

A Rational Choice Model of Trade Policies: Incorporating Institutional Economics Into Traditional Game Theory

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Abstract

In this paper I develop a rational choice model which will provide some answers to the central question of the paper, under which conditions it becomes probable to observe free trade policies. This rational choice model constitutes a synthesis of a game theoretic and an institutional analysis of trade policies. The game theoretic analysis presented in the paper exemplifies that traditional game theory provides a good framework for a strategic analysis of trade policies. However, it is not without interpretive problems. In order to provide a correct interpretation of trade policies, it is necessary to gain a good understanding of the true nature of the players as well as the domestic framework and foundation of their trade policies. This leads us to the analysis of domestic institutions. It is shown that they define the true nature of the players and provide a framework for the trade game. When we combine the insights of the institutional analysis with traditional game theory, we add a new dimension to the strategic analysis of trade policies. It becomes possible to trace and explain the underlying causes for past and present trade policies and predict future trade policies with more accuracy. Furthermore, we can clarify the conditions under which it becomes probable to observe free trade policies and how to achieve this cooperative solution. The rational choice model presented in this paper makes an important contribution to the understanding of trade policies.

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1 Introduction

International trade has transformed our world into a big market place. The economic interrelationship among all countries is becoming more complex every day, and it seems that our world is becoming ever “smaller.” International trade has become one of the pillars of economic success in many countries. Looking at the development of Western Europe after World War II trade has proved to be a reliable engine of economic growth. Economically, we live in an interdependent world. One may conclude that a multilateral trading system is in every country’s best interest and that countries are increasingly attracted by the gains from free trade and consequently open their markets. But reality looks different; protectionism is practiced by virtually every country today. The emergence of trading blocs does not mean the end of protectionism either. Quite the contrary is the case, as little “trade wars” between the blocs are becoming more common these days.² With growing economic interdependence the prohibitive costs of international economic conflicts are increasing. In the long run protectionism is not welfare improving. It is one of the factors that can undermine domestic, regional, and eventually global economic, political, and social stability. Questions arise about why in the past we haven’t observed free trade policies around the world and still don’t do so today, and under what conditions free trade policies become probable to be observed. In this paper I develop a rational choice model which will provide some answers to these questions. This rational choice model constitutes a synthesis of a game theoretic and an institutional analysis of trade policies.

The analysis is limited to two fictitious countries, Home and Foreign, which have trade and peaceful political relationships with each other. I model the trade relation as a simple prisoner’s dilemma (PD)³ in which both countries are assumed to be equally strong economically and able to affect their terms of trade. The goal of each government is to maximize the economic and social welfare of its country. Both countries realize the strategic possibilities of trade policy and know

²The “trade war” between the U.S. and the European Community in recent years is an example.

³The model being presented is a fairly simple one. Its simplicity, however, sufficiently highlights the principles of the two approaches discussed in the paper. It should be noted that the PD is not the only feasible game to describe trade relations between two or more countries. For the application of the PD and other games to similar topics, see Conybeare (1987).

that long-run protectionism is not welfare-improving. After setting up the game structure I discuss various modifications of the tit-for-tat strategy. It is shown that it can be rational for both countries to cooperate conditionally, i.e., lift trade barriers and allow freer trade.

The traditional game theory approach provides a good framework for a strategic analysis of trade policies. However, it is not without interpretive problems. It cannot elucidate how and why trade policies change over time and explain specific seemingly irrational, trade policies. In order to provide a correct interpretation of trade policies, it is necessary to gain a good understanding of the true nature of the players as well as the domestic framework and foundation of their trade policies. This leads us to the analysis of institutions⁴. The tools of the new institutional economics are most promising for this analysis, because institutional economics considers economic facts of a country, its institutional foundation, and the belief systems of its society.

In section three I explain why and how institutions shape the economic and political landscape of a country and can thus have direct or indirect effects on trade policies. It becomes clear that institutions are the framework of all strategic interaction and impose significant constraints upon governments. Generally, the institutional analysis provides a good understanding of the true nature of the players as well as the foundations and backgrounds of their trade policies. Combining the gained insights from this analysis with the game theoretic analysis described in the second section of the paper, adds a new dimension to the strategic analysis of trade policies. It allows us to analyze both trade and institutional issues and incorporate the insights from the analyses into *one* model. It becomes possible to trace and explain the underlying causes for past and present trade policies and predict future trade policies with more accuracy. Furthermore, we can clarify the conditions under which it becomes probable to observe free trade policies and how to achieve this cooperative solution.

The remainder of the paper is organized as follows. The next section discusses the approach of

⁴Institutions can be defined as “the rules of the game in a society or, more formally, [as] the humanly devised constraints that shape human interaction. (...) They structure incentives in human exchange, whether political, social, or economic” (North, 1990:3). Knight provides an alternative definition: “Institutions [are a] set of rules that structure social interactions in particular ways. (...) For a set of rules to be an institution, knowledge of these rules must be shared by the members of the relevant community or society” (Knight, 1992:2).

traditional game theory whereby the focus is on the PD. The institutional approach is presented in the first subsection of section three; the discussion of the synthesis of the game theoretic and the institutional analysis makes up the second subsection. Section four concludes.

2 Traditional Game Theory

2.1 Assumptions

The primary players of all games are the governments of Home and Foreign.⁵ They are assumed to be rational and self-interested economic agents. Each government seeks to maximize the economic and social welfare of its country for as long as possible. In the long-run, this maximum is only achievable in a world which is characterized by economic stability and stable world peace.⁶ Permanent protectionism will result in worldwide economic instability and will therefore undermine the countries' domestic economic foundation. The countries' discount rates are assumed to be constant over time, but the rate of time preference of Home need not be the same as of Foreign. The value of the discount rate is sufficiently small so that it becomes clear that the players value their future. Home and Foreign are the only players of the game, i.e., there is no third party involved which might function as a referee. Additionally, I rule out any external enforcement mechanisms like international institutions and organizations which might constrain players to choose specific strategies. Economically, the countries are assumed to be equally strong; thus, it becomes possible to model the situation as a symmetric PD. As in every PD there is no preplay communication. Communication is only possible by choosing and observing⁷ strategies⁸ and outcomes. Likewise, binding agreements are not possible. The players choose their strategies simultaneously. The information can be characterized as certain, complete, but imperfect. Expected payoffs⁹ are

⁵Even though some of the assumptions are rather restrictive, it doesn't make the game theoretic model too abstract and, eventually, allows us to employ a model toward a better understanding of trade policies.

⁶Boulding (1978) coined the term of stable peace in his book *Stable Peace*.

⁷*Observation* of other policies can comprise the analysis of policy announcements and economic data about the other country, as well as the exploitation of knowledge about the overall economic, political, and social constellation of the other country when making policy decisions.

⁸*Strategy* means that the government chooses a trade policy which it expects to help realize its goal if all side constraints, like the other country's trade policy, are being taken into account.

⁹*Payoffs* denote the expected net economic and social effect of the trade policy on the respective country. Such effects could, for example, be reflected in net exports, foregone opportunity costs in production, changes in standards

assumed to be ordinal¹⁰ and are received at the end of each period. They generally denote the net aggregate of some numeraire.

2.2 The Prisoner's Dilemma

Suppose the players formulate a trade policy for one year. There is no discounting in a *one shot PD*. The PD has the following payoff matrix:

| | | Home | |
|---------|---|------|-----|
| | | C | F |
| Foreign | C | x,x | z,y |
| | F | y,z | w,w |

where $y > x > w > z$. *C* stands for “Cooperate” and *F* for “Fink”, i.e., if a country practices protectionism it finks, and if it lifts all trade barriers it cooperates. The strategy preordering of Foreign is $FC > CC > FF > CF$ and similarly for Home ($CF > CC > FF > FC$). Since the countries choose their strategies simultaneously, the Nash equilibrium of this game is *FF*. It is unique but inefficient.

When we model the situation as an iterated PD we will find that protectionism need no longer be the only outcome of the game. We can distinguish between a finitely repeated PD and an infinitely repeated PD. In the *finitely repeated PD* the game is played T times; at $T + 2$ ¹¹ the world ends. The payoff matrix of the repeated PD should be the same as in the one shot PD, i.e., the payoff matrix of the one shot PD is now a single stage game in an infinitely repeated PD. Intuitively, the governments choose their trade policy strategy for the infinite future with respect to the given constraints. Suppose it is rational¹² to cooperate from game 1 ($t = 0$) and we get a

of living, industrial production, and productivity. Underlying the notion of payoffs is the principle of comparative advantage. That is, we assume that if countries have a comparative advantage to produce certain goods they will be better off if each country produces the good for which it has a comparative advantage because it can allocate scarce resources more efficiently. Other constraints like transaction costs, political or social costs can strengthen or weaken the principle of comparative advantage.

¹⁰It is possible to specify and quantify the payoffs in a game; for our purposes, however, it is easier to assume ordinal payoffs. Thus, we are able to make more general statements about the game structure, its outcomes, and the different strategies of the players.

¹¹At $T + 1$ the players still have the payoffs they received at T .

¹²*Rational* means that a player wants to maximize its payoffs and reaches this objective most efficiently.

mutual cooperative outcome (CC). If T is known to both players it is most likely that the mutual cooperation “equilibrium” unravels from the back and cooperation will actually never take place.¹³ What we get is bilateral protectionism (FF).¹⁴ If T is unknown however, all that the players know is a constant, time independent probability for a specific period to be the last. Mutual cooperation then depends on this probability. With a very low probability, cooperation is more likely than with a very high probability.

In the more realistic, *infinitely repeated PD* we assume that the countries have an infinite planning horizon. They weigh the short-term gains against the long-term gains and choose strategies with the highest expected payoffs. Comparing the payoffs of different strategies by discounting the expected stream of payoffs, they will eventually learn that $(CC) > (FF)$.¹⁵ How long it takes until we observe mutual cooperation between Home and Foreign depends on their discount parameters. The lower the discount rates of the players the faster we can expect mutual cooperation to be the outcome.¹⁶

I have not shown yet which strategy most likely leads to (CC) . Additionally, it remains to be answered if (CC) is stable against possible deviations of one or both players. These questions will be addressed in the next subsection.

2.3 Tit-for-Tat Strategies

The risk that a player finks and exploits the cooperation of the other player is highest in the first period. Because of discounting most benefits from finking come in the initial periods as long as

¹³This is known as the *chainstore paradox*.

¹⁴If T , however, is sufficiently large, say 100, we may observe mutual cooperation for at least a limited time. Both players know that their trade policy determines how long this game is played. If a player finks unconditionally he faces the risk that the other player too is unwilling to cooperate. It is uncertain how long it will be possible to maintain this outcome. In this case, the game might not be played T times as it ends already after t^* periods. We can therefore expect some form of cooperation in the repeated PD even if it is finite. Yet, the chain store paradox can't be completely ruled out. When we approach T the incentives to fink rises. As soon as one player unilaterally deviates from mutual cooperation the other will follow in the subsequent period and we will never return to CC . In other words, the cooperation equilibrium can unravel from the back but only up to a certain period. What this period (t^*) will be depends on the discount rates of the players.

¹⁵Bold capital letters denote infinity, i.e., (CC) means that strategy (CC) is played infinitely.

¹⁶It is important to stress that mutual cooperation does not arise from altruism, but from pure self-interest of the players.

the threat of an end to the game is still rather low. A country will open its market only if it expects that the other will do the same in the very period or soon thereafter. Otherwise, it is not rational to give up protectionism and tolerate the other country to be a free rider. Therefore, a country is willing to cooperate only *conditionally*.¹⁷

Suppose Home plays B , where B denotes the tit-for-tat strategy, and decides to open its markets. Coincidentally, Foreign does the same in the same period. Hence, after observing Foreign's policy Home will again cooperate in the consecutive period. However, it is not certain that Foreign will repeat its policy. If it does so infinitely, we get (CC) . But Foreign might as well decide to fink in the next period. Having lost revenues in the second period, Home will revise its policy and close its markets. As long as Foreign does not unilaterally reopen its market, Home will refuse to make any concessions and won't end protectionism. If Foreign does indeed reopen its markets after a while, Home will follow in the consecutive period. Again, it is uncertain if Foreign sticks to its cooperative policy for more than a period. It might take a while, if at all, until Foreign figures out what strategy Home is playing and joins it.¹⁸ We conclude that the (CC) situation need not be an equilibrium if only one country plays B .

If both countries lift all trade barriers at the same time and choose a tit-for-tat strategy and stick to this strategy forever, we will get a (CC) equilibrium. But even when we get this Pareto optimal situation, we cannot completely rule out the possibility that one player will fink at one time in the future. Home, for example, deviates from (BB) if the switch yields a higher payoff in the long run, i.e., the second and subsequent payoffs are greater than the first. If it does, it is most likely that Foreign will follow in the next period and we get (FF) . A switch from (BB) to (FF) does not yield a gain if and only if $a_i \geq \frac{y-x}{y-w}$ where a_i denotes the discount factor of the finking player i .¹⁹ If a_i is not big enough, (BB) is not a stable equilibrium.

¹⁷When both Home and Foreign don't want to open their markets under any circumstances the outcome will be mutual protectionism (FF) . As long as one country perceives the other country to be absolutely unwilling to open its market, it is not rational to unilaterally lift any trade barriers. Unconditional (CC) , too, is very unlikely to be chosen because one player always does better by switching unilaterally to F . But then the other player will follow and we get (FF) from then on. In other words, C can't stand against F . Unconditional (CC) is *never* an equilibrium.

¹⁸This time lag between decision and effect of a policy is one of the major problems with unilateral tit-for-tat, because it doesn't support cooperation.

¹⁹Playing (BB) yields: $x(a_i + a_i^2 + \dots) = \frac{x a_i}{1-a_i}$. Switching from (BB) to (FF) yields: $y a_i + \frac{w a_i^2}{1-a_i}$.

Let's turn to the possibility that both countries choose tit-for-tat but that one country starts with F (we denote this as strategy B') and the other with C . What we will observe is an alternation between (CF) and (FC) throughout the supergame. We cannot completely eliminate a player's incentive to fink at one time in the future; the result is similar to the one above. It only pays off to fink if the discount rate of the deviator is big enough.²⁰ The strategies (BB') or $(B'B)$ are certainly not Pareto optimal or superior, but their payoff stream is greater than (FF) . If we want to get from $(B'B)$ or (BB') to (BB) one of the player needs to be more patient than the other, i.e., have a lower discount rate. If only one player plays tit-for-tat and the other finks unconditionally the outcome will be (FF) .

We can now sum up the necessary and sufficient condition for (BB) to be an equilibrium. "If a player cannot gain by switching unilaterally from (BB) to B' or D ²¹ (...) no other strategy will yield a gain" (Taylor, 1987:69). If the discount rate is sufficiently small, (BB) is an equilibrium. (BB) alone cannot, however, enforce cooperation. The equilibrium does not provide the players with a "double incentive" to conform to it. "That I want the *other* player to conform is of no relevance to him, for we have assumed that he, like me, is a rational egoist" (ibid:72). Mutual cooperation will be the outcome if (BB) is the only equilibrium besides (FF) . An alternation between (CF) and (FC) will be the outcome if (BB') or $(B'B)$ is the only equilibrium besides (FF) .

Now let's consider a tit-for-tat strategy with an increasing punishment period. Suppose Home is willing to open its market and wants to cooperate conditionally. As in the simple tit-for-tat strategy it will play whatever the other player has played in the previous or initial period. However, it increases its punishment periods after each deviation of Foreign. The idea behind this strategy is that a short punishment period can fail in deterring a player from finking. The longer the punishment period the higher the chance that the punishment causes Foreign to open its market too.²² As long as the benefits of this "punishment" strategy exceed the costs of punishment it is rational to proceed with this strategy. But sooner or later, there can be a point when this is no longer

²⁰The necessary and sufficient condition for (BB') or $(B'B)$ to be an equilibrium is $\frac{w-z}{y-w} \leq a_i \leq \frac{y-x}{x-z}$.

²¹ D denotes F .

