

Game Theory with Application in Economics and Finance

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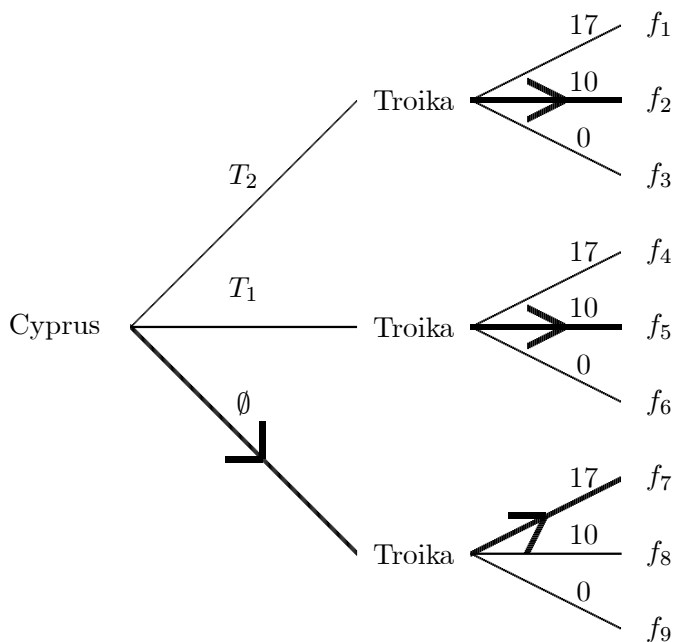
Solution Exercise Chap.2 (2/2)

Cyprus: Taxation of bank deposits to avoid a euro exit

1. From (I_4) & (I_5) the three possible Cyprus actions are: not to implement any tax, denoted by \emptyset ; to adopt the tax T_1 ; or to adopt the tax T_2 .

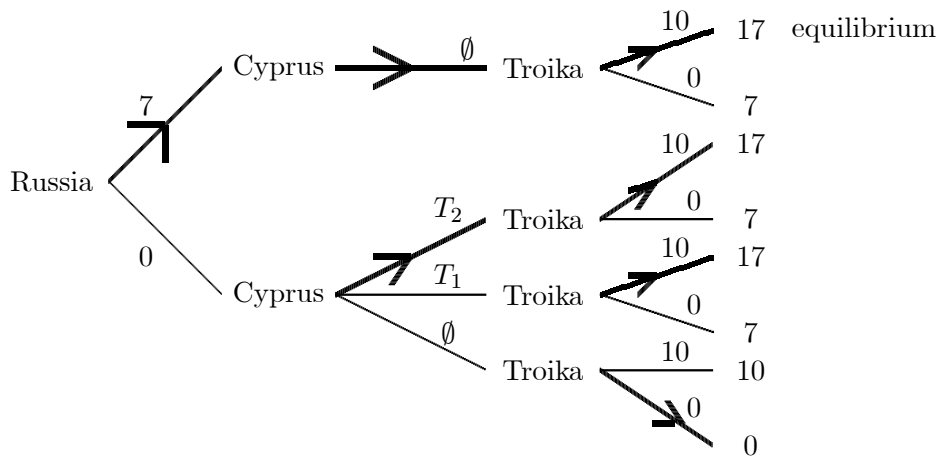
From (I_6) the three possible troika's (EU, ECB and IMF) actions are: to not take part in the rescue plan, denoted by 0; to lend 10 billion euros, denoted by 10; or to lend 17 billion euros, denoted by 17.

2. The sequential form game played by Cyprus and the troika where Cyprus moves first depicts as (ignore the array for the moment):

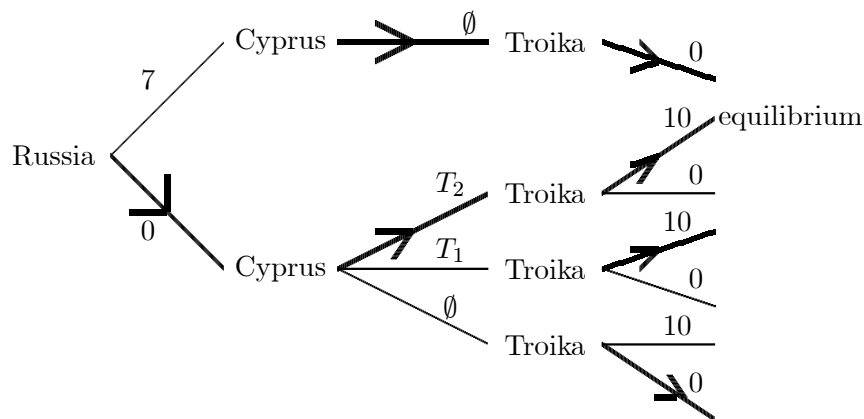


3. From (I_3) Cyprus rescue requires a help estimated at 17 billion euros. The leaves corresponding to a rescue are: $\{f_1, f_2, f_4, f_5, f_7\}$.

4. From $(I_1) \& (I_2) \& (I_3)$ the troika prefers a Cyprus rescue, but wants to be involved as less as possible. Therefore, troika's preferred leaves when Cyprus plays: T_2 is f_2 ; T_1 is f_5 ; and \emptyset is f_7 .
5. From (I_5) , Cyprus prefers f_2 to f_5 . From (I_2) Cyprus prefers f_7 to f_2 and f_5 . Finally, among the three preceding leaves, Cyprus prefers f_7 .
6. The backward induction outcome is f_7 : the troika is the only player involved in the Cyprus rescue.
7. From (I_8) there are only two possible troika's actions: to not take part in the rescue plan, denoted by 0; to lend 10 billion euros, denoted by 10. From (I_7) Russia's actions are: to not take part in the rescue plan, denoted by 0; to lend 7 billion euros, denoted by 7.
8. The sequential form game played by Russia, Cyprus and the troika where Russia moves first and Cyprus moves second depicts as (ignore the array for the moment):



9. The backward induction outcome consists in Russia lending 7 billion euros and the troika lending 10 billion euros.
10. From (I_2) the troika prefers this equilibrium to the one of question 6 because in both cases Cyprus is rescued but the troika lends a lower amount in the second case.
11. From (I_9) the troika will provide assistance only if Russia does not participate. The new game tree in the sequential order of question 8 depict as (ignore the array for the moment):



12. The backward induction outcome consists in Cyprus implementing the tax T_2 to raise 7 billion euros and the troika lending 10 billion euros.
13. From (I_2) the troika prefers this equilibrium to the one of question **6** because the rescue is performed at a lower lending amount from the troika (10 rather than 17 billion euros). From (I_9) the troika also prefers this equilibrium to the one of question **10** because now there is no more Russia participation.
14. By announcing a bailout reduction from 17 to 10 billion euros (I_8) and by providing Cyprus government with incentives to renounce to any Russian assistance (I_9) , the troika succeeds to implement his first-best equilibrium outcome.