# Truncation Strategies

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Deferred acceptance is strategy-proof for the proposing side but not for the accepting side. Coles and Shorrer (2014) find that truncation—the rejection of potential partners with whom a match does not meet threshold utility— can improve utility for the accepting side. In this note I affirm the findings of Coles and Shorrer by demonstrating utility gains from truncating, and analyze if truncation is more useful than an increase in the size of the proposing side. For ease, consider men-proposing deferred acceptance, where women (the accepting side) have the option to truncate.

Let us first revisit the average utility for a woman without any truncation. **Figure 1** shows the average utility each woman achieves from a given market size. This and all other figures are created with differently sized markets, with number of men $M = (5, 50)$ and number of women $W = (5, 50)$, and with utilities averaged over 30 iterations. Utility is defined as the fraction of one's best choice that each woman receives.

Figure 1: Utility without Truncation
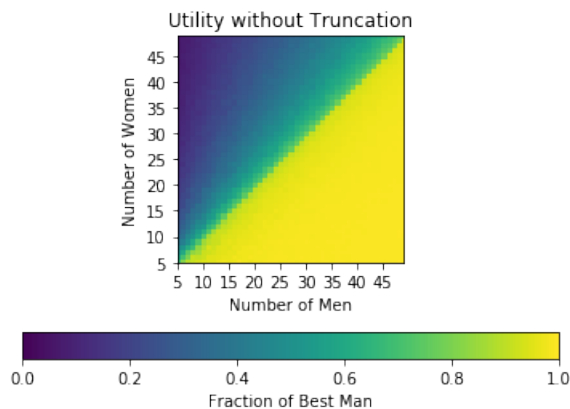
I then found the level of truncation that is optimal for women at each market size. Like Coles and Shorrer (2014), if the utility gains from any set of truncations is the same, the highest level of truncation is chosen. **Figure 2** shows the fraction of men that each woman should turn away in order to maxmize their

utility. Note that this does not show the utility gain from truncation, merely the amount of truncation that generates optimal utility gains.

Figure 2: Optimal Truncation
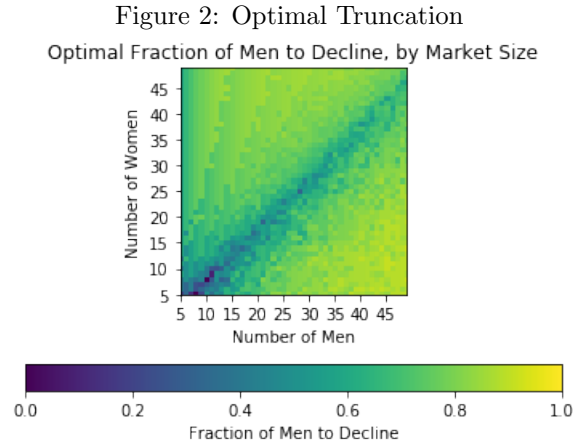
Then I graphed the average utility each woman receives from the level of truncation that is optimal given contemporary market conditions. **Figure 3** shows the utiltity received from truncating according to **Figure 2**.
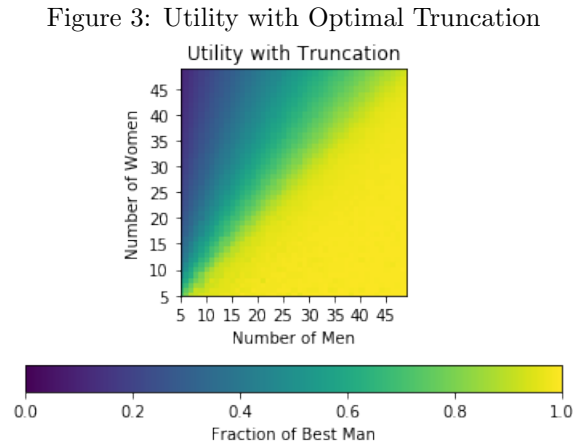
Figure 3: Utility with Optimal Truncation

Figure 4 shows the difference in utility between truncating and not truncating, or the difference between **Figures 3** and **1**. Note that optimally truncating never decreases utility; it is possible to truncate at a threshold utility less than the least-desired man, so that no match is changed.

