Final Exam CRIM2000 Notes

Week 5

Rationality and attitude to risk

- We assume rational consumers will maximize their expected utility, and rational producers maximize their expected benefits.
- If there is no systematic bias in the way agents form their expectations we say those expectations are rational.
- However, an analysis of agents expectations does reveal persistent bias in their decisions.

Intuition Regarding Risk Preferences and Criminal Activities

Risk Neutral – Those who are indifferent and their behaviour can be characterised by models that only consider expected return.

Risk Averse – the reluctance of a person to accept a bargain with an uncertain payoff rather than another bargain with a more certain, but possibly lower, expected payoff.

Risk Seeking – A person who will accept smaller expected earnings in order to pursue a career in which returns are highly variable.

Risk can vary with

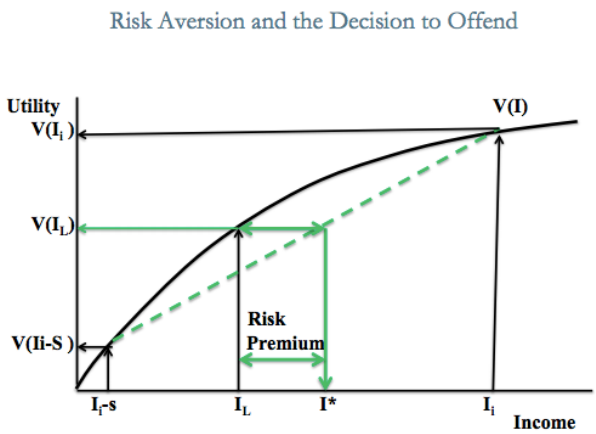
- Age
- Other demographic Factors (sex, population sub-groups)
- The context in which risk trade-offs are presented

Risk Continued

The effect of risk preference on the choice of legal vs. illegal behaviour has important implications for enforcement strategy "If those violating the law typically are risk seekers, they are more likely to be deterred by increasing the probability of conviction than by raising the sanctions facing those convicted"

Risk Aversion and Decision to Offend

The most common one is that utility increases at a decreasing rate with income so that the marginal utility of income (increase in utility produced by adding equal amounts of income) is decreasing.



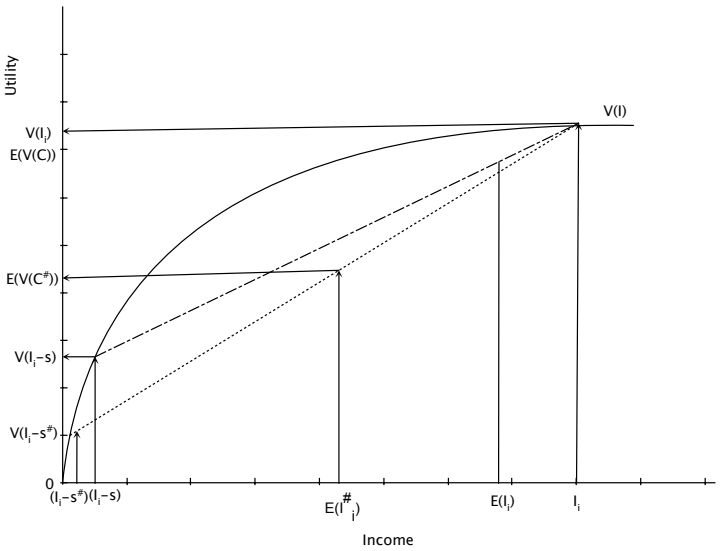
- Utility V(I) increases at a decreasing rate with income
- The individual has the opportunity to earn legal income equal to $\mathbf{I_L}$ – the utility of this legal income (which is earned with certainty) is found on the utility function $\mathbf{V(I_L)}$
- This individual also has the opportunity to engage in illegal activity and earn I_i which yield utility $V(I_i)$
- Illegal activity is often sanctioned – if convicted and sanctioned income would be I_i-s
- This is substantially less than I_i
- It follows that $V(I_i\text{-}S) < V(I_L) < V(I_i)$
- In short, if the probability of conviction is small, illegal activities appears to generate greater utility, but if conviction is virtually certain, then $V(I_i\text{-}S)$ is also virtually certain so crime is unattractive.
- The difference between I* and I_l or $(I^* - I_l)$ is called the risk premium – **this is the expected income that a risk averse person requires to compensate for giving up the certain legal income. In short, the risk premium is the price, in terms of expected added income, that the risk averse person requires for taking a risky position**. (Mentions he might ask what is risk premium)
- Note that the green line is the utility from illegal activity.

