Trade Agreements

CARSTEN KOWALCZYK
RAYMOND RIEZMAN

CESIFO WORKING PAPER NO. 2660
CATEGORY 8: TRADE POLICY
MAY 2009

CESifo *Working Paper No. 2660*

Trade Agreements

Abstract

This paper reviews the most significant recent developments in the theory of trade agreements. The paper offers an integrated approach to evaluating trade agreements, and uses the approach to present results on preferential and multilateral trade agreements. The paper identifies also several questions for further research.

JEL Code: F00, F02, F10, F11, F13, F15.

Keywords: trade agreements, multilateralism, free trade, customs unions, free trade areas, preferential trade.

Carsten Kowalczyk
The Fletcher School
Tufts University
MA 02155
USA
carsten.kowalczyk@tufts.edu

Raymond Riezman
Department of Economics
University of Iowa
IA 52242
USA
raymond-riezman@uiowa.edu

May 19, 2009

1 Introduction

The topic of trade agreements is a broad one. We will define trade agreements as agreements concerning nations' treatment of goods, services, or factors of production as these cross borders or have the potential of affecting the economic welfare of foreign nationals. This means, of course, that trade agreements are ubiquitous. Parties to agreements may be national governments or non-government entities such as producers or consumers. Parties may also be international organizations or supra-national political or economic institutions.

Trade agreements may be explicit or implicit. They may be simple or complex. They may be long-term or be associated with an immediate and one-time transaction. Trade agreements may specify prices, quantities, or policies such as tariffs, subsidies, quotas, content, standards, or even detailed conditions on behavior, such as competition.

Trade agreements may reflect an attempt by national governments to maximize some well-defined objective function. Such a function may be defined exclusively over national income, or it may have as arguments income of one or more special interest groups with the relative weighting of each group's income reflecting political influence through parliamentary processes, contri-

butions or lobbying, or reflecting some social preference for income distribution. Indeed, parties to trade agreements may have any type of preferences that reflect the economic and political reality of each party's domestic conditions including social norms. As is known from social choice theory, such "aggregation" may well lead to criterion functions that are not consistent with standard axioms of rational conduct. This would suggest that it may at times be difficult to associate international trade strategies or agreements with any simple national criterion.

A positive theory of trade agreements would seek to develop a framework that would generate the trade agreements that we observe. A normative theory of trade agreements would help identify deals that would raise welfare, however defined, of the participants. Such deals may specify new policies or even institutions, and thus be *de novo*, or they may specify gradual changes in policies or institutions if there are economic, political, or technological barriers to change.

We will confine our review to a consideration of recent work that assumes that each national government seeks to maximize national income. We do so for two reasons: First, the assumption that national governments seek to maximize income has been and remains the standard assumption in trade

theory. Secondly, the classical case for the attractiveness of free trade is that it maximizes total world income. From the perspective of standard welfare economics, distributional concerns are best addressed with explicitly redistributive policies rather than with trade policies. In other words, free trade with appropriate redistribution policies welfare dominates policies that distort trade. Therefore, as long as higher income is desirable, i.e., as long as it raises utility, which surely is the case for the vast majority of the world's population, national income would serve as an important metric.[1]

In section 2, we present the welfare calculus for national income in a general equilibrium environment with perfect competition. We present two versions of the national economic welfare calculus: one for analyzing changes in economic welfare when underlying changes are small, and one for changes in economic welfare when underlying changes are discrete. These approaches are mutually consistent, and we will refer to both as the terms-of-trade and volume-of-trade approach. We show in the remaining part of the paper how each expression can be used to answer key questions on trade agreements.

In section 3, we apply this welfare calculus to preferential trade agreements. Establishing new or expanding already existing preferential trade

[1]For an example of work that assumes that policies are affected by lobbies, see Gene Grossman and Elhanan Helpman (1995).

areas is a very active area of policy making – since the early 1990s, a remarkable 432 new preferential agreements were notified to the WTO.[2]

In section 4, we apply the welfare calculus to multilateral liberalization. We consider both results on how gradual reform as well as on discrete reform could be utilized to reach global free trade. In sections 3 and 4 we will also discuss results from computable general equilibrium models on trade agreements. Some of these models have cast light on orders of magnitude of welfare effects as well as informed theoretical developments.

It is a long-standing and recognized challenge for trade agreements that there has traditionally not been an external enforcement mechanism, such as for example a court, to ensure that nations put in practice that to which they have agreed. Thus parties to agreements must rely on themselves to ensure that agreements are upheld which, in turn, implies that countries might not wish to enter into agreements that it will be difficult to enforce. Agreements should be self-enforcing. In section 5 we consider some results that emphasize this constraint and hence the types of agreements we would expect to observe nations to establish. We conclude, in section 6, that the welfare analyses

[2]See http://www.wto.org. We define the types of agreements provided by GATT, in particular, customs unions, free trade areas, and preferential agreements, in section 3 of this paper.

in sections 3 to 4 and the analysis on self-enforcing agreements in section 5 are complementary. We also identify some questions for further research. Throughout the paper, we will also discuss results from computable general equilibrium models on trade agreements. These models have been helpful in casting light on orders of magnitude of welfare effects as well as in informing theoretical developments.

2 National Economic Welfare in Perfect Competition

Consider a world of n countries, each indexed by i ($i = 1, ..., n$), where price-taking consumers and producers trade a finite number of goods k with price-taking producers and consumers in other countries. If m^i denotes country i's vector of net imports, and if p^e is the corresponding vector of prices paid to foreign exporters or received by domestic exporters, and if p^i is the corresponding vector of domestic prices in country i, then $p^i - p^e$ is a vector of trade taxes or subsidies, with elements t^i_j ($j = 1, ..., k$) if rates are specific, or with elements $\tau^i_j p^e_j$ if rates are ad valorem.

It follows from the balanced trade condition that spending equals domes-

tic income plus tariff revenue, that the change in real income of the representative consumer in country i, $d\eta^i$, measured in units of a numéraire good, can be written as:

$$d\eta^i = -m^i dp^e + (p^i - p^e)dm^i. \tag{1}$$

Thus the change in real income is the sum of a terms-of-trade effect, $-m^i dp^e$, and a volume-of-trade effect, $(p^i - p^e)dm^i$, each of which evaluates changes with the initial values of trade flows and tariffs, respectively.[3]

There is a corresponding welfare expression if changes are discrete rather than infinitessimal. Let subscript A denote pre-change values and subscript B post-change values, and let Δ denote a discrete change. Denoting profit-maximizing pre- and post-change production by y^i_A and y^i_B respectively, the welfare effect from changes in domestic production is given by $S^i_\pi = p^i_B(y^i_B - y^i_A) \geq 0$. Similarly, if c^i_A is initial consumption, and if $c^i(p^i_B, u^i_A)$ would be the consumption at the new domestic price vector p^i_B that would preserve the initial level of utility u^i_A, adjustment in consumption due to substitution is given by a consumption efficiency effect, $S^i_\gamma = p^i_B(c^i_A - c^i(p^i_B, u^i_A)) \geq 0$. Defining $S^i = S^i_\gamma + S^i_\pi \geq 0$, it is then possible to write the change in country i's national income, $\Delta\eta^i = \eta^i_B - \eta^i_A$, as:

[3]See Ronald Jones (1969) and Avinash Dixit and Victor Norman (1980).

$$\Delta\eta^i = -m^i_A \Delta p^e + (p^i_B - p^e_B)\Delta m^i + S^i. \tag{2}$$

This expression states the welfare change as the sum of a terms-of-trade effect, $-m^i_A \Delta p^e$, where $\Delta p^e = p^e_B - p^e_A$; a tariff-revenue effect, $(p^i_B - p^e_B)\Delta m^i$, where $\Delta m^i = m^i_B - m^i_A$; and the non-negative efficiency effect, S^i.[4]

We refer to analyses drawing on either expression (1) or (2) as the terms-of-trade and volume-of-trade approach. In the general equilibrium theory of trade agreements, the small change expression (1) has proved useful for generating optimal tariff results, and for yielding the sign of change in welfare from any proposed policy reform and thus results on directions of desirable reform. The discrete change expression (2) offers exact welfare estimates of policy changes and has been used to compare different liberalization strategies, including customs unions and free trade.

3 Preferential Trade Agreements

While GATT/WTO emphasizes non-discrimination between its members, GATT Article XXIV allows WTO members to form free trade areas, which

[4] See Michihiro Ohyama (1972) or Earl Grinols and Kar-yiu Wong (1991) for a derivation of this expression.

eliminate the barriers on mutual trade between the free trade area members while leaving each member's tariffs on its trade with non-members to that member country to decide, or customs unions, which eliminate the barriers to mutual trade on the union members while setting common external tariffs on trade with non-members.[5]

Traditional analysis of preferential arrangements has been cast in terms of the trade diversion and trade creation approach pioneered by Jacob Viner (1950). Unfortunately, as discussed in Kowalczyk (1990, 2000), this approach is imprecise and incomplete, and it does not offer a strategy for empirical work. We apply instead the terms-of-trade and volume-of-trade approach to the welfare of preferential agreements. It is analytically convenient, and has none of the shortcomings of the traditional approach, in particular it is both consistent and complete, and it involves variables that are meaningful for empirical analysis.

Consider first the question of a small country's trade policy strategy. Many of the world's free trade agreements or customs unions have one or more small countries as parties. Yet, conventional trade theory had that a

[5] Additional requirements are that internal barriers must be eliminated on "substantially all trade" and that the average rate of protection on trade with non-members must not increase. Unilateral, discriminatory liberalization is also provided for if at least one of the parties is a developing country.

small country's best trade policy is unilateral free trade. Paul Wonnacott and Ronald Wonnacott (1981) showed that a small country, in a world where preferential trade agreements are possible, would prefer a free trade agreement with a large country to unilateral free trade, since the large country's preferential tariff reduction benefits the small country. However, the large country would lose from the arrangement. Kowalczyk (2000) formalizes the analysis and shows that the extra benefit for the small country is due to a terms-of-trade improvement from the large country's tariff reduction. The paper shows also that a small country may even prefer membership in many free trade agreements with several different large countries and it shows that equi-proportionate gradual tariff reductions between the small country and its large partners may offer higher welfare at every step until internal free trade has been established. The paper shows, finally, that while indeed the large country would lose from the free trade agreement's implied terms-of-trade worsening, the total net gain to the small and large partners is positive due to the small country's own tariff reduction, and hence the small country can offer a sidepayment to the large country equal to the large country's terms-of-trade loss in return for an offer to enter into a free trade agreement.

With this incentive for small countries to seek preferential agreements,

and if appropriate sidepayments are applied, it is possible that a large country would be willing to sign free trade agreements with many small countries.[6] Kowalczyk and Wonnacott (1992) show how this would lead to a world trading system of overlapping hubs-and-spokes structures: a layer of agreements due to each small country seeking access to many large markets – and thus each small country becoming a hub – and a layer as each large country would become a hub with many small country spokes.

Their analysis holds implications for the long-standing question of the relative desirability of free trade areas versus customs unions: Each large hub country may prefer a large rather than a small number of small country spokes since liberalizing with a collection of small spokes could be like liberalizing with a larger country and hence imply a smaller terms-of-trade loss for the large hub country. However, if the agreements are signed sequentially, an early small country spoke might seek to prevent the addition of new spokes since these may lead to worse terms of trade for the early spoke by the implied preference erosion. Due to the common external tariff, expansion of customs unions often require unanimity amongst members while free trade

[6] In more general environments, small countries might obtain free trade agreements with large countries in return for cooperation in other areas such as, for example, taxation, anti-trust, migration, health, the environment, labor standards, product standards, or defense.

areas do not. Hence, to avoid a hold-up situation on further expansion, the large country would prefer free trade areas rather than customs unions as a vehicle for extending preferential access.

In an explicit exploration of the role of country size, Michael Michaely (1998) proposes that size be measured by the small country's potential exports as a share in the large country's total demand. Given this definition, he shows that the large country's welfare loss is bell-shaped as a function of the small country's size. A free trade agreement with a micro-state has virtually no effect on the large country's welfare, nor would a free trade agreement with a "large" small country where the terms-of-trade loss for the large country would be only small. The largest loss would be from integrating with an intermediate size small country. Kowalczyk (2008), by using equation (2) in this paper, derives an upper limit on the welfare loss for the large country to be two times the tariff revenue it earns on its initial trade with the small country.

The WTO provides not only for free trade areas and customs unions, but also for higher income countries to extend preferential access without requesting developing country liberalization in return. Assuming the developing country to be a small country, Kowalczyk (2006) shows that while a

free trade agreement with a large country would yield the highest welfare for the small country, the welfare ranking for the small country of one-sided preferential access to the large country market versus its own unilateral liberalization is ambiguous. From expressions (1) or (2) in this paper, the ranking would depend on whether the implied terms-of-trade gains without domestic liberalization would offer a larger welfare improvement than eliminating own barriers which in turn are functions of the initial rate of protection and the developing country's own trade elasticities. The paper also establishes a new result that adds to concerns that preferential liberalization may make global free trade difficult to achieve: following a granting of preferential access to the small country, the large country would lose even more from subsequent small country unilateral liberalization. This is because such liberalization would expand the small country's trade with the large country which would lose even more tariff revenue on its imports from its non-preferential partners.

When some countries integrate in free trade areas or customs unions, what are the effects on non-member countries? In an attempt by the framers of GATT to restrict member nations' ability to use free trade areas or customs unions to extract better terms of trade from non-members, Article XXIV includes a stipulation that the average external tariff of members, upon in-

tegration, may not increase. However, this restriction is not sufficient to ensure that there are no spill-overs onto non-members.

Jaroslev Vanek (1965) introduced the notion of the compensating common external tariff of a customs union as the rate that would leave the economic welfare of non-members unaffected. Michihiro Ohyama (1972) and Murray Kemp and Henry Wan (1976) demonstrate that not only do such tariffs and hence customs unions exist in a standard competitive world economy but also that there exist within-union sidepayments such that no member country would be worse off from joining or expanding such a union. An important corollary is that global free trade could be reached through a process of ever expanding Ohyama-Kemp-Wan customs unions without any country in the world ever losing.[7]

More generally, when external tariffs are not set at the compensating level, a free trade agreement or a customs union may, if the rate is set below, lead to larger desired trade with non-members, or, if the rate is set above, to smaller desired trade with non-members. Kowalczyk and Wonnacott (1991, 1992) refer to the former case as a *complement* trade agreement, to the latter as a *substitute* trade agreement, and to the case of no spillovers as a *neutral* trade

[7]Pravin Krishna and Arvind Panagariya (2002) have derived a similar result for free trade areas.

agreement. The case of *substitute* agreements is, of course, the long-standing and important concern associated with preferential trade agreements with the classical problem of non-member exports of products that are similar to a member country's exports being shut out due to the preference. However, complementarities may exist between goods produced or consumed within a preferential trading area and goods provided by non-member countries. For example, increased production within a customs union or a free trade area could lead to increased import demand from non-members for inputs or other goods or services that are complementary in production. And if a trade agreement is beneficial to its member countries, their real income would increase and, under reasonable assumptions on income propensities to import, so would desired imports from non-member countries, again leading to positive spillovers.[8]

Ayhan Kose and Riezman (2000) show that while customs unions generally are more beneficial for the member countries than are free trade areas, for non-members the reverse is true. The reason is that the members of a customs union set tariff policy jointly, i.e. they coordinate, and hence inter-

[8]In an investigation of liberalization in Latin America in the 1990s, Antoni Estevadeordal, Caroline Freund, and Emanuel Ornelas (2008) find that preferential liberalization leads to lower external tariffs for free trade areas but not for customs unions.

nalize the benefits of own country tariffs for the other member countries who import the same goods as they do. In a free trade area external tariffs are set independently and members do not take full advantage of their potential to affect the terms-of-trade relative to non-members in their favor. Using numerical simulation methodology, Kose and Riezman (2002) show that a small country excluded from a customs union by large countries can experience large losses whereas if the same large countries form a free trade area the potential losses for the small country are much smaller.

Focusing on free trade areas, Eric Bond, Riezman, and Constantinos Syropoulos (2004) look at how the formation of a free trade agreement between countries that set tariffs that are welfare-maximizing affects equilibrium tariffs and the welfare of members and nonmembers when the latter also set their optimal tariffs. They show that, at constant nonmember tariffs, the liberalization of internal trade by symmetric members induces them to reduce their individually optimal external tariff below the compensating level thereby causing the outside country's terms of trade to improve and its welfare to rise. If the nonmember country behaves strategically, the formation of the free trade area leads the nonmember country to behave more aggressively in its tariff policy. As a consequence, the nonmember country benefits from

integration even more. The member countries benefit only if the free trade area is sufficiently large.

4 Multilateral Trade Agreements

In the world of policy making much economic reform is gradual. The now over 50-year old process of multilateral liberalization in GATT, and now in the WTO, seems to proceed at an almost glacial pace and at times to be at an outright standstill. And when struck agreements, whether multilateral or preferential, usually specify many years for phasing out internal tariffs. The question of why liberalization is gradual is an interesting one that we will return to in the next section.

Taking as a constraint that trade agreements must specify gradual changes in tariffs, scholars turned to the question of which formulae for tariff reductions nations could reasonably agree to in a multilateral negotiation. Assuming the existence of only trade taxes and the potential for international sidepayments, Tatsuo Hatta and Takashi Fukushima (1979) use equation (1) of this paper to investigate the world welfare effects from two types of reform that, at various times, have been proposed in various GATT rounds. One

type of agreement would specify that at each stage of reform the largest tariff be cut to the next highest level, and that this process be repeated until global free trade has been reached. Hatta and Fukushima show that this so-called *concertina* approach would raise world welfare at every stage. They consider also the proposal that all countries cut their tariffs simultaneously by the same percentage at every stage, and they are able to show that this so-called *radial* approach also raises world economic welfare at every stage of reform if all goods are substitutes.[9]

What if the initial situation has not only trade taxes but also trade subsidies, as is, for example, the case in agriculture? Kowalczyk (1989) shows that if rates are ad valorem then it is possible that a radial reduction of tariffs and subsidies may lower world welfare along a segment of the reform path. If, on the other hand, all rates are specific, then Fukushima and Namdoo Kim (1989) are able to show that such a welfare paradox is not possible: a radial reduction of all tariffs and subsidies will raise world welfare at every stage of reform.

It is not only for theoretical convenience but also for practical reasons that the world welfare or the potential Pareto criterion is important in the

[9] Ramón López and Arvind Panagariya (1992) consider reform when complementarities exist in production.

analysis of trade agreements: the long-standing criterion for agreement in multilateral negotiations is that any nation or group of nations can block a proposal and hence prevent an agreement. Put in the language of game theory, a proposal for a multilateral agreement must be in the core of the world trade game for that proposal to be implemented.[10]

Assuming that countries cannot engage in international sidepayments, Riezman (1985), in a first application of the core to a multi-country trade policy game, shows that some countries would prefer to establish free trade agreements or customs unions rather than agree to global free trade if countries cannot engage in international sidepayments. Later, Riezman (1999) uses the same model to argue that trade agreements might help or hinder the attainment of free trade depending on the size distribution of countries. In the case of similar sized countries, he shows that if customs unions are not permitted then free trade is in the core but if countries can form customs unions then free trade is not in the core. He also looks at another case, one large and two smaller countries. In this case, if customs unions are allowed then free trade is not in the core- the large country blocks free trade by charging a tariff and refusing to cooperate. If, however, customs unions were

[10]The core is the set of allocations that is blocked by no admissible coalition.

allowed, the large country cannot block free trade and free trade is in the core. The intuition for this result is that if the two smaller countries can form a customs union then the large country cannot win a tariff war (because the two other countries will form a customs union) and hence cannot block free trade.

Introducing international sidepayments into negotiations of multilateral agreements, Kowalczyk and Sjöström (1994, 2000) derive formulae for international sidepayments that would bring an agreement to eliminate all distortions in a world of monopoly trade into the core. In the standard competitive model, Konishi, Kowalczyk, and Sjöström (2009) show that a proposal for immediate global free trade with a financial mechanism that compensates any country for any associated terms-of-trade loss and taxes any country for any associated terms-of trade gains, is in the core of a world trade policy game where nations can choose as alternatives either the initial, arbitrary, status quo or to form Ohyama-Kemp-Wan customs unions. In this case, Ohyama-Kemp-Wan customs serve as an off-the-equilibrium option that no group of countries would choose. Ohyama-Kemp-Wan customs unions would never be observed. Moreover, Konishi, Kowalczyk, and Sjöström (2003) show that it is not possible to block any Ohyama-Kemp-Wan customs union with a

free-trade-with-transfers proposal. In other words, it matters for blocking what is put on the table. The upshot is that it may be easier to reach free trade by proposing it outright than by proposing half-way measures.

How large would the international sidepayments be in order to attain free trade? Thomas Hertel (2000) finds, from calculations derived from the GTAP model, that those regions of the world that would experience particularly large efficiency gains (more than two percent of GDP) also would tend to experience worse terms of trade, and he reports that such terms of trade losses may be large – up to 60% of efficiency gains for some major emerging market economies. Kowalczyk and Riezman (2007) present estimates of terms-of-trade effects from moving from a non-cooperative tariff equilibrium to global free trade in a CGE-model. For countries whose real income falls from free trade, the terms-of-trade effects are so large that they dominate any positive contribution from the consumption effects. For countries whose terms-of-trade improve, such improvements may constitute more than half of the countries' total gains from free trade. They also find, in their examples, that terms-of-trade effects from free trade can be up to nine percent of a nation's GDP, suggesting that the potential side-payments that would lead to adoption of free trade might be quite large.

5 On Self-Enforcement in Trade Agreements

As we stated at the outset of this paper, the purpose of our focus on the analytics of economic welfare is to provide a tool that can identify opportunities for trade agreements that have the potential to raise national income. The terms-of-trade and volume-of-trade approach allows for assessment of welfare consequences for all types of reform, multilateral or preferential, gradual or discrete, and for all nations, whether they participate or are on the sidelines. This, in turn, defines an opportunity set for agreements in the space of nations' tariffs. A natural question is then to ask which of these many possible tariff outcomes will actually emerge as an equilibrium. Which agreements will be struck?

The work and results reported in the previous sections of this paper draw on the standard, static, competitive, general equilibrium model. For any trade agreement, the usual strategy in that line of research has been to assume that national welfare maximizing governments set non-cooperative Nash tariffs on nations that are not parties to the agreement, and set tariffs on trade with partners according to some formula, whether it be zero as required by Article XXIV for free trade areas and customs unions, or it be some percentage reduction of initial rates as in the work of gradual multilateral

reform.

Each of these approaches to the determination of the non-cooperative and cooperative tariffs is subject to difficulties. Already early contributors such as Harry Johnson (1953-54) and William Gorman (1958) show that it is difficult to solve analytically for the welfare-maximizing non-cooperative tariff in theoretical work. Later work by Bond (1990), who derives the unilateral optimal tariff with many goods, by Syropoulos (2002), who explores the determinants of trade elasticities in a two-country, non-cooperative tariff equilibrium, and by Bond and Syropoulos (1996), who consider the optimal tariff of a trading bloc as a function of its relative size, confirm that the challenges associated with such computations in theoretical work are considerable.

John Kennan and Riezman (1988, 1990) recognized this early and, in their path-breaking explorations of preferential trade arrangements and free trade, chose instead to develop a simple computable general equilibrium model with extensive separability in both supply and demand to obtain equilibrium. Later-generation computable general equilibrium models, such as the large-scale GTAP model, do not even seek to solve for optimal tariffs but confine themselves to deriving numerical estimates of the welfare effects from speci-

fied, formulaic, changes in tariffs.[11]

It is also a challenge to model, and hence to predict, the cooperative tariffs, i.e., the rates nations would establish in trade agreements. Tibor Scitovsky (1942), Harry Johnson (op. cit.), Wolfgang Mayer (1981), and Avinash Dixit (1987) showed the difficulties of generating free trade or, more generally, a policy equilibrium on the contract curve, in standard static environments where nations use their non-cooperative optimal tariffs if no agreements are struck.

And formulaic approaches to the cooperative rates have shortcomings too. For example, research on free trade areas and customs unions has usually assumed that partners to such agreements adhere to the letter of Article XXIV and agree to zero tariffs on internal trade. However, this may not be optimal. For example, already John McMillan and Ewen McCann (1981) showed that in a three-good model, two customs union partners, even if small, may prefer an intra-union tariff (or subsidy) to internal free trade to obtain volume-of-trade gains through increased imports from the non-partner country.

Assuming that trading nations are in a repeated game and that a country

[11] See, for example, Hertel (op. cit).

can obtain short-term gains by deviating from an agreed tariff but long-term losses as its trading partner retaliates in subsequent periods, Kyle Bagwell and Robert Staiger (2002) present findings on tariffs to which nations can credibly agree under conditions of discounting and sufficient similarity of countries that retaliation eliminates any initial terms-of-trade gains.[12] The framework can also generate paths of gradual tariff changes: For example, Bagwell and Staiger (1997a) show that if countries agree to form a free trade area in the future, which they assume is a *substitute* agreement once it is fully implemented, the "most cooperative" most-favored-nation tariffs will temporarily increase as soon as the intention of establishing the free trade agreement has been announced but then ultimately fall back to its initial value. If, on the other hand, the partner countries agree to form a customs union then, Bagwell and Staiger (1997b) show, the "most cooperative" most-favored nation tariff path will be U-shaped instead, i.e., the tariff falls on the announcement, but ultimately begins to rise as the customs union partners will choose to renege on their most-favored-nation tariffs as they achieve

[12] This notion of reciprocity, one that leaves the terms of trade constant, is obviously restrictive but is analytically tractable. It does not include, for example, the type of reciprocity between large and small countries discussed in Kowalczyk (2000) and in Kowalczyk and Donald Davis (1998). Robert Lawrence (1996) and J. Michael Finger (2005) offer further examples of broader notions of reciprocity. Daniel Kovenock and Marie Thursby (1992) propose that an additional cost to a country from deviation is that it loses credibility and hence reduced ability to enter into future agreements.

increased market power once their tariffs have been fully harmonized in the customs union. Benjamin Zissimos (2007) shows that if the deviation from the initial agreed tariff is small, and if the punishment is limited, then trade liberalization must be gradual and free trade will not be reached since, in the absence of severe punishment, only the promise of further liberalization will prevent deviation in the present, but at free trade this promise cannot be made.

Another approach to generating the gradual phasing out of tariffs has been to introduce assumptions on production. For example, Michael Devereux (1997) considers learning-by-doing by export firms, Taiji Furusawa and Edwin Lai (1999) assume adjustment costs for labor when moving between sectors, and Bond and Jee-Hyeong Park (2002) and Richard Chisik (2003) consider the role of irreversible investment as proposed by John McLaren (1997).

6 Conclusion and Further Research

The area of trade agreements is obviously very large and one of much current research. We have focused in this review on research on the welfare

economics of trade agreements and on research on self-enforcing trade agreements. Results from the former literature identifies opportunities for cooperation and new combinations of policies that may yield outcomes that are welfare superior to existing policies or institutions. The results on sidepayments are the most obvious example. This line of research usually assumes a standard many-good, many-agent general equilibrium environment, which may make it difficult to offer strong predictions. The work on self-enforcing agreements has offered results that help identify which policies and hence agreements would reasonably be observed. These results are often derived under restrictive assumptions, for example, two or three goods or countries, or explicit functional forms.

The two literatures are obviously complementary. Indeed, as is known from the theory of mechanism design, it is useful to apply cooperative approaches to identify outcomes that are "desirable" according to some specified criterion and then to use non-cooperative approaches to explore whether it is possible to implement, at least approximately, these "desirable" outcomes. Free trade is a "desirable" outcome in the work on trade agreements for fundamental welfare economic reasons. We have reported how international sidepayments may be helpful to achieve this outcome. It is an interesting

question how a financial mechanism would look if it had to be self-enforcing.

We have also reported on results on formulaic approaches to welfare-improving liberalization. It would be interesting to explore whether these formulae, in particular the ones specifying equi-proportionate and *concertina* approaches to rate reductions, can be generated as equilibrium paths in negotiations between optimizing governments.

It has been established in the literature that free trade can be attained if customs unions do not exert spillovers onto non-member countries. Could a proposal to revise Article XXIV to require that customs unions do not result in spillovers to non-member countries be agreed by the members of the WTO?

The work reported in this paper also has implications for CGE modeling of trade policy. As our understanding of policy setting improves, it would be useful if such models incorporated elements of endogenous policy setting and reaction. The technical difficulties to do so may still be prohibitive but the return would be a "realistic" model for world trade where policies adjust to underlying shocks. An important input into that project would be the work on political economy of trade policy, another area of active research that space limitations have prevented us from discussing in this paper.

Finally, the terms-of-trade and volume-of-trade approach presented here should facilitate empirical research on trade agreements by casting the analysis in terms of standard economic variables that, in principle, can be estimated: the levels and changes in trade volumes, world market prices, and tariff rates.[13]

Acknowledgements

Prepared for the Palgrave volume *Handbook on International Trade*. This paper is part of the Globalization Project at the University of Aarhus.

References

[1] Bagwell, Kyle, and Robert Staiger (1997a): "Multilateral Tariff Cooperation during the Formation of Free Trade Areas," *International Economic Review* 38, 291-319.

[2] Bagwell, Kyle, and Robert Staiger (1997b): "Multilateral Tariff Cooperation during the Formation of Customs Unions," *Journal of International Economics* 42, 91-123.

[13] There has been considerable work on trade volumes. For example, Jeffrey Frankel (1997) offers an extensive discussion and results with an emphasis on gravity equation approaches. In addition, estimates of terms of trade effects would be required for a complete welfare analysis.

[3] Bagwell, Kyle, and Robert Staiger (2002): *The Economics of the World Trading System*, Cambridge, MA: The M.I.T. Press.

[4] Bond, Eric (1990): "The Optimal Tariff Structure in Higher Dimensions," *International Economic Review* 31, 103-116.

[5] Bond, Eric, and Jee-Hyeong Park (2002): "Gradualism in Trade Agreements with Asymmetric Countries," *Review of Economic Studies* 69, 379-406.

[6] Bond, Eric, and Constantinos Syropoulos (1996): "The Size of Trading Blocs: Market Power and World Welfare Effects," *Journal of International Economics* 40, 411-438.

[7] Bond, Eric, Raymond Riezman, and Constantinos Syropoulos (2004): "A Strategic and Welfare Theoretic Theory of Free Trade Areas," *Journal of International Economics* 64, 1-27.

[8] Chisik, Richard (2003): "Gradualism in Free Trade Agreements: A Theoretical Justification," *Journal of International Economics* 59, 367-397.

[9] Devereux, Michael (1997): "Growth, Specialization, and Trade Liberalization," *International Economic Review* 38, 565-585.

[10] Dixit, Avinash (1987): "Strategic Aspects of Trade Policy," in Truman Bewley, ed.: *Advances in Economic Theory: Fifth World Congress*. New York: Cambridge University Press.

[11] Finger, J. Michael (2005): "A Diplomat's Economics: Reciprocity in the Uruguay Round Negotiations," *World Trade Review* 4, 27-40.

[12] Frankel, Jeffrey (1997): *Regional Trading Blocs in the World Economic System*, Washington, D.C.: Institute for International Economics.

[13] Fukushima, Takashi, and Namdoo Kim (1989): "Welfare Improving Tariff Changes," *Journal of International Economics* 26, 383-388.

[14] Furusawa, Taiji, and Edwin Lai (1997): "Adjustment Costs and Gradual Trade Liberalization," *Journal of International Economics* 49, 333-361.

[15] Gorman, William M. (1958): "Tariffs, Retaliation, and the Elasticity of Demand for Imports," *Review of Economic Studies* 25, 133-162.

[16] Grinols, Earl L. (1981): "An Extension of the Kemp-Wan Theorem on the Formation of Customs Unions," *Journal of International Economics* 6, 95-97.

[17] Grinols, Earl L., and Kar-yiu Wong (1991): "An Exact Measure of Welfare Change," *Canadian Journal of Economics* 24, 61-64.

[18] Grossman, Gene, and Elhanan Helpman (1995): "The Politics of Free Trade Agreements," *American Economic Review* 85, 667-690.

[19] Hatta, Tatsuo, and Takashi Fukushima (1979): "The Welfare Effect of Tariff Rate Reductions in a Many Country World," *Journal of International Economics* 9, 503-511.

[20] Hertel, Thomas W. (2000): "Potential Gains from Reducing Trade Barriers in Manufacturing, Services and Agriculture," *Federal Reserve Bank of St. Louis Review* No. 4, 77-99.

[21] Johnson, Harry G. (1953-54): "Optimum Tariffs and Retaliation," *Review of Economic Studies* XXI, 142-153.

[22] Jones, Ronald W. (1969): "Tariffs and Trade in General Equilibrium: Comment," *American Economic Review* 59, 418-424.

[23] Kemp, Murray C., and Henry Y. Wan (1976): "An Elementary Proposition Concerning the Formation of Customs Union," *Journal of International Economics* 6, 95-97.

[24] Kennan, John, and Raymond Riezman (1988): "Do Big Countries Win Tariff Wars?" *International Economic Review* 29, 81-85.

[25] Kennan, John, and Raymond Riezman (1990): "Optimal Tariff Equilibria with Customs Unions," *Canadian Journal of Economics* 23, 70-83.

[26] Konishi, Hideo, Carsten Kowalczyk, and Tomas Sjöström (2003): "Free Trade, Customs Unions, and Transfers," Social Science Research Network, July; http://ssrn.com/abstract=428346.

[27] Konishi, Hideo, Carsten Kowalczyk, and Tomas Sjöström (2009): "Global Free Trade is in the Core of a Customs Union Formation Game," *Review of International Economics* 17, 304-309.

[28] Kose, Ayhan, and Raymond Riezman (2000): "Understanding the Welfare Implications of Preferential Trade Agreements," *Review of International Economics* 8, 619-633.

[29] Kose, Ayhan, and Raymond Riezman (2002): "Small Countries and Regional Trade Agreements: The Innocent Bystander Problem," *The Pacific Economic Review* 7, 279-304.

[30] Kovenock, Daniel, and Marie Thursby (1992): "GATT, Dispute Settlement, and Cooperation," *Economics and Politics* 4, 151-170.

[31] Kowalczyk, Carsten (1989): "Trade Negotiations and World Welfare," *American Economic Review* 79, 552-559.

[32] Kowalczyk, Carsten (1990): "Welfare and Customs Unions," NBER Working Paper 3476.

[33] Kowalczyk, Carsten (2000): "Welfare and Integration," *International Economic Review* 41, 483-494.

[34] Kowalczyk, Carsten (2006): "Liberalizing Trade between Large and Small: The Welfare from Three Different Strategies," *TheAsia-Pacific Journal of Accounting and Economics* 13, 2, 173-181.

[35] Kowalczyk, Carsten (2008): "Free Trade between Large and Small: What's in It for the Large Country? What's in It for the Small?" in Sugata Marjit and Eden Yu, eds.: *Contemporary and Emerging Issues*

in Trade Theory and Policy. Frontiers of Economics and Globalization, Vol. 4., Bingley, U.K.: Emerald Group Publishing Ltd.

[36] Kowalczyk, Carsten, and Donald Davis (1998): "Tariff Phase-Outs: Theory and Evidence from GATT and NAFTA," in Jeffrey A. Frankel, ed.: *The Regionalization of the World Economy*, Chicago: The University of Chicago Press.

[37] Kowalczyk, Carsten, and Raymond Riezman (2007): "Free Trade: What Are the Terms-of-Trade Effects?" *Economic Theory* (forthcoming).

[38] Kowalczyk, Carsten, and Tomas Sjöström (1994): "Bringing GATT into the Core," *Economica* 61, 301-17.

[39] Kowalczyk, Carsten, and Tomas Sjöström (2000): "Trade as Transfers, GATT and the Core," *Economics Letters* 66, 163-169.

[40] Kowalczyk, Carsten, and Ronald Wonnacott (1991): "Complement and Substitute Trade," Dartmouth College Economics Department Working Paper.

[41] Kowalczyk, Carsten, and Ronald Wonnacott (1992): "Hubs and Spokes and Free Trade in the Americas," NBER Working Paper No. 4198.

[42] Krishna, Pravin, and Arvind Panagariya (2002), "On Necessarily Welfare Enhancing FTAs," *Journal of International Economics* 57, 353-367.

[43] Lawrence, Robert Z. (1996): *Regionalism, Multilateralism, and Deeper Integration*, Washington, D.C.: The Brookings Institution.

[44] López, Ramón, and Arvind Panagariya (1992): "On the Theory of Piecemeal Tariff Reform: The Case of Pure Imported Intermediate Inputs," *American Economic Review* 82, 615-625.

[45] Mayer, Wolfgang (1981): "Theoretical Considerations on Negotiated Tariff Adjusments," *Oxford Economic Papers* 33, 135-153.

[46] McLaren, John (1997): "Size, Sunk Costs and Judge Bowker's Objections to Free Trade," *American Economic Review* 87, 400-420.

[47] McMillan, John, and Ewen McCann (1981): "Welfare Effects in Customs Unions," *Economic Journal* 91, 697-703.

[48] Michaely, Michael (1998): "Partners to a Preferential Trade Agreement: Implications of Varying Size," *Journal of International Economics* 46, 73-85.

[49] Ohyama, Michihiro (1972): "Trade and Welfare in General Equilibrium," *Keio Economic Studies* 9, 73-73.

[50] Riezman, Raymond (1985): "Customs Unions and the Core," *Journal of International Economics* 19, 355-365.

[51] Riezman, Raymond (1999): "Can Bilateral Trade Agreements Help to Induce Free Trade?" *Canadian Journal of Economics* 32, 751-766.

[52] Scitovsky, Tibor (1942): "A Reconsideration of the Theory of Tariffs," *Review of Economic Studies* 9, 89-110.

[53] Syropoulos, Constantinos (2002): "Optimum Tariffs and Retaliation Revisited: How Country Size Matters," *Review of Economic Studies* 69, 707-727.

[54] Vanek, Jaroslev (1965): *General Equilibrium of International Discrimination: The Case of Customs Unions*, Cambridge, MA: Harvard University Press.

[55] Viner, Jacob (1950): *The Customs Union Issue*, New York: Carnegie Endowment for International Peace.

[56] Zissimos, Benjamin (2007): "The GATT and Gradualism," *Journal of International Economics* 71, 410-433.

CESifo Working Paper Series

for full list see www.cesifo-group.org/wp
(address: Poschingerstr. 5, 81679 Munich, Germany, office@cesifo.de)

2597 Carsten Eckel, International Trade and Retailing, March 2009

2598 Gianni De Nicolò and Iryna Ivaschenko, Global Liquidity, Risk Premiums and Growth Opportunities, March 2009

2599 Jay Pil Choi and Heiko Gerlach, International Antitrust Enforcement and Multi-Market Contact, March 2009

2600 Massimo Bordignon and Guido Tabellini, Moderating Political Extremism: Single Round vs Runoff Elections under Plurality Rule, April 2009

2601 Ana B. Ania and Andreas Wagener, The Open Method of Coordination (OMC) as an Evolutionary Learning Process, April 2009

2602 Simon Gächter, Daniele Nosenzo, Elke Renner and Martin Sefton, Sequential versus Simultaneous Contributions to Public Goods: Experimental Evidence, April 2009

2603 Philippe Jehiel and Andrew Lilico, Smoking Today and Stopping Tomorrow: A Limited Foresight Perspective, April 2009

2604 Andreas Knabe, Steffen Rätzel, Ronnie Schöb and Joachim Weimann, Dissatisfied with Life, but Having a Good Day: Time-Use and Well-Being of the Unemployed, April 2009

2605 David Bartolini and Raffaella Santolini, Fiscal Rules and the Opportunistic Behaviour of the Incumbent Politician: Evidence from Italian Municipalities, April 2009

2606 Erkki Koskela and Jan König, Can Profit Sharing Lower Flexible Outsourcing? A Note, April 2009

2607 Michel Beine, Frédéric Docquier and Çağlar Özden, Diasporas, April 2009

2608 Gerd Ronning and Hans Schneeweiss, Panel Regression with Random Noise, April 2009

2609 Adam S. Booij, Bernard M.S. van Praag and Gijs van de Kuilen, A Parametric Analysis of Prospect Theory's Functionals for the General Population, April 2009

2610 Jeffrey R. Brown, Julia Lynn Coronado and Don Fullerton, Is Social Security Part of the Social Safety Net?, April 2009

2611 Ali Bayar and Bram Smeets, Economic, Political and Institutional Determinants of Budget Deficits in the European Union, April 2009

2612 Balázs Égert, The Impact of Monetary and Commodity Fundamentals, Macro News and Central Bank Communication on the Exchange Rate: Evidence from South Africa, April 2009

2613 Michael Melvin, Christian Saborowski, Michael Sager and Mark P. Taylor, Bank of England Interest Rate Announcements and the Foreign Exchange Market, April 2009

2614 Marie-Louise Leroux, Pierre Pestieau and Gregory Ponthiere, Should we Subsidize Longevity?, April 2009

2615 Ronald MacDonald, Lukas Menkhoff and Rafael R. Rebitzky, Exchange Rate Forecasters' Performance: Evidence of Skill?, April 2009

2616 Frederick van der Ploeg and Steven Poelhekke, The Volatility Curse: Revisiting the Paradox of Plenty, April 2009

2617 Axel Dreher, Peter Nunnenkamp, Hannes Öhler and Johannes Weisser, Acting Autonomously or Mimicking the State and Peers? A Panel Tobit Analysis of Financial Dependence and Aid Allocation by Swiss NGOs, April 2009

