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International trade and strategic behaviour: a game theoretical analysis of the trade dispute between Turkey and Russia

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ABSTRACT

Starting from the premise that strategic interactions between countries influence trade policy decisions, this paper is a first attempt at exploring the possible outcomes of a trade dispute between Turkey and Russia, assuming that Turkey can lodge a complaint about Russia's protectionist move to the WTO Dispute Settlement Body (DSB). Employing the course of events during the recent economic conflict between the two countries, the article models the stages of a trade game wherein players exhibit non-cooperative behaviour. It finds that Turkey reporting Russia to the DSB depends on the cost of the dispute, which represents both economic losses and losses that can be considered disadvantages in a broader sense. The results show that in trade relations where asymmetric interdependence is observed, if both parties mutually commit to an international organisation, binding regulations may provide strategy options that are otherwise infeasible for the disadvantaged player.

1. Introduction

Political economy explanations of trade policies help us to understand the structure of trade protection as well as the process of related policy formation. Nevertheless, it is not possible most of the time to choose permanent policies towards trade, since interests of countries may change as production structures and development levels change. As a result, several forms of strategic interaction appear during the trade policy-making process, which require close scrutiny.

The extant literature on related research mostly consists of attempts to model trade relations in a game-theoretical framework, emphasising how trade policy strategies can be interpreted to the strategies of a game. Indeed, trade policy decisions fit well to the strategic nature of decisions in game theory, where each player anticipates the choices of the other player(s), before deciding which course of action to take over a number of possible actions.

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In most of the existing studies however, it is not the countries and their *ex post* trade strategies which are under focus, but some generalising trade outcomes and distribution of welfare due to different choices in the game. Therefore, the analyses are concentrated on the search for equilibrium in a trade game, and the findings do not provide policy suggestions. An example is the study by Gould and Woodbridge (1998), where the authors show that retaliation may result in liberalisation or may cause a trade war depending on the market characteristics of the trading countries.

In the limited number of empirical analyses, the focus of the research is on developed countries. Grossman and Helpman (1995) model a two-level game between two large open economies which possess market power in several industries and induce governments to impose optimal tariffs on each other in these industries. The governments of these two countries negotiate for the equilibrium tariffs, in a setting where retaliation and conciliation exist. Gawande and Li (2006) test this model by using bilateral trade barrier data between the United States and Japan, and between the US and the European Union. Using a global numerical trade model, Harrison and Rutström (1991) compute the outcome of a trilateral trade war between the US, the EU and Japan, and then a bilateral trade war between US and Canada.

More policy-oriented literature, relevant to the content of the present paper, approaches the dispute settlement issue between countries as resolving conflicts or liberalising trade. The analyses which seek to explain how global international regulators such as the Dispute Settlement Body (DSB) of the World Trade Organization (WTO) may help achieve freer trade through a system of regulations fall into this category. In Abbot and Kallio's (1996) study, the policy problem of large exporters in agriculture is framed as a prisoner's dilemma game where General Agreement on Tariffs and Trade (GATT) may serve moving the market outcome closer to a cooperative solution, free trade in particular, if all trading parts cooperate. Bagwell and Staiger (2002) propose that the WTO's reciprocity and enforcement rules may offer a means of escape from a terms-of-trade-driven Prisoners' Dilemma. Employing possible outcome scenarios of various trade policy measures within a game-theoretic framework, Lee and Kennedy (2007) attempt to determine the impact of Japanese and South Korean import policies on US rice exports. Using the tools of three-level game theory, Hwang and Kim (2014) analyse the negotiation strategies followed by the EU in the EU-Korea Free Trade Agreement (FTA) negotiations and find that a regional union which adopts a common commercial policy orients itself toward market liberalisation and openness as pursued by multilateralism such as the WTO.

In this study, a trade dispute game is constructed between Turkey and Russia in a non-cooperative game-theoretical framework. To the best of our knowledge, despite a number of earlier trade conflicts between the two countries, no study yet exists which, following our game-theoretic methodology, deals with a trade dispute between the two countries. Thus, by examining a hypothetical trade dispute between these important trade partners, this study supplements a lack in the literature and promises inferences to better understand trade policy-making in both countries.

One distinct element of our analysis is the employment of the course of events during the trade conflict between Turkey and Russia in November 2015 to constitute the stages of a trade game wherein players exhibit non-cooperative behaviour. There are views expressed by the international press that the reasons for Russia's disputes with several countries 'are not linked to genuine trade relations but are rather motivated by other political considerations'

(Schewe, 2013, p. 1178). In this sense, Russia's membership to the WTO in 2012 was hoped to 'increase the transparency and predictability' of the country's trade policy moves (Schewe, 2013, p. 1171). We therefore introduce WTO Dispute Settlement Body to our model in order to diversify possible strategies and related outcomes.

The game starts with a trade sanction initiated by Russia against Turkish imports, leading to a dispute with Turkey.[1] Turkey in return notifies the DSB about Russia's protectionist move, and the game evolves. In the model, we take inspiration from the commonly used basic game-theoretical structure and avoid more complex models. However, we depart from the existing research by identifying a trade conflict between two real economies asymmetric in size and strategic in bilateral trade, in a model which includes the reputational gains and losses of being involved in a dispute. We also introduce time-dependent variables in the game and assume that the payoffs differ. We further perform a repeated game in order to seek whether repetition of the same game might foster cooperation.

The study is structured as follows. The second section introduces the model and its variables. The third section defines the stages followed by the designation of a setting where possible payoffs from a trade dispute are arranged. An extensive non-cooperative trade game between Turkey and Russia including the influence of the WTO is also presented in this section. The fourth section describes dominant strategies and Nash equilibria, followed by the repeated game. The fifth section offers concluding thoughts.

