REDUCING BUREAUCRATIC WASTE:
The Case of Turkish Public Personnel Language Exam

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ABSTRACT: This paper shows that administering the Public Personnel Language Exam (KPDS) of Turkey in many different locations instead of just one - the current practice- will be much less costly. Furthermore, once the decision about number of locations is made, the resulting system can be managed either in a centralized or decentralized manner. Albeit with one important proviso, the (reduced) costs involved are shown to be the same for both cases. A mixed mode of management is also outlined.

I) Introduction: Twice a year, in May and November, the ÖSYM [1]

[1] This is the Turkish acronym for Student Selection and Placement Center, a governmental agency,

administers a language exam known by its acronym as KPDS[2]. The exam takes place in Ankara. Anyone in Turkey who wants to **officially** prove her/his proficiency in a language other than Turkish has to take this exam once in every five years. The career paths and salaries of the individuals involved are linked to their exam scores. Not surprisingly thousands of people converge to Ankara to take it. A cautious guess of the yearly magnitude involved is ninety thousand individuals. Let CPS stand for the "cost of the present situation". Its components can be represented as follows:

CPS = Travel and Lodging Expenses + The Opportunity Cost of Wasted Time + The Cost of Traffic Accidents Caused by KPDS Induced Congestion.

Admittedly, to estimate the second and third items requires some ingenuity. As matters stand CPS is the sum of private costs born by KPDS goers. **{*Using the terminology of Section II, note that CPS consists of the "Number of exam takers times $c_{i,2}$", where $c_{i,2}$ stands for the per person cost of going from various provinces to Ankara.*}**

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located in the capital city/province of Turkey, Ankara.

[2] It stands for Public Personnel Language Exam

Thus no collective entity bears that cost and that is one reason for its existence. Hence CPS is a good example of the distinction between private versus social cost notions. For future reference let ***CPSactual*** stand for the particular current monetary magnitude of CPS.

II) Centralized Solution: It may be argued that the Bergson-Samuelson-Stiglitz approach that "assumes a single social-welfare-maximizing principal" (i.e. Hegel's philosopher-king) who acts like "an omnipotent, omniscient and benevolent dictator" might apply in our case. See Dixit (1996, p8). Thus suppose the ÖSYM decides to play the role of Hegel's philosopher-king. The obvious solution would be to administer the exam in each of the 80 provinces of Turkey. This would drive CPS down to zero. However legitimate fears of fraud prevent this solution. This paper proposes to administer the exam in seven[3] provinces where major universities are located. The rest of this section will argue that the problem at hand is a variant of the well-known transportation problem of linear programming. See Thompson/ Thore (1992, pp 9-19).

Let "i" index over provinces, i=1 to 80. Thus i=1 refers to Adana, i=34 to Istanbul, i=53 to Rize etc.[4]

Let "j" index over exam locations. Seven such sites are proposed.

[3] This number is not sacrosanct. Depending upon circumstances the exam can be administered in more or fewer provinces.

[4] Those are the license plate numbers of the provinces involved e.g. the one for Paris, France being 75.

Adana (j=1), Ankara (j=2), Diyarbakir (j=3), Erzurum (j=4), Istanbul (j=5), Izmir (j=6) and Trabzon (j=7).

Let a_i be the number of exam takers from province i. Thus a_{53} refers to the number of individuals from Rize who will take the exam. Similarly a_{34} represents exam takers from Istanbul and a_{67} the ones from Zonguldak.

Let $c_{i,j}$ denote the per person cost of going from province i to exam location j. Thus $c_{34,2}$ stands for the cost of going from Istanbul to Ankara; $c_{53,1}$ means the cost of going from Rize to Adana etc. Note that when a province also serves as an exam site the relevant cost is zero e.g. for Adana $c_{1,1}=0$.

