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"How much is your future worth?" – why finances will not solve the orthopaedic match

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Thank you for writing this insightful and interesting article. I think it sheds light on a rising problem of increasing applications, and I think both understanding the problem and finding a solution comes from economics and game theory. Al Roth had seen residency as a "match economy", and found a solution with the general medical "match", but I think the orthopaedic specialty highlights a particular "unraveling" of his match economy – in which there are too many applications, and not enough resources to fully evaluate those applicants (1).

The problem now isn't from the algorithm of the match itself, but rather the entry into the market through ERAS. ERAS does not limit applications, though the sliding scale application fee is supposed to serve as a financial deterrent. Thinking back to our basic college economics of commodities classes, that's basically a supply curve. The demand has been right-shifting every year. I also think that when your future's at stake, that demand is "inelastic" – that is, demand is insensitive to price changes.

With a finite number of 175 orthopaedic programs in 2019, and one could employ the radical method of "apply to them all" at a final cost of $3,770. While hefty for a medical student, I challenge with this response: how much is your future worth? When you're averaging $200,000-300,000 in debt, and when the monthly salary of an orthopaedic surgeon will soon be $43,865, the all-in strategy is financially inconsequential.

The curve provided by the authors demonstrate a diminishing marginal return, but the curve never becomes a "negative marginal return." To a committed applicant who is demand-inelastic, it would always be in their best interest to apply to additional programs. Supply-and-demand economic principles cannot be applied, if applicants are not subject to limited resources. As described by Al Roth, this is a market where price cannot set demand.

CHANGING THE GAME

I suggest changing perspective, and solving the problem as a problematic game with faulty rules, where too many players are taking too many turns. The first step of the application game is played out in collecting maximal numbers of interviews. That increases their chances of matching. The equilibrium state would therefore be to submit the maximal mount of applications if there are no negative repercussions for submitting more.

Since applications are basically submitted at a one-time event, this a "non-cooperative simultaneous game," a one-turn game akin to roulette or craps, where there is no information on where a ball or how dice may land. If one diversified their bets, they would increase their chances of something winning (though not to say they'll come out ahead). Since there are no true negative consequences of applying to more programs, if any given applicant were to apply to 175 programs, he would have the advantage over a similarly credentialed individual who has applied to less. The maximal application environment would be the equilibrium.

The true cost, however, is borne by programs and application reviewers. Frivolous applications dilute the time that can be spent on any individual applicant's file. Programs implement screener thresholds on marginally relevant measures (i.e. cutoffs on USMLE scores, which will now be phased out), but at a cost of missing qualitative attributes. Applicants are eventually hurt by the compromise to the quality of the application review process itself.

As mentioned in your paper, the idea of limiting applications has been presented before. However, with 1,037 applicants in 2019, what's to prevent a popular program from receiving applications from each of those applicants? It would seem as though the challenge comes from this single-stage entry game with no information, where each applicant does not yet know the attributes of others applying to a program they are interested in. Poorly credentialed individuals would still apply, popular programs would still have the problem of excessive applications to review, while lesser-known programs may get missed.

THE APPLCATION MARKET AS A STOCK MARKET

An alternative version of the game I would postulate is a multi-staged "sequential game", such as the stock market or Monopoly. An important part of such a game is "perfect information." In a market with "perfect information," all players have instantaneous knowledge of market prices and past performances, and their own attributes. They're able to judge their next step, based off what they see as how a stock has performed, whether they can afford the stock price, and the opportunity cost of not buying another stock.

I propose a system such as this: if we limited the process to 30 applications per applicant, 3 turns, and 10 applications delivered with each turn. Feedback can be delivered after each turn with information from the program including the number and competitiveness of the applications already received. This can include the usual metrics (USMLE scores, AOA rank, and # of publications). This delivers a "market price" for any given program, and with the limited resources left for the next turn, applicants can redirect their next 10 applications accordingly to where they may be competitive and where they can get a fair review of their application, and repeat for turn #3.

At our current rate, Equilibrium would mean the laborious process of 188,300 application reviews per year (or 1076 applications per program). We are nearly halfway there. If we limited application to 30, that'll bring it down to 32,280 application reviews (or 184 applications per program), a much more surmountable process. Applicants would simply need to know how to distribute their limited resources, or rather, how to quite literally "play their cards."

Disclaimer: e-Letters represent the opinions of the individual authors and are not copy-edited or verified by JBJS.

References

1. Roth, Alvin E. Who Gets What–and Why: the New Economics of Matchmaking and Market Design. Mariner Books/Houghton Mifflin Harcourt, 2016.

Conflict of Interest: None Declared