

- b. To insure that individual property rights are well protected.
- c. To improve citizens' ability to move around by building a road.
3. (10 points) There are a number of policy initiatives intended to replace government welfare programs (financed through taxes) by privately charity (organized by churches and other local community centers). Can 'fair income distribution' be considered a public good? Do you think that there would be enough of this good if income redistribution is left to people themselves? Relate your answer to the free-rider problem.
4. (25 points) Consider a simple two-person exchange economy. Mark and Erin consume two goods – posters of Britney Spears (pBS) and posters of Justin Timberlake (pJT). Currently, Mark consumes 10 pBSs and 5 pJTs, Erin consumes 3 pBSs and 9 pJTs. Mark's marginal rate of substitution of pBSs for pJTs is one ($MRS_{BSJT}^M=1=MU_{BS}^M/MU_{JT}^M$), Erin's marginal rate of substitution of pBSs for pJTs is 0.5 ($MRS_{BSJT}^E=0.5=MU_{BS}^E/MU_{JT}^E$).
- Define a Pareto efficient allocation.

6. (25 points) Consider two neighbors Terry and Rob. They both plan to produce fireworks on the New Year's Day. The (inverse) demand functions are given by:
- $$P_T = 100 - Q_T; \quad P_R = 100 - Q_R$$
- (quantities are expressed in number of rockets used); the marginal cost is given by $MC = 80 = \text{const}$.
- First suppose that Terry and Rob can prevent each other from watching the fireworks that each of them produces. In other words, fireworks display is excludable and is therefore a private good. What is the efficient number of rockets used by both Terry and Rob in this case? Show all your work.
 - Now assume that it's impossible to exclude neighbors from watching and enjoying fireworks. Now fireworks display is a public good. What is the efficient number of rockets in this case? Show all your work.
 - Define the free-rider problem. Based on your results in parts (a) and (b), comment if free-rider problem is present in this case?

7. (extra credit 5 points) There is an interesting phenomenon that exists in San-Francisco bay area. It is called 'casual car-pooling'. People driving from Berkeley to San-Francisco voluntarily stop at a certain parking lot and pick up people who need a ride to SF. People who need a ride to SF just show up at this parking lot and stand in line to get a ride. Most of the drivers are relatively well-off (if they have enough money to park in downtown SF). Interestingly, they do not take any money. So costs to passengers are virtually zero (you don't even have to maintain some small talk with the owner of the car). This system already exists for more than 15 years. Can you explain this phenomenon using the theory of externalities and public goods?