Notes 6”. Indifference curves with non-convex preferences

1. Concave preferences/mutually exclusive choices
Let’s relax the assumption of variety in consumption, i.e., convex preferences. It makes sense to assume that, given a choice between bread and beer (or root beer, if you are beer-averse), that you would choose some of each. But that’s not always appropriate. Say that you’ve completed your studies and received your degree. After living in a tent for a few years so you can pay off your student loans, you decide to move into something more substantial. (Let’s assume that you’ll rent rather than buy, to simplify things.)

Say that you have set yourself a monthly housing budget of $850. Looking online today (9/14/12), I find an 815 square foot apartment at a place called Colonial Grand at Edgewater in Huntsville that rents for $850 a month with a 12 month lease. Let’s round and call that $1.05 per square foot per month. Checking Craigslist, I luck out and find this entry at the top of the list: nice house south east huntsville - $850 / 3br - 2100ft² That works out to approximately 40¢ per sq. ft. (Remember, with an apartment you get a lot of services that you have to pay for separately with a house, but I’ll ignore that here.) So your $850 budget will buy you 815 sq. ft of apartment or 2100 sq. ft. of house. The key point, though, is that you will not buy some of each. You will buy all apartment, or all house. That’s obvious, but it has big implications for our indifference curves. We draw them as concave instead of convex, as shown in Figure 4.

Now—let’s find your utility-maximizing choice. You won’t choose any point on IC₁, since you aren’t spending your full budget, and still assuming that more is preferred to less, you’d be better off elsewhere. Point a exhausts the whole budget, but there are two problems with it: first, you’re consuming some apartment and some house, which makes no sense, and second, you could move to a higher indifference curve (IC₃), and hence increase your total utility, by moving to point b, at which you’re renting the “nice” 2100 square foot house. (That’s the big difference from convex indifference curves; we are not going to choose the point at which MRS = price ratio.) But that still does not maximize utility. If we choose point c—rent the apartment—we likewise spend the whole $850, but that puts us on indifference curve IC₄, which is the highest indifference curve we can just barely attain with our budget. So our utility maximizing bundle will be located where the indifference curve and the budget line meet one of the axes—at a corner, so to speak—and hence we call this a corner solution.

As an exercise—redraw the diagram shown in Figure 4, with the indifference curves being taller than they are wide, that is, something like this:

What do you choose as the utility-maximizing bundle now? What can you conclude about the relationship between the consumer’s preferences and the shape of the indifference curves?
2. Strict preference for one good

Here we’re going to assume that the price doesn’t matter. Your preferences are such you will not consume one of the two goods even if it’s free. Say that you are a nonsmoker, and the two goods are food and cigarettes. Say that your budget is $20, the price of food is $1 a unit, and cigarettes are $2 a pack. But you don’t care what cigarettes are selling for, because you won’t buy them under any circumstances.

Now—let the price of an apartment rise to $2 a square foot. Your $850 will only buy you a 425 sq. ft. apartment. (Think of it as a tent with plumbing and central heating.) Figure 5 shows this, with the budget line rotated downward on the apartment axis. Point c is no longer affordable. The best you can do is point b—you rent the house. As you probably expected, raising the relative price of an apartment leads you to rent a house as a substitute. But note that your total utility falls, as you are now on IC3. The higher price leads you to choose what previously had been your second best alternative.

Figure 5

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This is pretty simple. Your budget will purchase 20 units of food, or 10 packs of cigarettes, or some combination totalling $20, so the budget line is represented by BB. But you won’t choose any cigarettes, so your indifference curves are straight lines perpendicular to the food axis, i.e., the axis of the good you are willing to purchase. So, to spend the whole budget, you choose point a, which puts you on indifference curve IC3, and you maximize total utility there.

Note that this is another corner solution.

Here’s a variation on the above: Say that the two goods are peaches and pears, priced again at $1 and $2, respectively. I love peaches, and really don’t care for pears, but if pears become cheap enough, I suppose I would buy some. My indifference curves would be convex, and not strictly linear, but they’re pretty close to what I’ve shown in Figure 6. The difference is that, while I’m at a corner solution here, if the price of pears fell enough, I would move down IC1 to a point where I consumed at least a little bit of pears. Try drawing in a really flat budget line—representing cheap pears—and see what happens. (I actually ate some pears this past summer. My neighbor picked them off his tree and gave them to me, so the price was approximately zero.)

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