The Farsighted Stability of Global Trade Policy Arrangements

Stefan Berens, Lasha Chochua, and Gerald Willmann

Bielefeld University and IfW Kiel

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Contemporary Global Trading System

- The prevailing global trading system started with the creation of the General Agreement on Tariffs and Trade (GATT, 1947).

- Two articles of GATT significantly shaped the nature of the liberalization process

  - Article I of GATT - any concession granted to one member needs to be extended to all other members of the WTO (most-favored-nation (MFN) clause). MFN consistent agreements are referred to as Multilateral Trade Agreements (MTAs).

  - Article XXIV of GATT - countries may form Preferential Trade Agreements (PTAs), specifically, Customs Unions (CUs) and Free Trade Agreements (FTAs), without extending the concessions granted within the arrangement to other countries.

Motivation

- During the past rounds of multilateral trade negotiations, many countries were simultaneously involved in multilateral and preferential liberalization.

- The trade negotiations are complicated processes with significant effect on the countries' economies and they are accompanied by detailed studies about feasibility and scenario analysis

  - Literature sugests (Mölders (2012, 2015), Freund and McDaniel (2016)) that about 3-4 years elapses between the start of PTA negotiations and their implementation.

    ▸ Transition

- The existing literature considers a limited selection of possible trade policy arrangements and/or assumes limited farsightedness of the negotiating countries.

- **Main question:** Are PTAs 'building blocks' or 'stumbling blocks' on the path toward global free trade under the expanded choice set of trade arrangements and farsighted decision-makers?

Related Literature

We focus on the so-called 'rules-to-make-rules' literature:

- Saggi and Yildiz (2010); Saggi, Woodland and Yildiz (2013); Missions, Saggi and Yildiz (2016) - FTAs or CUs in combination with MTAs; Coalition-Proof Nash Equilibria.

- Lake (2017,2018, 2020) - FTAs and simplified MTAs; Markov Perfect Equilibria.

- Goyal and Joshi (2006); Furusawa and Konishi (2007); Zhang et al. (2013); Zhang et al. (2014) - FTAs; Pairwise Stability or Pairwise Farsighted Stability.

- Aghion et al. (2007) - cooperative game theory tools.

Setting Up the Model

- The tuple $\Gamma = \left(N, X, \{\prec_i\}_{i \in N}, \{\rightarrow_S\}_{S \subseteq N, S \neq \emptyset}\right)$ describes the general environment (Chwe, 1994), where

    - N is the set of players
    - X is the set of outcomes
    - $\{\prec_i\}_{i \in N}$ are players' strict preference relations defined on X
    - $\{\rightarrow_S\}_{S \subseteq N, S \neq \emptyset}$ is an "effectiveness relation"

- $x \rightarrow_S y$ means that if x is the status quo, coalition S can make y the new status quo.

The Set of Outcomes - Trade Policy Arrangements

▶ we consider a three-country world.

▶ All trade policy arrangements are one of four types: MFN, CU, FTA, and MTA.

  ▶ Each type, except for MFN, naturally induces different combinations of insiders and outsiders.
  ▶ Global Free Trade is essentially listed in three different variations, via trilateral CUs, FTAs, and MTAs.
  ▶ Additionally, the case of FTA contains the possibility of a special hub structure with two FTAs simultaneously.

▶ the total number of agreements we consider is 16.

The Set of Outcomes - Trade Policy Arrangements

▶ MFN trade policy arrangement:
$$\max_{t_{ij}, t_{ik}} W_i \text{ with } \{(t_{ij}, t_{ik}) \in \mathbb{R}_{\geq 0}^2 \mid t_{ij} = t_{ik}\}$$

▶ CU(i,j) trade policy Arrangement:
$$\max_{t_{ij}, t_{ik}, t_{ji}, t_{jk}} W_i + W_j$$
$$\text{with } \{(t_{ij}, t_{ik}) \in [0, t_i^{MFN}]^2 \mid t_{ij} = 0\},$$
$$\{(t_{ji}, t_{jk}) \in [0, t_j^{MFN}]^2 \mid t_{ji} = 0\} \text{ and } t_{ik} = t_{jk}$$