2. The model and the variables

In the analysis, the players, strategies and possible outcomes of a trade game are presented to define a trade dispute between Turkey and Russia. In the game, Turkey can notify to the DSB of Russia's trade protectionist move.

Assume that Turkey is the complainant (T_C) in a trade dispute with Russia, where the latter is the respondent (R_R). That is, Russia has taken an action of trade restriction and is accused by Turkey of having violated the WTO law. The players, strategies and outcomes of the game can be seen in Figure 1. The nodes of the extensive form game are constituted according to the stages of the WTO Dispute Settlement Mechanism (DSM). Stages of the dispute where bilateral negotiations are likely to occur are also shown in Figure 1.

In the game, Turkey's (Player 1) payoff is given before Russia's (Player 2) payoff in parentheses and payoff components belonging to either Turkey or Russia are denoted by subscripts T and R respectively. The variables are defined as follows:

f_T and f_R: Gains from bilateral trade for Turkey and Russia respectively before Russia's trade restrictions. The values of f_T and f_R may not be equal to each other since the economic gains derived from bilateral trade may be different for the two countries due to the composition and volume of trade.

t: Time period as a particular section of the dispute settlement process. t_1 is the time period between trade restriction and notification, t_2 is the period between notification and panel, t_3 is the period between panel and appeal, t_4 is the period between appeal and implementation appeal.

c_t: Cost of Russia's protectionist move for Turkey, including both the economic losses and losses that can be considered as disadvantages in a broader sense. c_t is also the amount that Turkey demands from Russia as compensation and its value is assumed to be proportional to the time the trade restriction is in action, t.
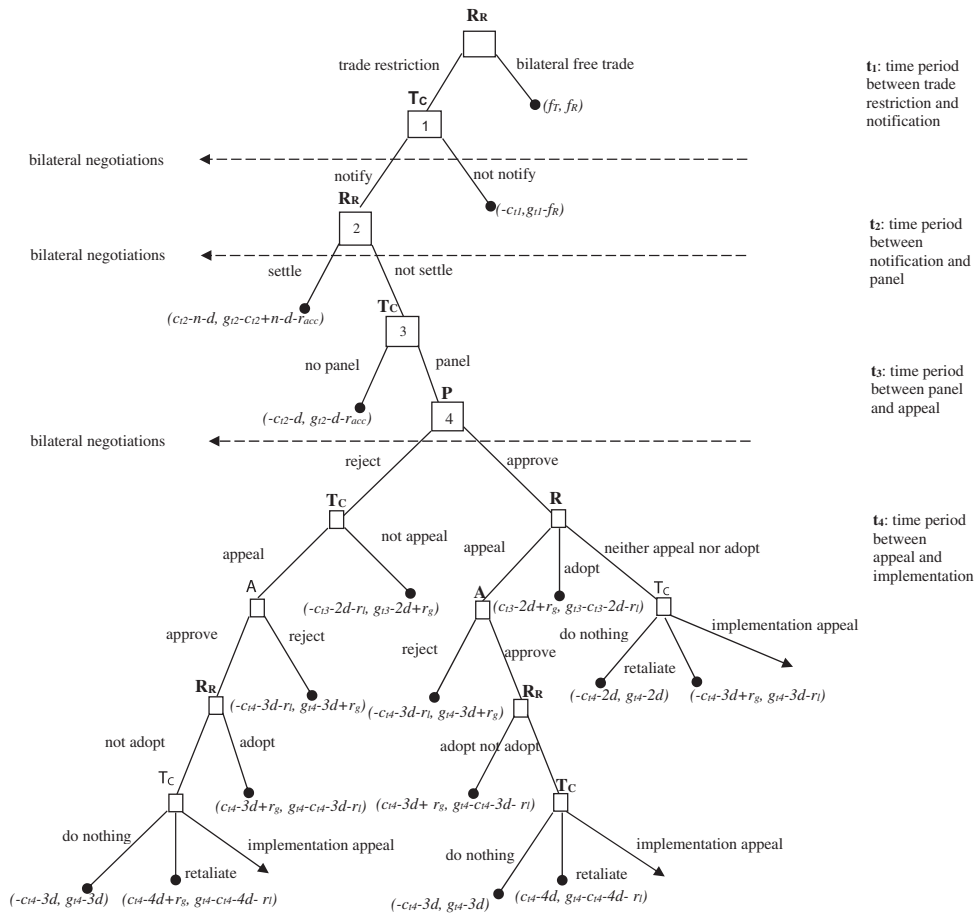
Figure 1. A trade dispute game between Turkey and Russia. Source: Author's modelling.

g_t: Value that Russia gains due to its trade protectionist move, including both the economic gains and the gains that can be considered as advantages in a broader sense. This may not be the same as c_t, since such a protectionist move may bring additional gains to Russia due to its advantaged position[2] in this particular trade dispute. The value of g_t is also assumed to be proportional to the time the trade restriction is in action, t.

n: Amount that is subject to negotiation during the consultations which Russia would aim to subtract from the amount Turkey demands as compensation, $[0 \leq n \leq ct]$. Though it is not possible to name the exact amount of n, it can be expected that Russia is going to have the bargaining power due to its high elasticity of demand[3] for Turkish imports. Thus, for Russia, n is going to equal to *0* at worst and c_t at best.

d: Legal and organisational cost of undergoing the dispute settlement system, or the economic value of the dispute costs for each party in each turn of the dispute settlement process. For simplicity, we assume that the value of d is equal for both parties.[4] If Turkey chooses to proceed in the game, the dispute costs will start to accumulate periodically (*i.e. d, 2d, 3d, 4d*).

r_{acc}, r_p r_g: When a notification is made to the WTO, it is publicly known. r_{acc} is the reputation loss for Russia of being accused in public. r_l is the reputation loss to either Russia or

Turkey in case of a negative outcome of the dispute settlement process. r_g is the reputation gain for either party in case of a positive outcome of the process.

x: Number of turns in the dispute process, $[1 \leq x \leq 4]$. With all alternating strategies and related outcomes in place, we construct four turns in the game, to be in line with the first four stages of a typical dispute settlement process within the WTO.[5]

p: Probability that Turkey's notification is a case violating the WTO rules, due to the type of case which – according to its magnitude, its match with various goals and priorities of the related government and its economic or political impact – determines the 'damage' it generates. $(1-p)$ on the other hand, is that the case is considered as discrepant by the WTO authorities.

The game is designed under the complete information assumption. Under this assumption, both players are equally informed about their own case and the past WTO dispute cases. Thus, differences in the players' expectations, if there are any, are negligible. The game is not played under perfect information, since in that case there would have been knowledge of actions inside the game.

It can be difficult to estimate exactly how a certain trade policy measure affects another country. Although trade conflicts have occurred between Turkey and Russia before, it would be hard to estimate the exact cost of a prospective dispute due to the dynamic nature of the trade volume and investment level between the two countries. However, as members of the WTO, both Turkey and Russia would have pre-information, based on earlier trade disputes among members, on the possible number of turns (x) before a dispute is solved, as well as on the probability that a case presented to the WTO would either be accepted (p) or rejected $(1-p)$.

3. Stages of the game

The theoretical framework presented in the analysis aims for the WTO to be involved in the setting as a mediator that the players of the game apply, in order to look for possible solutions to the trade dispute. Assuming that Turkey cannot implement retaliation measures independent from the WTO, if Turkey chooses to notify, then acceptance of the complaint by the organisation gives the country the opportunity to recover its costs.

Here, it should be noted that there is nothing Turkey can do to determine or to influence the form of the trade sanctions imposed by Russia. The sanctions are in their final form, designed by the owner country. Thus, as can be seen in the reduced game in Figure 2, all utilities after the panel is established, except for the dispute cost, are dependent on whether the case is accepted as a trade violation or not by the WTO authorities.

This requires Turkey to have a good observance and understanding of WTO rules and dispute settlement procedures in order to correctly estimate the evolution of the game. The unknown dispute cost is represented by *xd*.

When a player in a node is linked with another one with broken lines in the figure, it means that the player cannot determine which of these two nodes it is at when it must choose, but all possible payoffs are still known to both players, in line with the complete information assumption.

Going back to the extensive form game in Figure 1, evaluating the nodes of the game can provide policy suggestions and predictive outcomes. At the fourth node, there are two possible outcomes: either Russia is the loser of the panel report or Turkey is. Consider first
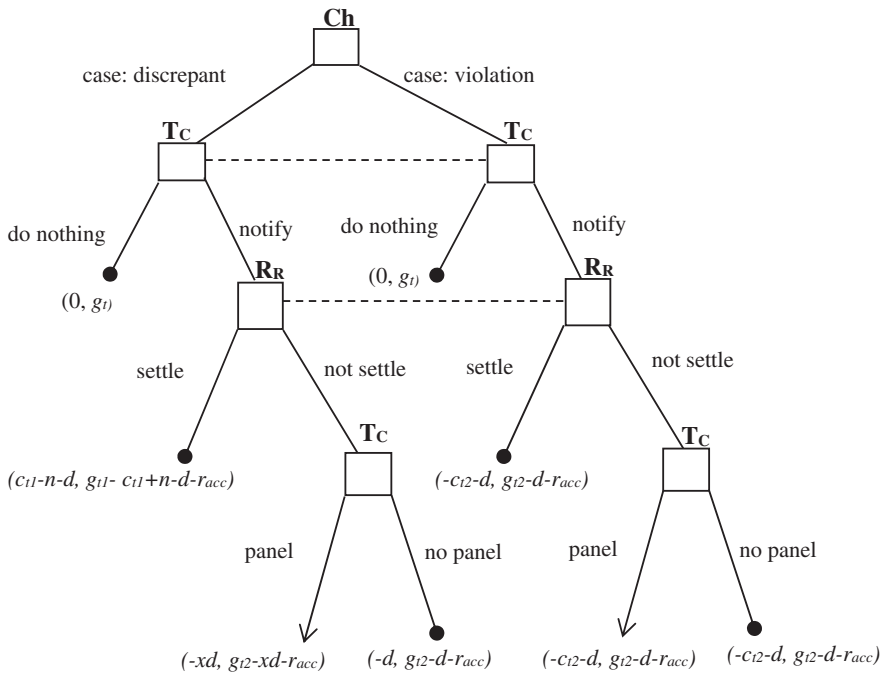
Figure 2. Reduced form game. Source: Author's modelling.

