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MAX WEBER'S CRITICS IN GÖDEL'S PROPOSITIONAL THEOREM. A POSSIBLE APPLICATION OF GAME THEORY IN THE FIELD OF POLITICAL SCIENCE

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ABSTRACT

This paper explores the applicability of Gödel's incompleteness theorem to political theory by examining critiques of Max Weber's principle of value neutrality. It analyses the positions of Leo Strauss and Michael Polanyi, arguing that their critiques function as game-theoretical equivalents of Gödelian propositions – true statements that cannot be formally proven within a given system. The study demonstrates how Strauss's notion of the "crisis of modernity" and Polanyi's idea of "personal knowledge" challenge the epistemological assumptions of Weberian rationalism. By linking formal logic with political philosophy, the paper proposes a new analytical framework for understanding the limits of value-neutrality in political science. It concludes by advocating for epistemological pluralism and the recognition of moral truth claims beyond formal systems.

KEYWORDS Game theory, Max Weber, Leo Strauss, Mihály Polányi, political epistemology

1. Game theory methodology of the Weberian system of ideas and its critics

Is it a surreal image, or is it just a more thorough examination of the issue raised by the title on the field table of political science? I think I have to give a negative answer to this simple question, since in my opinion, both Max Weber's system of thoughts and ideas on the concept of the task of political science, as well as the critical reflections on it (see Leo Strauss, Mihály Polányi, or Eric Voegelin's criticism of Weber), can be derived not only from the generally accepted technique of political science (Straussian close reading), but the reflexive collisions of these task conceptions can also be described by game theory foundations.

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Why „game theory"? The question may arise in the reader as to why I want to focus my analysis "exactly" and "exclusively" on the basis of game theory definitions of the political science tasks of the authors listed above, and in connection with this, their constructed and developed Weberian criticism, which are critical reflections – to use the words of Mihály Polányi – „they evoke the feeling of breaking the glasses."

I chose game theory because my starting hypothesis is that authors who live with a critical reflection on Weber's doctrines become interpretable through the thought rhythms of game theory, and not only become interpretable actors (actors who make Weber's principles the subject of criticism), but at the same time they can correspond to the critical reflections in question – in a game theory perspective – in relation to Gödel's theorem.

In the following, I would like to present and explain the essential aspects of Gödel's theorem in a simple, but also to-the-point way. After this presentation, as well as through the evaluation of the conclusion of the proof, the web of connections that weaves through the deep (according to some researchers, unbridgeable) gap between game theory and political analysis will become evident.

It attempts to build a bridge against the widening of this gap (at the theoretical level, this study) by revealing the mutual influence of game theory and political analysis: the basic game-theoretic ideas of Gödel's theorem (as well as game-theoretic sub-aspects derivable from this theorem), and how these derivations can be applied within the "modern" interpretation framework of political philosophy.

Analysing Gödel, how can we explore the critical reflections of political science task-conceptions? This study is about this question and its answer, which is meant to break down the "theoretical Berlin Wall" that separates game theory and political science as two distinct scientific fields.

We have to wake up to it, and I know that this awakening will surely be only a bold beginning on a difficult path, but in any case, the basic premise must be made: although we are talking about fields of science created through separate paradigms, which interpret the world according to different systems of views (and questions) (and reality as well), both game theory and political science must be considered together.

By combining these two separate spheres, the researched, analysed area – or issue, or problem – can be given an analytical and theoretical background that neither sub-science would be capable of on its own.

The main idea of my basic preliminary statement is therefore that it takes on a unique theoretical construction, according to which I assume that these two fields of science – although to a certain extent and degree they show significant differences from each other – when embedded in an analytical framework, are so special that, until now, in the analyses of political science we can acquire new analytical methods through the „big bang in political theory" that they stimulate, which embeds political science in a space studded with novel critical reflections, and which is full of game theory proliferations. This may also mark the beginning of a new era of political analysis.

And now let's see what the game-theoretic (essential) driving force of Gödel's theorem lies in, explained in more detail below.

2. Gödel's theorem, or a possible starting point in game theory

In the following, I will try to outline Gödel's theorem in terms of its essential aspects: let there be an nth function of this type applied to w (in terms of the chosen ordering of the symbol strings), which we denote as: $P_n(w)$.