▶ FTA(i,j) trade policy arrangement:
$$\max_{t_{ij}, t_{ik}} W_i \text{ with } \{(t_{ij}, t_{ik}) \in [0, t_i^{MFN}]^2 \mid t_{ij} = 0\}$$

The Set of Outcomes - Trade Policy Arrangements

- FTAHub(i) trade policy arrangement:
  - Country i applies zero tariffs
  - Country j (k analogous) faces the following problem:
    $$\max_{(t_{ji}, t_{jk})} W_j \text{ with } \{(t_{ji}, t_{jk}) \in [0, t_i^{MFN}]^2 \mid t_{ji} = 0\}$$

- MTA(i,j) trade policy Arrangement
  $$\max_{t_{ij}, t_{ik}, t_{ji}, t_{jk}} W_i + W_j \text{ with}$$
  $$\{(t_{ij}, t_{ik}) \in [0, t_i^{MFN}]^2 \mid t_{ij} = t_{ik}\} \text{ and}$$
  $$\{(t_{ji}, t_{jk}) \in [0, t_j^{MFN}]^2 \mid t_{ji} = t_{jk}\}$$

- Under GFT Optimal tariffs are zero for all countries

Effectiveness Relations under WTO - a One-Player Coalition
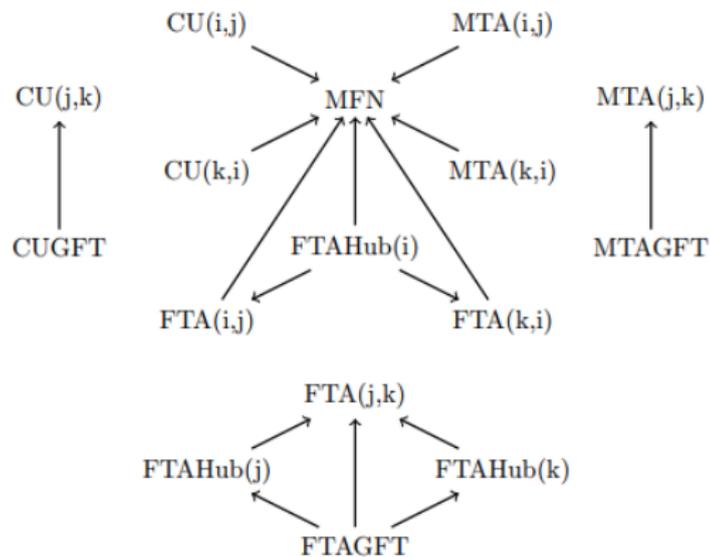
FIGURE 1. The transition graph for coalition $\{i\}$, $i \in N$.

Effectiveness Relations under WTO - a Two-Player Coalition

FIGURE 2. The transition graph for coalition $\{i, j\}$, $i, j \in N$, $i \neq j$.

Farsightedness

▶ The farsightedness of the policy-makers are captured by the notion of the indirect dominance.

▶ **Indirect Dominance:** x_1 is indirectly dominated by x_2, write $x_1 \ll x_2$, if there exist sequences $y_0, y_1, \ldots, y_m \in X$ (with $y_0 = x_1$ and $y_m = x_2$) and $S_0, S_1, \ldots, S_{m-1} \subseteq N$, such that $S_i \neq \emptyset$, $y_i \rightarrow_{S_i} y_{i+1}$, and $y_i \prec_{S_i} y_m$ for $i = 0, 1, \ldots, m-1$.

  ▶ The coalitions can form freely, and all actions are public
  ▶ The agreements are not binding
  ▶ A given player can be a member of several coalitions
  ▶ Decision-maker cares about the final outcome and not how we get there

Farsightedness

Definition - Consistent Set: A set $Y \subseteq X$ is consistent if $y \in Y$ if and only if for all $x \in X$ and all $S \subseteq N$, $S \neq \emptyset$, with $y \rightarrow_S x$ there exists $z \in Y$ where $x = z$ or $x \ll z$ such that $y \not\prec_S z$.

▶ A coalition deviates from the outcome only if its deviation leads to alternatives that benefit its members.

Proposition - Largest Consistent Set (LCS): There uniquely exists a $Y \subseteq X$ such that Y is consistent and $Y' \subseteq X$ consistent implies $Y' \subseteq Y$. The set Y is called the largest consistent set or simply LCS.

▶ Under the irreflexive preferences and a finite outcome space the LCS is non-empty and satisfies the external stability condition (for all $x \in X \setminus Y$ there exsists $y \in Y$ such that $x \ll y$).

Underlying Trade Model

- A 3-country, 3-good competing exporters GE trade model.
- $N = \{a, b, c\}$ - the set of countries.
- $G = \{A, B, C\}$ - three non-numéraire goods.
- Country $i \in N$ is endowed with zero units of good I and e_i units of the other goods.
- Each country i can impose tariff t_{ij} on the import from country j.
- Consumer preferences are represented by additively separable and quadratic utility function in each non-numeraire good.
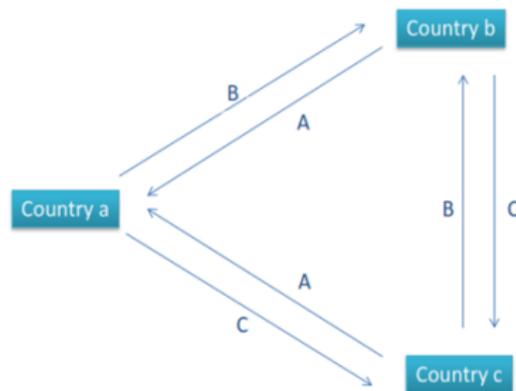
Underlying Trade Model - Equilibrium

▶ No-arbitrage condition:

$$p_i^I = p_j^I + t_{ij} = p_k^I + t_{ik} \tag{1}$$

▶ Market clearing condition:

$$m_i^I = x_j^I + x_k^I \tag{2}$$

▶ The equlibrium prices:

$$p_i^I = \frac{1}{3}\left(3\alpha - \sum_{j\neq i} e_j + \sum_{j\neq i} t_{ij}\right) \tag{3}$$

▶ The welfare function of country i:

$$W_i = \sum_{L\in G} CS_i^L + \sum_{L\in G\setminus\{I\}} PS_i^L + TR_i \tag{4}$$

Functioning of the Full Model

- Conditional on trade policy arrangement, countries determine the optimal choice of their tariffs and evaluate the welfare levels.

- Based on the welfare levels, countries construct their strict preference rankings of trade policy arrangements.

- The strict preference rankings and the "effectiveness relations" determine the indirect dominance relations over all possible trade policy arrangements.

- The strict preference rankings with indirect dominance relations then determines the stability of the trade policy arrangements.

The Parameter Space for Endowments

▶ We normalize the endowment of one country to one and focus on one of six representative triangles
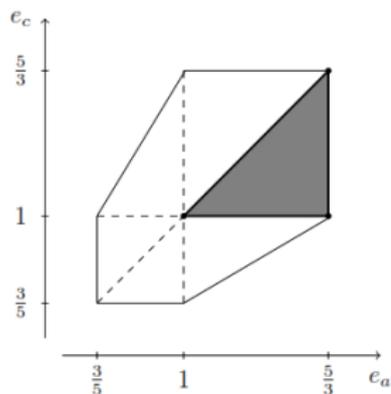
▶ We examine different scenarios: with and without PTAs, i.e. current vs. modified WTO rules, and one type of PTA only.

Analysis - Symmetric Case

▶ Under the current WTO rules, the ranking of preferences from the perspective of country a for fixed $i, j \in N \setminus \{a\}$ with $i \neq j$ is:

$$CU(i,j) \prec_a MFN \prec_a MTA(a,i) \prec_a FTAHub(i) \prec_a FTA(i,j) \prec_a$$
$$FTA(a,i) \prec_a CU(a,i) \prec_a MTA(i,j) \prec_a GFT \prec_a FTAHub(a)$$

▶ Under Modified WTO rule, the representative preference ranking of country a is:

$$MFN \prec_a MTA(a,i) \prec_a MTA(i,j) \prec_a MTAGFT$$

Proposition: Under symmetry, the global free trade is the unique stable outcome in both, current and modified WTO rules.

▶ Details

Analysis - One small, one large, and one varying country

- $e_b = e_{min}$, $e_a = e_{max}$, and $e_c \in (e_{min}, e_{max})$
- The scenario with current WTO rule
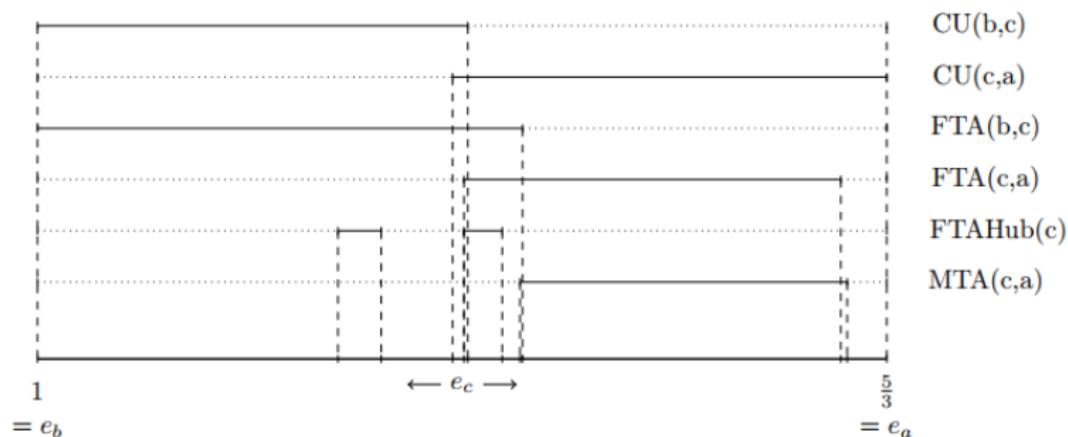
Characterization of the case of small, varying, and large country

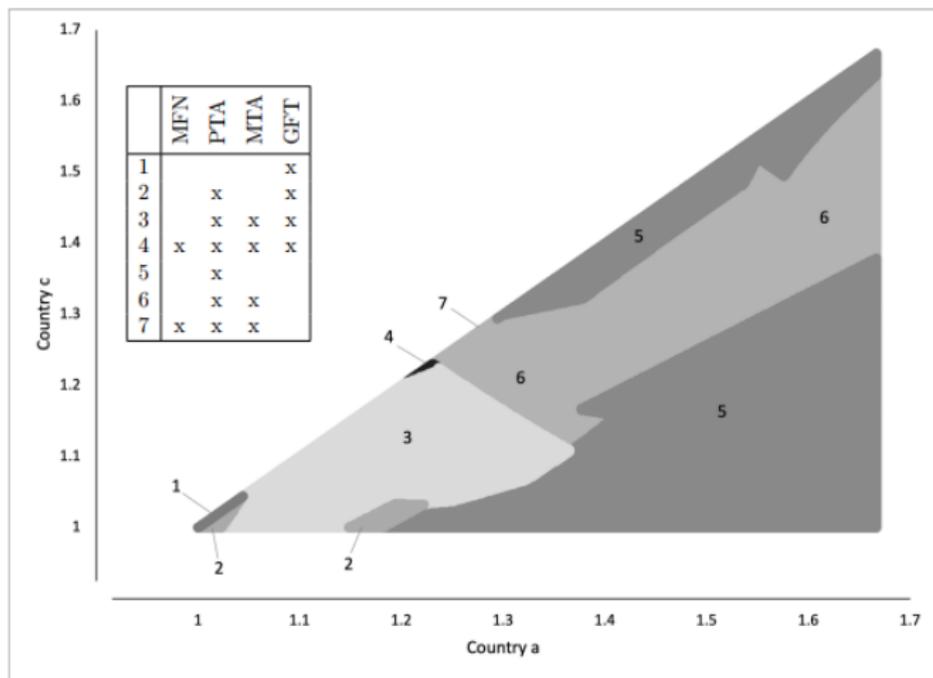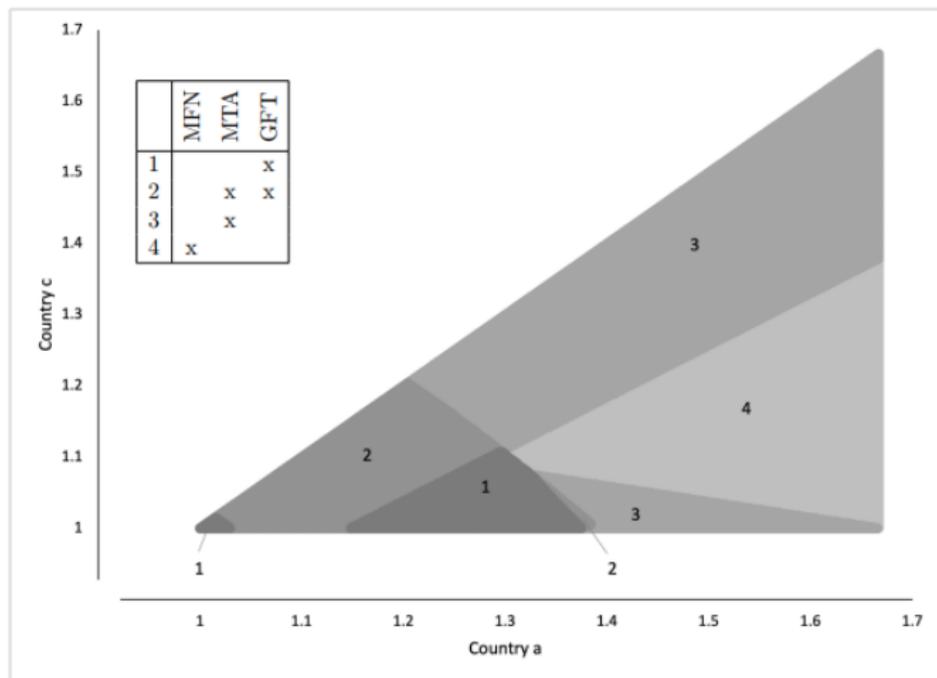# Analysis - One small, one large, and one varying country

▶ $e_b = e_{min}$, $e_a = e_{max}$, and $e_c \in (e_{min}, e_{max})$

▶ The scenario with hypothetical WTO rule
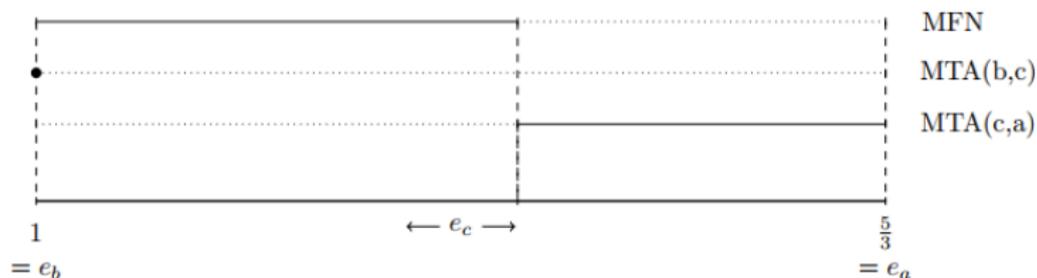
Characterization of the case of small, varying, and large country

