Trade Agreements, Tariff Bargaining, Incomplete Contracts and Offshoring

A Mini Course: CCER Peking University

Robert W. Staiger

Dartmouth

June 2018

Introduction

- After a brief overview, five self-contained but related lectures

Lectures I-II

- Trade Agreements and Tariff Bargaining
  - Lessons from the Torquay Round Bargaining Records
  - Quantitative Trade Modeling of Tariff Bargining in the Uruguay Round
  - What the Rise of Offshoring means for the Design of Trade Agreements

Lectures III-IV

- Trade Agreements as Incomplete Contracts
  - Rules
  - Disputes
  - The Non-violation Clause
  - Investor-State Dispute Settlement

Lecture V

- New Issues
  - Designing a Services Trade Agreement
  - Trade Agreements and Climate Accords

Is Multilateralism Dead?

Trade in the era of Trump

Robert W. Staiger

Dartmouth College

March 9 2018

Introduction

- Individuals are the ultimate drivers of globalization, but governments set the rules of the game

Introduction

- Individuals are the ultimate drivers of globalization, but governments set the rules of the game
  - the rules can be very important to the outcome

Introduction

- Individuals are the ultimate drivers of globalization, but governments set the rules of the game
  - the rules can be very important to the outcome
- The WTO (and GATT before it) is a place where governments come to agree on the rules of globalization
  - the multilateral rules that apply to all 164 member countries *and* their preferential trade agreements (PTAs)

Introduction

- Individuals are the ultimate drivers of globalization, but governments set the rules of the game
  - the rules can be very important to the outcome
- The WTO (and GATT before it) is a place where governments come to agree on the rules of globalization
  - the multilateral rules that apply to all 164 member countries *and* their preferential trade agreements (PTAs)
- The rules solve problems that would arise under "law of the jungle"
  - these rules define the constitution of the Global Trade Order

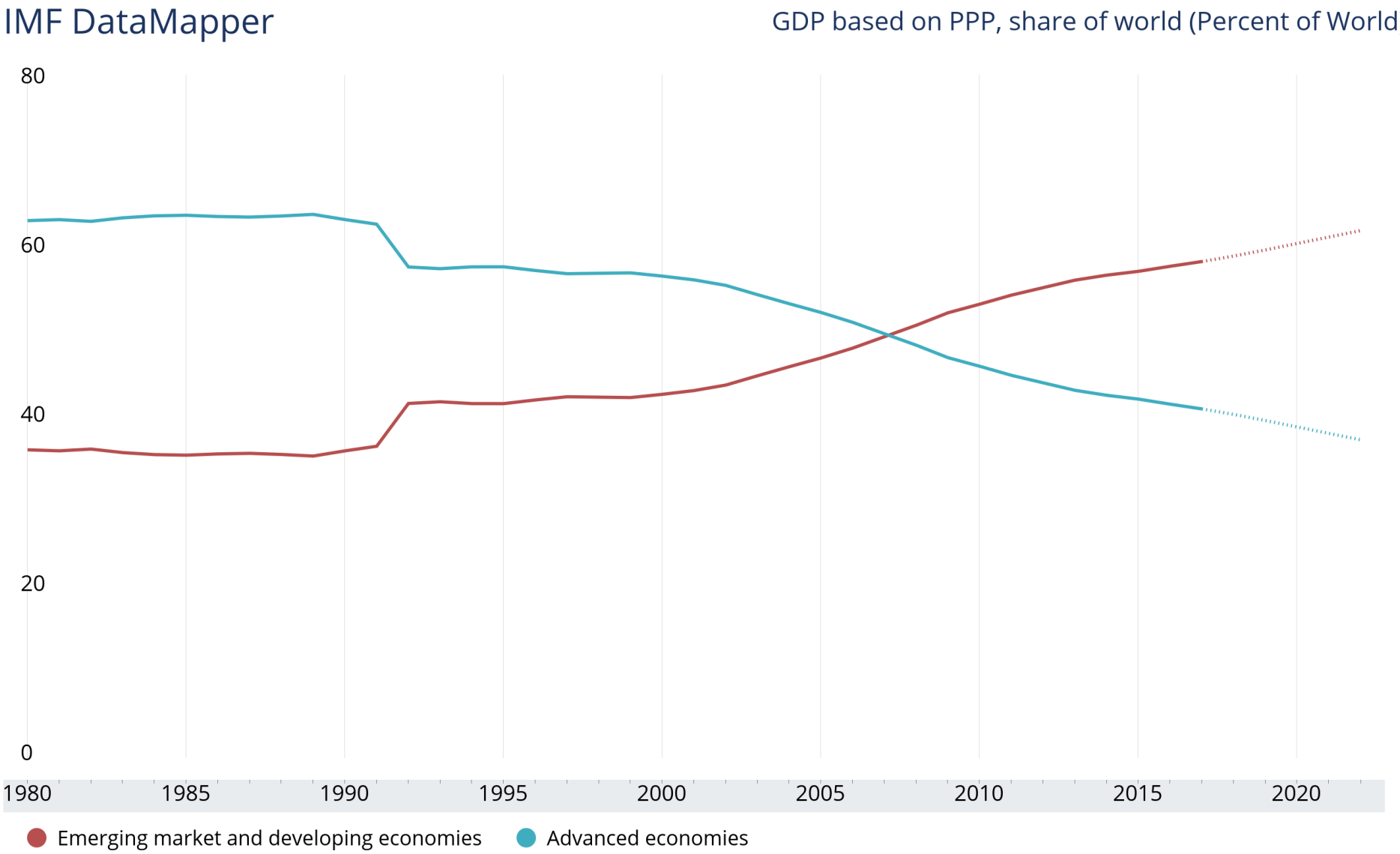
The GATT/WTO

- The GATT/WTO is "member-driven," and has traditionally been about "shallow integration"
  - seeking mutually advantageous trade liberalization as judged by the member governments
  - a focus on tariffs and other trade impediments imposed at the border

The ground is shifting

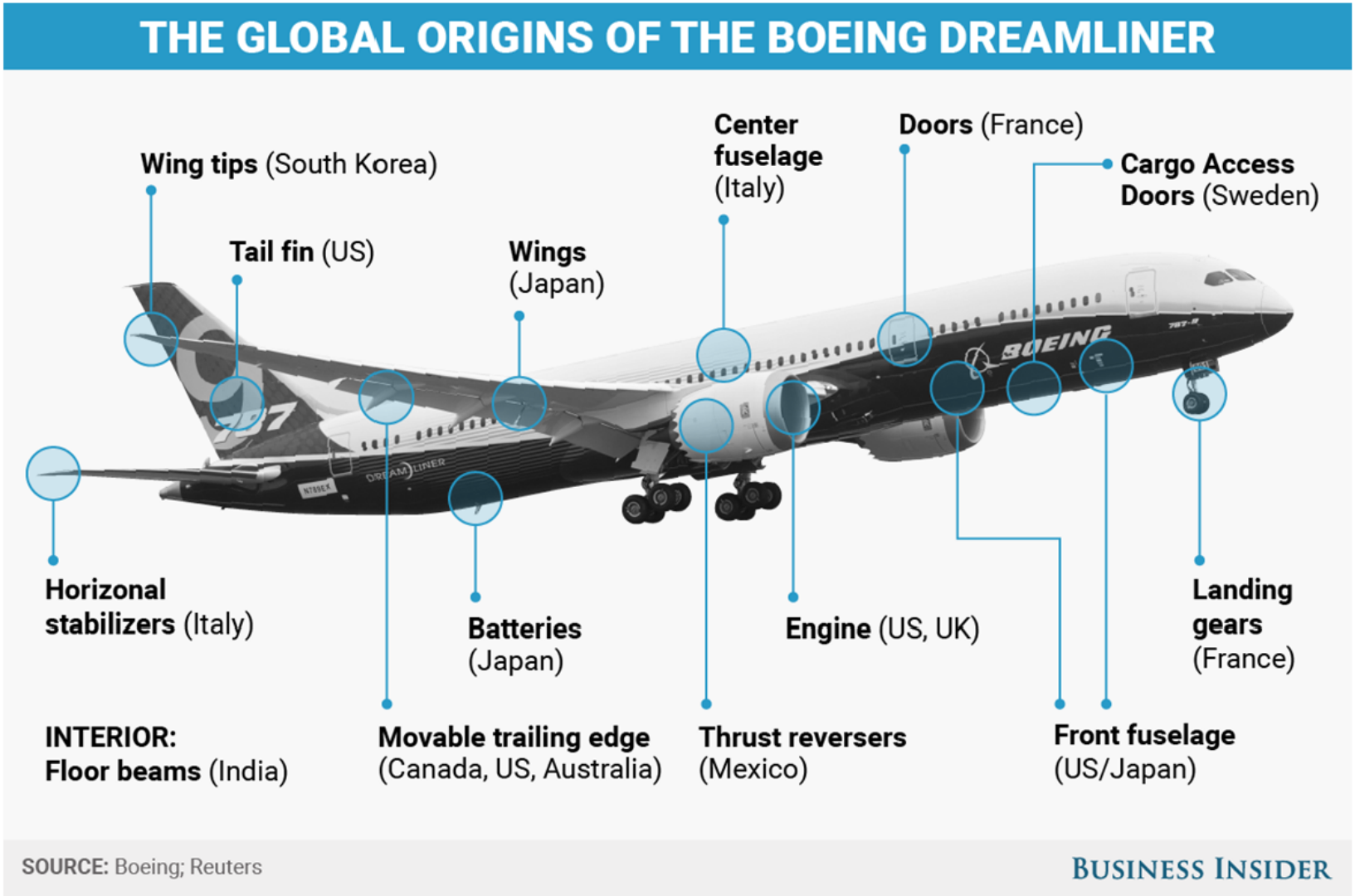
- But the WTO's Doha Round, begun in 2001, has disappointed
- Meanwhile, with the most recent wave of globalization...

- The rise of large emerging economies



©IMF, 2017, Source: World Economic Outlook (October 2017)

- The rise of offshoring and global supply chains



Multilateralism is stumbling

- ...the ground under the WTO is shifting, the WTO seems to be stumbling

Multilateralism is stumbling

- ...the ground under the WTO is shifting, the WTO seems to be stumbling

- ...we are witnessing a clear evolution from shallow to deep integration
  - The Transatlantic Trade and Investment Partnership (TTIP)
  - The Comprehensive Economic and Trade Agreement (CETA)
  - The Trans Pacific Partnership (TPP)
  - To some extent in the WTO

Multilateralism is stumbling

- ...the ground under the WTO is shifting, the WTO seems to be stumbling
- ...we are witnessing a clear evolution from shallow to deep integration
  - The Transatlantic Trade and Investment Partnership (TTIP)
  - The Comprehensive Economic and Trade Agreement (CETA)
  - The Trans Pacific Partnership (TPP)
  - To some extent in the WTO
- ...and a strong backlash against at least some dimensions of globalization
  - from those who have not shared in the gains
  - from those who feel sovereignty of their governments has been eroded

Trade in the Trump era

- What can we expect from trade in the Trump era?

Trump Trade Tweets

- This is about something much bigger than Trump

The prognosis for Multilateralism

- Is Multilateralism dead?
  - not dead, but may be entering a period of hibernation
- Do we need a new global trade order?
  - hard to say

We need a diagnosis

- Now more than ever, globalization's challenges demand a nuanced response based on a solid understanding of the problems
- Important to understand
  - why GATT worked
  - the economic environment it is best suited for
  - whether changes in the economic environment imply the need for changes in design of trade agreements