that the panel approves the case and that Russia is the loser of the report. If Russia chooses not to appeal, the panel report should be adopted within the period t_3. In that case, utility to be derived is going to be:

$$uR_R(adopt) = gt_3 - ct_3 - 2d - r_l \tag{1}$$

If, on the other hand, Russia appeals but the case is approved, it has to adopt the report within the period t_4 which leads to the expected payoff:

$$uR_R(appeal|approve) = gt_4 - ct_4 - 3d - r_l \tag{2}$$

If Turkey is the loser of the panel report and chooses not to appeal, Russia will not have to step back from its trade sanctions. Thus, the loss for Turkey is going to be:

$$uT_C(not\ appeal) = -ct_3 - 2d - r_l \tag{3}$$

If, on the other hand, Turkey appeals, but the case is rejected by the Appellate Body, the country has to adopt the Appellate Body's decision within a short period of time, t_4. In that case, Turkey is going to be facing the utility:

$$uT_C(appeal|reject) = -ct_4 - 3d - r_l \tag{4}$$

Out of 501 disputes which have been brought to the WTO between 1995 and 2015, the complainant or the respondent party has chosen to appeal only in 65 disputes following the

panel report. Among the 65 disputes, none of the Appellate Body reports has found that the Panel has completely erred in its legal findings.[6] Indeed, most reports are not completely approving or dismissive but instead they approve some parts of the complaint and dismiss other. This indicates that the panel reports contain accurate decisions in a majority of the cases. Thus, Russia must either strongly believe the probability of its appeal being accepted is higher in this particular case or the amount of compensation Turkey demands (c_t) must be very large in order to take the risk of appealing.

According to a local news agency, the economic cost of the trade dispute between Russia and Turkey in 2008 was around $1 billion at the time it was settled.[7] Although the dispute lasted three months, the cost for the Turkish side accounted for almost one-fifth of the value of total exports from Turkey to Russia in 2007, which was $4.7 billion. According to an assessment by the EBRD economists, Russia's sanctions against Turkey in November 2015 are expected to 'reduce Turkey's GDP growth in 2016 by around 0.3–0.7 percent, if they persist over the year and are fully applied'. The same assessment shows, on the other hand, that 'the impact on Russia's GDP will be limited, with some moderate pressure on import prices and inflation'.[8] According to an economist's statement to the BBC, 'the cost for Turkey in lost business could be at least $10 billion', while the country 'risks losing $3.5 billion annually in income from Russian tourists, and another $4.5 billion annually through the cancellation of construction projects'.[9] A report issued by one of Turkey's biggest banks, *Is Bankasi*, on the impact of Russian sanctions, supports this estimate, with a 'worst-case scenario amount of $7.3 billion'.[10] Turkish Deputy Prime Minister also declares a close estimate of $9 billion, adding that 'the tension is likely shave 0.3 to 0.4 percent off Turkey's GDP'.[11]

In a dispute case, Turkey can demand dispute costs close to those put forward in these estimates as compensation from Russia, which in turn may cause Russia to take the risk to appeal. Besides, amounts as such may prompt Turkey to choose to notify the WTO about Russia in the first place when the trade dispute in question occurs.

Depending on Russia's decision, Turkey could then either comply, or accept a defeat, or start retaliating. The latter two possibilities can affect future bilateral economic relations. Reflections of the retaliation possibility, for instance, can be seen on prospective investment projects as well as future trade contracts. If, on the other hand, the complaint is dismissed by the panel, Turkey can choose between:

$$uT_C\big(appeal\big) = p\Big(ct_4 - 3d + r_g\Big) + \big(1 - p\big)\big(-ct_4 - 3d - r_l\big) \qquad (5)$$

and

$$uT_C\big(not\ appeal\big) = -ct_3 - 2d - r_l \qquad (6)$$

At the third node, Turkey is to choose either to demand the establishment of a panel or not. If it chooses not to demand the establishment of a panel, related utility function is going to be:

$$uT_C\big(no\ panel\big) = -ct_2 - d, \qquad (7)$$

while the choice to establish a panel may result in either:

$$uT_C\,(\text{panel}|\text{approve}) = p\Big(ct_3 - 2d + r_g\Big) \qquad (8)$$

or:

$$uT_C(\text{panel}|\text{reject}) = (1-p).(-ct_3 - 2d - r_l) \tag{9}$$

depending on whether the case is approved or rejected by the panel, respectively. Thus, the complete utility function for Turkey for demanding a panel is:

$$uT_C(panel) = p\left(ct_3 - 2d + r_g\right) + (1-p)\left(-ct_3 - 2d - r_l\right) = p\left(r_g - r_l - 4d\right) - ct_3 - 2d \tag{10}$$

Turkey chooses to demand a panel if:

$$p\left(r_g - r_l - 4d\right) - ct_3 - 2d \geq -ct_2 - d \tag{11}$$

Here it should be noted that not to demand a panel is not a rational strategy for Turkey once the country complains to the WTO. Since all utility functions are known in advance, Turkey would not choose not to demand a panel strategy if it knew that would be its best expected outcome when it could choose to do nothing in the first place and get *0* in return.

The second node represents the consultation process of the WTO's dispute settlement, where in our setting Turkey and Russia try to reach a settlement on their own, based on negotiations. However, since all players' utilities are supposed to be known from the beginning in bargaining processes, each player knows which outcome one prefers over another. In this case, there is no need for bargaining at all since it is possible to trace the optimal mutually acceptable solution at once. Hence, if there is an agreement acceptable to everybody, we may say directly what the agreement will be, and this agreement will be offered by the first player in the first round of the negotiation. The intuition behind this reasoning is based on the Rubinstein Bargaining Model (Morrow, 1994). In our game, the choice to offer the agreement or not belongs to Russia, as it is to choose whether to give Turkey an acceptable offer or not. This is consistent with the intuition that Russia in such a situation in reality would consider doing the same, due to its significant economic ties with Turkey. It should be noted here that although Turkey is in a relatively disadvantaged position in its trade with Russia, Russia too has gains from this relationship not to be easily forsaken. On the other hand, since it is Russia who is assumed to have initiated the trade violation, and is the advantaged party, one may expect it to have the bargaining power in this process.