Let $x_{i,j}$ stand for the number of people from province i going to exam location j. Thus $x_{34,6}$ means people from Istanbul taking the exam in Izmir, $x_{53,7}$ refers to people from Rize taking the exam in Trabzon and $x_{1,1}$ stands for people from Adana taking the language exam in their own province etc.

The optimizing problem faced by the ÖSYM can be formulated as follows:

Minimize (1) Centralized = $\sum_{i=1}^{80} \sum_{j=1}^{7} c_{i,j} * x_{i,j}$

Subject to (2) $\sum_{j=1}^{7} x_{i,j} <= a_i$ for each i=1,2,……..80

(3) $\sum_{i=1}^{80} x_{i,j} >= 0$ for each j=1,2…7[5]

(4) $\sum_{I=1}^{80}\sum_{j=1}^{7} x_{i,j} = \sum_{I=1}^{80} a_i$

(5) Each $x_{i,j} >= 0$ (they are the decision variables)

Verbally (2) states the following: the total number of exam takers sent from each province to all seven exam sites cannot exceed the number of exam takers from that province. The meaning of the second constraint is: The total number of exam takers sent from all 80 provinces to each of the seven locations cannot be less than zero. Finally (4) ensures that every applicant will be able to take the exam.

The above problem can easily be solved using standard procedures. For further reference let ***Centralized**** refer to the cost magnitude generated by the optimal program. (Note that ***Centralized**** will become an actual pecuniary magnitude if the optimal program is implemented). Also let $x_{53,1}^{*}$…….$x_{53,7}^{*}$ refer to that portion of the optimal solution

[5] Clearly given the no negativity constraint (5), (3) is redundant: it is included to stress the equivalence with the classical transportation problem.

pertaining to Rize. Note that the first six magnitudes will be zero and the seventh magnitude will equal to a_{53}. The intuitive reason should be obvious: the least costly way of handling the exam takers from Rize is to send all of them to Trabzon!![6]

III) Kaldorian Improvement: Since the Pareto improvement notion is too restrictive (if one single person loses change is excluded even when the whole rest of society benefits) Kaldor proposed an alternative criterion. See Baumol (1977, pp528-9). The criterion is: if the pecuniary gains of those who prefer the status quo post exceeds the pecuniary losses of those who prefer the status quo ante, then go ahead and implement the change. ***In our case the change in question is to rationalize the KPDS, which means to administer the exam in many different locations instead of just one. Note that once the decision to switch is taken, the new situation can be managed either in a centralized or decentralized fashion***. Thus the terms centralized/decentralized are used in their **economic design** or **mathematical programming** sense, and not in their political science or geographic sense. Note that a decentralized mode of management does not mean the "disappearance" of the center. Under such a mode, the

[6] These two provinces, which are quite far away from Ankara, are adjacent.

center merely cedes the right to choose between exam locations to the examinees. The center still prepares the exam questions, keeps records and provides general supervision.

Conjecture I: ***CPSactual > Centralized****

The easiest way to establish that the Kaldor criterion is satisfied involves the following: let us focus on the "Travel and Lodging Expenses" (i.e. out of pocket expenses) portion of the costs involved. It follows from the above inequality that the expenses incurred by exam goers under the proposed scenario are less than those involved in actuality. Recall that exam goers' expenses are the revenues of bus and hotel operators. Thus the savings accruing to exam goers are lost income for the hoteliers and travel companies. From a social (i.e. Hegelian philosopher-king) viewpoint those two magnitudes cancel out. But since the opportunity cost of lost time and extra traffic accidents are also smaller[7] under the proposed scenario, it follows that the gains from the switch outweigh the losses. It should be pointed out that unlike the "Travel and Lodging Expenses", these two are deadweight losses, and i.e. the losses of one group are not the gains of another. To highlight the importance of

[7] Both these costs are positively linked to distance traveled, which falls substantially under that scenario. The same point is valid for "Travel and Lodging Expenses" as well.

reducing the opportunity cost of wasted time, it should be stressed it includes a crucial externality, since various parts of Turkey face a shortage of medical personnel who are among the examgoers. Note that as dealt with in this paper all gains (with the exception of externalities i.e. reduction in traffic accident costs and untreated cases which go to the insurance companies and to the uninjured/treated public) accrue to exam takers/goers[8]. However other arrangements are possible.

