Getting the least out of the worst: a critical assessment of the admission process to Italian schools of medicine*†

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Abstract

Every year, students applying to schools of medicine in Italy outnumber the available places by a ratio higher than 5:1; the need to select the enrolling class of students and to allocate these students to the various schools of medicine is a clear example of bilateral matching problem. The purpose of this essay is to examine how this matching issue is currently solved within the system of Italian public universities and to critically review the efficiency of the resulting outcome. In particular, I will show that the enrolling class of students of medicine is far from corresponding to the best pool of prospective national candidates. At the end of the essay, I will also outline a stylized reform proposal that, by using exactly the current one-day-only testing procedure, selects the student body in a potentially more efficient fashion.

1 The long road to the Hippocratic Oath

1.1 High-school is over...and now?

Medicine has always been regarded as the noblest of the sciences. The idea of helping others, relieving pain, preventing and curing diseases is a difficult, though attractive and generally well-remunerated, task.

Italian high-school students are certainly not immune from this "attraction": each year, students willing to pursue medical studies outnumber the places available at the 39 public universities (excluding 3 private institutions and 2 courses taught in English) by a ratio of approximately 5:1. It is hard to say whether the pool of prospective students of medicine is so large because of the relatively low tuition (especially if compared to U.S. medical schools), the relatively safe career this field of studies guarantees, the natural attractiveness

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the medical profession exerts on high-school graduates, or simply some combination of these factors. Whatever the source of this appeal, it is out of any doubt that Italian schools of medicine need to resort to some selection mechanisms in order to avoid ending up with an oversized student body.

As it often happens with tertiary education in Italy, the current solution to this issue stems directly from the M.I.U.R.[1]. At the end of their secondary education, Italian high-school graduates willing to pursue college education generally do not know exactly what and where they will be studying in the next few months. This happens for two main reasons: first, several university courses admit only a limited number of students, and admission tests to these courses[2] are never administered before the end of August (i.e. just a couple of months in advance with respect to the first Fall classes); secondly, enrollment at courses where admission is unrestricted is generally possible till well after lectures have already begun.

1.2 Admission to medical schools

As far as medical schools[3] are concerned, admission depends on the outcome of a "one-day-only" standardized test (generally administered during the first week of September). Referring to the tests administered in the last two years (i.e. academic years 2009/2010 and 2010/2011), students had to answer 80 multiple choice questions pertaining to the following areas:

- 40 "General culture and critical reasoning" questions;
- 18 "High-school level biology" questions;
- 11 "High-school level chemistry" questions;
- 11 "High-school level physics and math" questions.

Analogously to many other paper based standardized tests (most notably, the SAT), each correct answer is worth 1 point, each wrong answer is worth -.25 points and blank answers are awarded 0 points. Given that the number of possible answers is 5, this trivially implies that, in expectation, a complete blind guessing strategy yields 0 points.
As soon as results are available, each university publishes a ranking of the students who took the test at its seat. The first ranking criterion is given by the total number of points received by a candidate (that is, simply the sum of correct answers in all sections of the test net of 0.25 times the number of wrong answers); as tie-breakers, universities refer to the following criteria (in this given order): points earned in the "General culture and critical reasoning" section, points earned in the biology section, points earned in the chemistry section, points earned in the physics/math section, high-school graduation mark.[4]

[1] M.I.U.R. is an acronym which stands for *Ministero dell'Istruzione dell'Università e della Ricerca*.

[2] From here on, I will refer exclusively to Italian *public* universities; private universities benefit from some degree of autonomy which, at least in specific cases, lets them free to administer admission tests before high-school students complete their last year of secondary education.

[3] In Italian: *Facoltà di Medicina*. Once again, I am referring to *public* schools of medicine; the 3 private institutions select students following autonomously set admission procedures, whereas the outstanding 2 courses in English have a common admission procedure that is different from the one of the other 39 public universities.

[4] In academic years 09/10 and 10/11, high-school graduation mark has been employed as a tie-breaker - and not necessarily for the ranking of admitted students - respectively 26 (that is, 25 couples of students who had taken the admission test at the same university had received the same points in all sections, and 3 more students who had taken the test at the same university had received the same points in all sections) and 31 times (that is, 30 couples of students who had taken the admission test at the same university had received the same points in all sections, and 5 more students who had taken the test at the same

The most interesting feature of this testing procedure is that *all universities* administer the *very same test* on the *very same day, at the very same hour* but, contrarily to what we might *a priori* expect, prospective students cannot use the results of the test to apply to more than a single medical school. In other words: each student can apply to a single (public) medical school, and the only way to do so is to physically go to this university in order to take the admission test (which is nonetheless equal for all public schools of medicine in Italy) at the only available sitting date.

1.3 Some perplexities

Even a cursory outline of the admission procedure should immediately shed some light on the blatant weaknesses of this system. In particular, it should be noted that such procedure entails two classes of very serious problems:

- **Ex-ante selection issues:** regardless of how the final ranking is computed (i.e. this does not depend on having a single national ranking or 39 university level classifications), an admission system that depends *exclusively* on the outcome of a single test is almost certainly going to neglect a huge amount of information concerning each candidate's aptitudes, motivations and qualities (*inter alia*: her entire school career, her past work/volunteering experiences, etc.).

