

A PARTIAL CREDIT APPROACH FOR STUDYING PEOPLE'S PERCEPTION FOR LEGISLATIVE AND FISCAL POLICY EFFICIENCY

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Abstract

In this research we have developed a comparative analysis by using a pilot survey to analyse the nature of perception regarding applied policies and legislative issues in fiscal domain. The Partial Credit Model (PCM) is considered herein as a relevant tool for analysing data where both policy outcomes and legislative performance are measured across a spectrum of ordered categories. The survey is organized into items whose responses are recorded on 5 Likert scales and has been conducted in a group of specialists familiar with the matter. In the model, the perceived efficiency is considered as the latent trait that guide responders answer regarding the true success of certain law amendments and applied policies. By measuring the threshold difficulty-like parameter we have estimated initially the change of the people's supportiveness between adjacent categories of items asking for fiscal platforms and their role in fighting informal economy. We observed that the threshold parameter patterns do not change significantly for fiscal legislation and taxes policies, indicating that most responders do not identify the difference between fiscal policy as a broader government strategy which use both spending and taxation to influence the economy, and tax policy that refers to the rules governing how taxes are collected. Considering that the sample has been of purposive type based on the specialists who are familiar with the subject, the study points at the importance of carefulness on organising surveys and editing questions when the target communities are broader and less accustomed with many details included in common survey.

Key words: PCM and Rasch Model, sociometric measurement, social perception, fiscal policy, latent variable.

Përmbledhje

Në këtë studim kemi konsideruar një analizë krahasuese duke përdorur një anketë pilot për vlerësimin e natyrës së perceptimit në lidhje me politikën dhe çështjet legjislative në fushën fiskale në vendin tonë. Modeli Rasch për variabla shumë vlerëshe apo ndryshe Modeli i Kreditit të Pjesëshëm (PCM) është konsideruar këtu si instrument i rëndësishëm dhe adekuat për analizimin e përgjigjeve shumë vlerëshe të pyetësorëve për rezultatet e politikave dhe performancës legjislative. Anketa pilot është e organizuar në pyetje me përgjigje të tipit 5 shkallë Likert, dhe është realizuar në një grup specialistësh të familjarizuar me çështjet trajtuar. Në procesin e modelimit, efikasiteti i perceptuar për një policim të dhënë konsiderohet si tipari latent që i udhëzon të anketuarit të përgjigjen në lidhje me suksesin e vërtetë të ndryshimeve të caktuara ligjore dhe politikave të aplikuara. Duke matur parametrin e vështirësisë së pragut, ne kemi vlerësuar fillimisht ndryshimin e mbështetjes ndërmjet niveleve të njëpasnjëshme në përgjigjen e pyetjeve që përkojnë me platformat fiskale dhe rolin e tyre në luftimin e ekonomisë informale. Në analizën e të dhënëve pilot ne konstatojmë se parametri prag i varibalit kuazi-vështirësi nuk ndryshojnë ndjeshëm, si në rastin e anketës për legjislacionin fiskal ashtu edhe për atë të politikave tatimore. Kjo evidencë sugjeron se shumica e të anketuarve nuk e identifikojnë ndryshimin midis politikës fiskale si një strategji më e gjerë qeveritare që përdor si shpenzimet ashtu edhe taksimin për të ndikuar në ekonomi, dhe politikës tatimore që i referohet rregullave që rregullojnë mënyrën e mbledhjes së taksave. Duke marrë parasysh që mostra ka qenë e qëllimshme bazuar në specialistë që janë të njohur me subjektin, studimi thekson rëndësinë e kujdesit në organizimin e anketave dhe redaktimin e pyetjeve kur komunitetet e synuara janë më të gjera dhe më pak të mësuara me shumë detaje të përfshira në anketën e zakonshme.

