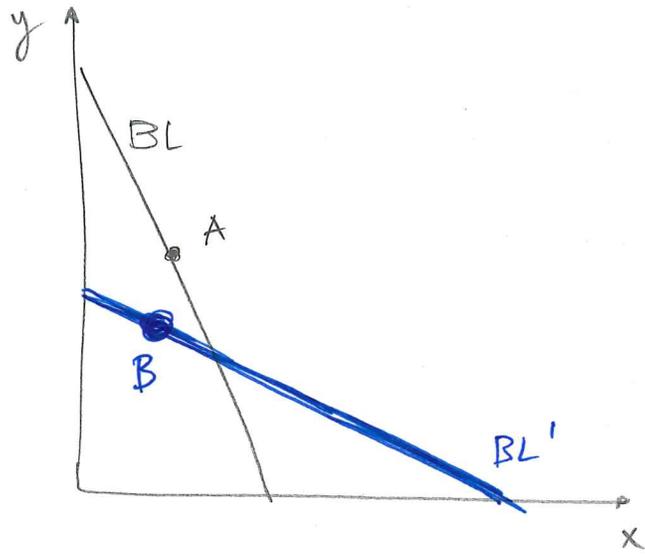


Figure 2

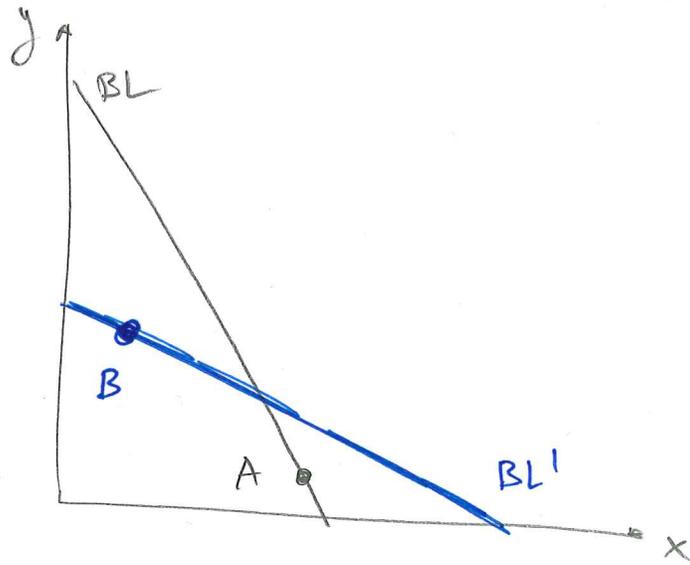


Figure 3

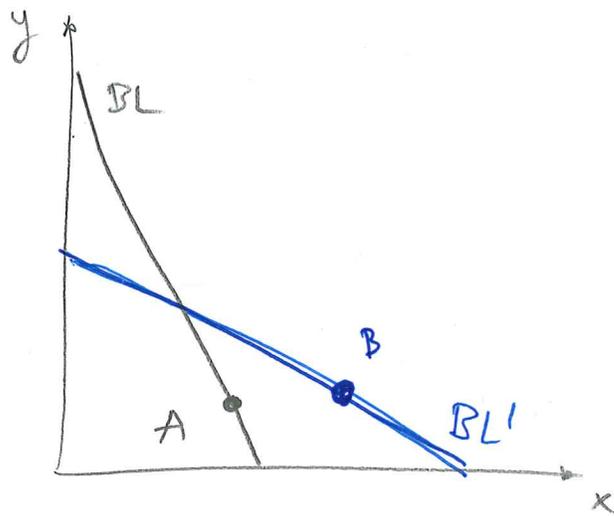


Figure 4

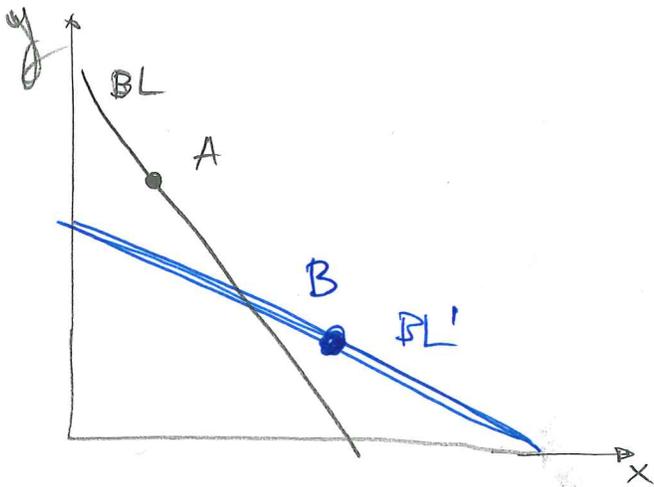


Figure 5:

