5. Game theory with partially irrational or unfair players OR
From the "Prisoner's Dilemma" to "The Greek's Dilemma"

In this section we will treat the Greek debt problem by the means of game theory and will not only show that this problem is closely related to the prisoner's dilemma but will also answer the question of what is the logic outcome of the "game".

Due to lack of figures (the Greek's government has carefully made sure of that even with respect to the Troika), we are unable to perform a sufficiently correct quantitative estimation of the total damage (direct and collateral) of any of the outcomes. However, we explicitly point out that by applying the mechanism as elaborated in chapter 3, "School Transport and Circadian Rhythmic", in principle, such a failure analysis is possible. As the method applied explicitly takes soft boundary conditions being typical for humans (mood, irrational behavior, hesitation with respect to the unknown, snugness, purblindness, ignorance etc.) into account we can even be sure to account for the so-called uncountable in a clearly defined uncertainty budget.

Taking all this information the following two questions pop up:
1. Why do we have to endure so much dimwitted talk and action from so many leading politicians and even some "economists" in Europe (already having excluded the current Greek's government from our consideration)?
2. Who has an interest in such bamboozling tactics?

This brief study will lead to the answers and in essence will give them as follows:
To question 2: Politicians have made severe mistakes in the past and now they want to correct these mistakes in the most comfortable way. Naturally, "comfortable" means comfortable for the politicians and thus, by no means necessarily in an optimum manner for the people of Europe and most certainly not optimum for the European tax payer (with a few well-known exception, of course). In order to be able to go this "comfortable" way, the politicians will waste a lot of money – OUR MONEY. And that is why they need to cheat at us, to lie to us, to bamboozle us. This way they hope we will not realize the betrayal.
To question 1: Well, this question allows a bifurcation point answer. Either, such politicians and some of these "economists" are really as dim as they talk or they lie on purpose. In some cases, of course, it also can be a mixture of both. Helped by the fact, that the whole matter is complex, holistic approaches are rare among both, politicians and scientists (with a very few exceptions like Hans Werner Sinn, Wolfgang Bosbach and others) and ordinary people are busy enough with their own lifes (not to talk about the time and effort necessary to accumulate enough knowledge to sufficiently comprehend the matter), the politicians had and still have, relatively easy play here. However, the emphasis lays on the word RELATIVE.

Motivated by many request regarding the "overall" or "global" viewpoint this Greek debt problem demands, we will also give a holistic approach about how this Grexit scenario can be conducted, with the optimum outcome for all players… with the exception of the current Greek government. The latter simply is caused by the huge discrepancy between reality and those promises this government has made, in order to become recently elected by the Greeks. It will become evident that many so called "politically intended" or even "humanely reasoned" considerations are more or less only arguments of pretense. In reality, all such arguments against the Grexit are only intending to fix a situation which in biology is called host-parasite. Thereby the parasites are by no means the people of Greece in general but all those who want to maintain a situation where public money (from the host, which is the European tax-payer) can easily be transferred into private pockets or to corrupt politicians and officials.

We point out explicitly here AGAIN, that the biologic comparison given above IS NOT meant to describe the people of Greece in general and a lot of parasitic aspects in this context are not even remotely being orchestrated by Greeks.

Game theory is the formal study of conflict and cooperation. Game theoretic concepts apply whenever the actions of several agents are interdependent and usually of rational character. As these agents may be individuals, groups, firms, states or any combination of these it might be plausible to assume that in some "games" also irrational agents can be present. The reader may find a brief introduction into game theory in [35].

In order not to alter the usual concepts of game theory, which provide a comfortable language to formulate, structure, analyze, and understand strategic scenarios, we are here seeking for a mechanism allowing us to incorporate irrational decisions or unfair behavior into existing classical game theory concepts. The expression *unfair* here means, that one player, after having achieved his or her maximum goal or can be sufficiently sure that he or she will achieve it, is changing the rules of the game. It can also mean, of course, that the rules are changed by one player before the payoff in case he or she might lose the game. In essence, *unfair* stands for the affinity to cheat. After that, the player is trying to play the game again under the pretense now sticking to the rules, cheating again and so on and so on. In essence, the mechanism might be understood as a perturbation of the classical approach. However, instead of going for perturbation methods we intend to find solutions by the means of the Higgs field mechanism. In a sense, the classical game here "floats" in the Higgs field which in many cases can be considered as a field of trust, mistrust, sympathy, honesty, discipline, reliability and so on.