²²Home does not *primarily* want to punish Foreign but reach mutual cooperation because its payoffs will be higher than unilateral finking or playing any other strategy.

the case and Home needs to choose a different strategy. Like (BB) , and $(B'B)$ or (BB') this strategy can lead to a cooperative equilibrium if the discount rate is sufficiently small so that no player has the incentive to deviate unilaterally to (FF) .

2.4 White Noise

If our model is to reflect the real world accurately we cannot rule out unexpected events to happen, i.e., white noise. Suppose Home has observed that Foreign refrained from protectionism for the last three periods. Foreign's apparent commitment to cooperate convinces Home to open its market in the next period because of the potentially higher payoffs in the long-run. However, in that period an unexpected event, say, a natural catastrophe, hits Foreign forcing it to close its market.²³ Instead of the expected x units Home receives only w units. To include white noise in our model we keep the payoff matrix of the PD, but now assume that only the means of the payoffs are given. "The actual payoffs are Normally distributed with those means and with a standard deviation" (Kreps, 1990:515). Allowing for white noise in the model reduces the certainty of information to the players and affects their strategy choices. They have to base their strategy decisions on a distribution of the means of the payoffs with an unknown standard deviation. A country is less certain whether the other country finks intentionally or if white noise causes it to refrain from free trade. "The higher the noise the less we can get in an equilibrium for both sides. As the noise (standard deviation) rises, it becomes [increasingly difficult] to disentangle what an opponent is doing" (ibid:503). Even if both players play (BB) at one time the overall outcome need not be (CC) all the time. In order to avoid becoming a victim of unilateral defection of the other country, a country will try to monitor the other country. This monitoring can be difficult and costly, consequently reducing payoffs. Yet, it is critical because there always exists the incentive to fink and then to blame the result on noise. In order to be credible any deviation must be punished, even when accidental. This will further reduce the aggregate payoffs, but seems vital to prevent the situation from getting out of hand.

²³Nelson (1988:81-82) lists additional, uncontrollable variables particularly for African countries: "extendable drought, a catastrophic drop in the price of the country's major export product(s), sharply rising costs of imports, unanticipated increases in the servicing charges on variable- interest-rate debts, or instability and war in surrounding countries, which may cut transport links or otherwise harm noncombatant neighbors."

Even if we get back to a (CC) situation for a few periods in a row, (CC) will never be a very robust equilibrium.²⁴ How robust the equilibrium can become depends then on the amount of white noise. Once white noise makes it impossible to predict the opponent's move with any accuracy, both countries will "move to play noncooperative strategies" (ibid). Admittedly, there needs to be quite a lot of white noise to prevent (CC) to be a robust long-run equilibrium; this possibility can, therefore, be dismissed.

2.5 Some Open Questions

When we model the trade relationship between Home and Foreign as an infinitely repeated PD we have seen that mutual cooperation is a possible outcome. Variations of the tit-for-tat strategy can lead to mutual cooperation even though it does not support cooperation. Introducing noisy variables complicates the analysis. There is no dominant strategy in the infinitely repeated PD.

General interpretive problems arise, however, if one ought to explain the underlying causes of specific, seemingly irrational trade strategies and policies. Observing the other country's trade policies, a country builds expectations about the other country's motives and strategies, and vice versa. These expectations become a base for future policy decisions. Yet, it remains unanswered how exactly these expectations are formed, and how and why an actual outcome can deviate from the one predicted by the game theoretic model. If it happens to be the case that a trade game has multiple equilibria it is impossible to explain a specific outcome as opposed to another, especially if the actual outcome is none of the equilibria outcomes. Furthermore, traditional game theory cannot elucidate how and why trade policies change over time.

One of the reasons for these deficiencies are the restrictive assumptions of neoclassical economics which underlie traditional game theory. In particular, the countries are assumed to be rational and self-interested economic agents. Inherent in this assumption is the notion that economic policies reflect the economic optimum. As will be explained later, these neoclassical

²⁴We get similar results if we allow sunspots to happen. Sunspots equilibria are "equilibria that depend on extraneous uncertainty only because agents believe it to be so" (Blanchard and Fischer, 1989:255). The transition between sunspots is probabilistic and there is a potentially infinite number of non-unique equilibria. Nature selects one based on a distribution function, but it is never possible to predict which one will actually be chosen.

assumptions are highly unrealistic and misleading, and therefore, have to be relaxed. In order to provide an accurate analysis of trade policies, it is necessary to gain a good understanding of the true nature of the players as well as of the foundation and the domestic framework of their trade policies. This leads us to the analysis of institutions and, thus, to the second pillar of our rational choice model. In the next section, I will first present the most important aspects of institutional economics, and then combine the newly gained insights from institutional economics with the game theoretic analysis described above.

3 Incorporating Institutional Economics Into Traditional Game Theory

3.1 Institutional Economics

It is the goal of institutional economics to understand and explain institutions and belief systems as they relate to the creation of economic policies. So far we have said that the countries just take their discount rates and expected payoffs into account when choosing a strategy. If they are not certain about the accuracy of their observations, say, after the occurrence of white noise, they base their decisions not only on the consideration of the past performance of their opponent, but also on some kind of belief, attitude, or expectation. Beliefs, attitudes, and expectations can change over time. They are influenced²⁵ by ideas, ideologies and the social environment. The players don't act in a social vacuum, but in an environment which shapes them and vice versa. Institutions create communication and enforcement mechanisms, and provide the framework for human interactions. They are a foundation for all strategic interactions. If we want to understand the true nature of the players we therefore have to shed light on the institutional environment of their countries, and thus detect those institutions which significantly shape and influence trade policies and the expectations about other countries' trade policies.