  Additionally, a single-day test is extremely risky: what if a potential Nobel Prize winner is sick on test day and does not perform at the top of her abilities?
  It may be argued that the risk of underperformance due to illnesses or other individual level problems should be indipendently distributed across prospective students of all degrees of ability[5]; however, even if this were true, it would not imply that the outcome of such test is *fair*, but simply that it is equally uninformative with regard to anyone's ability. This is probably one of the many reasons why U.S. colleges and universities, even though they expect prospective students to submit the scores of some standardized tests (SAT, ACT, GRE, GMAT, TOEFL, etc.), generally place no restrictions on the number of times each individual can take the test (and also why standardized test scores are usually considered along with many other evaluation factors).

- **Ex-post selection issues:** If the test is exactly the same for all applicants, why should its results be employed just for a single university? This point arises some serious doubts concerning the current testing procedure: let's suppose for a second that the test administered each year is the perfect instrument at our disposal to identify potential doctors' abilities. This would imply that students scoring higher on the test would on average complete their studies before, with better marks, and then become better physicians than their peers who received lower scores. Even if this were the case (and this seems a quite implausible assumption), there is little sense in having 39 local rankings instead of a single national one: by doing so, good candidates which were rejected in particularly competitive seats and that would be eager to pursue medical studies in some other university must wait another year prior to reattempting admission. Conversely, bad candidates may be admitted to other schools of medicine just due to the lax competition faced during the test and to the impossibility of better candidates to apply to more than a single university.

university had received the same points in all sections). Practically speaking, high-school graduation mark is irrelevant to define a candidate's admission probability.

[5] However, it may also be the case that this objection does not hold: what if, for instance, better potential physicians systematically underperform on test day because of the stress that comes from higher personal expectations?

In the following sections of this essay, I will examine the data concerning the admission outcome (number of applicants, number of seats available, average total points of applicants) of the last two academic years. Specifically, I will try to give some insight concerning how large the aforementioned ex-post selection problem is.

2 "Anatomy" of a prospective student of medicine

2.1 Preliminary considerations on all students who have taken the test

Tables 1 2 3 provide the most essential information concerning the pool of prospective students of medicine in academic years 2009/2010 and 2010/2011. For the sake of simplicity, here and in the rest of the essay I will mainly discuss the issues given by university-level differences in total points received by applicants (i.e. I will ignore differences in terms of average points of the single sections of the test).

Here are some preliminary considerations:

- In the period under examination, the applicants-over-available-places ratio remained between 3.02 (Varese in a.y. 2009/2010) and 11.02 (Foggia in a.y. 2010/2011). On a national level, this ratio was 5.33 in 09/10 and 5.53 in 10/11. This confirms the fact that medical education is highly popular in Italy.

- With only few exceptions (Università del Molise, Seconda Università di Napoli, Università di Parma, Università di Messina, Università di Perugia, Università di Udine), the number of applicants increased from 2009 to 2010.

- The number of available places generally increased for all institutions[6]. This increase was the largest (both in absolute and relative terms: + 103 places, corresponding to an almost 36% increase) for the University of Palermo. The only decrease in the number of available places happened at the University of Modena and Reggio-Emilia (from 143 to 142): this is a little curious, because the number of applicants to this seat increased (from 794 to 849), whereas at the University of Molise, where applicants went from 636 to 520 (i.e. an 18% reduction), available places increased by almost 10% (from 75 to 82).

- The reason why there is no correlation between variations in number of applicants and available places is that, each year, the number of places is determined according to a very questionable procedure that, among other things, is also grounded on the alleged "demand" of doctors by each single *regione*. This obviously rests on the un-tested (and possibly dangerous) assumptions that graduates from a given *regione* will then work as physicians in that very same geographical area.
  Furthermore, it should be noted that, **after** the test has already been administered, the MIUR generally intervenes by increasing the number of available places for most universities. Once again, this is explained by the fact that the bureaucratic procedure which drives the definition of available places (and which aims at estimating the "demand" of physicians by each regione, and that rests on the absurd assumption that local graduates will work in the same place where they have studied) continues well after the test has been administered.
  Even though this is not specifically the topic of this essay, I think it is worth emphasizing that the year-long procedure which underlies the definition of the available places at each institution is not only unreasonable, but also dangerous. I do not see any compelling motivation that justifies why universities should admit as many

[6]The total number of available places, even if not reported in the tables, increased from 8009 to 8923.

students of medicine as determined by a central bureaucracy.
To be brief: I believe universities should be totally free to autonomously set the optimal number of students they will be able to teach. Otherwise, if we believed that the definition of available places should satisfy an underlying "demand" of physicians by each *regione*, wouldn't it be better to centrally plan the optimal allocation of medical graduates and oblige them to work in a given area? I am not suggesting that the latter would be a good solution to the alleged problem of the uneven geographical distribution of physicians (which, as far as I know, has not been convincingly documented in the relevant literature); I am simply asserting that the current rationale is dangerous, because if we really believed in it, then we could think that purely dictatorial ways of distributing human resources could fulfill the same purpose in an even better fashion.