Fjalë kyçe: *Modeli Rasch dhe PCM, matjet sociometrike, perceptim social, politike tatimore, variabël i fshehtë.*

Introduction

The assessment of quantities that depend both on expertise and profound knowledge for a particular field but involve emotional or other biased parts of attitude, relies on the category of complicated sociometric measurement. Noticing that ex-post legislative evaluations are becoming so practical in the study of functional legislation, see (Linda et al, 2025), (Knap et al, 2023), (Konstadinov, 2024), for detailed discussion and analysis, and the increasing literature dedicated on that implicit investigation, we have considered a

revision analysis for recent surveys methods and practices regarding such delicate measurement and followed several steps of improving it to obtain trustworthy and useful result. In (Llakaj and Prenga, 2025) we have considered the Rasch Analysis for providing guidance of editing an adequate questionnaire for such measurement, and, in (Llakaj et al, 2026) we have reported some initial findings.

In general, for these cases, we can distinguish a dual form or dual attitude from those typical responses that can also be classified as implicit and explicit expressions. It follows that a single measurement would be difficult because it must embody direct and indirect measurements respectively, which are different. So, for direct attitude measures, the response reflects the evaluation, whereas for indirect measures, one infers the evaluation, often by comparing performance conditions in response latency tasks or with self-report measures that obscure the content of measurement (Ranganath et al, 2008).

On the other hand, it is difficult to compose questionnaires that can avoid this duality. Regardless of other problems related to this last solution, the survey must be doubled to read both features that are classified as direct or indirect expression or attitude. In a more general view, we can always adopt a decomposition stage by employing factorial analysis and principal components analysis, but in practice it does not look such easy, but we cannot guarantee the selective power of the methods needed, because the variance used by those models is compounded by both effects. Another alternative could be a tactical change to the approach, considering indirect techniques that can filter unwanted noises through calibrating processes such as in Rasch model or other Item Response

Theory applications. Before going on those terms, consider the nature of the overall problem. Firstly, the assessment concerning post-ante and post ex evaluation, efficacy of legislation and reforms is becoming of great concern for developing countries due to the frequency of amendment, quality of law alignment with the EU and many other factors. In the framework of studying our country's systems, we have disused in (Llakaj and Prenga, 2025) and next in (Llakaj et al, 2026), the use Indexes theory for filtering the questionnaire from 'problematic items' and next we used the Rasch model and for calibrating our questionnaire intended to measure several performance parameters. In this research we have considered also detailed analyses and extinctions provided in the framework of the CI analysis in (Prenga et al, 2023), (Prenga et al, 2022)

where has been underlined that measuring by Rasch model in several our systems must challenge in-homogeneity issues, non-iid variable features etc.

Table 1. The proposed survey

Formulation of the survey Items	Y / N	Result by using Indexes Check
Taxes' policies		Questionable
Education development and strategies		<i>Usable in current form</i>
Crime convictions and general order		<i>Usable in current form</i>
Environment care and management		<i>Usable in current form</i>
Youths' perspective and employment		<i>Usable in current form</i>
Law enforcement		Questionable
Elderly support and policies		<i>Usable in current form</i>
Military advance in the framework of recent development.		<i>Usable in current form</i>
Health and medicine		<i>Usable in current form</i>
Foreign affairs performance and straightening the role of the country		<i>Usable in current form</i>
Financial stability		Usable in current form
Social care and projects		Usable in current form
Wages sectors improvement		Questionable
Legislation in general (completeness)		Questionable
Rule of law		<i>Usable in current form</i>
Justice and reforms		<i>Usable in current form</i>
Free market guarantees and medium of doing business		Questionable
Accuracy of Legislation for Proprieties and public terrains		<i>Usable in current form</i>

Effectiveness of implementation of legislation for assets and	<i>Questionable</i>
Management of political mediums and democracy	<i>Questionable</i>

We will discuss the table (1), but as seen from the shadows indicators, it resulted that around 35 % of surveys do not pass the reliability by the indexes check. Noticing that in the original observation presented in (Llakaj et al, 2025) the analysis has been based in the dichotomous Rasch model, supposedly the political influences, expertise can be analysed in the framework of latent traits.