The choice sets of the players of the trade game are defined by a mixture of formal and informal norms, rules, and enforcement characteristics. Formal rules, for example laws, may be easily

²⁵North (1990:23) defines ideologies as "subjective perceptions (models, theories) all people possess to explain the world around them."

detected and understood by the players. It is the informal constraints like belief systems, ideologies, and cultural traditions that are complex and more difficult to comprehend. Institutions evolve over time. Yesterday's institutions have shaped today's and will influence tomorrow's institutions.²⁶ In order to interpret current institutions and assess their future development correctly, it is essential to follow and understand their evolution. While formal institutions can change relatively easily and quickly, for example by passing a new law, informal institutions can be much more resistant to change. Combining the transformation of both formal and informal institutions we might get completely different outcomes than intended. Changing crucial institutions can transform the whole social and economic system, because they are the backbone of class formation and the social structure, and can determine who makes decisions about trade policies. Changing institutions can thus have lasting effects on the structure of the economy and political stability.

The institutional framework determines the political and economic atmosphere. It “permits the complex impersonal exchange necessary to political stability and to capture the potential economic gains of modern technology” (North, 1990:117). Institutions can help create markets by structuring the economy and, simultaneously, constitute political interests which then shape economic institutions and organizations. On the one side, the political constellation has a direct impact on the structure of the economy as politicians “shape the way in which economic interests receive effective definition” (Bates, 1989:46). On the other side, the economic situation will definitely affect the interests of the people who urge politicians to keep or change an economic policy. Political decisions about trade policies are, directly and indirectly, shaped and influenced by the complex and dynamic institutional structure of a country. When we analyze trade policies, we have to shed light on the linkage between trade and domestic policies, because:

mismanagement of the macroeconomy can have damaging effects on a country's trade and its trade preferences. Policies eroding an economy's international linkages (...) may undercut its domestic bases of support for free trade. In this way domestic policies, *even those unrelated to trade*, may affect the state of the international trading system. (Milner, 1988:300-301; emphasis added)

We have to be aware that it is not always economic incentives that are the rationale for

²⁶This is called *path dependence* in institutional economics.

economic policy decisions. This can be exemplified by the economic performance of Kenya²⁷. Kenya has today one of the strongest economies in Africa. The foundation for Kenya's exceptional performance is in part the absence of ideological divisions in the government²⁸ and its commitment to economic growth. However, when we analyze Kenya's economic policies and perceptions of market forces in more detail we find apparent contradictions in its implications. It is, for one reason, the population's and the government's lack of confidence in the market that leads the government to interfere with the market. The government is concerned that unregulated markets produce fluctuations in supply which might threaten the survival of parts of the population. Prices are widely viewed as normative and are often politically determined. They are not conceived as variables with a unique market-clearing magnitude (cf. Nelson, 1988:92).²⁹ To guarantee stable prices the government controls and sets prices. Additionally, it designed marketing boards for grain and maize to stabilize the difference between domestic and world prices.³⁰

Market regulation has become an instrument of political control. Economic policies that prove to be politically popular are sometimes financially costly and economically inefficient. The seizure of the central control over Kenya's grain supply by the government and the promotion of buying center programs for grain serve as examples. The longer it takes until a new economic policy pays off, the larger the pressure of groups that oppose the policy and the less likely long-term economic policies succeed. For example, as long as the short-term survival of farmers is not secured farmers won't be willing to adopt production forms which in the long-run might yield higher profits, but

²⁷Even though this example is not directly linked to Kenya's trade policies it clarifies the multidimensionality of economic policies in general, and underlines previously made points in this section.

²⁸Since 1964 Kenya's dominant party is the Kenyan African National Union (KANU). It traditionally prefers a centralized state and promotes the accumulation of wealth through the unimpaird play of market forces (cf. Bates, 1989:55-56).

²⁹A price distortion index for Kenya "which summarizes the effects of state intervention across a number of markets and reports a marked negative correlation between the distortion index and the growth rate of GDP across a sample of less developed countries" (Mosley, 1988:71) is listed in the World Development Report 1983, pages 60-62.

³⁰See Bates (1989) and Nelson (1988) for an excellent discussion of Kenya's agricultural policy.

which have high short-run risks.³¹ Political and economic incentives and institutions³² become increasingly intermingled and almost impossible to distinguish from each other. What constitutes an economic interest becomes politically determined. It can't be too surprising then that, *in general*, economic policies do not always reflect the economic optimum.

Given the complexity of economic policies and their institutional foundation, the question arises if it is at all possible to detect those institutions which directly or indirectly affect and influence the shaping of trade policies and the types of expectations about the countries' trade policies. Institutional economics can provide answers to this question. It sheds light on three important issues which help us to understand trade policies. First, we look at economic, geographic, and demographic facts of a country and its articulation of trade policies. Second, we shed light on the institutional foundation of a country. This analysis comprises the analysis of organizations and pressure groups, and their role in the political and economic process as well as in society. It thus becomes possible to pinpoint the key players in a country. Furthermore, since institutions evolve through time it is important to look at their historical development as well. Understanding the evolution of institutions can provide valuable intuition about their future development. Third, we take the belief systems in a society, like ideologies and perceptions of market forces, into account.

