Health Economics

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Week – 10

Lecture 51- Introduction to DEAP Software

Welcome friends once again to our NPTEL MOOC module on Health Economics. We have explained the health efficiency concept in different principles so far, and we have clarified all possibilities related to the basic concepts such as CCR input-output models. We also discussed, to some extent, the BCC model, including its slack targets. So, in this lecture, we will clarify the DEAP software, which enables us to get the score to estimate from the data. So, I will clarify one by one how DEAP software is very useful and widely considered by researchers to estimate the values. So, DEA software is called DEAP; the name of the software is DEAP, and how to run, etc., will give you all the clarifications. Then there are many computer software that give results for productivity and efficiency like SHAZAM, which is also a purpose econometric package, LIMDEP, and Limited Dependent Variable Package. This also results in productivity and efficiency. DEAP is precisely on data envelopment analysis; it is a computer program.

You can refer to the Coelli 1996 work, and Frontier is another one that gives information on the estimation of stochastic frontier models. Again, we will refer to the same author. TFPIP, the Total Factor of Productivity Index, is a program written by Coelli. Some add-ins are also required, like many Excel add-ins such as DEAsolver, etc. We have already included it, and we clarify it step by step. In this practical lecture, DEAP will be utilized to give you step-by-step, hands-on experience.

And this is indeed a free software that is freely available on the web. I will give you the direction and it is very easy to access. So how do you go for it and download it? Here, we have given you the link; otherwise, in the Google search, you simply write down DEAP software. So, with DEAP software, you will also get the link; otherwise, this link will be useful.

So now I am just going to show you to this extent. I am going to use that screen to show you how it can be utilized on the web. So here it is in Google search. I have used DEAP software. The screen is clearly visible to you. The first one you can link to it, and it will give you the directions for downloading like the DEAP version is here.

It looks like this page, which you have already displayed on the screen, and on the down, you will find out all these details. So others like Frontier, TFPIP, DPI, etc., might be used in a later lecture. The concepts will at least give some directions, but at this moment, we will clarify DEAP. So download software is given.

So this is what I am going to guide you in my main screen. So here it is. So this is what I have said. Now, what do you do here? You just go to the download software point and click on it, and it gives you a zip folder. We need to unzip it, and preferably with the name DEAP, you can keep it on your screen. This contains all sorts of information, such as readme files, DEAP extension files, and many other example files.

You can see the example files are very clearly given like this. We will clarify it for you one by one. This is the main software.

You just follow it. So, in this one, this is how the DEAP folder is actually looked at. And even if you can download and unzip, we have already unzipped it. So from my download one, you will find out this for sure. And it is like this.

So you can just unzip, and then the folder will be on your screen. So here is a folder. You unzip it, and many useful example files are given. So we will clarify one by one on our screen. So, let us go further.

This is what our example formats. The readme file basically gives how to save with the file name and format and a number of maximum characters, data formats, etc. So, I am not spending much time here. Throughout the process, we will require a .txt file that is precisely called a text-delimited format file.

We can put our input and output, which we have already said in our model, in our theory of the CCR model or BCC model as well. We will explain output and input in the .txt format. So the initial columns would be with output and it will be followed by inputs. Output may be 1, output may be 2 or inputs may be similarly more than 1. But make sure that you are not going to write on that file with their headings.

We will specify the headings through the instruction page. The name of that data file should be small, as small as possible, and DEAP does not take the big file name. Suppose our example dataset has two inputs. In this case, we have just given, for the sake of clarification, I have taken nursing hours and medical supplies. There are two inputs and two outputs taken from inpatient admission and outpatient visits of 10 firms.

Firms in the efficiency and productivity analysis we used to take as DMUs. Firms may be 10 hospital units, so we will be utilizing them. This might be an example. And here are the 10 firms. Their two inputs and two outputs are here.