A Rasch polytomous approach for analysing latent trait structure

Rasch analysis is a well-known and capable psychometric technique used to analyse surveys data, aiming to establish a common scale for measuring both system latent variables such as the student's ability, person's attitude against an issue, and the items' features such as difficulty, question clearness etc. In this regard, sociometric or interdisciplinary modellers try to parallelise all the features after whose stand a logistic function that interconnect factors and responses. Basically, we must ensure that the response is a balance between two parameters, the one being individual feature off the respondent, and another a global estimate for an item. The model assumes latent variable is expressed in individual ability of the responder to express the support for the set of questions that behave as projection of the whole quantity in each issue, and in the comprehensibility of the questions.

In the easier application instruments consists of several questions whose can be answered correctly or incorrectly, hence assigning binary values 0 and 1, see (Pihmho et la, 2011), (Harivati, 2017), etc., or (Coletta et al, 2005) , (Crooks et al, 2014), (Planinic, 2011), for original CI analysis. Once the questionnaire is drafted, individual responses and perceived complexity of the questions are calculated using original formulas for Concept Inventory measurements $\beta_i = \ln \frac{A_i}{1-A_i}$; $\delta_j = \ln \frac{1-D_j}{D_j}$ where A is the ratio of supportive answer for respondent (i) and D is ratio of supportive answer from all participants for question (j). By using those 'averaged' values as most representatives δ_j, β_i the probability that a statement embodied on question (j) would be supported by individual (j) is given by $P_{estimate}(i, j) \equiv$

$P(T(i, j) = 1 | \delta_j, \beta_i) = \frac{e^{\beta_j - \delta_i}}{1 + e^{\beta_j - \delta_i}}$. After proceeding with iterations of replacing $P_{estimate}^{step-1}(i, j)$ with $P_{estimate}^{step}(i, j)$ controlled by a residual threshold criteria, final values δ_j^{final} , β_i^{final} , together with several indicators are evaluated. After identifying pathological issues and filtering events which are accompanied with bad statistical significance, the model outcomes describe better the structure of the Support Variable, than a direct measurement

We advise the reader to consider original literature for Rasch analysis in Concept Inventory studies for clarifying elements and theoretical fundamentals of such analysis. However, it might be fuzzy for individuals to respond with accept/reject for a concrete question. Suppose we ask a law expert if judiciary reform adopted recently has been successful. Clearly it cannot be firmly supportive or opposed, he welcomes larger freedom to express his judgment. Therefore, a multiscale variable should be adopted, endorsing the evaluation by a categorical assignment of h levels say, such as Likert scale for example. In this case, the Rasch model become Rash polytomous. In this approach, the estimated probability for correct answering is given by

$$P_e(i, j) \equiv P(x_{ij} = h | \beta_i, \delta_j, T) = \frac{\exp[k(\beta_i^{(k)} - \delta_j^k) - \sum_{j=0}^h \tau_j]}{\sum_{k=0}^m \exp[k(\beta_i^{(k)} - \delta_j^k) - \sum_k \tau_k]} \quad (1)$$

where τ is the ‘threshold’ parameter, see (Anderson et al, 2010), (Andrich, 1978), (Planinic, 2019) for details. The novelty in the formula (1) is the threshold parameter which behave as a global feature of the system and measure the ideal differences between successive levels of the evaluation scale. It convenes perfectly with our requirement to recognise the structure of the attitudes rather than an averaged opinion.

Therefore, after carefully selecting the questionnaire items, and considering an adequate sampling for measures, we can be focused on this parameter to analyse the hidden parameter of interest. Following this idea, we can compare and even perform hypothesis testing regarding those values, once being evidenced. So, we replaced the evaluation scheme for the questionnaire of the Table (1) by using Liker scale, that is naturally related to the supportiveness regarding the question asked on the certain items, (Likert,1932). These features convene with our intention to measure the hidden effect on the answering or assessing a response by Likert scale level. It will encompass also political influences, but everything is quantified on the threshold values

between Likert classes, giving a more robust assessment of the individual support on the evaluating the questionnaire item. Notice that the effect of the whole population would diminish or will be averaged in this parameter. By that explanation we believe that the threshold parameter measured by the Rasch polytomous model would represent the sample or even population's perception on the key answering idea, the efficiency of the legislative framework.

