

# On stability in matching and strategy-proofness in social choice

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## Valorisation

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Valorisation of knowledge refers to the application of scientific knowledge in practice. It aims at creating societal significance from learning by making this information accessible. Valorisation is not just about ‘money’, but also about how the exchange of learning and ideas help the society.

Specifically, this Valorisation helps me to think about why I spent the last few years of my life as a PhD researcher and whether my contributions are helpful to the society. I not only tried to contribute to the society by doing research, but I also contributed to the education of others by teaching in a number of courses. In this section, I try to discuss the societal relevance of the topics discussed in this thesis.

The first part of this thesis broadly studies how ‘desirable’ matchings can occur in society with couples. In real life, we often encounter scenarios where an institution has to be matched with individuals, be it schools with students, hospitals with doctors, firms with workers, etc. Often, there are individuals who want to be matched to the same location. Thus, it is important to know when it is possible to avoid undesirable matchings. This thesis looks at different conditions which might be necessary to achieve the desired results.

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In the second chapter, we study under what conditions can members of the couple deviate from their individual preferences to be together. This is a very practical problem which couples often face. For example, a person might prefer the school at Amsterdam to the school at Maastricht, but might be willing to change her preference if her better half prefers the school at Maastricht to that at Amsterdam just to be together with her partner.

In the third chapter, we study whether combining individual preferences to get a preference for couples is enough to get a desirable matching. The result we obtain is somewhat counter intuitive, but it is still applicable in society today, since it shows that even if the individuals form a couple, there still needs to be altruism to avoid undesirable matchings. This is because, in the above example, the combination of individual preferences has no preference implication between the two situations where both the agents are matched to the same school. This creates a problem of ambiguity, which can only be overcome if there is a sense of altruism among the members of the couple.

The second part of the thesis deals with the aggregation of individual opinions and preferences to reach a collective decision outcome. This is widely used in many situations, for example in voting, or enacting a law in the constitution, deciding on the location of a public good based on peoples' preferences, etc. In the fourth chapter, we study the situation in which a part of individuals' preferences is known. This is closely associated with what we encounter in daily life. A part of an individual's preference is revealed by religious beliefs, behavior on internet, political views, health conditions, etc. In our study, for different individuals different preference parts may be known. For instance, a vegetarian prefers cheese to any food item containing meat, where a lactose intolerant person would never prefer cheese to any other dish. This study tries to find the socially acceptable outcome in such a situation.