3.2 The Synthesis With Traditional Game Theory

Institutions define the true nature of the players and thus provide a framework for the trade game. Describing the trade relationship between Home and Foreign as an infinitely repeated PD³³, we leave some of the original assumptions unchanged³⁴. Again, we assume that there is no preplay

³¹Nelson (1988:81-82) writes about this as follows: "Farmers engaged entirely or predominantly in subsistence production are unlikely to give up the security of food self-sufficiency by devoting resources to a marketable crop, unless they perceive the prospective market price to be clearly remunerative and offer an attractive alternative. If that market price is not maintained for some years, their confidence in the market may be shaken. This is particularly true for annual crops."

³²*Political* institutions shape the calculations of political entrepreneurs and thus the political environment; *economic* institutions affect primarily economic variables.

³³I refrain from a repeated discussion of the one-shot and the finitely repeated PD; previous results apply unless stated otherwise.

³⁴Insofar as our rational choice model incorporates both insights from institutional economics and traditional game theory, it constitutes a synthesis of institutional economics and traditional game theory. It is not a purely game theoretic model in the sense of a formal game, even though a formal game is a component of the model. On the other hand, it is

communication. The countries are strictly self-interested and there is no third party involved as a referee. The only way to communicate is by observing the other's actions. In contrast to traditional game theory, however, we no longer assume the countries to be economic agents in the sense of neoclassical economics.³⁵ Instead we treat the government's domestic constraints as endogenous. Consequently, the term *rationality* can be qualified: The governments want to maximize the economic and social welfare subject to the changing institutional environment of their countries and reach this objective efficiently.

Since we have a better description of the players, it has become easier to estimate the discount rates and the payoffs³⁶ of the players. This improves the accuracy of the strategic analysis and its predictions. The basic mechanisms of the PD have not changed, but former interpretive problems can be diminished if not even eliminated. This refers, first of all, to specific outcomes which formerly were not predicted by the game theoretic model. Domestic institutions do matter in the determination of trade policies as they are a foundation of strategic interaction. Taking institutions into account, a government's trade policy or strategy might not seem to be irrational any more.³⁷ If we have multiple equilibria outcomes in a trade game it becomes possible to narrow down the possibilities and choose and explain the actual outcome. In other words, it takes both a strategic and an institutional analysis to explain or predict particularly those outcomes which seem not to be plausible at first.

Because we no longer assume institutions to be given and time-invariant, but instead take the evolution of institutions into account, we can modify the game description during the course of a game even if a change in trade policies, expectations, or preferences takes place. Knowing more about the underlying reasons of policy changes, i.e., the relevant domestic institutions, makes it

not a model of purely institutional economics because institutional economics by itself does not sufficiently take the strategic elements of trade policy into account.

³⁵This neoclassical assumption cannot be justified if we want to provide a realistic and accurate analysis of trade policies. The simple economic agent from economic theory does not exist in the real world. When we analyze trade policies we have to be aware of the fact that every government is constrained by different domestic institutions. Assuming universal economic agents is false because it ignores this fundamental reality and can, consequently, lead the analysis in the wrong direction.

³⁶Given our information about the institutional environment of the players, it is now possible to estimate the social welfare gains of a trade policy more precisely.

³⁷Recall that *rational* has a slightly, yet significantly, different meaning in our rational choice model.

possible to foresee future changes in trade policies. If a trade policy changes unexpectedly we can assess the impact of this change on the overall institutional environment and thus the framework of our trade game.³⁸ In short, we can explain why and how trade policies change over time and what impacts these changes have on the strategies of the players.

We have not answered yet the question under what conditions it is most likely to observe free trade in early stages of the trade game. To shed light on this specific issue, it is helpful to modify the structure of the game. We relax the assumption of no preplay communication and assume that Home indulges in an institutional analysis of Foreign before and during the game, and vice versa. Both know that the other player is doing this as well.³⁹ The countries can assess the actions of their opponent much better and estimate the discount rate accurately. Consequently, Home's forecasts of the most likely strategies of Foreign are probably realistic (and vice versa). Mixed strategies⁴⁰ become more reliable as the uncertainty about the other player's choice is reduced.

Nevertheless, a bit of uncertainty remains and allows non-cooperative outcomes. It might seem obvious, for example, that Home, at a time it expects Foreign to cooperate and lift all trade barriers, exploits its knowledge about Foreign's institutions and closes its market. However, Home will hesitate before doing this because it knows that Foreign has similar knowledge about Home's institutions and predicts its move. In this case, Foreign will not open its market in the first place. We would get (*FF*) as an outcome. Home anticipates this mechanism. It therefore becomes rational for Home to lift its trade barriers if and only if Foreign will cooperate in the next game. The outcome will be (*CC*). In short, the incentive to get a one time higher payoff from unilateral finking has decreased. If a country expects the other to stop protectionism it will not relapse to unilateral protectionism, but promote free trade as well. However, the last assertion is true only if the institutional structure in both countries is supportive to trade and, more generally, to open markets.⁴¹ Generally, mutual cooperation becomes more likely when both countries' institutional

³⁸Our rational choice model thus offers a dynamic, strategic analysis of trade policies.

³⁹Strictly speaking, we no longer have a PD since the information set has expanded tremendously.

⁴⁰"A mixed strategy maps each of a player's possible information sets to a probability distribution over actions" (Rasmusen, 1989:69).

⁴¹As we have seen in the case of Kenya, this need not always be the case. Suppose a country which has trade relations with Kenya knows that Kenya is bounded by political interests that are skeptical of the value of free trade.

structures are “market oriented.” Similarly, bilateral protectionism will be a likely outcome if the institutional foundation of at least one country constrains the government to restrict free market entry.