Response of Risk Averse to Changing Expected Sanctions

In this figure we model how does a risk averse person's choice of illegal or illegal work react to a change in the probability of conviction or expected sanction if convicted

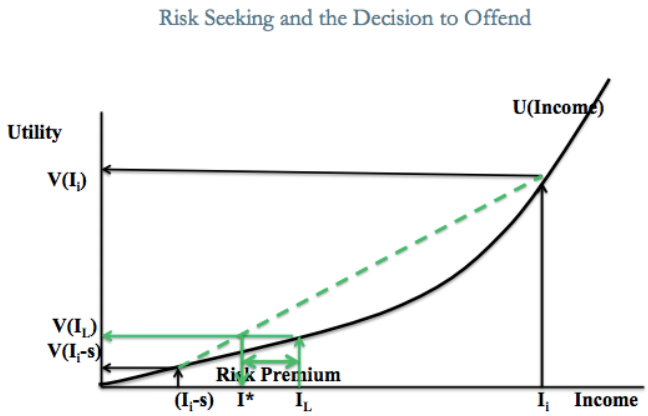
1. First consider rise in the probability of conviction – $P\#_c > P_c$
2. This lowers $E(I_i)$ to $E(I^{\#}_i)$ and lowers expected utility from crime along the dashed chord between $(I_i\text{-}s, V(I_i\text{-}s))$ and $(I_i, V(I_i))$. Thus, the decrease in expected utility makes **legal work more attractive**.

3. Now consider an increase in sanction if convicted
4. The higher sanction will (1) income if convicted decreases from (I_{ii}-s) to (I_i-$s^{\#}$) – thus $V(I_i - s^{\#}) < V(I_i - s)$
5. The resulting new expected utility is found on the dotted line, which is below the old dashed/dotted line – thus this lowers expected utility for any level of expected illegal income – thus a decrease in expected income if convicted causes a decrease in expected income from illegal activity, which decreases $E(I_i)$ to $E(I^{\#}_{ii})$
6. Taken together, these two effects lower expected utility from E(V(C)) to $E(V(C^{\#}))$ – producing a significantly negative effect on the attractiveness of crime
7. Thus, the risk-averse individual facing increased sanctions if convicted is deterred both by the decrease in expected income from crime and the increase in risk due to larger sanction. This leads to a prediction that, if crime is being committed by risk-averse offenders, the response to a given increase in expected sanctions due to an increase in sanction will be larger than the response to a rise in the probability of conviction.



Risk Seeking and Decision to Offend

- In this case, the marginal utility of income is increasing – thus the utility function is convex rather than concave (as was the case for a risk averse person) – otherwise all arguments are the same
- A risk-seeking person's initial choice process can be analysed using this Figure
- Legal income (I_L) yields utility $V(I_L)$
- Illegal activity results in either: (a) income (I_i) and utility ($V(I_i)$ with a probability of (1-p_c); (b) or income (I_i –s) and indirect utility $V(I_i$-s) with a probability p_c as the individual is convicted and sanctioned.
- Because the utility function is convex, the chord connecting the points (I_i, $V(I_i)$) and ((I_i-s), $V(I_i$-s)) – as shown by the dashed line – is above the utility function. Thus expected income from crime at which the utility from legal and illegal activity is equalized $I^* < I_L$.
- The risk-seeker will thus choose illegal activity even if expected earnings from crime are lower than legal earnings. Thus, the risk-seeker will sacrifice expected return to take additional risk.



Response to Risk Seekers to Changing Sanctions
Increasing P_c (probability of conviction) has the same effect on the risk-seeker as on the risk-averse person
When expected income from crime falls – the expected utility from crime directly lowers.
However, as shown in this diagram sanctions have a different effect on different groups of individuals (e.g. risk seekers vs. risk-averse)

1. Raising the expected sanction from s to $s^{\#}$ causes a decrease in expected income from crime from $E(I_i)$ to $E(I_i^{\#})$
2. This lowers the attractiveness of crime
3. The increase in expected sanction affects income net of sanctions, $(I_i - s^{\#}) < (I_i - s)$, so that $V(I_i - s^{\#}) < V(I_i - s)$
4. As you can see this results in a clockwise rotation of the chord where expected utility of crime is now found on the dashed green chord.
5. In short, the increase in sanctions has made crime more attractive to the risk seeker in that the expected income needed to carry out illegal activity has fallen