Reviewer's report

Title: Can we predict the scale of brain drain for medical doctors? Emigration preferences and plans among medical students in Poland

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Reviewer: Johan Hansen

Reviewer's report:

General comment
The article addresses an important topic and certainly has the potential to be relevant to experts working in the same field in other countries. It addresses a number of relevant dimensions to professional mobility that are interesting to learn about, such as by inquiring how long respondents intend to leave and whether they are undertaking concrete action. However, in order to reach this potential a number of unclarities need be resolved and some additional interpretation is needed.

Major Compulsory Revisions

The largest difficulty when reading the article is that the empirical basis for the study’s central claim is not clear to me, being that the authors ‘can forecast that 30-40% of Polish medical students will emigrate over the next few years’. This result doesn’t seem to follow from the other findings that are reported. For one, the sentence directly following this statement states that ‘62% of respondents estimated the likelihood of emigration at 50%’. I’m assuming that is meant ‘50% or less’ instead of exactly 50%. But even then, this would imply that 38% estimates their chances as higher than 50%, which still is no solid prediction that they will indeed do so, given the low threshold. Elsewhere in the same article it is reported that 3 out of 4 respondents estimate their chance of departure to be 70% or lower, so in that case the prediction that 25% of all medical students have a good chance to leave would be equally plausible. In another part, it is reported whether students had already undertaken concrete steps to accomplish their migration goals, with 72% of students already having undertaken one or more steps. Is it 72% of all respondents or only of a certain subgroup, such as the ones with a chance of leaving of minimally 50%? In either case, it is again unclear how the 30-40% forecasting estimate relates to these findings.

This is especially relevant as the central focus (and title) of the article is mostly on determining this forecasting estimate. This is also illustrated by the fact that the discussion mostly contains a summary of migration estimates in other countries. While valuable to compare these numbers, the question is how comparable they really are, as some of the other studies appear to use different question formats, for example when reporting that ‘as many as 24,7% of Hungarian physicians contemplated migration in 2004’. This appears to be a dichotomous (yes/no) question rather than a question for estimating chances of
departure. It would be very valuable if the article were to discuss the differences in interpretation between these different ways of questioning.

The same discussion also points to a more conceptual difficulty of interpretation of the study’s findings. Reference is made to a study in Croatia where 71% of medical students ‘wished to migrate if they could not attend specialization training at home’. For this study exactly the same context is relevant, as the survey population consists of medical students rather than those in specialist training. This raises the question how realistic the estimates by these medical students are. Perhaps leaving is only a serious option for most if they cannot access medical training in Poland. The results of the survey also hint to this, as chances of leaving are lower for final year students. It makes one curious what the national context is, which is so far not explicitly mentioned. The background provides some evidence of medical doctors leaving the country, and one could argue that this is a bigger problem than when medical students leave, as the first group also had followed a long and expensive specialist training which then goes to waste. While surveying students is interesting and worth publishing about, the article would benefit from some addition comments why this group is so relevant as well. And is it that specialist training programs already experience problems in finding sufficient numbers of enrolees? If so, then the article is especially relevant. But this is less the case if the numbers of medical students who graduate each year are much higher than the numbers of positions available for specialty training. Then the problem would only be pressing if it is especially the highest performing students who wish to leave. But the study’s findings already show that that isn’t the case. It would be understandable if the data is not available in detail to answer each of these questions, but then the discussion would benefit from putting the current findings into more perspective and mentioning some of the limitations of the current approach.

Other unclarities:

In the methods section, no mentioning is made of nonresponse to the survey, other than a minor set of surveys left incomplete (3% of questionnaires used). Did the total sample respond to the survey or is the nonresponse simply left unreported? In the latter case, what is the response rate, how representative is the sample and what are possible biases? Similarly, while it is mentioned that the survey is conducted in five out of 11 universities, outsiders have no way of determining if these universities are fully comparable to the nonparticipating universities. Do they for example provide the same range of specialist training as the others, as some medical students may select a university based on their initial specialisation preferences?

As for statistics used, the authors report a wide range of analyses used for obtaining projections, including classification models such as discriminant analysis, decision trees or neural networks. In the results section there is no mentioning of these particular techniques any more. Where are these used and how? Related to this, I do not see a clear explanation why the multivariate analyses are done the way they are now. It appears the authors run 2 models on the same dependent variable, first linking it to age and gender, then to a different
set of variables such as perception of career opportunities. Why not combining all into one similar type of analysis is unclear, as well as why only the exact results for the first analysis are shown. As a next step, a slightly different set of variables was used to predict the length of departure. Was this done only among the students who want to leave or also with the ones who don’t want to leave included (set at 0)? Plus why are age and gender not included in that analysis? (or are they included but not significant)?

Two minor last element are:
A correlation is reported between the probability of leaving and preparations to leave. But as one can undertake multiple preparatory actions, this isn’t automatically one variable but consists of multiple dummy variables. How are they included: summarized into one variable (yes on one or more items), as sum score or otherwise?

Plus there is a second case where the use of percentages is unclear, namely when reporting how long students intend to leave. While this is a very valuable question which makes the study richer than simply asking whether one leaves, I cannot tell if percentages are calculated for all students (including those with say a 0 or 5% chance of leaving), or only above a certain threshold.

- Minor Essential Revisions

Overall, the article is well-written. However, there are some sentences that either miss a word, have a word too many or that need to be rephrased.

Level of interest: An article whose findings are important to those with closely related research interests

Quality of written English: Needs some language corrections before being published

Statistical review: No, the manuscript does not need to be seen by a statistician.

Declaration of competing interests:

I declare that I have no competing interests