We conclude that it becomes rational to cooperate in the first game under two conditions. First, both countries must engage in an institutional analysis of the other country before and during the game. Second, the institutional structures of *both* countries must be supportive of open market policies. If at least one country lacks this structure, bilateral protectionism can be the eventual outcome. These two conditions are, respectively, the necessary and the sufficient condition for rational mutual cooperation to happen already in the first game, *ceteris paribus*.

We next analyze if this (*CC*) situation can become a stable (*CC*) equilibrium by looking at the possibilities and consequences of finking, and the appearance of white noise. Institutional economics makes it possible to learn likely sources of finking, i.e., institutions that cause one country to close its market. By taking these institutions into account when planning a strategy, Home, for example, can choose the appropriate strategy which might prevent Foreign from exercising protectionism. Foreign is aware of this and analyzes Home’s institutional structure respectively. Finking of a country will be less likely if the other can predict it and chooses similarly. However, it is impossible to consider and understand all institutions that directly or indirectly influence trade policies. We therefore cannot rule out finking *per se*. Suppose, Foreign finks and Home didn’t predict this move. Home has two options. First, it tries to find out what caused Foreign to close its market. Learning about the institutions that led Foreign to its move, Home adjusts its trade policy appropriately so as to eliminate Foreign’s initial incentives to close its market. Home will forecast future actions of Foreign with more accuracy and can thus avoid being the victim of unilateral protectionism once again. Both countries will, with or without a punishment period, eventually return to (*CC*) because it will give them the highest payoffs in the long run. Second, Home follows Foreign and practices protectionism as well. However, given our assumptions the Pareto inferior

The country’s institutional knowledge makes it more likely to close its market since cooperation can’t necessarily be expected from Kenya. Unless it perceives Kenya’s economic and political environment to become more open and receptive to freer trade, it will continue protectionist trade policies and will not open its market to Kenyan products.

(*FF*) is no longer a long-run equilibrium. Thus, unless Home is unable to find out what institutions or institutional changes caused Foreign to close its market, Home and Foreign will soon return to (*CC*).

The introduction of white noise doesn't change the last assertion. Conducting an institutional analysis before and during the game is equivalent to closely monitoring the other country. Home, for example, can take into account how Foreign will most likely behave if white noise occurs and adjusts its trade policy adequately. In a sense, we can reduce the set of white noise in size and make its appearance less probable. The information becomes more certain. The standard deviation of the expected payoffs is smaller since both countries have a greater information set and can forecast possible deviations. Hence, Home will be able to tell whether Foreign actually wanted to fink or if white noise caused Foreign to close its market. Any deviation from a cooperative regime can be punished more effectively because a country has a better idea of how to punish the other causing it to return to the cooperative regime. A thorough institutional analysis of another country makes it less likely for a country to become a victim of unilateral defection. Furthermore, if we allow the countries to communicate directly, possible threats become more credible if the institutional structure of the other country is known and considered.

We conclude that if the necessary and sufficient conditions for mutual cooperation are fulfilled, it is rational to cooperate in the first game. The resulting (*CC*) outcome is a stable and robust equilibrium. We can't entirely rule out white noise, but it is unlikely that (*FF*) will be the long-run equilibrium.

4 Conclusion

I have developed a rational choice model which provides some answers to the central question of the paper, under what conditions it becomes probable to observe free trade policies. Our rational choice model constitutes a synthesis of a game theoretic and an institutional analysis of trade policies.

The game theoretic analysis presented in the paper is a fairly simple one. It is partly based

on relatively restrictive assumptions. Nevertheless, these simplifications do not prevent us from sufficiently highlighting the underlying principles of the game theory approach. More complex game theoretic analyses with weaker assumptions exist, but their discussion would have only complicated the presentation. Overall, traditional game theory provides a good framework for a strategic analysis of trade policies. However, it is not without interpretive difficulties. In particular, it cannot explain changes in policies over time and the reasons behind specific, seemingly irrational trade policies, i.e., actual outcomes which deviate from the ones predicted by game theory. It furthermore remains unclear how to choose the right outcome if a trade game is characterized by multiple equilibria, and how expectations about other's trade policies are formed. One reason for these deficiencies can be found in the very restrictive assumptions of neoclassical economics which underlie traditional game theory. It is not justified to assume that the governments act like homogeneous, self-interested economic agents because every government is constrained by different domestic institutions. For example, when we analyze the trade relations between a western, industrialized country and an eastern European country, we have to be aware of the very different institutional structure in these countries and the different premises of their trade policies. Additionally, it is false to assume explicitly or implicitly that in an equilibrium economic policies always reflect the economic optimum.

In order to find answers to the open questions of traditional game theory it is necessary to gain a good understanding of the true nature of the players as well as the foundations, and the domestic frameworks of their trade policies. This has led us to the analysis of domestic institutions which are a foundation of all strategic interaction and significantly influence the making of trade policies of a country. They define the true nature of the players and provide a framework for the trade game. Therefore, an institutional analysis ought to be a fundamental part of any strategic analysis of trade policies. Knowledge about the domestic institutional environment results in a better description of the players and the constraints and, consequently, improves the accuracy of the strategic analysis. When we combine the insights of the institutional analysis with game theory, we

add a new dimension to the strategic analysis of trade policies.⁴² It allows us to analyze both trade and institutional issues and incorporate the insights from these analyses into *one* model. It becomes possible to explain particularly those outcomes which seem implausible at first. Considering the evolution of institutions enables us to trace and explain the underlying causes for past and present trade policies and predict future trade policies with more accuracy. Furthermore, we can clarify the conditions under which it becomes probable to observe free trade policies.