Data analysis and results

The draft questionnaire like the one displayed on Table 1 has been sent to some experts asking them to assess its validity for measuring generalised supportiveness of peoples for govern policies. This document contained 30 items as to mimic a generalised Concept Inventory exemplar, discussed in (Hestenes, 1998). We got 9 answers, from whose 6 estimated it as good instruments, and 3 showed comments or even rejection for several formulation. We removed 5 items that appear in many comments. After this check, the experts were more confident that this instrument is capable for measuring the intended quantity, but again, there were comments and remarks on at least one of the items giving the content validity ratio $CVR = \frac{N_{confirm} - \frac{N}{2}}{\frac{N}{2}} \sim (0.33 \div 0.77)$ which is considered good. We chose to keep 25

items for piloting. The questionnaire is piloted based on some social network links, asking firstly 'please fill this form if you supported the open list on recent elections. we argument that this way of asking and the fact that respondents could not be verified by us, as good guarantee that militants do not participate on this survey, at least in considerable number. Respondents that voted for open list are likely to be rational voters and we might model theory decision based on logical paradigm.

Due to the reduced capacities on realising a random sampling we use this opportunity sampling procedure for piloting our questionnaire. Notice also that we believed in reduced militant population on certain social networks such as Facebook friends for a researcher or public clerks, so this purposive sampling acts also as the first filer for militant. Notice also that we can model militant behaviour by adding a bias parameter, but it would overcharge the model with many variables, see (Prenga et al, 2023, Prenga et Ifti, 2016) etc.!

Table 2. Table of Indices and adapted meaning

Index	Formula	Desired range *	** Our explanation, if the index is outside the desired range
Difficulty in understanding	$\delta_i = \frac{n_{Correct}}{N},$ $\delta_{test} = \frac{1}{n_i} \sum_{i=1}^{n_i} \delta_i$	0.3-0.9	Confusing questions or questions with unclear content
Discrimination	$d = \frac{(N_{highestScore} - N_{lowestScore})}{N}$ $D_{Test} = d_{avg}$	>0.3	A question that is not suitable for distinguishing highly supportive attitudes from highly rejecting ones.
Cronbach alpha	$r_i = \frac{\bar{x}_i - \bar{x}}{\sigma(x)} \sqrt{\frac{\delta_i}{1 - \delta_i}}, r_{avg} = \frac{1}{n_i} \sum_{i=1}^{n_i} r_i$	>0.2	The responses are not based on solid knowledge of the subject's procedures. Re-administering the survey may yield different results.

Discriminatory power	$\rho_{test} = \frac{n_i}{n_i - 1} \left(1 - \frac{\sum_{i=1}^{n_i} \sigma(x_i)}{\sigma^2(x)} \right)$	>0.7	The question/survey does not clearly distinguish overall attitudes.
Self-consistency index	$\Delta = \frac{N^2 - \sum_i f_i^2}{N^2 - \frac{N^2}{n_i + 1}}$	>0.7	The questionnaire is not self-consistent; the questions do not assess the construct as a whole.

In this stage, we employed Table 1 as filtering procedure for each item. Moreover, we do not claim herein a satisfactory measuring for the concrete variable in the case study system but are focused on the general procedure seen

form the modelling point of view. In addition, we have used indexes proposed in (Ding et al, 2006) for CI measurement analysis. We have adapted original definition by a slight extension in our recent work (Llakaj and Prenga, 2025). After this procedure it resulted that 5 more questions have at least one index out of desired range according to Table 2. This might mirror the heterogeneity of the sample as well, but we decide to sacrifice them and reduce our questionnaire in the final form showed in the Table 3.