- There is considerable variability in the two-year-average of total points received by candidates at different institutions. On average, Catanzaro is the institution which attracts the least performing candidates (with a two-year average of 26.11), whereas Milano is the one with the highest total average for both years (with a two-year average of 36.45). It is quite straightforward that candidates taking the test at different places are indeed very different. Unfortunately, I have no information concerning the previous history of candidates (e.g. geographical residence, age, school, etc.) and therefore cannot say whether these differences stem from significant inter-regional ability of candidates or from some strategic behavior of students (that is, I cannot say whether high-school graduates from Milano sistematically overperform high-school graduates from Catanzaro, or if applicants at Catanzaro underperform with respect to applicants at Milano simply because the University of Catanzaro systematically attracts worse candidates than the University of Milano does).

2.2 Preliminary considerations on admitted students only

After having briefly examined the data concerning the whole pool of applicants, it is now interesting to make a comparison among the different pools of *admitted* candidates; I therefore repeat the whole exercise of section 2.1 by focusing on admitted students only. As before, Tables 4 5 6 epytomize the relevant information discussed in the rest of this section.

- There is a considerable amount of inter-university variability in terms of average total points. Specifically, averaging over two academic years, mean total points received by admitted candidates vary from a minimum of 43.60 (L'Aquila) to a maximum of 53.77 (Pavia).

- The number of points received by the last admitted candidate of each institution are subject to remarkable variability as well. In academic year 2009/2010, the least performing admitted candidate in Varese received 38.50 points, whereas the last admitted candidate in Pavia obtained 48.25 points.
As far as academic year 2010/2011 is concerned, the least performing admitted candidate in Molise received 37.50 points; conversely, the last admitted candidate in Milano obtained 48 points.

- The large amount of variability in terms of average total points and of points received by the last admitted candidate ensures that a very unpleasant situation arises: good rejected students from a very competitive university may have enough total points to confortably access to a less competitive university where they would probably be willing to study. That is, the pool of admitted candidates does not coincide with the

pool of the best prospective students on a national basis. As I will show shortly, this problem is indeed very large and affects a considerable share of the pool of admitted candidates.

3 University-level rankings: estimating the efficiency loss

As I mentioned in subsection 1.3, the current admission procedure entails both ex-ante and ex-post selection issues. As far as the latter are concerned, the problem stems from using a single standardized test with 39 distinct rankings. In particular, it might very well happen that some relatively good rejected students may have high enough scores to confortably gain admission to another institution. Conversely, bad admitted students would not enter medical school if the best students on a national level were given the right to choose where to study. This is indeed a very critical problem: if we are willing to believe that the current testing procedure is the best way to assess students' abilities, then, by prohibiting students from applying to more than one university, admitted applicants almost necessarily do not coincide with the best applicants on a national level.

In addition to this, strategic behavior may arise: when deciding where to apply for admission (i.e. where to take the test) students are faced with a trade-off between directly pursuing their own preferences (i.e. taking the test at their favorite university) and maximizing their chances of admission by taking the test at a university which generally attracts less competitive students. Hence, it is quite likely that some students act strategically and avoid applying to their most preferred university in order to increase their chances of being admitted. This form of rational behavior has its efficiency costs too: students who acted strategically and, ex-post, would have (also) been admitted to their most preferred university obviously regret not having truthfully revealed their preferences. Unfortunately, there is no easy way to reliably measure this second form of ex-post inefficiency.

In order to correctly assess the magnitude of the "mismatching" issue (i.e. admitted students $\neq$ best students), we need to know whether the best students which have been rejected with the present mechanism (i.e. single test + 39 rankings) would be willing to move to another university. This is obviously an information we cannot retrieve.
However, we can still use the best 8,009 (a.y. 2009/2010) and 8,923 (a.y. 2010/2011) students on a national level as a benchmark and make a comparison between this pool of applicants and the 8,009 and 8,923 students who were actually admitted with the university-level rankings.

3.1 How large is the mismatch?

Then, how different are the 8,009 and 8,923 students who were admitted in the last two years from the 8,009 and 8,923 best students on a national level?
As Tables 7 8 9 10 show, the two pools of admitted students and the ones of best national students are significantly different.

As far as academic year 2009/2010 is concerned, if all 8,009 best students on a national level had been given the chance to study medicine (and had accepted this opportunity regardless of the university), the pool of students of medicine would have differed by an astonishing amount of 1,131 units from the pool of students who have been actually admitted with the ruling system. More to the point: many candidates who took the test in Southern universities would have been rejected in favor of candidates coming from the North. Among the admitted candidates of Northern universities (including Tuscany), only 109 individuals from four institutions were not among the best ones on a national level (Siena, Torino - Orbassano, Varese, Vercelli).
Obviously, the opposite phenomenon can be observed looking at those candidates that

would have entered with a single national ranking, but who were eventually rejected through their local rankings. Specifically, the University of Palermo and the University of Messina are the only 2 institutions located below Marche whose candidates may have benefitted from a single national ranking. The University of Milano is by far the leading university in terms of best rejected candidates: with a hypothetical national ranking, 206 rejected students who took the examination at this seat would have had the chance to study at some other university (roughly speaking, this corresponds to one fifth of all rejected students that may have benefitted from a national ranking). More generally, it is impressive to observe that, over a total number of 8,009 available places, 1,131 of them (that is, 14.22%) may have been more efficiently allocated using a single national ranking.