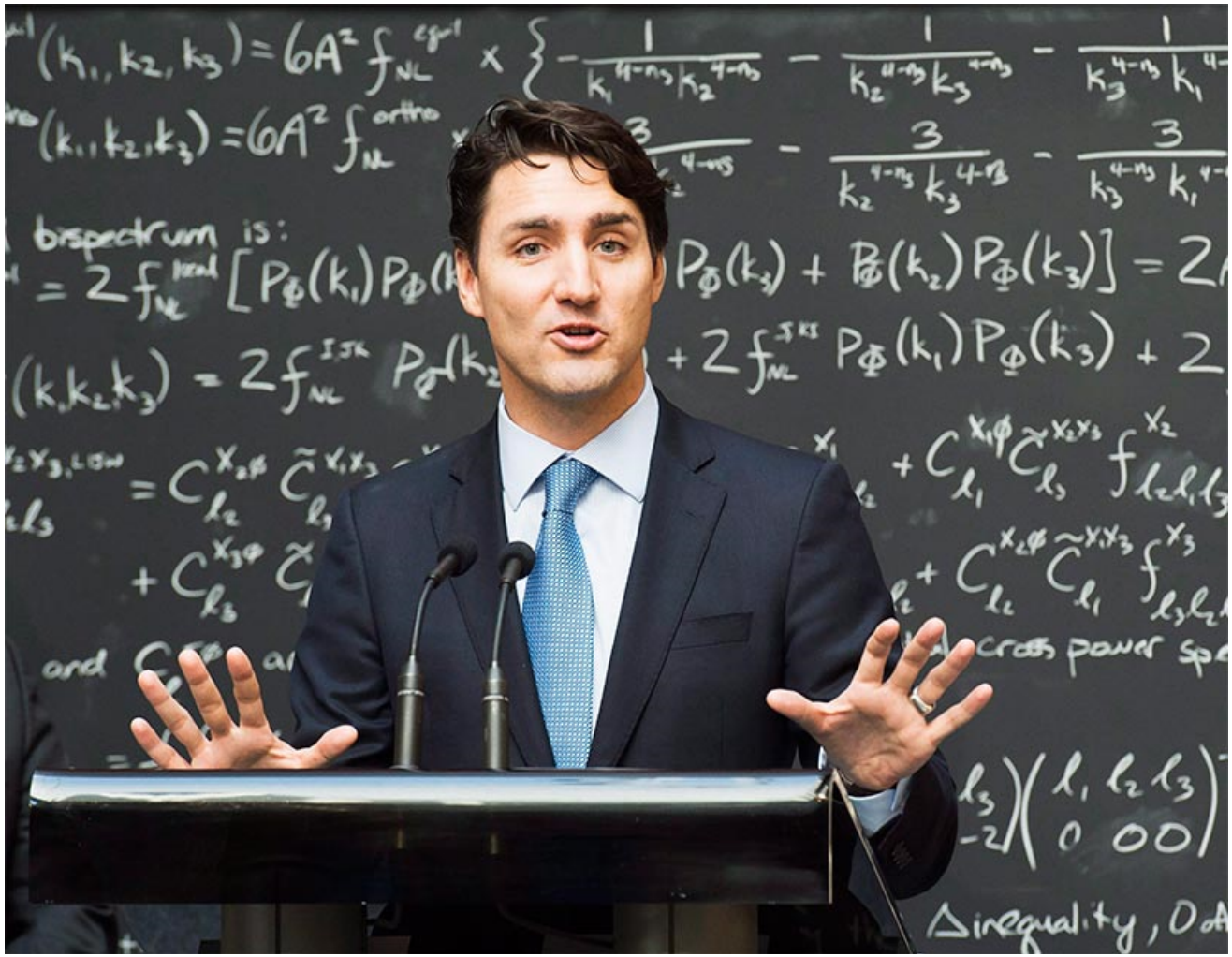
The stakes are high

- What's at stake?
  - the future path of globalization
  - which international institutions will set the rules of globalization
  - what trade-offs we will face in our globalized world

A key starting point

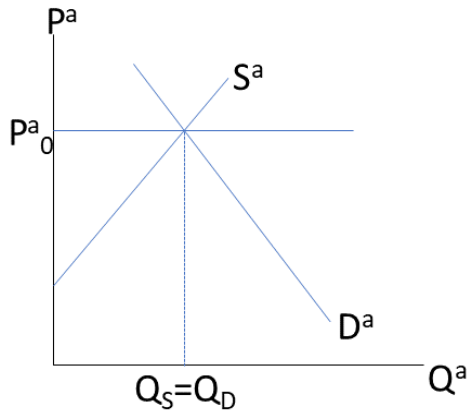
- The WTO's legitimacy is not built on the case for free trade
  - rather, it's built on the case for internalizing negative externalities

- Explaining this is going to be a little tedious...



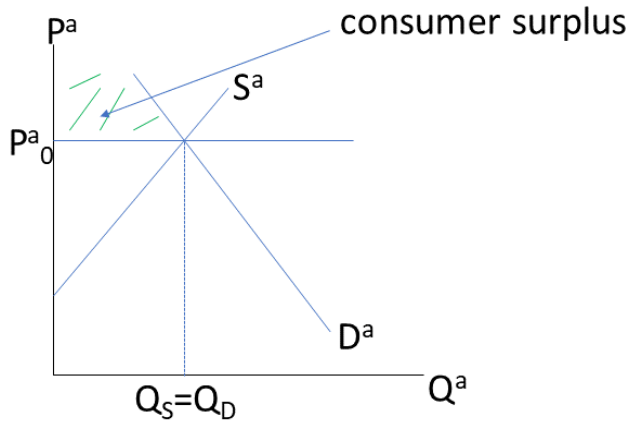
A closed economy

- A closed economy



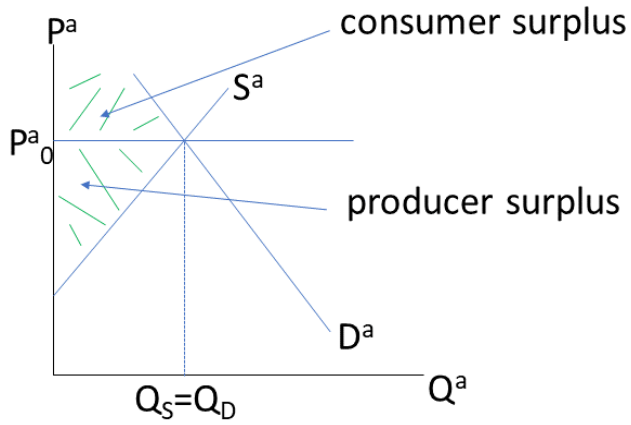
A closed economy

- A closed economy



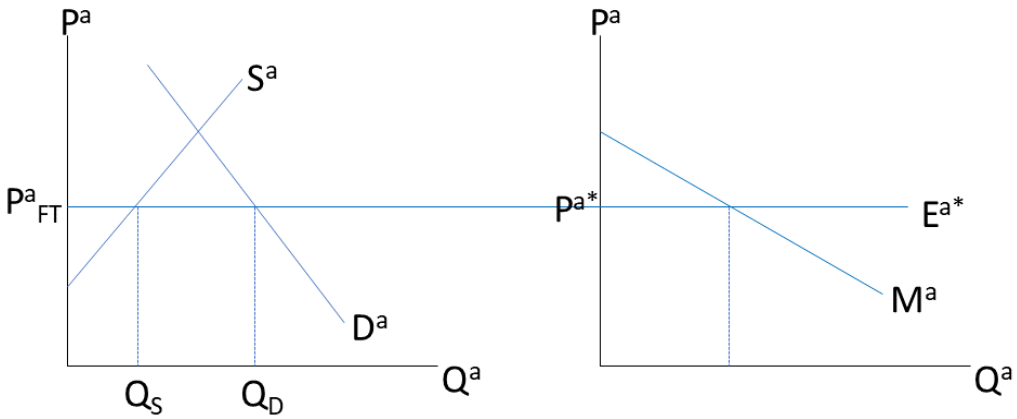
A closed economy

- A closed economy



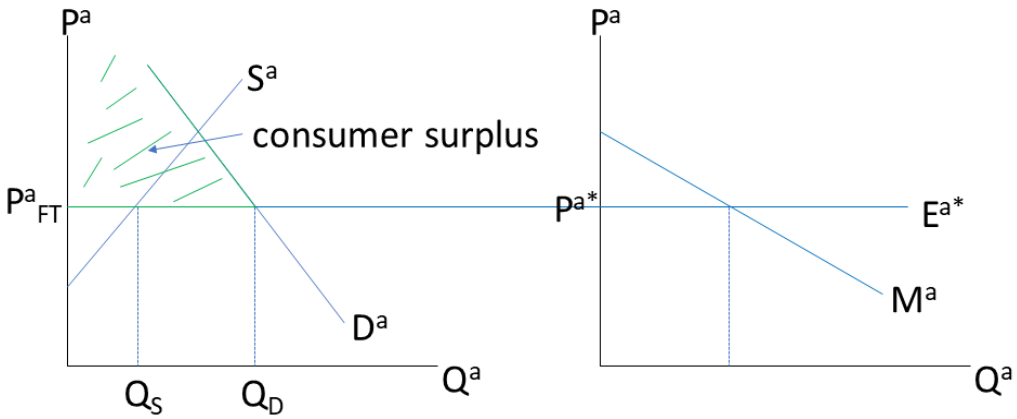
A small open economy

- A small open economy



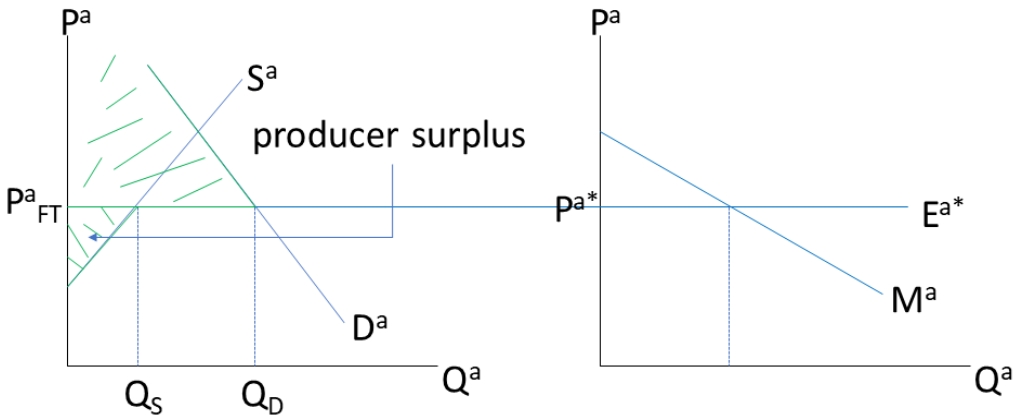
A small open economy

- A small open economy



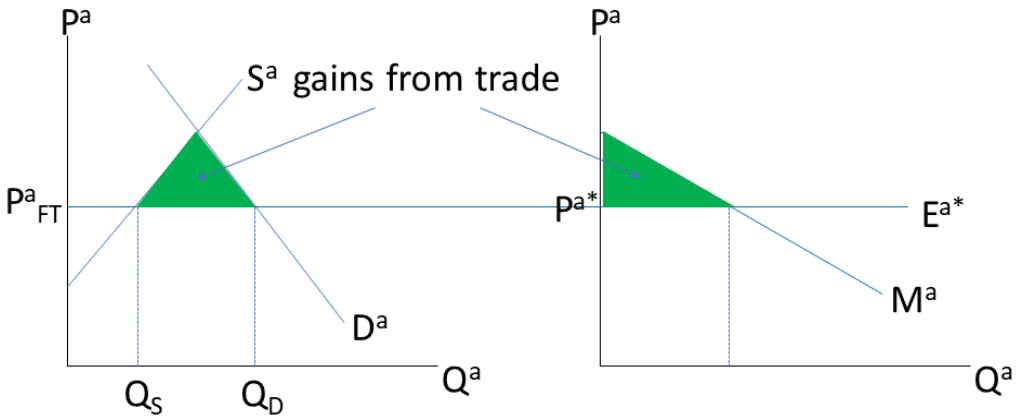
A small open economy

- A small open economy



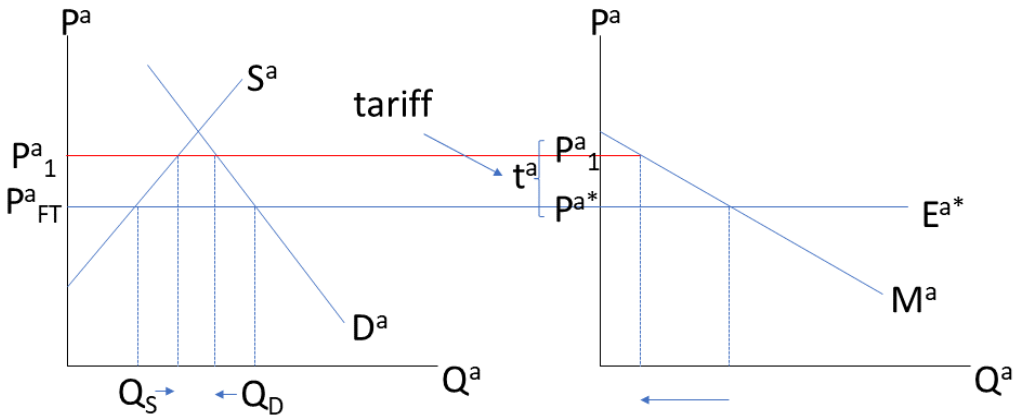
A small open economy

- A small open economy



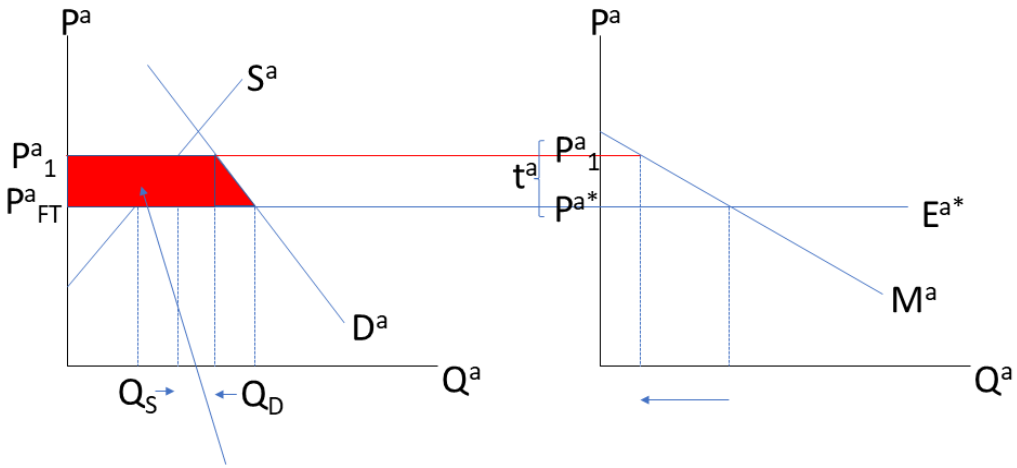
The purpose of Trade Agreements

- A *small country's* unilateral tariff choice



The purpose of Trade Agreements

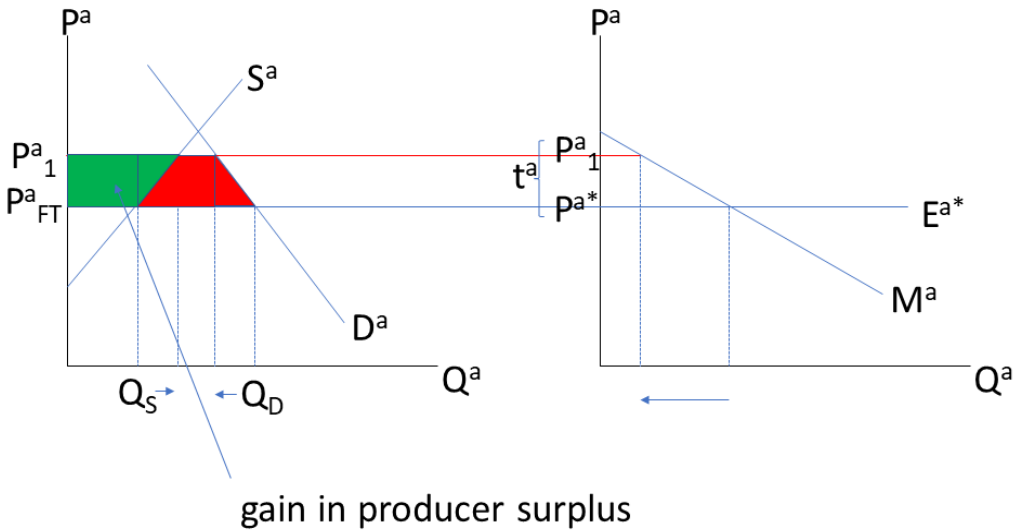
- A *small country's* unilateral tariff choice



Loss of consumer surplus

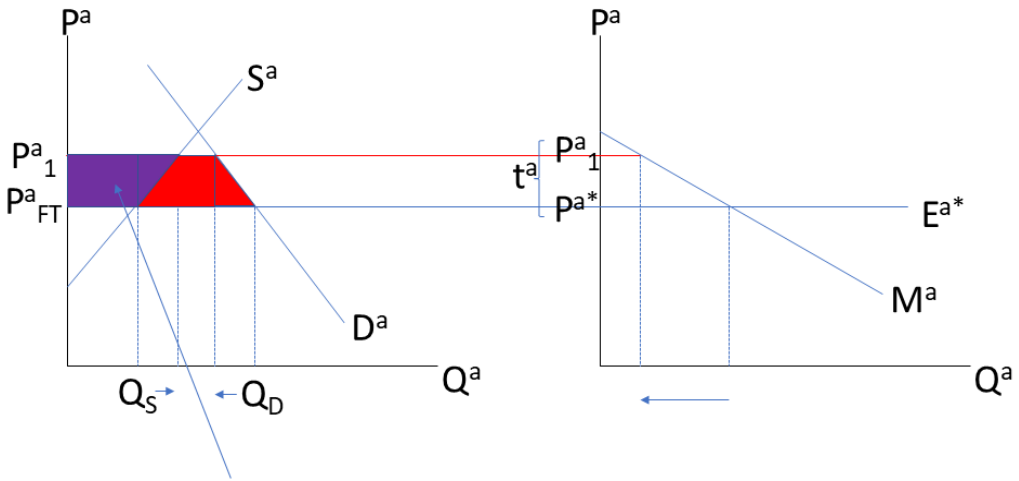
The purpose of Trade Agreements

- A *small country's* unilateral tariff choice



The purpose of Trade Agreements

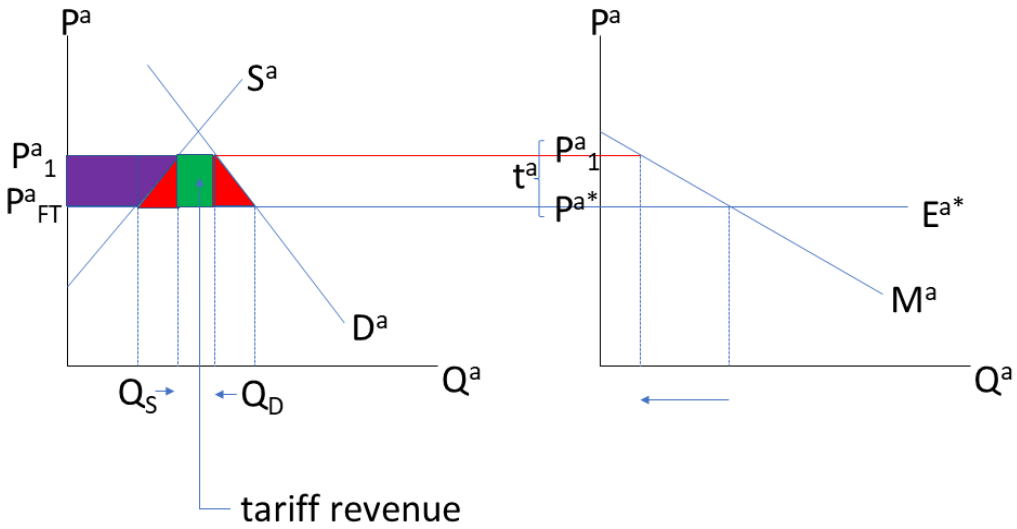
- A *small country's* unilateral tariff choice



gov's valuation of shifting surplus from consumers to producers

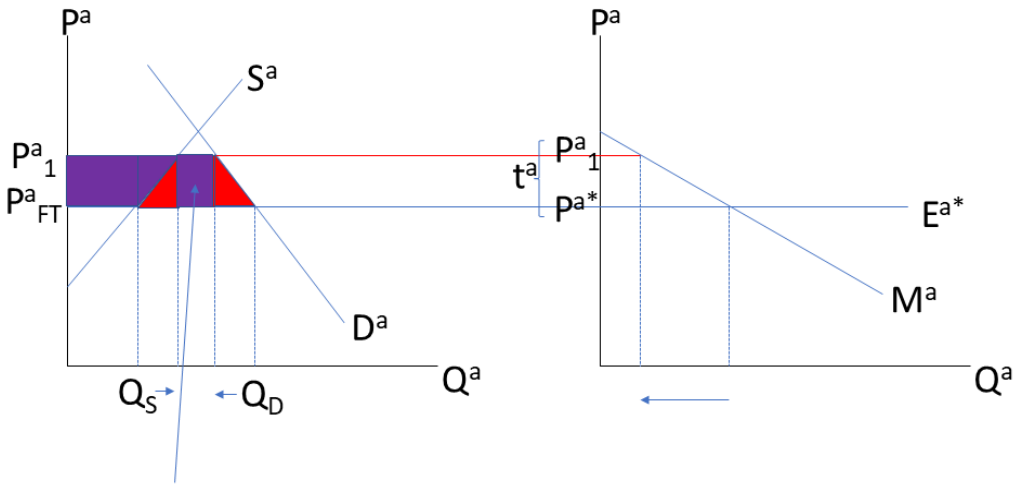
The purpose of Trade Agreements

- A *small country's* unilateral tariff choice



The purpose of Trade Agreements

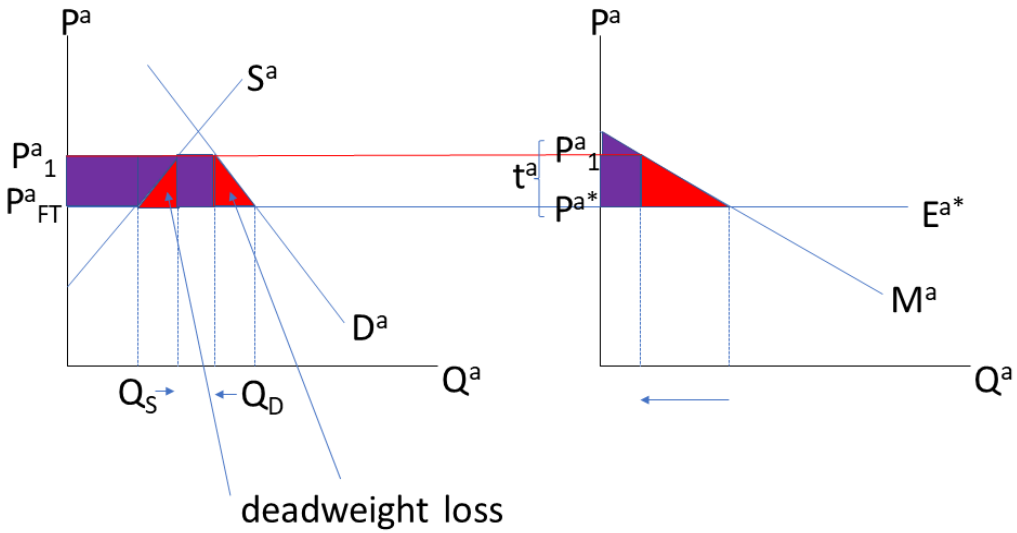
- A *small country's* unilateral tariff choice



gov's valuation of converting consumer surplus to tariff revenue

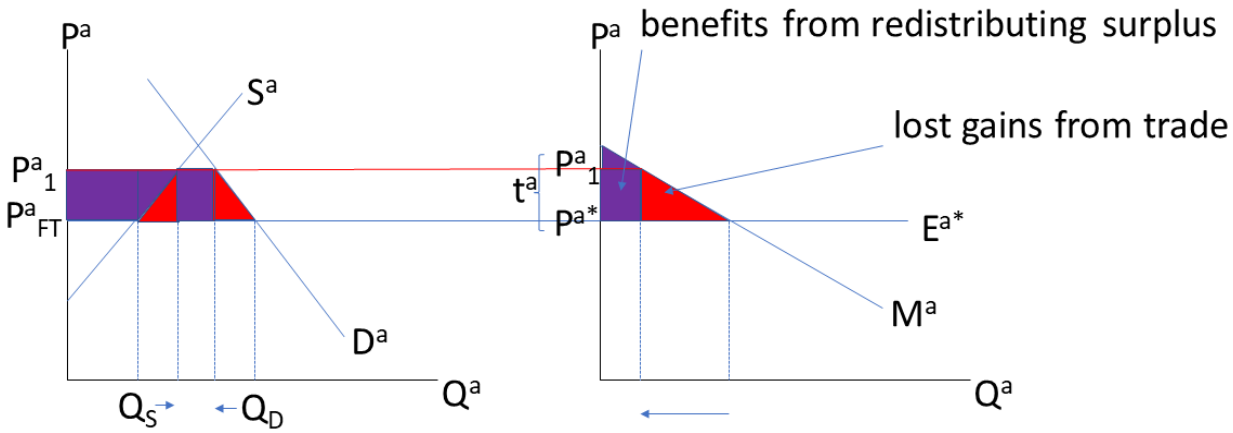
The purpose of Trade Agreements

- A *small country's* unilateral tariff choice



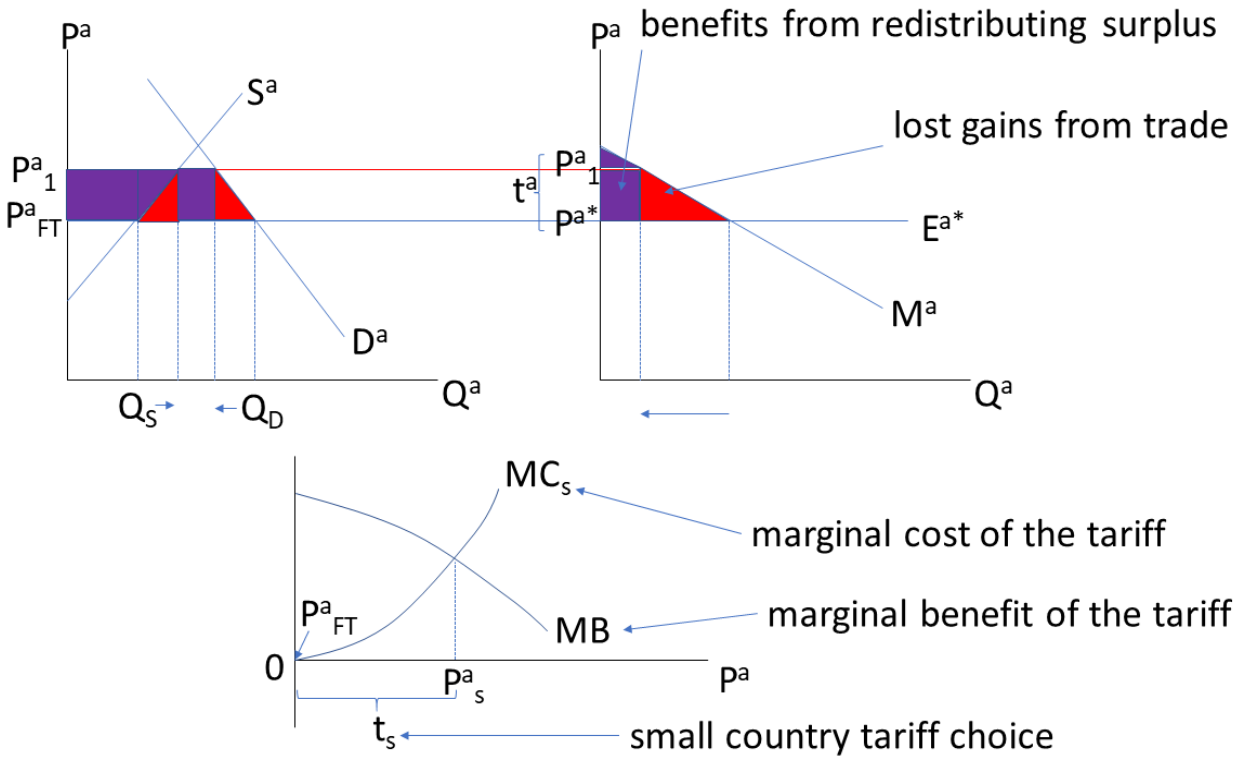
The purpose of Trade Agreements

- A *small country's* unilateral tariff choice



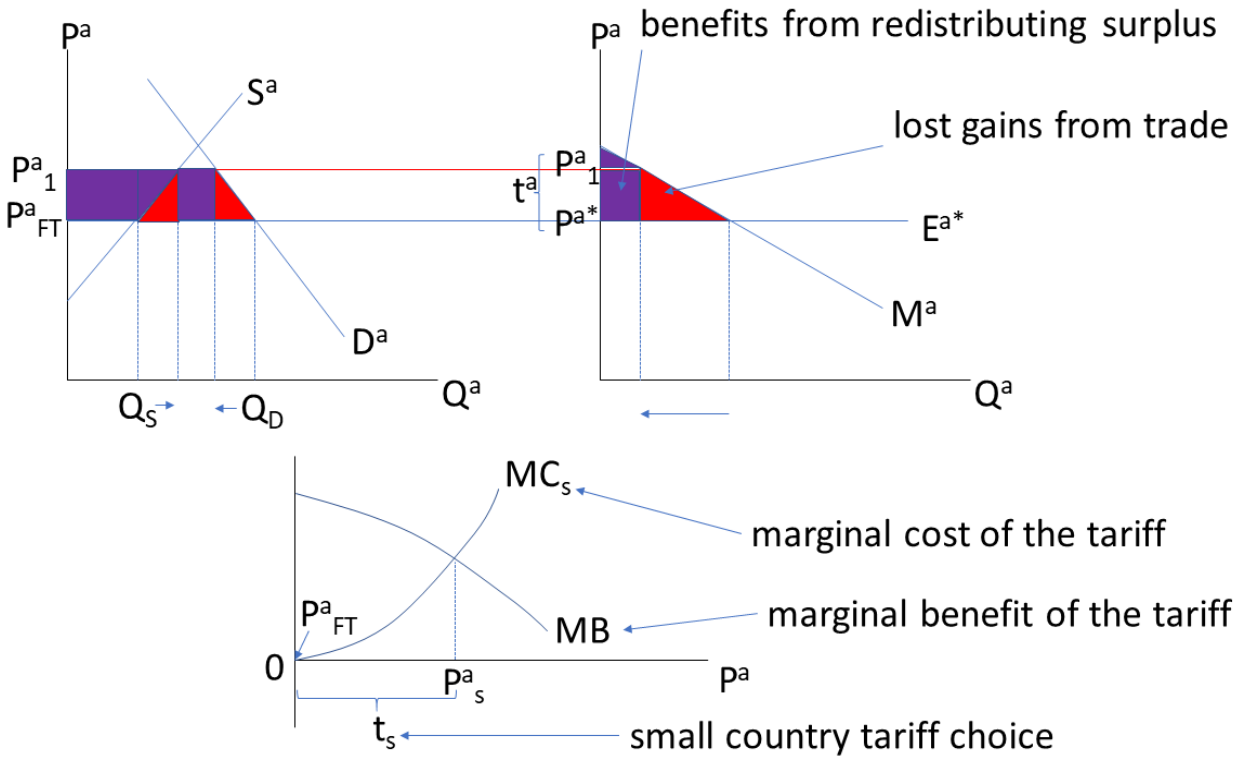
The purpose of Trade Agreements

- A *small country's* unilateral tariff choice



The purpose of Trade Agreements

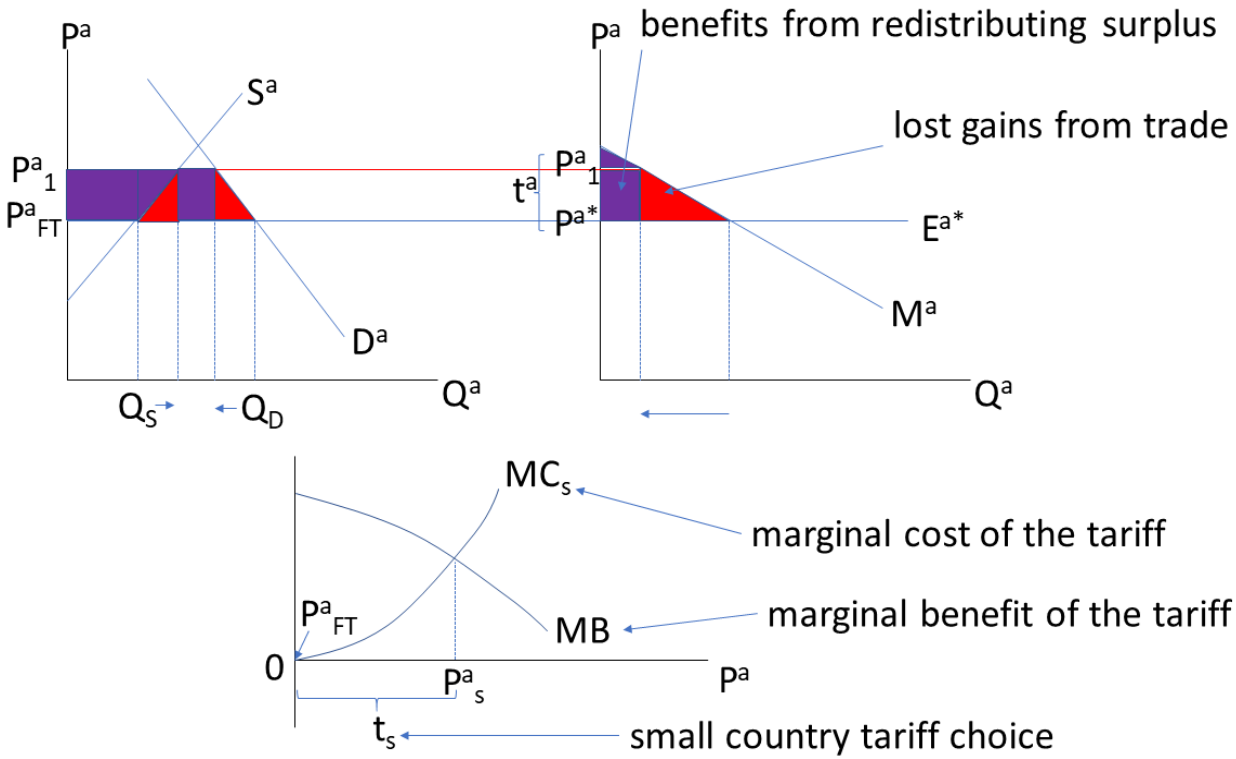
