

Reserve System with Beneficiary-Share Guarantee

Xi Jin

Abstract :

We study allocation problems with reserve systems under minimum beneficiary-share guarantees—requirements that targeted matches constitute at least a specified percentage of total matches. While such mandates promote targeted matches, they inherently conflict with maximizing total matches. We characterize the complete non-domination frontier using minimal cycles, where each point represents an allocation that cannot increase targeted matches without sacrificing total matches. Our main results: (i) the frontier exhibits concave structure with monotonically decreasing slope, (ii) traversing from maximum targeted matches to maximum total matches reduces matches by at most half, (iii) the Repeated Hungarian Algorithm computes all frontier points in polynomial time, and (iv) mechanisms with beneficiary-share guarantees can respect category-dependent priority orderings but necessarily violate path-independence. These results enable rigorous evaluation of beneficiary-share policies across diverse allocation contexts.