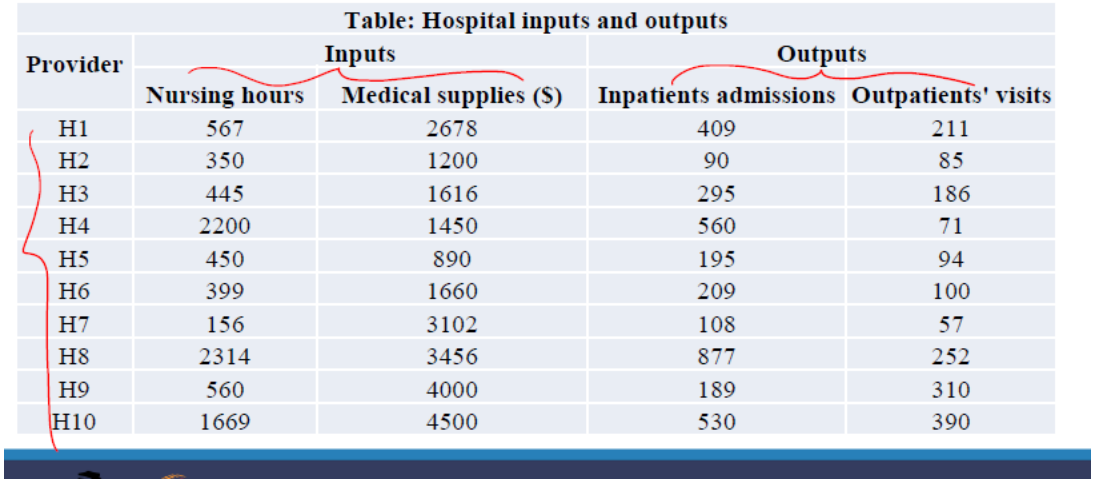

Table: Hospital inputs and outputs

Provider	Inputs		Outputs	
	Nursing hours	Medical supplies ($)	Inpatients admissions	Outpatients' visits
H1	567	2678	409	211
H2	350	1200	90	85
H3	445	1616	295	186
H4	2200	1450	560	71
H5	450	890	195	94
H6	399	1660	209	100
H7	156	3102	108	57
H8	2314	3456	877	252
H9	560	4000	189	310
H10	1669	4500	530	390

Hospital inputs and outputs and some of the figures in terms of their nursing hours, medical supplies in terms of their cost, etc., are given a number of visits. Now we will put it in our txt file. Initially, this is in our Excel file, but then we will save it in dot txt delimited format. So, this is what the process will continue.

So, keep the Excel file name without headings. This is what is important. So, the heading should not be given, only the numbers. So, without heading, I will tell you what it looks like such that the initial columns contain outputs followed by input, and then we need to save it. This is how it looks like in our txt format.

This is simply a notepad file. So, we have taken all those numbers only, but initially, this will be our output, and this is the input. And then we need to save it. As an example, you can just have a look at my other screen side by side.

I am just trying to make it. So, here is my Excel file containing the data. So, this is my Excel file. So you can see these. These only, these four, you just look at this number starting from this number. I have just selected it for you.

We have copied it, and you can save it as a notepad file. So that notepad file should be saved as. So, here it is. We have copied this, and we will save it as our data file in DEAP software format. That format, as I already told you, is through dot txt. You can simply, and my next step will clarify, simply we will go through these, then we will save it.

Then there is the name. You have to take it accordingly, and as per the instruction, I will tell you, but most importantly, this is the one, dot text. So, limited dot txt format. We will just select one by one. I will tell you through the package. So, let us proceed to my main screen, and I will explain what is there.

So, save all work files only in the DEAP folder. Another clarity: all your work files, the save, and the new save, as I have done it, have to be the extension. You can just check that

it has to be in the DEAP folder, which you have already created. We also need to remember that we have to close other files that are already open. Once it is saved, then you have to close it. The second step is to create the instruction file.

First, what we did it, we started with the data file. The second one is an instruction file that will help us to understand what kind of data it is and what that sample is. We usually, I think if you remember, have the DEAP package in a folder that has already given examples, eg1,, I will tell you one by one. So, this is the file eg1-instruction ins, etc. So, that will specify the instructions. So, what is this instruction then? In the first case, the data which we have created, we saved it through CCR1, that is our data.