Exactly the same reasoning applies to academic year 2010/2011 as well: here we have 1,375 admitted students out of 8,923 (i.e. 15.41%) that, with a single national ranking system could have been rejected in favor of better performing students. The geographical observations which have been noted before apply to this case as well (good candidates in Northern universities may easily gain admission to Southern universities; Palermo is the only Southern exception that occurs in both academic years).

3.2 How serious is the mismatch?

The aforesaid considerations could reasonably be neglected by a lazy policy-maker if the average quality of the two different pools of candidates were not remarkably different. After all: even if the doctors are different individuals, why bother changing the current admission procedure if a single national ranking does not deliver *significantly* better doctors?
The purpose of this section is to check how qualitatively different the currently admitted students of medicine differ from the benchmark case of the best candidates on a national level.

Table 11 delivers an immediate and intuitive comparison between the currently admitted students and the best performing candidates on a national level. Apparently, this difference is not that big (in either academic year), provided that we are sufficiently superficial to compare the *whole* pool of admitted applicants to the *whole* pool of best national candidates. These results seem indeed to offer some sense to the quite provocative question I asked above: if, collectively taken, all the best national candidates just differ by a mere .5 average total points from the currently admitted students, why should we change the test? If changing admission rules is costly, then pursuing a potential maximum efficiency increase (remind that I am always using the best students on a national level as a simple benchmark) of less than .5 average total points may not appear a marginal benefit worth the fighting for.

Needless to say, this situation changes dramatically if we restrict our attention to so-called *swing* students: that is, those students who are admitted only if we use a specific ranking criterion (practically speaking, these are exactly the students I refer to in Tables 7 to 10). Table 12 provides evidence that the pool of admitted swing candidates is, in both academic years, visibly worse than the pool of swing candidates that would have had the chance to enter schools of medicine using a national ranking. Over the last two academic years, the best rejected applicants received an average of 45.09 total points, against 41.93 of the admitted swing applicants (see last column in Table 12). In other terms: the best rejected candidates of the last two academic years received an average total score that was 7.54% larger than the average total score of the worst admitted applicants.

Hence, it is evident that the use of 39 different rankings not only determines a *large* mismatching problem in terms of number of affected students (14-15% of the number of available places), but also a quite severe one in terms of quality of rejected vs. admitted candidates (on average, the best rejected candidates have a 7.54% higher score than the

worst admitted candidates).

4 Evaluating the current system

4.1 Why worst?

In a quasi-perfect world, I would expect universities to autonomously define which criteria should be followed to evaluate prospective students' applications. In particular, I imagine that most schools of medicine would require applicants to take some standardized test, but would then integrate this information with a thorough evaluation of the students' curricula, marks, letters of reference, and possibly with a personal interview as well.
I do not think there can be a peculiar mechanism which almost mechanically identifies the ability level of a prospective student of medicine. Specifically, I think that, for a wide variety of reasons, different universities may have different preferences in terms of which students they would like to admit. For example, some universities could be looking for students with top marks, regardless of their previous life and/or professional experiences. Some other colleges may be willing to admit people who, apart from or in addition to being good (but not necessarily extraordinary) students, display remarkable leadership and/or other valuable qualities that are deemed to be important in that specific academic environment. In brief: I think a reasonably good admission procedure should employ the information provided by standardized test scores, but should also implement it with sundry other criteria (which may very well be different from one institution to the other).

Unfortunately, we do not live in a perfect world and, needless to say, our country is far from being a close approximation to such hypothetical perfection. As I mentioned in Subsection 1.3 , a one-day-only admission test is essentialy an imprecise instrument upon which to determine the admission of a candidate. Specifically, such admission procedure ignores a lot of other - potentially biased, but probably useful nonetheless - signals concerning a candidate's ability (e.g.: high-school grades, high-school ranking, other standardized test scores, etc.), and some candidates may take the test under non-standard conditions (i.a.: health related problems), thereby further jeopardizing the infomativeness of its results. Because of these two issues, among the many mechanical selection systems we could devise, I think the current admission procedure is probably the worst one in terms of both the amount of information it is based on and the reliability of the information itself.

4.2 Why least?

Even if we blindly accepted the idea that a single-day-only test is the most perfect way to assess a prospective student's ability, there would never be any way to reconcile 39 local rankings with a purely efficiency oriented reasoning. In particular, let's suppose that the current test perfectly identifies how likely it is that a student will become a good physician (this is, after all, the implicit assumption we need to make in order to accept the idea of a one-day-only test admission procedure). Hence, higher total points translate into better potential physicians. If this is the case, why should we stick to 39 local rankings instead of directly giving the best students on a national level the opportunity to choose where to study? If we did so, we would never end up having worse doctors than the ones we have under the current local rankings system. In fact, if all students were willing to study exclusively in the place where they have actually taken the test, then a single national ranking would do no harm and simply replicate the current matching outcome.