The chains of these propositions, which form the proofs of the theorems in the system, can also be marked by natural numbers following the ordering scheme outlined above. We denote them by: Π_n.

In the line below, let's review the following "propositional function" of the number w: $\sim\exists x$ [Π_x proves $P_x(w)$].

In terms of the essence of the statement, it only says (for us) that the *x*-th proof is the proof of the proposition that *Pw()* is applied to the value of *w* itself. The negated "existential quantifier" outside the square brackets is meant to remove one of the variables ("there is no *x* for which..."), ergo it is a quasi-divisor, as a result of which the arithmetic propositional function ultimately depends only on the value of the only "remaining" variable *w*. The whole phrase is meant to say that *Pw(w)* has no proof. This is the true core of Gödel's theorem: there are true propositions "with no proof within the system" (Penrose, 1993, p. 26).

Let's see the further details of the proof: we have numbered each one-variable propositional function, as a result of which the one just described must also be given (assigned) a number: let this number be *k*. Our propositional function is therefore the *k*-th in the list. Thus, the structure of the function will be as follows:

$\sim\exists x$ [Π_x proves *Pw(w)*] = *Pk(w)*. We must examine this function in addition to the specialized value $k = w$ corresponding to it.

As a test result, we get: $\sim\exists x$ [Π_x proves *Pk(k)*] = *Pk(k)*.

What does this specialized proposition *Pk(k)* tell us about? About the fact that this propositional function is completely and perfectly defined on the one hand, and that it is impossible to prove it on the other hand, since we do not have an adequate method for this.

In the words of Roger Penrose, the essence of this special proposition is reflected in the mirror image of Gödel's theorem, according to which:

> "Although *Pk(k)* is an arithmetic proposition, according to its construction, it states what is on the left: 'there is no proof of the proposition *Pk(k)* within the system.' If we have laid out our axioms and procedural rules carefully, and if we have done the numbering correctly, it is not possible to prove this *Pk(k)* within the system. Because if there were, then the 'meaning' of the statement *Pk(k)*, namely that there is no proof, would be false, so *Pk(k)* as an arithmetic proposition should be false. Our formal system cannot be so badly structured as to allow the proof of false propositions! Therefore, it must be the case that *Pk(k)* actually has no proof" (Penrose, 1993, p. 25).

And it's true. This is exactly what *Pk(k)* wants to tell us about itself. For this reason, what *Pk(k)* says must on the one hand be a true statement, while on the other hand it must also be true as an assumed arithmetic proposition, despite the fact that "we find a true proposition that has no proof within the system!" Ergo, the fact that our proposition cannot be proven does not rule out its truth. But no matter how we think about this issue, there will always be propositions that – in Penrose's expression – "get off the grid."

By following the line of thought detailed above, we have thus arrived at Gödel's conclusion, according to which we have established that this special proposition *Pk(k)* is a true statement, but we must also state here that although it is a true statement, the proposition *Pk(k)* cannot be proved within a formal framework. An additional insight into the essential aspect of this thought rhythm is that the formalistic (mathematical) concept of "truth" cannot necessarily be complete. In other words, no matter what kind of connections we can invent for arithmetic, we can say with certainty that there will be truths (special propositions) within the system that cannot be proven within the framework of formal systems thinking (i.e., we cannot assign true truth values to them through the formalist procedure).

As a result, we believe we can see the validity of the Gödel proposition *Pk(k)*, although we cannot derive this from the series of existing axioms.

Gödel's proof is a related mathematical experiment, the essence of which is to eliminate the hegemonic nature of the formalist point of view in the strict sense, and through this elimination to show us the weak support pillar of the formalist point of view – which lies in the true statements that we do not know within the

formalized system through the logic of the system and cannot prove by its mathematical regularities.

In this way, I have to accept Penrose's conclusion (about the essential driving forces of Gödel's theorem), according to which:

> "Whatever the situation, I see that a clear consequence of Gödel's proof is that the concept of mathematical truth cannot be enclosed in a formal scheme […] Because how to decide which axioms and rules of procedure to accept when trying to set up a formal system? Our decision must always be guided by our intuitive understanding of what is 'self-evidently true' if we know the 'meaning' of the symbols of the system" (Penrose, 1993, p. 134).