Analysis - Interior of the Triangle

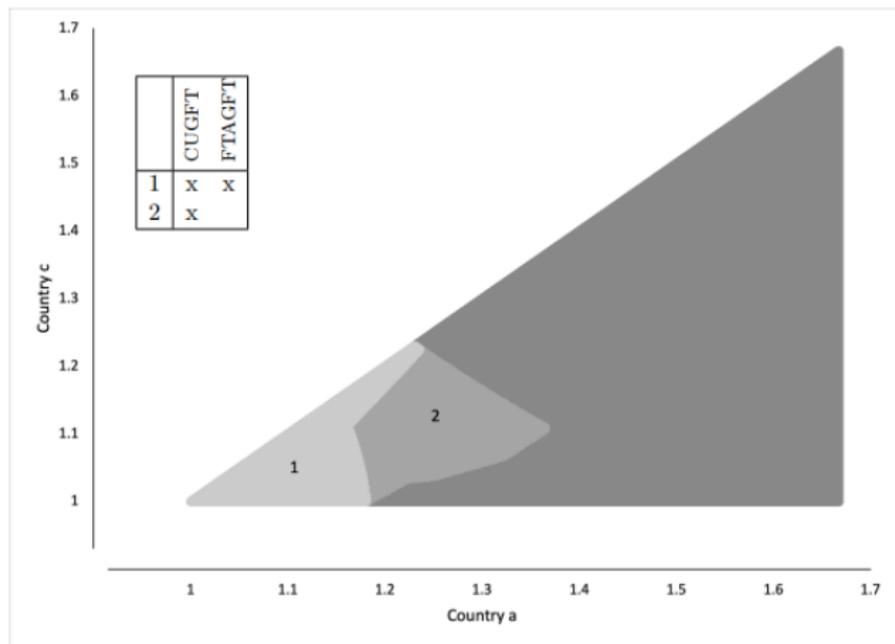Simplified Overall Stability with PTAs

Analysis - Interior of the Triangle

Simplified Overall Stability without PTAs

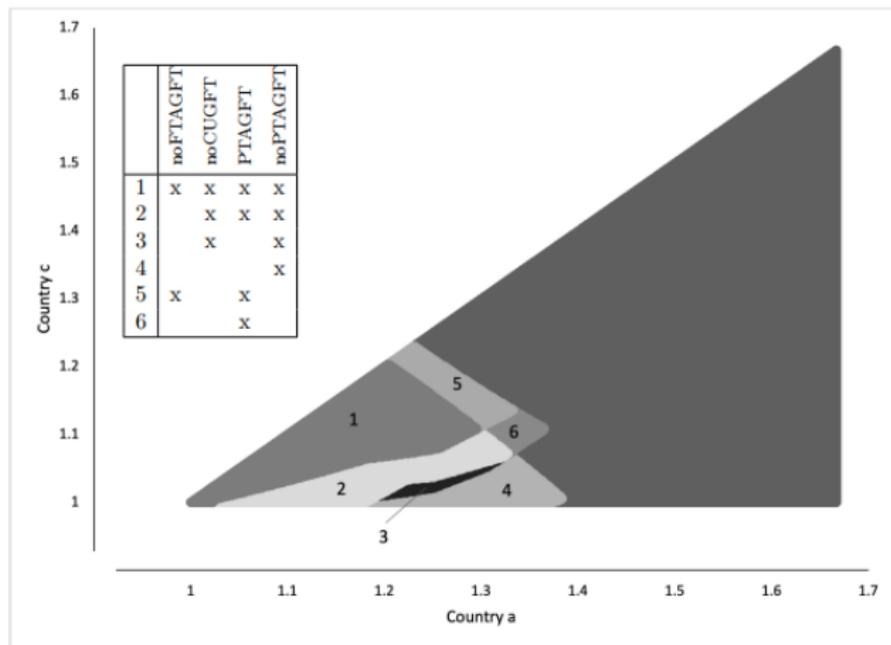# Analysis - 'building blocks' or 'stumbling blocks' ?!
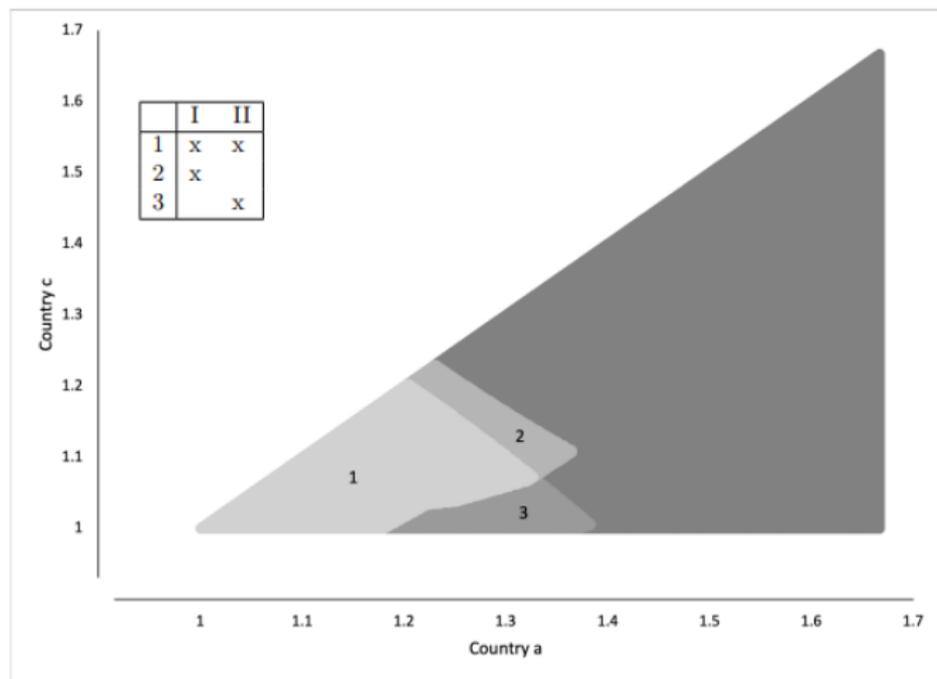
Stability of the GFT regime in the scenario with (I) and without (II) PTAs

