FYI

John Nash – A Beautiful Mind

The story of John Nash was dramatized in the film 'A Beautiful Mind' based on a book of the same name by Sylvia Nasar. Nash entered the world of game theory in the late 1940s and 1950s and gained the Nobel Prize for Economics in 1994 for his contribution to the field. (The scene in the film where Nash 'hits' upon his idea based on him and his friends choosing a girl to date is dramatic licence but an interesting way of presenting the theory all the same!) His work has had an impact on all manner of economic and political situations. It is important to remember that Nash was not an economist – he was a mathematician. In fact, Nash only took one course of economics during his undergraduate studies – a course in International Trade – and that was only to fulfil the degree requirements of the course he was on. Nash's ideas, therefore, are purely in the realm of the application of mathematical ideas to a bargaining problem. The application to economics and other areas has been somewhat broader.

At the heart of Nash's ideas were the mix of both cooperative and non-cooperative games. In the former, there are enforceable agreements between players whilst in the latter there are not. The key thing in both cases is that the players in the game know that they cannot predict with any certainty what the other is going to do (exactly the situation facing firms in an oligopolistic market). Equally, they know what *they* want but are aware that all the other players think as they do. It has been referred to as the 'I think he thinks that I think that he thinks that I think...' scenario.

The solutions that Nash derived were based around this thinking, where each player had to try to put him or herself in the position of others. The 'equilibrium' position would be where each player makes a decision which represents the best outcome in response to what other players' decisions are. The definition of a Nash equilibrium is a point where no player can improve their position by selecting any other available strategy whilst others are also playing their best option and not changing their strategies. One of the implications of Nash's work is that cooperation may well be the best option in the long term.

Let us take an example.

Assume there are two firms competing with each other for profits in a market. The two firms have three decisions to make with regard to their pricing strategies. They can choose to set their price at either €10, €20 or €30. The matrix showing the profits made at these different prices is shown in Table 17.2 below.

TABLE 17.2