A Prisoners' Dilemma?

What can the film A Beautiful Mind teach us about competition between Europe's Collecting Societies?

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References:
[1]European Commission (2005): 'Commission recommendation on collective cross-border management of copyright and related rights for legitimate online music services.' Brussels, 21 October 2005.

The film A Beautiful Mind introduced the work of John Nash to the wider world. Here, Will Page looks at the Nobel Prize winning economist's greatest contribution, Game Theory, and applies it to the challenges facing Europe's Collecting Societies.

The European Commission's 2005 Recommendation into the future of Europe's twenty-five Collecting Societies opens up the market to competition[1] . Let's recap on the basics:

The Commission's option one for the future leaves the possibility that the societies will do nothing to change the current set-up; with market forces prevailing. This option is not favoured by the Commission, so we should discount it. The Commission's option two for the future implies the societies will compete for music users, which can only mean competing with each other on price, driving down the amount of money available to music creators. This does not seem to be the purpose of collecting societies. This leaves as a preference, option three - where societies compete for members on service levels.

We therefore have two strategies before us: option two and option three. Option three is optimal as it best serves music creators, but it requires the cooperation of all Europe's collecting societies. The sub-optimal option two allows one society to betray its fellow societies in a bid to win users. This dilemma is a familiar one to those who have studied Professor Nash's contribution to Game Theory.

Game Theory is often explained by introducing the prisoners' dilemma. Two suspects, A and B, are arrested by the police. The police have insufficient evidence for a conviction and, having separated both prisoners, visit each of them to offer the same deal. If one testifies for the prosecution against the other and the other remains silent, the betrayer goes free and the silent accomplice receives the full 10-year sentence. If both stay silent, the police can sentence both prisoners to only six months in jail for a minor charge. If each betrays the other, each will receive a two-year sentence. Each prisoner must make the choice of whether to betray the other or to remain silent. However, neither prisoner knows for sure what choice the other prisoner will make.

The dilemma can be summarised thus:

The 'Classic' Prisoners' Dilemma		
Prisoner A's Options	**Prisoner B's Options**	
	Prisoner B Stays Silent	**Prisoner B Betrays**
Prisoner A Stays Silent	**Both serve six months**	**Prisoner A serves 10 years Prisoner B goes free**
Prisoner A Betrays	**Prisoner A goes free Prisoner B serves 10 years**	**Both serve two years**

The dilemma arises when one assumes that both prisoners only care about minimising their own jail terms. Each prisoner has two options: to cooperate with his accomplice and stay quiet, or to defect from their 'implied pact' and betray his accomplice in return for a lighter sentence. The outcome of each choice depends on the choice of the accomplice, but the player must choose without knowing what their accomplice has chosen to do.

What would be the best move? Let's assume we're Prisoner A. If Prisoner B stays quiet, our best move is to betray as we walk free instead of receiving the minor sentence. If Prisoner B betrays, our best move is still to betray, as by doing this, we receive a relatively lesser sentence than staying silent. So, if both prisoners arrive at the same conclusion, both will betray. In economics, this 'betray-betray' solution is known as the Nash Equilibrium.

Of course, the correct choice would be for both prisoners to cooperate with each other, as this would reduce the jail time served by both to one year in total (ie six months each). Any other decision would be worse for the two prisoners when considered together. When the prisoners both betray each other, each prisoner achieves a worse outcome than if they had cooperated. This optimum outcome of 'silent-silent' is often called the Pareto Equilibrium.

Now, let's get back to our option two and option three dilemma and re-work the game.

For this purpose, let's change the wording from stay silent to cooperate (ie in option 3). In this example, betrayal would occur if one society took the option two route and lowered price to compete for users.

Thus we return to the problem of the Nash Equilibrium. In this example, 'betray-betray' leads to option two - which we know is the least preferred option for the societies' members, when compared to option three's 'cooperate-cooperate'.

Just as in the classic Prisoners' Dilemma, cooperation is optimal but unstable, since there are reasons why one society might choose to betray. It may seem irrational to betray the long-term greater good but one society may rationalise its reasons for doing so. Perhaps it views the short-term benefits of a first mover advantage outweighing the long-term cost, due to economies of scale.

Given that the European Commission has recommended option three, Nash might argue that the only way to prevent a society betraying is to remove the alternative option and ensure that the cooperation wins out for the benefit of (in this case) composers, songwriters and music publishers. And that has implications for the decisions that Europe's collecting societies and the European Commission will have to take in the coming weeks and months over the question of the collective cross-border management of copyright.

Europe's Collecting Societies' Dilemma

		Society B's Options	
		Society B Cooperates	Society B Betrays
Society A's Options	**Society A Cooperates**	**Both respect option three**	**A loses revenue B gains market share**
	Society A Betrays	**A gains market share B loses revenue**	**Both enter option two**