At this node, the value of *n* will be subject to negotiation. Turkey would prefer *n* to be equal to *zero* and Russia would prefer *n* to be equal to c_t. If we assume that Russia makes the offer, it will start by offering Turkey nothing ($n = ct$). However, an offer at this stage with $ct_2 - n - d$ should be greater than the payoff led by the '*not settle*' strategy $(-ct_2 - d)$, otherwise it is unacceptable for Turkey. This means that Turkey will only accept offers where $n < 2 - ct_2$.

When choosing whether to offer an acceptable size of *n* to Turkey or not, Russia's decision will depend on whether it prefers the payoff that the settlement strategy will produce or the one it will get when Turkey demands the establishment of a panel. The latter will result in either:

$$uR_R(panel|approve) = p(gt_3 - ct_3 - 2d - r_l) \tag{12}$$

or:

$$uR_R(panel|reject) = (1-p)\left(gt_3 - 2d + r_g\right) \tag{13}$$

Adding these together, the complete utility function for Russia if it chooses not to settle is:

$$uRR(notsettle) = uR(panel|approve) + uR(panel|reject) \tag{14}$$

$$= p\left(gt_3 - ct_3 - 2d - r_l\right) + (1-p)\left(gt_3 - 2d + r_g\right) \tag{15}$$

$$= p\left(-ct_3 - r_l\right) + (1+p)r_g + gt_3 - 2d \tag{16}$$

Russia's utility function for settling with Turkey is:

$$uR_R(settle) = gt_2 - ct_2 + n - d \tag{17}$$

The decision equation for Russia at this point is to settle if

$$gt_2 - ct_2 + n - d > .p\left(-ct_3 - r_l\right) + (1+p)r_g + gt_3 - 2d \tag{18}$$

At the beginning, Russia chooses between free trade and initiating a trade restriction. Given that Russia draws a protectionist measure in its trade with Turkey, at the first node Turkey should decide whether to convey the case to the WTO level, by notifying the DSB. Turkey is assumed to have *zero* while Russia is assumed to have $gt - f_R$, as the respective payoffs, when Turkey chooses the strategy '*do nothing*'. Here, Turkey should compare two utility functions, given that it notifies, that Russia chooses to settle and that Russia chooses not to settle and consequently Turkey goes for a panel. That is, $uT_C(settle) = ct_2 - n - d$ and $uT_C(panel) = p\left(r_g - r_l - 4d\right) - ct_3 - 2d$ respectively. Turkey chooses to notify if it knows that the relevant function is greater than *zero* (which will be the outcome if it does not notify at all); otherwise it would not notify. As of January 2016, more than 80% of the complaints brought to the WTO have been approved. Thus, the high probability that the case would be approved would be crucial for the players, confirming the implications of the analysis.

4. Dominant strategies and Nash equilibria

In order to find out the dominant strategies, the game can also be shown in strategic form as in Table 1. Out of six strategies (and four relevant payoffs) shown in the table, it is then possible to track those that could be Nash equilibria.

Table 1. Strategic form game.

T_C (Turkey)		R_R (Russia)	
	Strategies	Settle (S)	Not settle (NS)
	Notify, no panel (N-NP)	$(ct_2 - n - d, gt_2 - ct_2 + n - d - r_{acc})$	$(-ct_2 - d, gt_2 - d - r_{acc})$
	Notify, panel (N-P)	$(ct_2 - n - d, gt_2 - ct_2 + n - d - r_{acc})$	$(pc - xd, gt_2 - pc - xd - r_{acc})$
	Not notify (Nn)	$(-ct_1, gt_1 - f_R)$	$(-ct_1, gt_1 - f_R)$

Source: Author's modeling.

Nash equilibria:

1. Notify, No Panel; Settle (N-NP; S) - false

$$PTC(N - NP; S) \geq PTC(N - P, S) = ct_2 - n - d \geq ct_2 - n - d(true)$$

$$PTC(N - NP; S) \geq PTC(Nn, S) = ct_2 - n - d \geq ct_1(true)$$

$$PR(N - NP; S) \geq PR(N - NP, NS) = gt_2 - ct_2 + n - d - r_{acc} \geq gt_2 - d - r_{acc}(false)$$

2. Notify, no panel; Not Settle (N-NP; NS) – false

$$PTC(N - NP; NS) \geq PTC(N - P, NS) = -ct_2 - d \geq pc - xd(false)$$

$$PTC(N - NP; NS) \geq PTC(Nn, NS) = -ct_2 - d \geq -ct_1(false)$$

$$PR(N - NP; NS) \geq PR(N - NP, S) = gt_2 - d - r_{acc} \geq gt_2 - ct_2 + n - d - r_{acc}(true)$$

3. Notify, Panel; Settle (N-P; S) – true

$$PTC(N - P; S) \geq PTC(N - NP, S) = ct_2 - n - d \geq ct_2 - n - d(true)$$

$$PTC(N - P; S) \geq PTC(Nn, S) = ct_2 - n - d \geq -ct_1(true)$$

$$PR(N - P; S) \geq PR(N - P, NS) = gt_2 - ct_2 + n - d - r_{acc} \geq gt_2 - pc - xd - r_{acc}(true)$$