2618 Guglielmo Maria Caporale, Roman Matousek and Chris Stewart, Rating Assignments: Lessons from International Banks, April 2009

2619 Paul Belleflamme and Martin Peitz, Asymmetric Information and Overinvestment in Quality, April 2009

2620 Thomas Dohmen, Armin Falk, David Huffman and Uwe Sunde, Are Risk Aversion and Impatience Related to Cognitive Ability?, April 2009

2621 Yin-Wong Cheung and Xingwang Qian, The Empirics of China's Outward Direct Investment, April 2009

2622 Frédérique Bec and Christian Gollier, Assets Returns Volatility and Investment Horizon: The French Case, April 2009

2623 Ronnie Schöb and Marcel Thum, Asymmetric Information Renders Minimum Wages Less Harmful, April 2009

2624 Martin Ruf and Alfons J. Weichenrieder, The Taxation of Passive Foreign Investment – Lessons from German Experience, April 2009

2625 Yao Li, Borders and Distance in Knowledge Spillovers: Dying over Time or Dying with Age? – Evidence from Patent Citations, April 2009

2626 Jim Malley and Ulrich Woitek, Technology Shocks and Aggregate Fluctuations in an Estimated Hybrid RBC Model, April 2009

2627 Jin Cao and Gerhard Illing, Endogenous Systemic Liquidity Risk, April 2009

2628 Thiess Buettner and Bjoern Kauder, Revenue Forecasting Practices: Differences across Countries and Consequences for Forecasting Performance, April 2009

2629 Håkan Selin, The Rise in Female Employment and the Role of Tax Incentives – An Empirical Analysis of the Swedish Individual Tax Reform of 1971, April 2009

2630 Nick Johnstone and Ivan Hascic, Environmental Policy Design and the Fragmentation of International Markets for Innovation, April 2009

2631 Spiros Bougheas, Richard Kneller and Raymond Riezman, Optimal Education Policies and Comparative Advantage, April 2009

2632 Jay Pil Choi and Heiko Gerlach, Multi-Market Collusion with Demand Linkages and Antitrust Enforcement, April 2009

2633 Thor O. Thoresen, Income Mobility of Owners of Small Businesses when Boundaries between Occupations are Vague, April 2009

2634 Guido Schwerdt and Amelie C. Wuppermann, Is Traditional Teaching really all that Bad? A Within-Student Between-Subject Approach, April 2009

2635 Kurt R. Brekke, Luigi Siciliani and Odd Rune Straume, Hospital Competition and Quality with Regulated Prices, April 2009

2636 Peter Diamond, Taxes and Pensions, April 2009

2637 Shoshana Grossbard, How "Chicagoan" are Gary Becker's Economic Models of Marriage?, May 2009

2638 Roland Strausz, Regulatory Risk under Optimal Incentive Regulation, May 2009

2639 Holger Zemanek, Ansgar Belke and Gunther Schnabl, Current Account Imbalances and Structural Adjustment in the Euro Area: How to Rebalance Competitiveness, May 2009

2640 Harald Hau and Marcel Thum, Subprime Crisis and Board (In-)Competence: Private vs. Public Banks in Germany, May 2009

2641 Martin Halla, Mario Lackner and Friedrich G. Schneider, An Empirical Analysis of the Dynamics of the Welfare State: The Case of Benefit Morale, May 2009

2642 Balázs Égert, Infrastructure Investment in Network Industries: The Role of Incentive Regulation and Regulatory Independence, May 2009

2643 Christian Gollier, Expected Net Present Value, Expected Net Future Value, and the Ramsey Rule, May 2009

2644 Sören Blomquist and Håkan Selin, Hourly Wage Rate and Taxable Labor Income Responsiveness to Changes in Marginal Tax Rates, May 2009

2645 Dominique Demougin, Oliver Fabel and Christian Thomann, Implicit vs. Explicit Incentives: Theory and a Case Study, May 2009

2646 Francesco C. Billari and Vincenzo Galasso, What Explains Fertility? Evidence from Italian Pension Reforms, May 2009

2647 Kjell Arne Brekke, Karen Evelyn Hauge, Jo Thori Lind and Karine Nyborg, Playing with the Good Guys – A Public Good Game with Endogenous Group Formation, May 2009

2648 Guglielmo Maria Caporale and Luis A. Gil-Alana, Multi-Factor Gegenbauer Processes and European Inflation Rates, May 2009

2649 Henning Bohn, A Static Model for Voting on Social Security, May 2009

2650 Markus Haavio and Kaisa Kotakorpi, The Political Economy of Sin Taxes, May 2009

2651 Augusto de la Torre, María Soledad Martínez Pería and Sergio L. Schmukler, Drivers and Obstacles to Banking SMEs: The Role of Competition and the Institutional Framework, May 2009

2652 Tobias Lindhe and Jan Södersten, Dividend Taxation, Share Repurchases and the Equity Trap, May 2009

2653 Assaf Razin and Edith Sand, Migration-Regime Liberalization and Social Security: Political-Economy Effect, May 2009

2654 Yin-Wong Cheung and Hiro Ito, A Cross-Country Empirical Analysis of International Reserves, May 2009

2655 Bart Cockx and Bruno Van der Linden, Flexicurity in Belgium. A Proposal Based on Economic Principles, May 2009

2656 Michael Melvin, Lukas Menkhoff and Maik Schmeling, Exchange Rate Management in Emerging Markets: Intervention via an Electronic Limit Order Book, May 2009

2657 Susanne Neckermann, Reto Cueni and Bruno S. Frey, What is an Award Worth? An Econometric Assessment of the Impact of Awards on Employee Performance, May 2009

2658 Steven Brakman, Harry Garretsen and Charles van Marrewijk, Economic Geography within and between European Nations: The Role of Market Potential and Density across Space and Time, May 2009

2659 Giovanni Facchini and Cecilia Testa, Reforming Legislatures: Is one House better than two?, May 2009

2660 Carsten Kowalczyk and Raymond Riezman, Trade Agreements, May 2009