# Abstract of the Dissertation
## *Designing and Analyzing Cost-Sharing Mechanisms under fundamental performance objectives*

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This dissertation deals with *mechanism design* and puts special focus on *cost-sharing problems*. A set of customers is interested in a specific service. This service is auctioned off by a *service provider* to a subset of these customers. In particular, the provider has to solve two problems:

- Which customers are given the service?
- What is the price each customer has to pay?

This dissertation considers this task under the assumption that the decisions to the above problems can solely be based on customers' bids. This problem is one of the most fundamental problems in economics and has many applications, for example in public infrastructure projects or in service supply.
The decisions of the provider are computed by a *cost-sharing mechanism*. However, it cannot be assumed that customers' bids correspond to their true valuations. The main task is thus to grant *group-strategyproofness*, i.e., to provide incentives to customers such that neither single cheating nor cooperative collusion leads to a higher profit. These incentives are naturally realized through payment computation.
Next to group-strategyproofness, there are much more desirable properties. Naturally, the cost of providing the service should be covered by the payments. On the other hand, the provider has to stay competitive and thus the surplus should be as small as possible. These requirements are summarized by the term *budget-balance*. Moreover, from the economic point of view, there should be a reasonable trade-off between the cost of the provider and the true valuations of the rejected customers, i.e., the mechanism should be *economic efficient*. Finally, practical applications demand for efficient computation of the mechanism and the solution that provides the service to the selected customers.
The main contribution of this dissertation is the extension of research in this area, in particular in the design of new mechanisms that partly improve the performance of existing mechansims. Main applications are scheduling problems and connectivity problems within networks.