4. Notify, Panel; Not Settle (N-P; NS) – true

$$PTC(N - P; NS) \geq PTC(N - NP, NS) = pc - xd \geq -ct_2 - d(true)$$

$$PTC(N - P; NS) \geq PTC(Nn, NS) = pc - xd \geq -ct_1(true)$$

$$PR(N - P; NS) \geq PR(N - P, S) = gt_2 - pc - xd - r_{acc} \geq gt_2 - ct_2 + n - d - r_{acc}(true)$$

5. Not notify; Settle (Nn; S) – false

$$PTC(Nn; S) \geq PTC(N, N - P; S) = -ct_1 \geq ct_2 - n - d.(false)$$

$$PTC(Nn; S) \geq PTC(N, P; S) = -ct_1 \geq ct_2 - n - d(false)$$

$$PR(Nn; S) \geq PR(Nn; NS) = gt_1 - f_R \geq gt_1 - f_R(true)$$

6. Not notify; Not settle (Nn; NS) - false

$$PTC(Nn; NS) \geq PTC(N - NP, NS) = -ct_1 \geq -ct_2 - d(true)$$

$$PTC(Nn; NS) \geq PTC(N - P, NS) = -ct_1 \geq pc - xd(false)$$

$$PR(Nn; NS) \geq PR(Nn; S) = gt_1 - f_R \geq gt_1 - f_R(true)$$

Table 2. Reduced game.

T_C (Turkey)		R_R (Russia)	
		Settle (S)	Not settle (NS)
	Notify, panel (N-P)	$(ct_2 - n - d, gt_2 - ct_2 + n - d - r_{acc})$	$(pc - xd, gt_2 - pc - xd - r_{acc})$

Source: Author's modeling.

Out of six possible strategies in the game, the third and the fourth strategies seem to be Nash equilibria, which are $N - P, S$ and $N - P, NS$ respectively. These results show that once Russia imposes the sanctions against Turkey, Turkey as a rational player with complete information will always choose to notify and to panel, no matter if the countries settle or not in the end. Therefore the strategic form game can be reduced to the following form shown in Table 2.

5. Repeated game

In real economic relations, players usually do not interact once and for all as in single shot games. In cases where a dispute has occurred, recurrence of the game is even more meaningful to alter the non-cooperative outcome. Therefore, a repeated game is performed in this section to portray whether cooperation might be fostered.

Klimenko, Ramey, and Watson (2008) have shown that external enforcement might serve achieving cooperation in recurrent trade agreements, particularly when mechanisms such as delays in dispute settlement and direct penalties are activated. We take inspiration from this idea and the model's basic assumptions. The authors build their model on the choice of tariff levels within trade agreements; instead, we adapt the idea to our stage game where the game starts with a dispute between Turkey and Russia. Turkey complains about Russia to the DSB and the countries negotiate on a compensation set to reach agreed-upon tariffs to proceed with pre-dispute bilateral trade. Complete information assumption holds in the repeated game and the DSB still exists as the institution to which players can apply in cases as needed. The DSB is further assumed to be keeping the history of the previous trade violations, complaints, negotiations and settlements. In the stage game, it was found that Turkey would always choose to notify and further panel once Russia implemented trade sanctions. This finding is embraced in the repeated game. By doing so, it is guaranteed that the presence of the DSB, when actively utilised, makes a difference in terms of the outcome.

Following Klimenko et al. (2008), it is assumed that the dispute solution within the DSB's dispute settlement process takes place with delay. Since policies chosen by the countries during the dispute resolution process do not matter for the DSB in terms of settlement, the players are likely to choose Nash equilibrium strategies. However, the countries are aware of the cost that the delay in dispute settlement entails, which in turn might foster cooperation.

The punishment mechanism for the defecting player in the repeated game works in two ways. First, after defection, the payoff for the defecting player is lower than the cooperative strategy payoff but the joint value of the relationship is still valid. In this setting, bargaining power is not fixed and assumed to be dependent on the history. In other words, if one player defects from cooperation it is going to have a reduced bargaining power and less of the joint value in future negotiations (Klimenko et al., 2008, p. 4).

Consistent with the 2015 dispute between Turkey and Russia, we assume that the period starts with a 'dispute state' as denoted by the DSB. This is where the dispute settlement process begins, and if settlement is achieved, DSB switches the state immediately from 'dispute' to 'cooperation' with probability p. Note that this probability is exogenous, and cannot be raised or lowered by the players, implying that dispute settlement process cannot be influenced by the disputing members. Countries continue negotiating henceforth, under the assumption that their negotiation strategies depend on history. Immediate switching vice versa, from 'cooperation' to 'dispute state' as soon as a trade violation occurs, is in line with our finding in the stage game that Turkey always chooses to notify the WTO's DSB about Russia.

When the DSB switches the state from 'dispute' to 'cooperation', countries choose from a set of payoffs U^C and report it to the DSB. If the dispute cannot be resolved, with the probability of $1 - p$, the state remains as 'dispute' in the next period, independent of the actions chosen by the players in the current period. This time, countries choose from a set of U^D, which in principle can be identical to U^C.

For given sets of U^C and U^D, expected continuation payoffs can be as follows, implying that if the dispute is solved, (u_1, u_2) is chosen from U^C in the following period, and if it is not solved, (u_1', u_2') is chosen from U^D, with probabilities p and $1-p$ respectively.

$$U^E = \left\{ p(u_1, u_2) + (1 - p)(u_1', u_2') | (u_1, u_2) \in U^C, (u_1', u_2') \in U^D \right\}$$

The payoff profile (u_1, u_2) is supportable in state s, $s = C, D$, if there are agreed tariffs $(\hat{\tau}_1, \hat{\tau}_2)$ and payoffs $(\hat{u}_1, \hat{u}_2), (u_1^1, u_2^1), (u_1^2, u_2^2)(u_1', u_2')$
where: for $s = C$: $(\hat{u}_1, \hat{u}_2) \in U^C$, and $(u_1^1, u_2^1), (u_1^2, u_2^2) \in U^E$; and
$s = D$: $(\hat{u}_1, \hat{u}_2), (u_1^1, u_2^1), (u_1^2, u_2^2) \in U^E$.