Analysis - More on Preferential Liberalization

Stable area for GFT reached via CUs/FTAs

Analysis - More Scenarios and Stability of GFT

Different Scenarios and Stability of Global Free Trade Arrangements

Conclusion

- ▶ Under symmetry, GFT is the unique stable trade constellation in both regulatory scenarios.

- ▶ In case two countries are relatively smaller, prohibiting PTAs increases the area of stability of the GFT regime. In comparison, when two similar countries are relatively larger, PTAs are conducive to the stability of the GFT regime.

- ▶ Once the world is further away from symmetry, abolishing the exception for PTAs might result in the worst possible state from the perspective of overall world welfare, the non-cooperative MFN regime.

- ▶ It is perhaps important, as we advance, to move the debate of 'building blocks' vs. 'stumbling blocks' to a level of detail that goes beyond this binary choice.

Transitions between trade agreements, 1992–2012

Gnutzmann and Gnutzman-Mkrtchuan (2019)
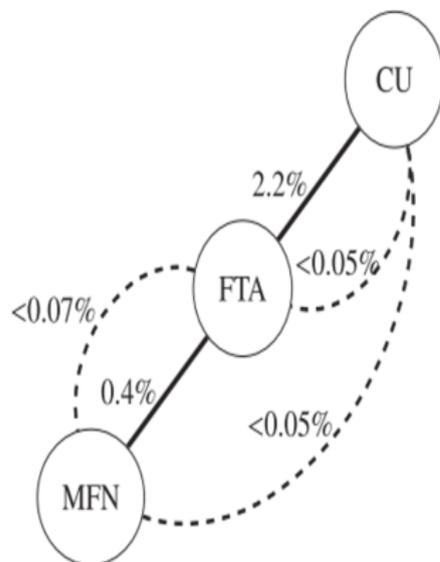
Details

