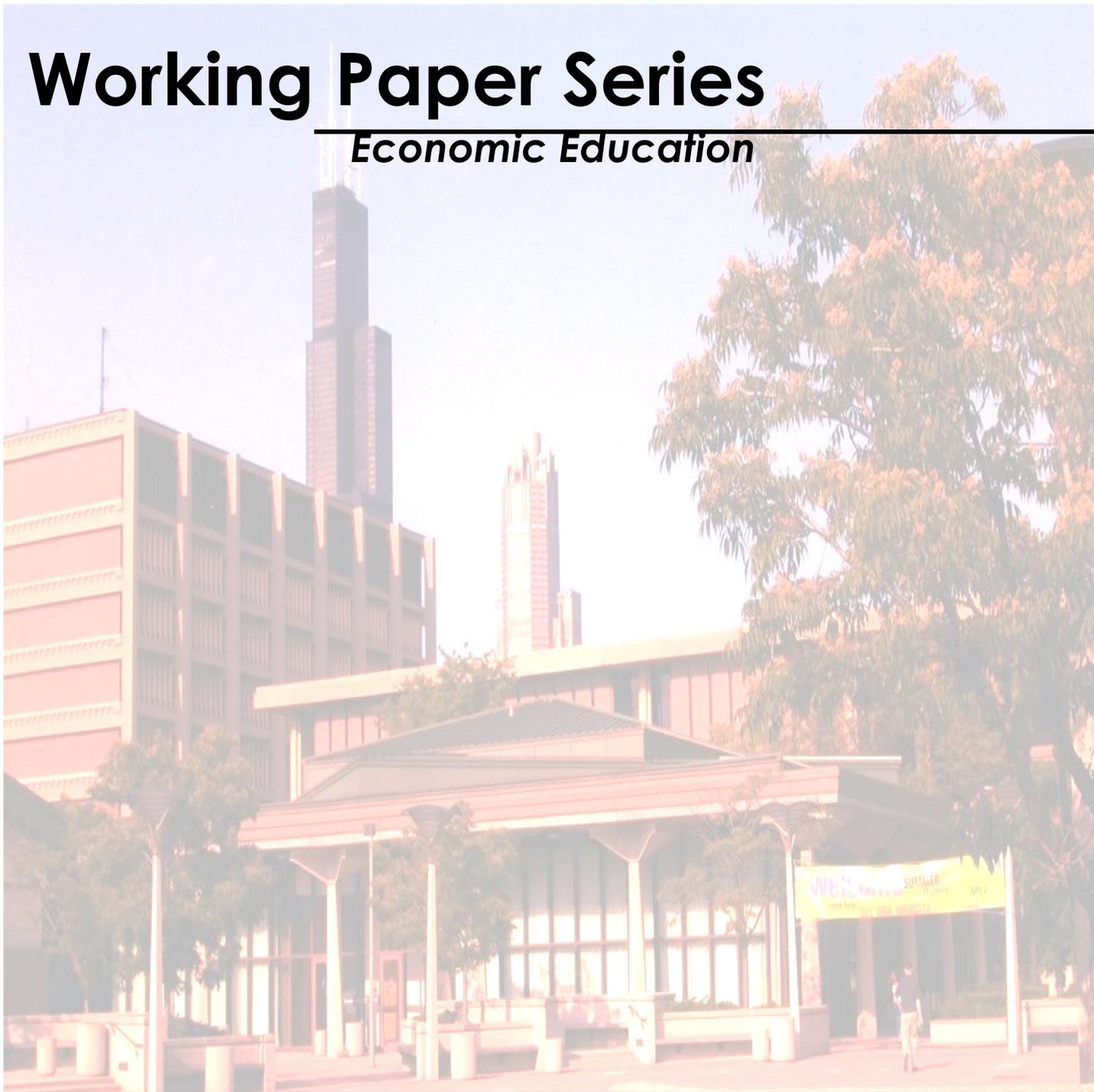


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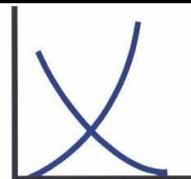