The second one we are creating is in the notepad file, and this can be taken from the DEAP sample notepad files. We need to specify their data file. We have already saved it as CCR1 dot txt, then an output file to be mentioned. So, the output we are creating at this moment is CCR-output dot txt as an output file. And a number of firms we know that it is very clearly mentioned.

This is our output file, and the number of firms is 10, as well as the number of time periods since we are only looking at the specific time and that too in an input and output relationship. So, in that case, we are not anywhere linked with the different time periods. Hence, the time period is 1. The next one is our number of outputs. At this moment, we have clarified from the beginning it is 2 outputs.

So, 2 outputs are mentioned as 2. Then, the number of inputs, of course, is 2 because we already specified. And now, it is a little challenging to understand. The DEAP software gives some coding for it, input as 0 and output-oriented model; either it will be input-oriented or output-oriented and with 1. At this moment, we are actually sticking to CCR-based calculation, which means an oriented model. Therefore, we are actually taking the name as CCR 1, etcetera, so it will be easy for us to understand.

Therefore, hence since the input is actually coded as 0, we have taken a 0 in our entry. Then you must have remembered we clarified whether it is CRS-based, Constant Returns to Scale or VRS-based. We know that our CCR model is based on the CRS principle. So, VRS, we will take it later, but at this moment, our CRS base, hence the code, is 0. So, other advanced models are not applied at this moment; we are only working with the basic DEA, so it is actually 0.

It takes the stage as a multistage format, and hence, we have entered it as 0. So, actually, I am using DEA multistage to get slacks. So, slacks are actually also covered. So, this is how we can open the command front. So, we will also clarify one by one: open the DEAP or DEAP.exe, then this is what is opened, and this is what it looks like. Then, enter the instruction file name. So, we know the instruction file name very clearly, and we have highlighted it in this example for you.

This is basically CRS1-ins. So, CCR1-ins.txt. So, I will just automatically specify that the file is created with the name entered in the instruction file for output since output was specified in our instruction, so another output file will be created. So, the results will be very clear with the enter we will find out the result. As I have filled the entity in the instruction file according to Constant Returns to Scale input-oriented, we will first discuss the results of the based input-output model. So, then we will take it other like CCR output, then BCC input and output later lectures.

So, I will just show you how it looks like in my next window, in another window, you just see from the folder. So, this is how it is here. This is what the DEAP software looks like, as I already said. Here, you are supposed to mention that it is CCR; you can just see CCR1-INS and dot txt. So, this is where I got it and how it looks like. You can just see all sorts of things that CCR1-ins look like, which I already explained in my previous slide.

As I told you already, CCR1 dot txt is my data file name, and output we have already created in our instruction itself that CCR1-output dot txt, then number of firms, number of time periods, number of outputs, number of inputs, then here it might have some confusion. So, input-oriented or output oriented we very clearly mentioned that it is input oriented model hence it is 0 is entered and where did you get this instruction, how can I make it this, you can just I am just going to close it you can see all those instruction formats are already given in a folder. You need to just change according to your these left column files and specific as per your requirement you need to change it. So, now output will be created from the software if you simply enter what I have only mentioned here nothing else only enter CCR1-instruction dot txt just enter, and you will get a result. And where is the result? It is in the CCR1 which CCR1-output, which I already mentioned.

So, you can just have a look; this is the result. So, you can just have a minimum understanding of this, which we will clarify in our next lecture. Slacks are calculated using the multistage method. We already mentioned that it is a DEA multistage method. So, by 10 firm outputs and their slacks by their peers, peer weights, etcetera, and their scores are calculated, and we will clarify all these interpretations in our next class. So, and now, as I already told you, the output-based models in both CCR format as well as BCC will be clarified in the next class. So, I hope you have understood it, and the next lecture will be very interesting, and you can start writing for your paper. Thank you.