In brief: not only we evaluate prospective students using a very limited assessment tool, but we also employ the outcome of such standardized instrument in the least efficient way.

5 A less inefficient alternative

If we stuck to the notion that, for objectivity reasons, a one-day-only standardized admission test is necessary, we should make sure that we make the best out of this probably mediocre instrument. The most obvious way to do so is the following: as soon as the results of the test are published, the first individual in the national ranking is asked to state where she wants to study. This student picks her choice, and then the second student makes her own choosing too, and after her, all the following individuals in the ranking report their preferences in the order given by their position in the ranking.
This amounts to letting students choose according to their position in the national ranking. Obviously, better placed students benefit from a set of choice which cannot be smaller than the one of worse ranked students (because the latter are called to choose when the available places at some universities have already been taken by the former). In the very extreme case where all students are willing to study exclusively at the institution where they have taken the test (and if we assume that there currently is no strategic behavior), the outcome of such admission procedure coincides with the outcome of the current 39 local rankings system. The real issue of this very appealing system is timing: if 9,000 places are to be filled, it is clear that each student should choose pretty fast in order to let all of her lower-ranked peers have time to do the same. I personally see no straightforward solutions for implementing such *ex-post*[7] determined matching based on a single national ranking (if not greatly anticipating the test with respect to the first lectures).

Alternatively, I think we could resort to some form of mixed *ex-ante* and *ex-post* determined matching that works as follows:

i. When students register for the test, they are asked to report the university where they are most willing to study. This university may, or may not, coincide with the place where they physically go to take the test. To do so, students pay a certain registration fee (say, €150 - take into account that current registration fees range from €70 to €80 according to the university where the test is administered).

ii. The test is administered exactly as it is now: it is the same for all universities and it is administered contemporaneously in all testing centres.

iii. The results are published using a single national ranking. All students see their own position in the national ranking and *also* the first university preference of all other candidates.

iv. All students are asked to confirm their first preference (that is, they *cannot* change their first preference, but they are obliged to confirm it in order to be considered for admission), and also have the opportunity to add a second preference without paying any cost.

v. In addition to confirmation, students can also (but are not be obliged to) benefit from adding a third, a fourth and a fifth prefence, but they should be able to do so only paying an additional fee (e.g. €150/€200 for the possibility of adding up to the fifth preference).

vi. Notice that not only the best 9,000 students on a national level (assuming there are exactly 9,000 places to be filled) should be asked to confirm their first preference and report their further preferences, but a larger sample of applicants (possibly all of them).

[7] Using a very sloppy jargon, I define this matching to be *ex-post* determined because students would be asked to report their preferences *after* the publishing of test results.

vii. Once all students have reported their preferences, the administrative bureaucracy allocates students according to their reported preferences: that is, the best students are admitted to their first preference as long as places there are available, then to their second preference, and so on and so forth.

viii. A definite admission proposal is then offered to students: who accepts it, should not be able to immatriculate to any other university course (otherwise someone may accept it simply to keep an option open). On the other hand, should any of the best national students reject her definite admission proposal, the best waiting-listed applicants who have confirmed their applications should be offered admission (provided that their preferences are compatible with the available places).

ix. Who accepts admission should then be reimbursed of at least part of the additional €150/ €200 which were (not necessarily) paid to add up to the third, fourth and fifth preference (e.g. 50% of such amount could be discounted from tuition fees). The reasoning is straightforward: if all students could freely add up to a fifth preference, they may do so simply to take advantage of this priceless option, thereby increasing the degree of complexity (and probably the instability) of the matching algorithm. Then, the reimbursement may be motivated by providing students a monetary incentive to accept admission also to the third, fourth, and fifth preference (provided that doing so eliminates all outside options: that is, who accepts admission should be barred from registering to other university courses in Italy).

I believe this procedure or a similar one would strike a good balance between feasibly managing a national ranking with more than 40,000 applicants for 9,000 places and efficiently using the results obtained in a perfectly comparable standardized examination. Also notice that this system is compatible with the current timing of the test: that is, this system may allow us to exploit a single national ranking even without anticipating the date of the admission test (which, in any case, I think should be anticipated by various months).

Provided the impossiblity (???) of addressing the *ex-ante* selection issues examined in Subsection 1.3, my aim was to show that the current testing system still may be usefully exploited to solve the serious *ex-post* selection issues that are apparent in the admission data.
If the total nuber of points received in the admission test is the only relevant criterion used to judge one's ability, I see no compelling reasons why this should hold for candidates taking the test at the same institution and not be extended to compare candidates from different universities.

6 Conclusions

The number of prospective students of medicine in Italy far exceeds the number of available places. In this essay, I have provided some arguments regarding the ex-ante and ex-post selection issues which are intimately connected with the current one-day-only admission test procedure. As far as the latter are concerned, the data from the last two admission tests suggest that the use of a single national ranking would allow us to select a much better student body than the one we end up with using 39 university level rankings. Given that the use of a single national ranking (possibly, but not necessarily, following the guidelines outlined in Section 5) would allow us to select better students at basically no higher costs, I see no reasons why such an easy-to-implement measure has not already been accepted by national institutions.