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## *A Quick Look at Becker's Irrational Consumer*

Richard M. Peck, Associate Professor  
University of Illinois at Chicago

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**Center for  
Economic  
Education**

Department of Economics (m/c144)  
University of Illinois at Chicago  
601 South Morgan Street  
Chicago, Illinois 60607  
Tel 312-996-2684  
Fax 312-996-3344  
<http://cee.econ.uic.edu>

## **A Quick Look at Becker's Irrational Consumer**

Richard M. Peck  
University of Illinois at Chicago  
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Becker's Irrational Consumer paper (JPE 1962) is a classic. Becker considered a consumer choosing randomly from their budget set, according to a uniform probability distribution. He then demonstrated that on average both compensated and uncompensated demand curves are downward sloping; put differently, mean choices (in a two good framework) satisfy the weak axiom of revealed preference. Becker's demonstration was a geometric argument that made particular use of the assumption of a uniform distribution. Becker's conclusion can be easily generalized. Here we demonstrate that if individuals randomly choose consumption bundles on their budget sets, then on average, both the compensated and uncompensated demand curves are downward sloping, irrespective of the underlying probability distribution of the random choices. The proof is surprisingly simple.

We also note that the Becker framework is formally similar to that of Hildenbrand (1983)<sup>1</sup> but the interpretations differ. The Hildenbrand characterizes average demand when there are a large number of heterogeneous infinitesimal agents while the Becker paper considers the average behavior of a single individual making a large number of repeated random choices from their budget line. One can also think of the Becker framework as a characterizing mean consumption of a large population of identical individuals each making random choices from their budget line. The Hildenbrand framework, however, is much more general; distribution of population characteristics is arbitrary and the number of goods, while finite, is not restricted to just two. Becker's framework can easily be generalized along these lines.

### **Downward Sloping Demand in the Two Good Model**

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<sup>1</sup> The Hildenbrand framework is much more general; distribution of population characteristics is arbitrary and the number of goods, while finite, is not restricted to just two.

There are two goods, x and y with prices  $p_x$  and  $p_y$ , income is I.  $\alpha$  is a random variable distributed on [0,1] with mean  $\bar{\alpha}$ . Individual randomly chooses point on budget line

$$p_x x + p_y y = I$$

We suppose that this choice occurs as a realization of  $\alpha$ , so that

$$x = \frac{\alpha I}{p_x}$$

and

$$y = \frac{(1-\alpha)I}{p_y}.$$

Taking expectations, average or mean demand is given by

$$\bar{x} = \frac{\bar{\alpha} I}{p_x}$$

and

$$\bar{y} = \frac{(1-\bar{\alpha})I}{p_y}$$

Clearly, mean demands  $\bar{x}$  and  $\bar{y}$  both slope downward for  $\bar{\alpha}$  strictly between 0 and 1. Since  $0 \leq \bar{\alpha} \leq 1$ , the mean demand curves  $\bar{x}$  and  $\bar{y}$  corresponds to a utility maximizing individual with Cobb-Douglas preferences. Since the mean demand curve arises from utility maximization, mean consumption conforms to WARP. It is clear, however, that there are no restrictions on the underlying distribution of  $\alpha$ , with support [0, 1], other than the existence of a mean  $\bar{\alpha}$ . The case Becker considered corresponds to  $\alpha$  distributed uniformly on the unit interval. For this case, the mean of the distribution  $\bar{\alpha}$  is  $\frac{1}{2}$ .

### **References**

Becker, GS, [1962] "Irrational Behavior and Economic Theory," *The Journal of Political Economy*, [Vol. 70, No. 1](#) (February 1962), pp. 1-13.

Hildenbrand, W, [1983], "On the "Law of Demand"", *Econometrica*, Vol. 51, No. 4 (July 1983), pp. 997-1020.