That is, Gödel's statement of fact – that the concept of mathematical truth transcends the concept of formalized systems thinking – transcends something "absolute" and "God-given"[2].

My goal (similar to Penrose's efforts) in this case too was to show, about a special Gödel proposition that cannot be proven or disproven using the axioms and rules of the formal system under investigation, that using our findings regarding the meaning of the operations in question, we can clearly see that it is a true proposition!

How can the critical reflection of Leo Strauss and Mihály Polányi on Max Weber's system of ideas be related to the proof of the Gödel proposition?

If we accept the Gödel proposition, the essence of which is that there are aspects of thinking, concepts of truth, and, as a result, true statements that cannot be proven (that is, they rely on the subjective), then such subjective factors include the crisis of modernity in the case of Leo Strauss, and the double meaning of personal knowledge in Polányi's interpretation process – or just think of Polányi's conceptual construction of "truth, freedom".

Knowing all of this, I believe that both Leo Strauss and Mihály Polányi can be interpreted through their criticism of Weber (not only as Max Weber's critics in political science), but also as specialized forms of manifestation of the Gödel proposition. That is, through the influence of game theory and political analysis (political philosophy) on each other – through a kind of Strauss and Polányi's outstanding proposition *Pk(k)* – which goes against the formal concept of "truth" and, as we shall see, surpasses it.

[2] Mathematical truth goes beyond man-made constructions.

In what follows, I will make a theoretical attempt to show how the logical path of the Gödel proposition depends on or can be related to, when viewed from the field of critical reflections on Weber's doctrines (Strauss and Polanyi).

3. Comparing the two Weber critiques with game theory: Or Weber's critics in Gödel's theorem – matching them on game-theoretical grounds

Leo Strauss's topos entitled „Crisis of Modernity" is an essential determinant of his philosophical thought.

For Strauss, the essence of this crisis can be seen in the fact that modernity (which simultaneously expects objectivity, an unselfish faith in historicism, the acceptance of the progressivity of modern science as a fact, and the spread of the idea of value relativism in scientific knowledge) is opposed to the premodern – one might say, to what is now labelled as unscientific – in which both political thinking and classical political philosophy (both its paradigm and questioning) are based.

This conflict, in the Straussian sense, is unsolvable, but there is only one way to prevent the escalation of the conflict, and for Strauss this is nothing more than the rehabilitation of classical political philosophy in the classical sense (starting with the Socratic turn); it is necessary to raise classical political philosophy back to its appropriate rank in relation to the scientific fields.

Analysing Strauss's critique of Weber, he arrives at the insight into the German social scientist's thinking that the Weberian system of conditions – whose real strength lies in the fact that the unique can arise from the general itself (Weber, 1967, 1970, 1995, 1998) – in Strauss's reading means nothing more than that they can be interpreted exclusively as the effects of other unique or partial phenomena, but our knowledge of the whole will never really be complete.

Strauss argues against Weber that the acceptance of the dimension of value neutrality is only a deceptive blind hope; what's more, it results in the self-deception of the social scientist himself, since both our concepts of values and our individual (only for us) interests determine the scientific orientation that, as a future "researcher, as a social analyst", we intend to accept.

In other words, in the Straussian sense, the social scientific desire for Weber's value neutrality is nothing more than an imaginable utopia or an illusory atmosphere viewed in the sky of social science, since it already bears its "valued character" through the main questions of the research field we have chosen, as well as through knowledge of the methodology of the given research system, in which values and value judgments are both "historically relative" when viewed in Strauss's theoretical construction.

Furthermore, Strauss believes that scientific truths are also – so to speak – realized as the results of subjective value judgments and, in this connection, arbitrary value choices. As a result of Weber's rejection of value neutrality, we cannot "call a spade a spade."

In our case, the Gödel propositional function reaches the Straussian path here: that is, the irreducibility of the "value neutrality criterion" highlighted by Strauss, viewed in the field of social science discourses, brings with it the game-theoretic correspondence of the Straussian interpretation (through Weber's critique), on which the Gödel propositional theorem provides the basis for us. The Gödel proposition (Straussian version) is one in which *Pk(k)* is equal to the Straussian value measurement function against value neutrality.