Table 1: Schools of medicine: no. of applicants, no. of places available and average points (a. yrs. 09/10-10/11) - 1/3

University	N. appl. 09/10	N. appl. 10/11	N. places 09/10	N. places 10/11	Appl. per place 09/10	Appl. per place 10/11	Tot pts 09/10	Tot pts 10/11	Tot pts average
Aquila	920	988	122	134	7.54	7.37	26.17	28.78	27.52
							(9.94)	(10.02)	(10.06)
Bari	2193	2549	356	380	6.16	6.71	30.58	31.04	30.83
							(10.50)	(9.89)	(10.18)
Bologna	1769	2172	330	363	5.36	5.98	33.32	33.29	33.30
							(11.86)	(11.60)	(11.72)
Brescia	1148	1210	180	190	6.38	6.37	32.79	33.28	33.04
							(11.50)	(11.04)	(11.27)
Cagliari	1284	1568	165	180	7.78	8.71	27.79	28.90	28.40
							(10.25)	(9.89)	(10.07)
Catania	2228	2518	300	300	7.43	8.39	29.87	30.13	30.01
							(11.64)	(11.24)	(11.43)
Catanzaro	983	1385	100	176	9.83	7.87	24.60	27.19	26.11
							(10.31)	(10.31)	(10.39)
Chieti	1422	1801	172	191	8.27	9.43	28.12	29.12	28.68
							(10.56)	(10.36)	(10.46)
Ferrara	1049	1110	156	177	6.72	6.27	34.58	34.26	34.42
							(10.49)	(10.38)	(10.43)
Firenze	1511	1648	240	242	6.30	6.81	32.96	33.33	33.16
							(11.64)	(11.03)	(11.33)
Foggia	690	904	78	82	8.85	11.02	26.80	28.66	27.85
							(9.30)	(10.18)	(9.85)
Genova	1181	1297	240	264	4.92	4.91	34.87	35.81	35.36
							(11.32)	(11.02)	(11.17)
Marche	879	980	130	143	6.76	6.85	31.92	32.05	31.99
							(11.15)	(10.69)	(10.91)

Means with standard deviations in parentheses

Table 2: Schools of medicine: no. of applicants, no. of places available and average points (a. yrs. 09/10-10/11) - 2/3

University	N. appl. 09/10	N. appl. 10/11	N. places 09/10	N. places 10/11	Appl. per place 09/10	Appl. per place 10/11	Tot pts 09/10	Tot pts 10/11	Tot pts average
Messina	1339	1293	220	220	6.09	5.88	31.60	29.22	30.43
							(13.08)	(10.83)	(12.08)
Milano	2059	2299	360	396	5.72	5.81	36.23	36.65	36.45
							(11.52)	(11.56)	(11.55)
Milano Bicocca	609	891	120	128	5.08	6.96	34.64	35.73	35.29
							(11.25)	(10.77)	(10.98)
Modena e Reggio Emilia	794	849	143	142	5.55	5.98	33.20	34.69	33.97
							(11.62)	(11.51)	(11.59)
Molise	636	520	75	82	8.48	6.34	27.85	28.61	28.19
							(10.00)	(9.37)	(9.72)
Napoli Federico II	2328	3193	341	372	6.83	8.58	28.09	30.15	29.28
							(11.10)	(10.65)	(10.89)
Napoli (Seconda Un.)	2412	2082	330	363	7.31	5.74	29.55	29.33	29.45
							(10.69)	(10.89)	(10.78)
Padova	1904	2218	326	359	5.84	6.18	35.99	36.01	36.00
							(11.30)	(11.25)	(11.27)
Palermo	1848	2151	315	418	5.87	5.15	34.40	35.01	34.73
							(12.96)	(12.09)	(12.50)
Parma	1305	1248	200	220	6.53	5.67	33.32	31.72	32.54
							(11.07)	(10.93)	(11.03)
Pavia	1103	1291	150	176	7.35	7.34	34.18	35.00	34.62
							(12.27)	(12.11)	(12.19)
Perugia	1306	1275	227	238	5.75	5.36	32.26	31.64	31.95
							(11.28)	(11.62)	(11.45)
Pisa	1469	1657	255	280	5.76	5.92	33.57	34.07	33.84
							(10.81)	(10.50)	(10.65)

Means with standard deviations in parentheses

Table 3: Schools of medicine: no. of applicants, no. of places available and average points (a. yrs. 09/10-10/11) - 3/3