Here we want to revisit the "prisoner's dilemma" (c.f. [35], pp. 10-13). This is a game in strategic form between two players. Each player has only two strategies, which are "Cooperation" C and "No Cooperation" NC. For simpler identification, we give the strategies or moves in the form (strategy of player I, strategy of player II).

Player I		Player II	
		C	NC
	C	2, 2	0, 3
	NC	3, 0	1, 1

Table 1: The Prisoner's Dilemma game (s. text).

Table 1 presents the resulting payoffs in this game. Player I chooses a row, either C or NC, and simultaneously player II chooses one of the columns also with C or NC. The strategy combination (C, C) has payoff 2 for both players, and the combination (NC, NC) gives each player payoff 1. Please note: The higher the payoff, the better for the player. The combination (C, NC) results in payoff 0 for player I and 3 for player II, and when (NC, C) is played, player I gets 3 and player II gets 0. We are not going to discuss this classical problem in detail, but it is obvious that the combination (NC, NC) is the "optimum" or better put the logic choice for both players considered together and that, if deciding completely rationally, each player would opt "No Cooperation".

By interpreting the payoffs in a new way, we can immediately construct the "Greeks dilemma" out of the prisoner's dilemma.

Greece shall need huge financial support from player I (called the "institutions") in order to avoid bankruptcy and being forced to give up the Euro while player I, for political and geo-strategical reasons, is interested in keeping Greece in the Euro-group and also in avoiding

such a bankruptcy of one of its partners. Unfortunately, in order to avoid bankruptcy, player I does not only need to spend huge amounts of money to player II, but also has to demand certain changes in the inner running of Greece (this is usually being called "reforms").

As an additional constraint each player has to follow responsibilities and "moods" from those it has gotten its authority. Thus, in the case of player II this is the people of Greece and in the case of player I it is the people of those countries Greece demands to be supported by and wants to receive the necessary money from. We shall call this here the sovereign I and II for player I and player II, respectively. Now, for both players the situation shall be such, that its two sovereigns expect cooperation with their interest and this, in majority, would lead to Greece being forced out of the Euro, which is been called here the "Grexit". The reasons for both sovereigns to support such a harsh step are different, of course. While the Greeks simply do not want to suffer under the strain of "hard reforms", sovereign I simply does not want to spend its own money (tax-payer's money) less or more as non-investive grants for a country, where e.g. (only a brief excerpt):

- Pensions are about 4 times as high as the average in the other European countries (based on the BIP)

- People are going into retirement about 8 years earlier than in one of the strongest countries in EU (Germany)

- Military spending is much higher than the average in the rest of the EU (based on BIP)

- Spending on state officials is much higher than the average in the rest of the whole EU (based on BIP)

- After 5 years of "reforms" and promises of the latter by the various Greek governments there is still no working tax-system (outstanding taxes exceed 70,000,000,000.-€) and this is only one of the many things Greece wanted to "improve"

- Corruption is among the top in the world

- Black market and illicit employment are world leading and

- Even though the most expensive ones in Europe (based on BIP) state's control mechanisms are completely inefficient to non-existent

- The money player I has already given to the Greeks has been used as follows:
  about 1/3 was for the banks
  about 1/3 was to further finance the Greek's exorbitant standard of living (by far exceeding what they can afford taking the productivity in that country)
  about 1/3 was used to finance the exodus of capital, meaning the money the Greeks had brought out of the country

- Still, Greece has the largest tank army in the whole EU

- Before even the attempt is been made to collect money among the more wealthy Greeks, especially those who have dramatically benefitted from the unbalanced governmental spending in the previous years, the sovereign I sees itself besieged by the Greek government to give even more money into an obviously rotten system.

- … of course, there is much much more, but the author is of the opinion that the government of Greece has already disqualified itself enough – no matter what game is been played and how one would like to call it – and those few reasons given here

should suffice to explain sovereign I's mood. However, there is still one important fact we have to present here:

- Greek is principally not competitive within the Euro and no matter how much money is being thrown into this inappropriate construction, the system will never self-organize into a financially steady constellation (not within the Euro), meaning that it will always need the monetary "support" from the rest of the Euro-zone. Here, we put the word "support" into quotation marks, because it is evident that this "support" in truth is nothing but a permanent flow of charity or alms.

In this constellation, of course, we have the classical prisoner's dilemma and both sovereigns demand NC (no cooperation) from their government-players I and II. This should lead to the outcome (1, 1) taking our game structure as given in table 1. In short, this would be the realization of the so-called "Grexit" and it is the logic choice in this situation taking logic and the usual game theory procedures.

However, this game had been played already and the reader knows that for some funny, apparently not very rational reasons both players had ignored their own sovereigns and opted for C (cooperate = no Grexit) rather than the logic choice NC (no cooperation = Grexit).

In order to understand this decision one could adapt the model by letting a Higgs field of "funny reasons" coupling into the previous game structure and shifting the payoffs such a way that in fact – by some miraculous transformation – the combination (C, C) promised better outcomes for both players than the classical (NC, NC)-solution.

Player I	Player II	
	C	NC
C	2, 2	0, 3
NC	3, 0	1, 1

$+$

Player I	Player II	
	C	NC
C	U_{C1}, U_{C2}	U_{C1}, U_{NC2}
NC	U_{NC1}, U_{C2}	U_{NC1}, U_{NC2}

Table 2: The Prisoner's Dilemma game with a "funny reasoning" Higgs field coupling into the payoff-structure of the classical game motivating the players to opt for (C, C) rather than the classical solution (NC, NC) (s. text).

There is no need to mull over the internal structure of the potentials U_{ij} (i=N, NC; j=1, 2) as we only need to know that these potentials are sign definite (for the politicians) driving the outcome of the game towards "Cooperate" (thus, against the Grexit) for player I almost no matter what player II does. Anyway, especially for U_{i1} the sign character (for player I) is highly speculative, mainly psychologic and only based on fuzzy political, but in essence meaningless or even dangerously wrong slogans and things like:

- "If the Euro fails, Europe will fail, too!" (A. Merkel)
- If we do not help Greece, the Russians will do and this will destroy the EU
- Nobody is able to foresee what else can happen after the Grexit[3], or does anyone?
- If the Greeks drop out of the Euro the "bad players" on the financial market will immediately pick other weak partners in the Euro-group and play hard ball with them[4].

Thus, in essence, all these arguments behind the definiteness especially of U_{i1} are nothing but politician's ambition mixed with a bit of dogma PLUS – and this should not be underestimated – the interest of the private sector (private investors) to keep the politicians spending taxpayer's money they can withdraw. There is no deeper logic or resilient fact or

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[3]Counter question: Does anybody know what happens without the Grexit? Well, the author has pretty good guesses, if not to call it evaluations, for both scenarios, but one thing is for sure: In the case of the Grexit, the current government will make sure that it will look like one of those African famines. They will not do anything to ease the pain for the country respectively the people, they are responsible for and who have elected them, because of the lies and the false hopes, this government has spread (and still is spreading). Even as this is easily achievable, to prepare that country for the necessary steps and to mitigate negative effects, they will make it suffer as much as possible only to point their fingers to player I and say: "This is all your fault!"
If truth be told and taking strict rules of logic, after having done nothing to buffer the negative effects of a Grexit for their own people so far, the Greek's government almost has no other choice but to play this cruel card now. They run out of options and as giving in to the conditions of player I, which meant reforms, is political suicide for player II, he can't do anything else but to threat player I with the suffering of a whole country. This, of course, is classical blackmail and if player I gives in this is going to be the end of the EU, not the Grexit.

[4] On the contrary, the financial market is not as stupid as those politicians try to make them look to us. The players in the finance sector will know that now every other Euro-group partner will double its efforts in avoiding the Greek's fate and this means reforms. This however, means strengthening these partners and this the financial marked players full well know and value. Thus, it'll become easier and – what is more – fairer for the other Euro-group partners after the Grexit.

theory behind. It is pure Angst the politicians rake among sovereign I in order to make the people pliant to their own ambitions and wishes.

Now however, the reader of course knows the history:
After the game had been played and player I had opted for C (spending its sovereign's tax money to player II) and player II pretended to do so, too, meaning also to opt for C which in his case meant "reforms", player II suddenly and "unexpectedly" switched to NC. This way player II maximized its outcome to 3 and minimized the payoff for player I to 0. If truth be told, it isn't even a 0, it rather is a huge negative payoff player I and sovereign I have received so far.
After a short while, when player II had spent the whole payoff of the previous game, he asked player I for a new game and again suggested to play it under the same "fair" rules as before. Player I, as usual, only too willing to gamble its sovereign's money, obliged. The reader knows the result, of course.
Gradually however, after quite a few of such games had been played, a second Higgs field came literally into play and this time it was the field of mistrust. One might also call it a learning effect of a rather dim-witted player I, who, taking the previous experiences of player II's behavior, "suddenly" starts to evaluate the game structure somewhat more realistically and realizes its true structure being of the form given in table 3 rather than the one in table 2.

Player I		Player II	
		C	NC
	C	2, 2	0, 3
	NC	3, 0	1, 1

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Player I		Player II	
		C	NC
	C	U_{C1}, U_{C2}	U_{C1}, U_{NC2}
	NC	U_{NC1}, U_{C2}	U_{NC1}, U_{NC2}

+

| Player I		Player II	
		C	NC
	C	U_T, 0	U_T, 0
	NC	0, 0	0, 0

Table 3: The Prisoner's Dilemma game with a "funny reasoning" plus a "mistrust" Higgs field coupling into the payoff-structure of the classical game clearly showing player I that there is only one option and this is NC. Anything else will only lead to endless repetitions of (C, NC)-situations being the worst outcome for player I (s. text), because he does not only loses spectacularly against player II but also is been punished by its sovereign.

We might not need to worry about the U_{ij} for the reasons given above, but it is worthwhile to consider the internal structure of U_T, which we call here the **"Higgs field of MISTRUST"**. It is pretty much obvious that such a field shall have a Lorenz-type form like:

$$U_T = \left(-\frac{M}{\sqrt{1 + y^3 - \left(\frac{c-x}{c}\right)^2}} \right); \tag{47}$$

The reason, of course, is to be sought in the fact that even the most stupid and understanding or forgiving figure (player) will reach a point where there is no further going on, no further giving in, no further spending money into a never ending story, a barrel without bottom. We may call this limit player I's own speed of light c. With the variable x and y, denoting player I's solidarity and player II's willingness to reforms we may evaluate the following picture about a possible mistrust field potential U_T.

The choice for symmetry in the term $(c-x)^2$ in our potential U_T is well reasoned by the fact that even if player I for itself does not see the limit for its solidarity towards player II, the sovereign I will see it limiting the variable x to both sides around a certain maximum. This is the danger for player I potentially not realizing when the sovereign I will tilt towards very radical solutions rather than to throw more good money after the bad, as player I apparently likes it best. The power exponent 3 for the variable of "reform willingness" of player II is well reasoned, too. It is been chosen, because it provides a plateau around a certain value (here zero), but shows significant positive effect in favor of player II when reforms are being honestly done. In the same way, of course, the effect is negative for player II when reforms are being withdrawn (or lied about) by the Greek's government.

The Higgs Field of mistrusts against the Greek's government
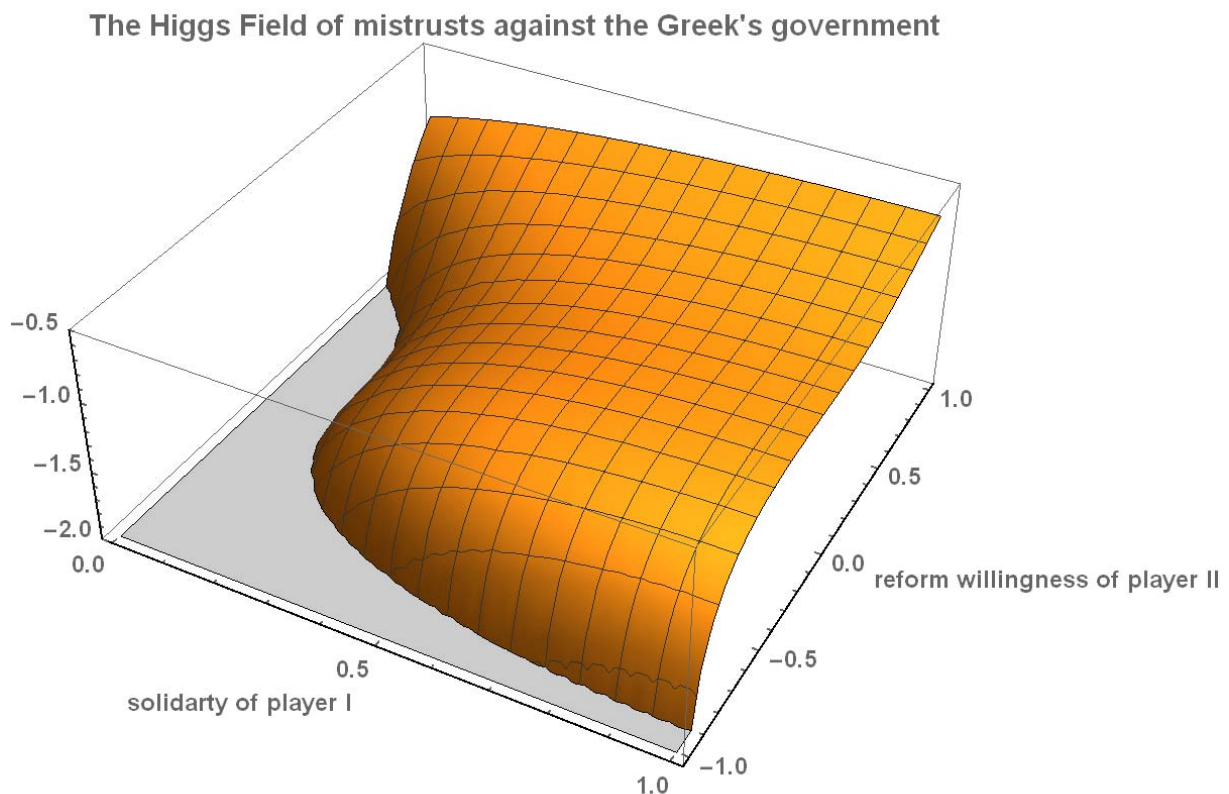
Fig. 42: The Higgs field of mistrust for our Greek's dilemma game. Solidarity and reform willingness are given in arbitrary units, but it is a simple task to adjust them to the current political situation.