When the game is in the dispute state, all continuation payoffs are chosen from U^E. Once the 'cooperation state' is achieved, deviation from agreed tariffs $\hat{\tau}_1$ and $\hat{\tau}_2$ leads to the 'dispute state', where continuation payoffs are again from U^E.

We denote the set of payoff profiles that are supportable in state s by $S^S(U^C, U^D)$. U^C and U^D are state-dependent sets of recurrent agreements under the following conditions:
$s = C, D$,
for each $(u_1, u_2) \in U^S$
(u_1, u_2) maximises the sum of the countries' payoffs on the set S^S and (U^C, U^D). This assumption requires that each player does its best in each state.

There exists (u_1', u_2') such that each player gets an equal share of the joint value which is defined relative to a disagreement point consistent with agreement in the following period (for $i = 1, 2$),
where:
for $s = C$: $(u_1', u_2') \in U^C$ and
for $s = D$: $(u_1', u_2') \in U^E$

Continuation payoffs are always chosen from U^C or U^D, but the countries cannot change the state as part of their agreement.

Within this framework, Klimenko et al. (2008) provides evidence that dispute costs, in particular the high ones, foster cooperation. This finding seems reasonable for our setting in that both reputation and dispute settlement costs cannot be negligible for trading partners such as Turkey and Russia.

6. Conclusion

Over the last two decades, Turkey and Russia have become major trading partners and energy cooperation is the most significant component of this trade relation. Nevertheless, economic relations between the two countries depicts a lopsided characteristic in favour of Russia due to Turkey's dependence on Russian gas. To rate the extent to which Russia may use this advantage as an actor in trade disputes, we present a game-theoretical model with all possible moves and outcomes of a WTO dispute settlement process between the two countries. With all the basic assumptions in place and the expected best moves for each player revealed, we find that the variables c_t and p are essential in our setting. That is, we find under a complete information assumption that Turkey chooses to convey the case to the DSB if the value of the dispute cost in question is not negligible and that with higher probability it expects – based on information about earlier cases – that its complaint will be approved.

The flow of the game shows that if the players cannot settle and the case reaches a panel, the players' payoffs in the following nodes vary according to the panel's legal findings and to whether Russia complies or not. If Russia does not comply, Turkey may either choose to retaliate or it lodges an implementation appeal. It may also choose to do nothing. If Turkey chooses the implementation appeal strategy, it will have to face higher dispute costs and there is no guarantee whether its appeal will be approved. On the other hand, if Turkey chooses to retaliate, the countermeasure(s) should be constituted to cover the size equal to its economic loss caused by Russia's protectionist move. In such a case, Turkey should have previously made progress at least in finding markets alternative to Russia, with comparable transportation costs for its exports, in addition to its import demand elasticity for natural gas imports. Otherwise, the retaliation option would not be beneficial.

Another finding of our analysis is that in the consultation process, the choice to offer a mutually acceptable offer for agreement belongs to Russia as the first player in the first round. We also show in our model that not to demand a panel is not a rational strategy for Turkey once the country notifies to the WTO.

Finally, repeating the stage game may contribute to achieving cooperation in that both reputation and dispute settlement costs for the two countries are not negligible.

Recent trade conflicts between the two countries make the research up-to-date, relevant and of current importance for international economic relations. Continuation of the analysis provided in this study might encourage and shape the further development of the relationship between Turkey and Russia to a new level even more cooperative in all spheres, thus making relations healthier.

Notes

1. This assumption starting the game is strongly in line with real life. Russia imposed a series of economic sanctions against Turkey after Turkey downed a Russian warplane in November 2015. These sanctions included a ban on Turkish imports of certain agricultural produce and food, prohibition of hiring new Turkish workers and restriction of future Turkish economic activities, a 75% reduction in the number of international road transport permits for Turkish companies, reinforcing safety controls in Russian waters and seaports; abeyance of bilateral economic cooperation programmes and commissions, a ban on bilateral charter flights, a recommendation by the state tourism agency to suspend sales of Turkey holidays to Russian

citizens and cancellation of visa-free travel for Turkish citizens to Russia (http://www.ebrd.com/news/2015/economic-implications-of-russias-sanctions-against-turkey.html). After demanding a personal apology from Turkish President Erdoğan for months, Kremlin announced on 27 June 2016 that Erdoğan had expressed his regrets over the incident and that 'was ready to do everything possible to restore friendly ties' (https://www.theguardian.com/world/2016/jun/27/kremlin-says-erdogan-apologises-russian-jet-turkish). In turn, Russian Prime Minister Medvedev said that the economic sanctions against Turkey will be lifted gradually (http://aa.com.tr/en/economy/russia-to-lift-sanctions-on-turkey-gradually-pm-/600593). In mid-July 2016, the Kremlin stated that Putin had called Erdoğan about the *coup d'état* attempt in Turkey, 'telling him that Russia found anti-constitutional acts and violence unacceptable and was hoping for the restoration of order and stability in Turkey' (http://www.reuters.com/article/us-turkey-security-putin-idUSKCN0ZX0C8?il=0).