Table 3. Pilot survey items. Bold fonts items are used finally

Survey Items	Category
Education development and strategies	<i>General</i>
Crime convictions and general order	<i>General</i>
Environment care and management	<i>General</i>
Youths' perspective and employment	<i>Mixed</i>
Elderly support and policies	<i>Mixed</i>
Military advance in the framework of recent development.	<i>General</i>
Health and medicine	<i>Mixed</i>
Foreign affairs performance and straightening the role of the country	<i>General</i>
Financial stability	Fiscal/Financial
Social care and projects	<i>General</i>
Rule of law	<i>General</i>
Justice and reforms	<i>General</i>
Accuracy of Legislation for Proprieties and public terrains	<i>General</i>
Structure of taxes in general	Fiscal/Financial
General taxes on wages and secondary job and dividends	Fiscal/Financial
Free market guarantees and medium of doing business	Fiscal/Financial

Legislation for real states Proprieties and public terrains	Fiscal/general
Taxes burden	Fiscal/Financial
Exchange rate stability	Financial, general
Policies against fiscal evasions	Financial, general

Threshold spectrum from Rash Polytomous

From the reference dichotomous questionnaire which have passed CVI test and other CI – like indexes tests we removed the questions that were not apparently related to the fiscal aspects, resulting at only 8 questions for this procedure. We did not conduct further certifying stage because we just enlarged the spectrum of responses from (0,1) to 1-5 (1=fully contest, 5 = fully agree) for qualified questions. This questionnaire was sent for implementation, but by now, we gathered very few responses, only 25, consisting at an indicator sampling and not usable for real statistical analysis. Notice that due to the elevated technical nature of the evaluation, this survey cannot be productive by in random sampling, so the questionnaire was sent to the employee or administrative staffs.

We observed that for questions which were qualified as with high difficulty in the CI formalism terms, responders have pointed frequently to the neutral point 3. It highlights a formulation problem or face validity issue, that has to be considered further on. We observe that typically in this category are the questions which indirectly measure the efficacy of the legislation which initially has been tagged as not laying along with the perception for governance goodness. It signifies a separation point on methodological investigation for those components. We have calculated the threshold difficulty parameter, by using Partial Credit Model formula, disregarding the fact that the number of responders was low, (25 initially but effectively only 19 because 6 exemplars were found with many casual or random selections, henceforth, filtered), and the number of question was small too, 8.

Recognizing those constraints as very limiting issues, we decided ton not validate the results, but considered them as indicatory only. Considering also that we are talking for the piloting stage and methodologies to improve them, we might report those results as preliminary, and usable for discussing the efficacy of the method proposed here.

So, after performing the Rasch Polytomous Model (or equivalently, the PCM based analysis) we have extracted the threshold difficulty-like parameter, and rounded their values to the first digits, considering the remaining part meaningless due to the small number of (items, responders). Hence, finally we obtained $\tau = \{0, -3.3, -1.1, 1.8, 3.05\}$.

We observed that the first term of the threshold parameter which by the definition measures the difference on supportiveness's level 2 to the lowest, has the highest magnitude. (Notice that the lower level is taken 0 as by Rasch formalism). It signals that responders who oppose the statement completely have found high uncertainty in the general understanding of the questionnaire or have high level of uncertainty in the overall supportiveness of the fiscal law efficacy or fiscal performance of the state agencies that employ it. After this elaboration we come onto some conclusions regarding the method employed. In the first stance, this work reveals the importance of the methodology as calibrating procedure for common surveys that seems to be taken for granted in practice.

We didn't realize to conclude quantitatively, because the model itself indicates us throughout its stages that more measurement and more elaborations are needed, to achieve the reliability. Moreover, these discrepancies are measurable by the Rasch parameters, that is not possible elsewhere. We noticed also some indicatory parameters, that must be verified by a larger survey. The irregular structure obtained for the threshold parameter can be interpreted in both survey adequacy and understandability, and also in responders' confusions or indeterminacy to firmly answer a multiple scale question.

Conclusions

In this research we have described a step by step procedure to realize a meaningful survey for measuring latent variables or traits in sociometric measurement. After concluding to a trustworthy reduced survey on fiscal, and taxes policed performances conducted in a small purposive sampling of experts, we have analyzed the indicatory outcomes. The most important finding is that the threshold values of the characteristic parameter of the Polytomous Rasch model (namely PCM), showed a non-homogeneous distance between levels, indicating that the structure of perception of the responders is very complex and could affect the results of a survey. A larger survey which we are developing successively is expected to shed more light on this use.

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Notes on Contributors

The author of this study has finished the studies of master's degree in business management at the New York University of Tirana. She has worked as high rang specialist at the Supreme Audit Institution of Albania.

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