As we see, from certain values of reform-unwillingness of player II downwards and no matter what those "good-natured potentials" U_{ij} are resulting in, there is always a limit for the solidary where the payoff becomes too negative to be acceptable even for the most helpful and cooperative player I. He simply will have no other choice but to opt NC.

Now the question is:
How strong does the field of mistrust couple into the outcome or payoffs of player I?
Or, to put it the other way round:
How strong is the parameter called "trust" $1/M$ towards player II still vectoring player I towards a Cooperate-decision against the interest of its own people or sovereign?
In the equation given above we have given the mistrust parameter the symbol M. Being interested in how much total damage is been done by player I, not drawing the logic conclusion and opting for NC, we can now apply the usual Higgs formalism and evaluate the masses being created[5]. With our potential not being of harmonic structure anymore the evaluation is a little bit different than in the sections before, but it can easily be seen that there is a great dependency of the total damage on the mistrust parameter M.
Thus, in a matter of fact, this mass of cumulated damage also seems to be nothing but a big pile of mess.

We leave it to the reader to make a realistic estimate for the parameter of mistrust M or trust $1/M$ and thus, following classical game theory, to come to a logic conclusion regarding the logic choice in the game (be it the final outcome for the real one or not).

This finally, makes – perhaps - player I realize that, no matter how strong the "funny reasoning" field U_{ij} ever was and of what strange substance it was made of, the only logic option ever was and is and will always be "No Cooperation" with a character like player II. This of course means the Grexit and finally, this unfair GAME will be OVER.

Finally, a holistic approach for a "Proper Grexit"

A) The current Greek government has to organize the Grexit in a "good governance" manner

B) The Euro-partners are assisting within the first and probably more difficult weeks with respect to crucial matters like energy, health, food etc. This will not only help to stabilize the country but also counterbalance the danger of Greece drifting towards partnerships or situations EU and NATO do not want (together with another such "steering-" or motivation-tool described under points D and E).

C) The moment the Greek government will have introduced a new currency this currency will devalue against the Euro

D) It is very likely that external forces will speculate against this new currency. In addition, the immanent / intrinsic competitive weakness of Greece will contribute to a possible very deep fall of the new currency. Thus, the Greek government will need assistance (supporting purchases) from external banks and institutions.

E) These supporting purchases should be performed by forces who:

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[5] BTW: It can be shown that in this constellation, meaning from a certain value of unwillingness of player II to reforms onwards, the decisions of player II do not matter anymore. This gives a situation similar to the famous battle in the Bismarck Sea, often been named in connection with game theory, where one player can be eliminated from the analysis.

a. Have a natural interest in keeping Greece in the EU and in the NATO
b. Maintain some influence regarding Greece's future
c. Are interested in getting some of the public money back they have "invested" in Greece so far. Here interest is guaranteed simply because with the new currency, Greece will be able to overcome its principle competitive weakness and after a reasonable time (about 2 to 3 years) the new currency will rise in value. This however, will bring those former supporters a welcome profit reducing those losses they had made with the previous, inappropriate rescue program.

Thus, we see, player I has a nice set of cards in her or his hands where the further waste of taxpayer's money could be omitted and the endless suffering and the dishonorable alms-treatment of the people of Greece could be ended.

The question must be allowed here: Why is this set of cards not being played by the European politicians and who is winning because of that?