In other words, it is possible to imagine value judgments and value choices viewed within a specific field of science for which we do not have an adequate – relevant – series of proofs about the nature of the values or value judgments. In the absence of this, we can only say that the choice of values and value judgments based on Straussian foundations is the "true statement" (comparable to Gödel's proposition), which, at the same time – since we can speak of value choice in the intended sense of the subjective – cannot be proven by using the axioms and rules of the formal system, or we can arrive at a series of disprovable but nevertheless true statements that go beyond the thought perspective of the formal system.

We can attribute such a meaning to Leo Strauss's "concept of value" – a true statement on the one hand – and to Mihály Polányi's concept of personal knowledge on the other hand, applying Gödel's propositional theorem to both (Strauss, 1994,1996, 1999; Strauss & Cropsey, 1994).

4. Mihály Polányi's concept of personal knowledge in Gödel's propositional theorem

Regarding the concept of personal knowledge (Málik, 2006), Mihály Polányi believes that the preconditions for both scientific research and teachings that require scientific standards are created by the scientist's belief system, which is connected to the overall system of things.

Polányi argues, based on the evidence, that personal judgment – unique to each scientist – inevitably influences how strongly a given body of evidence is taken to support the validity of a particular statement. So, the scientist, as a subjective

element, can decide for himself what he accepts as "truth" and what he rejects, treating or considering as false as a result[3].

Analysing and interpreting Polányi, it becomes visible to us that in the subjective "choice between judgments" there is also a moral aspect that goes beyond the level of formal system thinking, and this moral force begins to operate in the idealism triggered by Polányi, turning the scientist's judgments into a matter of conscience.

After all (just as Strauss also comes to this conclusion), all scientists – who search for problems to be solved and thereby strive for a deeper understanding of social matters – form their individual opinions relying on their characteristic ("scientist") personal judgments, which they see in their own way and publish on the spacious field table of science, where the views they develop can become the subject of criticism, acceptance, and rejection at the same time.

In Polányi's view, science can only remain viable in modernity if scientists are able to voice their individual views, as a result of which scientists' decisions are considered sovereign in the world of science.

Through the application of the Gödel proposition, Polányi's theory is also transformed into a new system of views, and the analysis and impact of political philosophy built on game theory foundations are formulated anew, focusing on the field of modern political science.

We can make the following observations about Polányi's system of views outlined above (using Gödel's theorem): *Pk(k)* is the same as the scientist's subjective choice of values, which Polányi bases on moral principles. In this way, this choice of values based on morality becomes the element that goes beyond the magic circle of formalized system creation, as a result of which we can obtain another "true statement", since scientists can indeed form their own individual value judgments – as long as the social organization, in the case of Polányi and Strauss, is based on democratic standards – following the "true statements" they accepted and the facts they rejected in our case (Polányi, 1992, 1993, 1994, 1997).

5. Conclusion

Nevertheless, we must note that although in both cases we reached Strauss's and Polányi's idealism to establish the "true statements" of theses that transcend formalized systems, we cannot prove these true statements, and here the

[3] See the "scientist's acceptance of truth" appearing in Polanyi, as well as two other factors: on the one hand, the "value neutrality of criticism" inherent in Strauss's theoretical construction, and the connection between the terms appearing in Weber's sociology: the citizen in his "subjective intended sense".

influence of Gödel's propositional theorem can be seen in action within their theoretical constructions.

In other words, through the use of game theory (including Gödel's propositional theorem), we were able to embed social scientist-philosopher authors who reflect on Weber's doctrines (especially with regard to the concept of value neutrality) in a new framework. As a result of this, we can acquire a new epistemological and conceptual approach to political science – one that political science alone, including modern political philosophy, would not be able to satisfy.

Through the application of game theory, we became aware of the fact that there are "true statements" – not just proofs within the field of formal mathematics (by Gödel's propositional theorem) – which, although considered true, cannot be proven "using the system of axioms available in the given formal space" and with the help of conceptual criteria.

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