MATCHING OF SUPERVISORS AND STUDENTS WRITING THESES:
A PROPOSAL FOR IMPROVEMENT

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On March 1, we (the members of the Department of Economics) received a mail from the HOD's in which they stressed the complexity of the process of allocating supervisors to students, and asked for our understanding. Although I know little about the actual process that is used, I have the strong impression that the task would be less burdensome, and the outcome better, if a different procedure would be used. Essentially, the current procedure is a centralized command and control process in which the HODs dictate the outcome. We can expect a market process to do better. The role of the HODs could be limited to specifying the rules of the market. In this brief note, I suggest a specific market process. I suggest that we try this market process in the academic year 2017-2018 and that we adopt it if it is a success.

Markets can be centralized or decentralized. I propose a centralized matching market. Following the seminal paper of David Gale and Lloyd Shapley from 1962,[1] a large literature has developed on how to organize such markets. Gale and Shapley proved two key results: a stable matching exists, and (applied to our context) there exists an F-optimal stable matching as well as an S-optimal stable matching. They show that there is a simple procedure to find such an optimal matching. Here F stands for faculty members, while S stands for students. Our interest is in the F-optimal matching: this is that stable matching that is best for all members of F. Clearly, if we are self-interested, we should choose this matching. However, there is also a public interest justification: Faculty may have strong preferences, while students will be nearly indifferent, as long as they get good supervision. Clearly, the F-optimal match leads to good supervision.

It will be obvious that the result needs certain assumptions. The most important assumptions in Gale-Shapley are that each side has well-defined preferences over the other side and that there is complete information. A problem in applying the Gale/Shapley procedure in our context is that we don't know the students, hence, do not know our preferences. Therefore, the procedure should start with students providing information, so that we learn or preferences. The minimal

[1] D. Gale and L. Shapley, College admissions and the stability of marriage. *American Mathematical Monthly*, 69 (1962), 9-15.

amount of information that should be provided (centrally) for each student is GPA and field of interest, the latter preferably in the form of a research question. To minimize transaction costs, students could also list 1-3 supervisors that they consider most suited. As background information, students should also upload CV and grade list.

Once that information is provided, we can simply use the Gale-Shapley Deferred Acceptance Procedure with F as the active (proposing) side, DAF. As is the case now, each supervisor i has to supervise a certain number of students, Q_i, which is determined by the HODs according to a fair, objective and transparent procedure. Each supervisor makes Q_i offers to students and those students that receive offers select the best one. Supervisors that have not yet filled their quota continue making offers until all quota are filled. Crucially, students' acceptances are tentative; the match becomes final only in the last round. A significant advantage is that DAF can be easily programmed. Once the program (and the associated information platform) is in place, the system runs itself.

The DAF procedure can be used both for the Bachelor's phase as well as for the Master. For the latter, the matching of interests of the student and the supervisor is even more important. I think that is this case, the phase prior to the formal matching could be used for both sides to get to know each other better. If I understand well, in the MSc we currently have four tracks: BEE, COMP, MAFIN and PP. Given that information is key, it would be desirable if teachers in a certain track are informed about the students in their track as early in the academic year as possible.

One issue that might have to be dealt with in the MSc is rationing to due quantitative mismatch in certain tracks. In my view, a faculty member should not be forced to supervise MSc students that are not working in his area of expertise. To avoid rationing and mismatches, it is desirable if students are informed early in the year on how much supervision capacity there is in each of the tracks.