2. According to the European Bank for Reconstruction and Development (EBRD), Turkey covers almost 56% of its energy imports from Russia (http://www.ebrd.com/news/2015/economic-implications-of-russias-sanctions-against-turkey.html). There is also a proposed gas pipeline project named Turkish Stream between the two countries with a total annual capacity of 63 billion cubic metres (bcm) of which the first string would be carrying gas to the Turkish domestic market and the remaining three are intended to deliver gas for the European market (http://www.gazpromexport.ru/en/projects/6/,https://www.foreignaffairs.com/articles/turkey/2015-10-11/kink-pipeline, https://www.americanprogress.org/issues/security/report/2015/05/06/112511/turkeys-growing-energy-ties-with-moscow/). Following Russia's ratification of economic sanctions against Turkey, the Russian Energy Minister had announced that the project was suspended. However; on 29 December 2015, the Minister said Russia was interested in resuming the project (http://www.naturalgaseurope.com/russia-gas-supply-turkey-resume-turkish-stream). During trade conflicts that have occurred between the two countries so far, it has always been a topic of interest whether Turkey's large and increasing dependence on Russian energy may encourage Moscow to attempt to use its gas supply as leverage (http://en.trend.az/world/turkey/2435688.html).

3. There are studies which verify this statement. Uz finds in her study that the demand for Turkey's imports from Russia are more inelastic as compared to imports from other countries (Uz, 2010, p. 67). Due to the composition of trade between the two countries, it is possible to assume that Russia may substitute 'Turkish exports – of which foodstuffs constitute 20 percent, with other major items including textiles, vehicles and machinery' – elsewhere (http://www.ebrd.com/news/2015/economic-implications-of-russias-sanctions-against-turkey.html).

4. Bown and Hoekman (2005) estimate a 'litigation only' cost of dispute to be at least US$500,000 per turn in typical trade disputes within the WTO DSM process (Bown & Hoekman, 2005, p. 870). Therefore, for a possible trade dispute between Turkey and Russia, this amount can be a proxy. By doing so, it becomes possible to estimate costs to bear and utilities to gain for Turkey on starting a complaint or on proceeding in the further stages of the dispute settlement process.

5. When a complaint is made to the WTO, should no agreement be reached in the first stage after 60 days of consultations between the disputing parties, the complainant can request the establishment of a panel in the second stage, which has to come to a conclusion in six months. In the third stage, both parties have the right to appeal. If the respondent is found guilty, it has to correct its measures in 'a reasonable period of time', which may be determined by member proposals, the DSB, parties in dispute or by an arbitrator. Thirty days after a 'reasonable period' expires, the DSB approves the retaliation measures against the respondent which are supposed to compensate the effects of the protectionist measures. For a flow chart of the dispute settlement process, see https://www.wto.org/English/Tratop_E/dispu_e/disp_settlement_cbt_e/c6s1p1_e.htm

6. https://www.wto.org/english/tratop_e/dispu_e/dispu_current_status_e.htm

7. *Türkiye-Rusya gümrük restle*ş*mesinde iki taraf da kaybediyor*, 2 September 2008, available at http://www.haberler.com/turkiye-rusya-gumruk-restlesmesinde-iki-taraf-da-haberi (accessed 26 January 2016).

8. http://www.ebrd.com/news/2015/economic-implications-of-russias-sanctions-against-turkey.html
9. http://www.bbc.com/news/world-europe-35209987
10. http://sputniknews.com/middleeast/20160117/1033268635/turkey-economy-russian-sanctions.html, https://ekonomi.isbank.com.tr/UserFiles/pdf/ra_01_2015.pdf
11. http://www.hurriyetdailynews.com/turkish-economy-risks-losing-9-billion-over-russia-crisis-deputy-pm.aspx?pageID=238&nID=92187&NewsCatID=344

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References

Bagwell, K., & Staiger, R. W. (2002). Economic theory and the interpretation of GATT/WTO. *The American Economist, 46*, 3–19.

Bown, C. P., & Hoekman, B. M. (2005). WTO dispute settlement and the missing developing country cases: Engaging the private sector. *Journal of International Economic Law, 8*, 861–890.

Gawande, K., & Li, H. (2006). Trade barriers as bargaining outcomes. *The World Economy, 29*, 437–457.

Gould, D. M., & Woodbridge, G. L. (1998). The political economy of retaliation, liberalisation and trade wars. *European Journal of Political Economy, 14*, 115–137.

Grossman, G. M., & Helpman, E. (1995). Trade wars and trade talks. *Journal of Political Economy, 103*, 675–708.

Harrison, G. W., & Rutström, E. E. (1991). Trade wars, trade negotiations and applied game theory. *The Economic Journal, 101*, 420–435.

Hwang, K.-S., & Kim, H.-J. (2014). Three-Level game theory and the strategy of Eu-Korea Fta negotiation. *The Journal of East Asian Affairs, 28*, 85–130.

Klimenko, M., Ramey, G., & Watson, J. (2008). Recurrent trade agreements and the value of external enforcement. *Journal of International Economics, 74*, 475–499.

Lee, D.-S., & Kennedy, P. L. (2007). A political economic analysis of U.S. rice export programs to Japan and South Korea: A game theoretic approach. *American Journal of Agricultural Economics, 89*, 104–115.

Morrow, J. D. (1994). *Game theory for political scientists*. Princeton, NJ: Princeton University Press.

Schewe, C. J. (2013). Russia in the WTO: The Bear on a Leash? Russia in international trade disputes and the added value of a WTO membership. *Journal of World Trade, 47*, 1171–1202.

Uz, I. (2010). Testing for structural change in the bilateral trade elasticities of Turkey. *Middle East Technical University Studies in Development, 37*, 53–72.