- For example, $FTAHub(a)$ is indirectly dominated by $CUGFT$ as there exists a (finite) sequence of outcomes and coalitions such that all coalitions in the sequence prefer the final outcome over the current one:

$$FTAHub(a) \rightarrow_{\{b,c\}} FTA(b,c) \rightarrow_{\{a,b,c\}} FTAGFT$$

- As $FTAGFT$ itself is not indirectly dominated by any other outcomes, $FTAHub(a)$ cannot be a stable outcome.
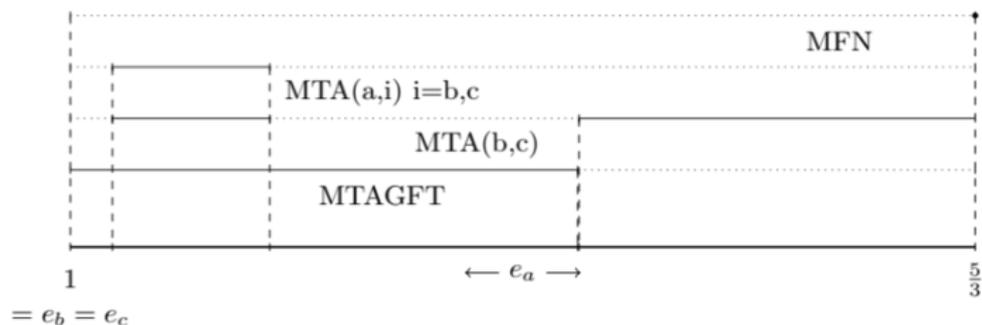
LCS vs. CPNE

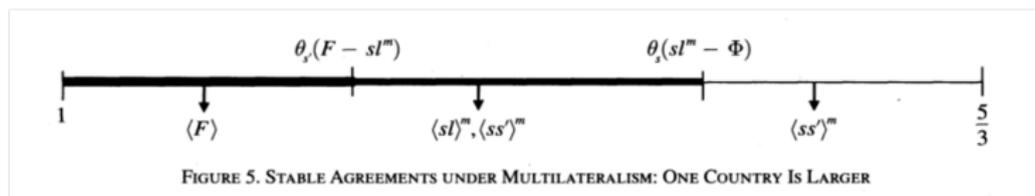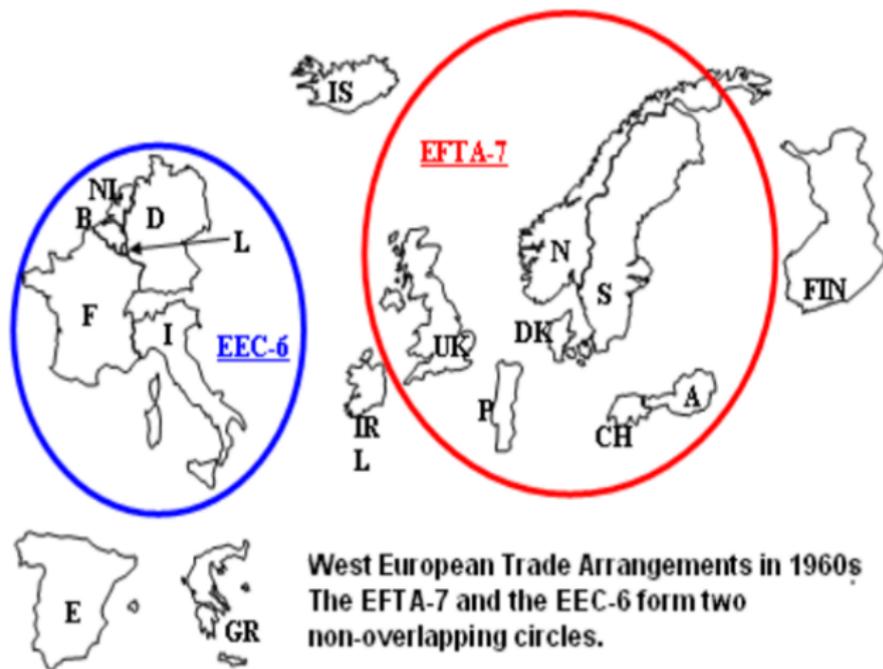FIGURE 8. Characterisation of the case of small, small, and varying country

FIGURE 5. STABLE AGREEMENTS UNDER MULTILATERALISM: ONE COUNTRY IS LARGER

LCS vs. CPNE

West European Trade Arrangements in 1960s
The EFTA-7 and the EEC-6 form two
non-overlapping circles.

Example: LCS vs. CPNE