University	N. appl. 09/10	N. appl. 10/11	N. places 09/10	N. places 10/11	Appl. per place 09/10	Appl. per place 10/11	Tot pts 09/10	Tot pts 10/11	Tot pts average
Roma Sapienza 1	3948	4580	593	671	6.66	6.83	30.37	30.94	30.68
							(10.71)	(10.65)	(10.68)
Roma Sapienza 2	849	1280	172	191	4.94	6.70	31.30	30.27	30.68
							(10.44)	(10.32)	(10.38)
Roma Tor Vergata	1562	1564	220	264	7.10	5.92	30.96	31.91	31.44
							(10.45)	(10.29)	(10.38)
Salerno	993	1340	110	165	9.03	8.12	27.24	28.33	27.86
							(10.35)	(9.95)	(10.13)
Sassari	893	905	121	130	7.38	6.96	27.57	27.38	27.47
							(10.54)	(10.32)	(10.43)
Siena	797	978	151	180	5.28	5.43	31.71	30.84	31.23
							(10.93)	(10.42)	(10.66)
Torino - Torino	1624	1964	321	353	5.06	5.56	34.37	35.99	35.25
							(11.22)	(10.70)	(10.97)
Torino - Orbassano	555	657	110	126	5.05	5.21	34.14	33.08	33.57
							(10.87)	(10.11)	(10.47)
Trieste	578	696	110	121	5.25	5.75	35.57	35.85	35.73
							(11.66)	(11.77)	(11.72)
Udine	770	539	88	96	8.75	5.61	32.93	36.73	34.50
							(10.95)	(11.45)	(11.31)
Varese	432	767	143	155	3.02	4.95	31.53	34.77	33.60
							(11.18)	(10.95)	(11.14)
Vercelli	432	564	75	75	5.76	7.52	31.53	32.83	32.26
							(11.18)	(10.24)	(10.68)
Verona	919	1327	164	180	5.60	7.37	35.29	35.80	35.59
							(11.00)	(10.78)	(10.87)

Means with standard deviations in parentheses

Table 4: Schools of medicine: no. of admitted candidates, minimum passing number of total points and average total points of admitted candidates (a. yrs. 09/10-10/11) - 1/3

University	N. places 09/10	N. places 10/11	Min passing pts 09/10	Min passing pts 10/11	Tot pts 09/10	Tot pts 10/11	Tot pts average
Aquila	122	134	37.50	39.75	42.44	44.66	43.60
					(4.39)	(4.19)	(4.42)
Bari	356	380	41.25	41.25	46.90	46.83	46.86
					(4.64)	(4.91)	(4.77)
Bologna	330	363	44.25	44.50	50.17	50.22	50.20
					(4.72)	(4.65)	(4.68)
Brescia	180	190	44.50	44.75	50.19	49.88	50.03
					(4.51)	(4.37)	(4.43)
Cagliari	165	180	40.25	41.50	44.62	45.97	45.32
					(3.68)	(3.59)	(3.69)
Catania	300	300	43.50	44.00	49.17	49.16	49.16
					(4.73)	(3.84)	(4.30)
Catanzaro	100	176	38.50	39.00	43.63	44.46	44.16
					(5.05)	(4.61)	(4.78)
Chieti	172	191	40.75	42.25	‘46.72	47.74	47.26
					(5.38)	(5.10)	(5.25)
Ferrara	156	177	45.75	44.75	50.55	50.13	50.33
					(3.90)	(4.30)	(4.12)
Firenze	240	242	45.00	45.25	50.96	50.54	50.75
					(4.97)	(4.53)	(4.75)
Foggia	78	82	38.00	42.50	43.29	47.86	45.64
					(4.62)	(3.31)	(4.60)
Genova	240	264	44.75	45.25	50.22	50.78	50.51
					(4.28)	(4.09)	(4.19)
Marche	130	143	43.75	43.50	49.37	49.45	49.41
					(4.45)	(4.85)	(4.65)

Means with standard deviations in parentheses

Table 5: Schools of medicine: no. of admitted candidates, minimum passing number of total points and average total points of admitted candidates (a. yrs. 09/10-10/11) - 2/3

University	N. places 09/10	N. places 10/11	Min passing pts 09/10	Min passing pts 10/11	Tot pts 09/10	Tot pts 10/11	Tot pts average
Messina	220	220	44.50	39.50	51.38	45.46	48.42
					(5.70)	(5.16)	(6.18)
Milano	360	396	47.75	48.00	52.87	53.35	53.12
					(4.29)	(4.47)	(4.39)
Milano Bicocca	120	128	44.50	46.75	50.74	53.02	51.92
					(4.89)	(5.29)	(5.22)
Modena e Reggio Emilia	143	142	43.75	46.00	50.03	50.99	50.51
					(5.46)	(4.31)	(4.94)
Molise	75	82	40.00	37.50	45.20	43.03	44.07
					(4.17)	(4.79)	(4.62)
Napoli Federico II	341	372	40.25	43.00	46.12	48.47	47.35
					(4.82)	(4.51)	(4.80)
Napoli (Seconda Un.)	330	363	41.50	39.75	47.06	45.68	46.34
					(4.31)	(5.07)	(4.77)
Padova	326	359	47.25	47.50	52.88	52.99	52.93
					(4.23)	(4.43)	(4.33)
Palermo	315	418	47.50	46.00	53.98	52.29	53.01
					(5.17)	(4.56)	(4.90)
Parma	200	220	44.75	42.00	49.98	47.27	48.56
					(4.33)	(4.16)	(4.45)
Pavia	150	176	48.25	47.75	54.09	53.50	53.77
					(4.64)	(4.85)	(4.75)
Perugia	227	238	43.25	41.75	48.79	48.14	48.46
					(4.64)	(4.93)	(4.80)
Pisa	255	280	44.00	44.25	49.85	49.64	49.74
					(4.68)	(4.43)	(4.55)