Truncating is a useful strategy in balanced markets and when the number of women exceeds the number of men. Note this is the utility *difference*; there is little improvement from truncation when the number of men is greater than the

Figure 4: Utility Gains from Truncating
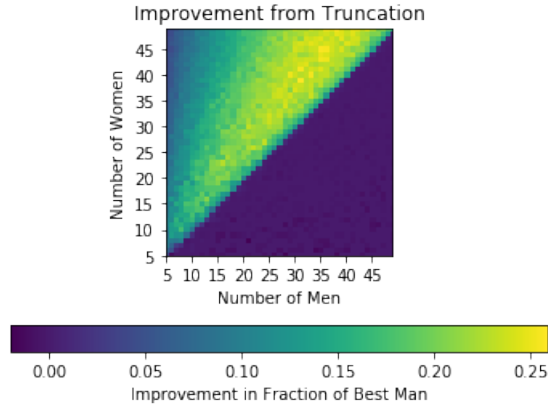
number of women because women are expected to get the best possible outcome then even without truncation.

Another way for women to improve utility is to increase their demand, or to introduce *another man* into the market. **Figure 5** shows the improvement in women's average utility from adding another man into the market.

Figure 5: Utility Gains from Adding Another Man
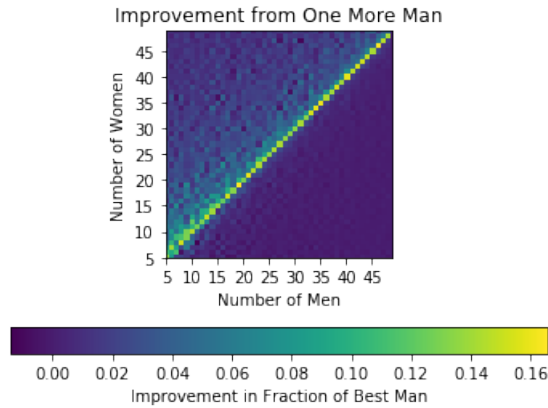
A former note has already discussed that an increase in the number of men in a balanced market generates the biggest increase in women's average utility. Adding an extra man when utility already nears 1 (when the number of men is significantly higher than the number of women; see **Figure 1**) will not drastically change women's utility, meanwhile gains from increased competition are expected when the number of women is significantly larger than the number of women, but are smaller than in a balanced market.

Truncation and increased competition strictly improve women's average util-

ity. I now consider if truncating optimally or if increasing the number of men in the market is more optimal for women. **Figure 6** includes this comparison.

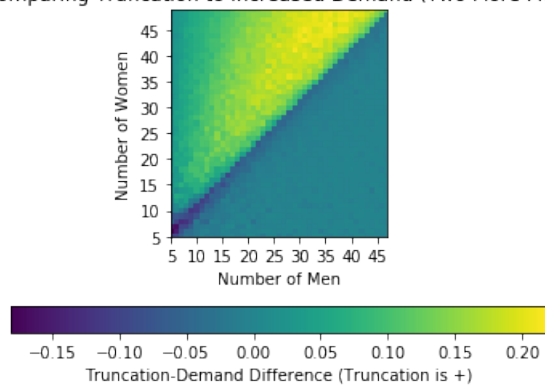Figure 6: Difference in Utility: Truncation vs. One More Man
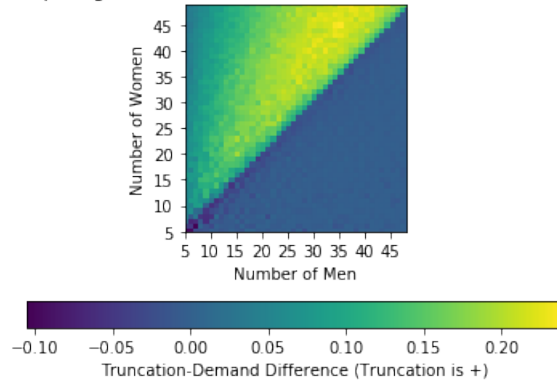
Truncating is a strictly better strategy when the market is not balanced, and both strategies do not change utility when the number of men is significantly larger than the number of women (see **Figures 4** and **5**). I then determined to find the number of men who had to enter the market in order for women's gains from increased demand to become comparable to optimal truncation strategy. Consider **Figure 7** which includes the difference in utility when two men enter the market, and when four men enter the market. (Note the difference in color codes.)

The increase in competition is signficant when the number of men and women are small, but as market sizes grow large, truncation is still a much more effective strategy.

Figure 7: Difference in Utility: Truncation vs. Two/Four More Man