IV) Decentralized Solution: It can be argued, when given the option of choosing between seven exam locations, **each and every examgoer** will face the following **binary integer-programming** problem, which also happens to be a **linear assignment** problem: (for illustrative purposes I will highlight the problem faced by one Rize exam taker denoted by the superscript "III", say, the third examinee from Rize or person III from Rize.)

Minimize (5) Decentralized $= \sum_{j=1}^{7} c_{53,j} * y_{53,j}^{III}$

Subject to (6) $\sum_{J=1}^{7} y_{53,j}^{III} = 1$

(7) Each $y_{53,j}^{III}$ is either 0 or 1 (they are the decision variables)

[8] The terms exam takers/goers, plus the term "examinee", are used interchangeably,

Equation (6) merely says that person III from Rize has to take the exam in one of the seven locations, whereas equation (5) posits that s/he will try to do it in the least-costly manner.

Suppose person III from Rize solves the problem. Let $y_{53,1}^{III*}$…..$y_{53,7}^{III*}$ refer to the optimal values. Intuitively it should be clear that the first six would be "0" and the last will be "1" because the least costly way for a Rize person is to take the exam in Trabzon![9] Let $y_{53,7}^{I*}$,$y_{53,7}^{II*}$,….$y_{53,7}^{V*}$, ….$y_{53,7}^{X*}$,...represent the optimal values by the first, second,...fifth, ……tenth ……etc. individuals from Rize.

Conjecture II: $y_{53,7}^{I*} + y_{53,7}^{II*} + \ldots.y_{53,7}^{X*} + \ldots\ldots = x_{53,7}^{*} = a_{53}$

Thus the relevant subset of EQS 1-4 (the one obtained by setting i equal to 53 in these equations) is equivalent to "the number of Rize exam takers times" EQS 5-7. ***Decentralized**** represents the expenses incurred by person III from Rize. Summing over the relevant magnitudes for every exam goer from Rize gives the cost incurred by exam takers/goers from Rize. Each and every examinee (irrespective of province) will have

[9] See footnote 6

to solve a similar **BIP or linear assignment problem**. (Mathematically this involves replacing 53 with 1 for Adana, 2 for Adiyaman ….etc in EQS 5-7.) Let ***DecentralizedTotal**** be the magnitude obtained when the summation is done over each and every exam goer/taker regardless of province.

Conjecture III: ***DecentalizedTotal* = Centralized****

The above equality is a by product of the equivalence between Eqs. 1-4 and "the total number of examinees times" EQS 5-7. It merely states that costs incurred by exam takers/goers are the same in the two cases. However note that this formulation abstracts away from communication/coordination costs e.g. mailing expenses etc., which are smaller under decentralization. Also note that under decentralization, the opportunity costs of wasted time and traffic accidents need not be actually estimated. In some meaningful sense the examinees "already know them". This last property is a manifestation of the commonplace that the informational requirements of a decentralized system are less than those of a centralized one.

Finally, a mixed mode of management is also possible. It could be achieved as follows: the examinees have the right to select their exam site and actually do so. Thus each one of them solves her/his linear assignment problem. Let the resulting outcome be called the **decentralized actual solution**. The exam goers are required to inform the center of their province of origin –**and of nothing else! –** On the basis of this knowledge, that is the $a_{i'}$ s and the opportunity costs (the $c_{i,j}$'s) that it estimates, the center solves the LP problem of eqs 1-4. Let the result be called the **centralized notional solution**. Conjectures II and III show that these two solutions would essentially coincide.

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