Means with standard deviations in parentheses

Table 6: Schools of medicine: no. of admitted candidates, minimum passing number of total points and average total points of admitted candidates (a. yrs. 09/10-10/11) - 3/3

University	N. places 09/10	N. places 10/11	Min passing pts 09/10	Min passing pts 10/11	Tot pts 09/10	Tot pts 10/11	Tot pts average
Roma Sapienza 1	593	671	41.75	42.25	47.30	47.63	47.48
					(4.41)	(4.53)	(4.48)
Roma Sapienza 2	172	191	40.00	41.25	46.00	47.00	46.52
					(5.00)	(4.83)	(4.93)
Roma Tor Vergata	220	264	42.25	41.75	47.61	47.34	47.47
					(4.38)	(4.84)	(4.63)
Salerno	110	165	40.50	40.75	46.25	45.33	45.70
					(4.39)	(3.81)	(4.07)
Sassari	121	130	40.00	38.25	45.03	44.57	44.79
					(4.50)	(4.63)	(4.56)
Siena	151	180	42.25	40.00	47.65	46.28	46.91
					(4.70)	(4.71)	(4.75)
Torino - Torino	321	353	44.00	46.00	50.15	51.35	50.78
					(4.99)	(4.74)	(4.89)
Torino - Orbassano	110	126	43.50	42.00	49.50	47.91	48.65
					(5.44)	(4.48)	(5.01)
Trieste	110	121	46.00	46.25	51.98	52.45	52.22
					(4.19)	(5.09)	(4.68)
Udine	88	96	45.75	47.50	51.14	53.38	52.31
					(4.49)	(4.91)	(4.83)
Varese	143	155	36.25	44.25	44.23	49.75	47.10
					(5.69)	(4.74)	(5.90)
Vercelli	75	75	43.00	44.00	48.44	49.23	48.84
					(4.53)	(3.89)	(4.22)
Verona	164	180	45.50	47.25	51.34	52.79	52.10
					(4.78)	(4.50)	(4.68)

Means with standard deviations in parentheses

Table 7: Students admitted with the current system who were not among the 8,009 national best (a.y. 2009/10)

University	Number of students
Aquila	80
Bari	103
Cagliari	79
Catania	9
Catanzaro	62
Chieti	60
Foggia	49
Molise	32
Napoli Federico II	125
Napoli (Seconda Un.)	85
Perugia	13
Roma Sapienza 1	125
Roma Sapienza 2	69
Roma Tor Vergata	37
Salerno	35
Sassari	59
Siena	30
Torino - Orbassano	1
Varese	73
Vercelli	5
Total	1,131

Table 8: Students among the 8,009 best on a national level who were not admitted with the current system (a.y. 2009/10)

University	Number of students
Bologna	40
Brescia	32
Ferrara	65
Firenze	43
Genova	37
Marche	5
Messina	29
Milano	206
Milano Bicocca	24
Modena	2
Padova	155
Palermo	176
Parma	37
Pavia	103
Pisa	15
Torino - TO	24
Udine	45
Verona	46
Total	1,131

Table 9: Students admitted with the current system who were not among the 8,923 national best (a.y. 2010/11)

University	Number of students
Aquila	70
Bari	128
Cagliari	63
Catanzaro	103
Chieti	48
Foggia	8
Marche	3
Messina	103
Molise	57
Napoli Federico II	39
Napoli (Seconda Un.)	161
Parma	50
Perugia	59
Roma Sapienza 1	137
Roma Sapienza 2	58
Roma Tor Vergata	68
Salerno	72
Sassari	62
Siena	62
Torino - Orbassano	24
Total	1,375

Table 10: Students among the 8,923 best on a national level who were not admitted with the current system (a.y. 2010/11)

University	Number of students
Bologna	38
Brescia	31
Catania	6
Ferrara	27
Firenze	53
Genova	48
Milano	236
Milano Bicocca	67
Modena	47
Padova	200
Palermo	111
Pavia	124
Pisa	22
Torino - TO	111
Trieste	60
Udine	55
Varese	7
Vercelli	3
Verona	129
Total	1,375

Table 11: Qualitative comparison of the pools of currently admitted candidates and of the pools of best national candidates

	09/10: admitted	09/10: best national	10/11: admitted	10/11: best national	Average: admitted	Average: best national
Mean total points	49.02	49.48	49.07	49.54	49.05	49.52
(s.d.)	(5.42)	(4.87)	(5.29)	(4.75)	(5.35)	(4.81)

Table 12: Qualitative comparison of the pools of swing candidates

	09/10: admitted	09/10: best national	10/11: admitted	10/11: best national	Average: admitted	Average: best national
Mean total points	41.71	44.99	42.11	45.16	41.93	45.09
(s.d.)	(1.48)	(1.16)	(1.27)	(1.02)	(1.38)	(1.09)