In a nutshell, the synthesis of institutional economics and game theory provides a good approach to a strategic analysis of trade policies and thus makes an important contribution to the understanding of trade policies. An interesting question in this context is what kind of information trade negotiators of different countries need in order to arrive at mutually beneficial trade agreements. Given the prospects of valuable insights we could gain from such an analysis, it is worthwhile pursuing this topic.

Appendix: Application of Our Rational Choice Model To Other Economic Policy Issues

I now want to present an example how to apply our rational choice model to other economic policy issues. To do so I drop the assumption of symmetric players and discuss a moral hazard situation in which one player, the principal, can't observe the effort of another player, the agent, and tries to formulate a contract which reveals the nature of the agent. Preplay communication is now possible. The information can be characterized as imperfect, asymmetric, certain, and complete. Furthermore, we assume epsilon-truthfulness.⁴³

In the following example, the International Monetary Fund (IMF) is the principal and Kenya the agent. Let's say, the IMF wants to grant Kenya a loan to promote Kenya's economic development process. The IMF formulates a contract in which it outlines the conditions for the loan. Kenya can then decide to pick the contract and the desired actions (incentive compatibility constraint) which lay on or above the level of its reservation utility (participation constraint). Suppose, the IMF requires that part of the loan is used for a certain project, but can't completely control if the required amount of money flows into this project. In order to punish any laziness of Kenya, the IMF needs to be able to distinguish between laziness and bad luck of Kenya. Not being able to accurately observe and measure Kenya's effort, the IMF will try to create a contract based on whatever best indicates effort and reveals Kenya's true nature. Whenever there are certain circumstances that indicate with a high probability that Kenya does not comply with the contract the IMF will punish this "laziness" (boiling-in-oil contract), for example, by withdrawing a promise to grant further crucial loans. However, this works only if Kenya is not very risk averse and can be severely punished. Otherwise the threat will not be credible. Furthermore, given the asymmetric and imperfect information the

⁴²Conybeare (1987) recognizes the importance of institutions but he gives them only limited explanatory power. He first tries to explain trade behavior by interstate games as we have done in section 2. If any particular behavior can't be explained this way he sheds some light on institutions in the hope that this can decipher the remaining residual.

⁴³I.e., the agent tells the truth if he is indifferent between lying and telling the truth.

assessment of specific circumstances might not be accurate. The goal of the IMF is therefore to formulate a second-best contract subject to the information asymmetry and constraints on writing contracts. There is no simple rule that would explain how the IMF can, regardless of specific circumstances, succeed in doing this. What we will observe as a final outcome in a moral hazard problem depends on the particular situation in which the contract is written and what it deals with.

If we assume that the IMF has analyzed Kenya's domestic institutions and thus has a good understanding of Kenya's institutional environment, the moral hazard it faces is reduced. Say, the IMF wants to finance a large-size project which requires the cooperation of some of the largest firms in Kenya. While the cooperation with large firms seems economically plausible, other factors, however, prevent a productive and effective cooperation.⁴⁴ Hence, investing in an environment which doesn't seem to be very supportive of large-size projects, will probably not yield the desired payoffs. The IMF has to formulate a contract that provides enough incentives for Kenya, including local politicians, to cooperate. It could, for example, ensure that the large project would benefit small firms as well, and thus guarantee local political and social support. Knowledge of crucial Kenyan institutions should help meet this objective. We conclude that if we introduce institutional economics into the moral hazard situation it is possible to formulate a contract that will make cooperation of the agent more likely. The moral hazard the principal faces is reduced.

Let's consider yet another example. Suppose, an industrialized country P (the principal), which in the past has financially supported many development projects in Kenya, wants to realize a new large-scale project, say, the building of a factory, and relies on the work and cooperation of Kenya. In contrast to previous projects, however, the new project will not primarily benefit Kenya but P. We assume that both countries have a good knowledge of the institutional environment of the other country. Under these circumstances it might seem likely that P uses its knowledge of Kenyan institutions to create effective threats. It could, for example, threaten to withdraw its financial assistance from projects which guarantee a stable political basis for Kenya's president Moi or play off one large ethnic group against another. However, P must not forget that Kenya too can forecast P's strategy and its real intention. Consequently, Kenya would not accept such a contract in the first place. Formulating a contract that is one-sided and only serves P's interests is not the optimal choice and not rational unless P can be absolutely assured that Kenya will accept the contract. Under our circumstances, this will rarely be the case. No one-sided enforcement mechanism creates an atmosphere that assures long-term stability and peace. Forced cooperation cannot eliminate the sources of incentives to fink. An acceptable contract has to benefit both countries. Explicit binding agreements are neither a sufficient nor a necessary condition for this contract. To formulate an optimal, self-enforcing contract both countries need to have perfect knowledge of each other's institutions. However, institutions are simply too complex to be evaluated entirely. An undefinable and undistinguishable set of institutions always remains and leaves an element of uncertainty. Still, even without an optimal contract our rational choice model can produce a better contract for both principal and agent than traditional game theory alone.

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⁴⁴Large firms usually have better capital equipment than smaller firms, but often they don't operate efficiently. One of the reasons for this inefficiency is rooted in the political field. Small firms represent a larger source of voters and are politically more promising. Hence, local politicians tend to support small firms rather than large ones.

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