- A *small country's* unilateral tariff choice



- A *small* country's policy choices impose no externalities on the world

The purpose of Trade Agreements

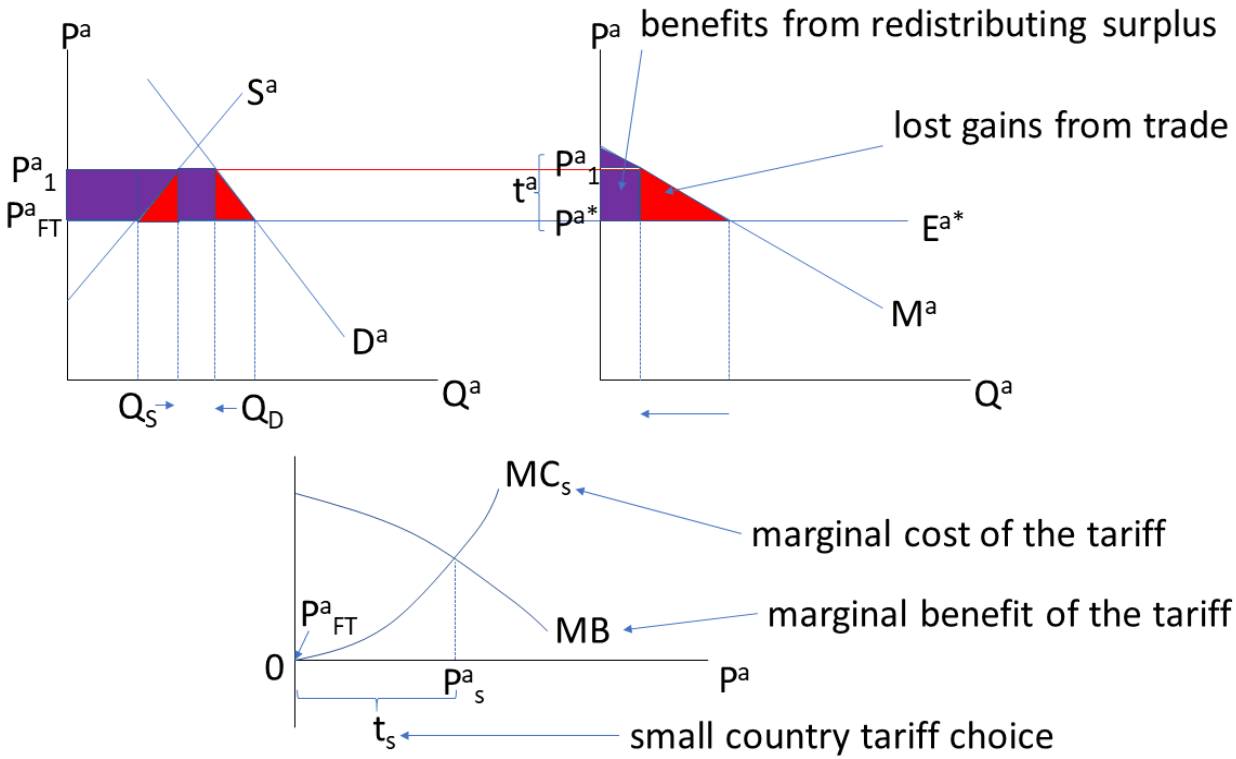
- A *small country's* unilateral tariff choice



- A *small* country's policy choices impose no externalities on the world
- $\Rightarrow$ Policy choices are *internationally efficient* in a world of small countries, given national government objectives

The purpose of Trade Agreements

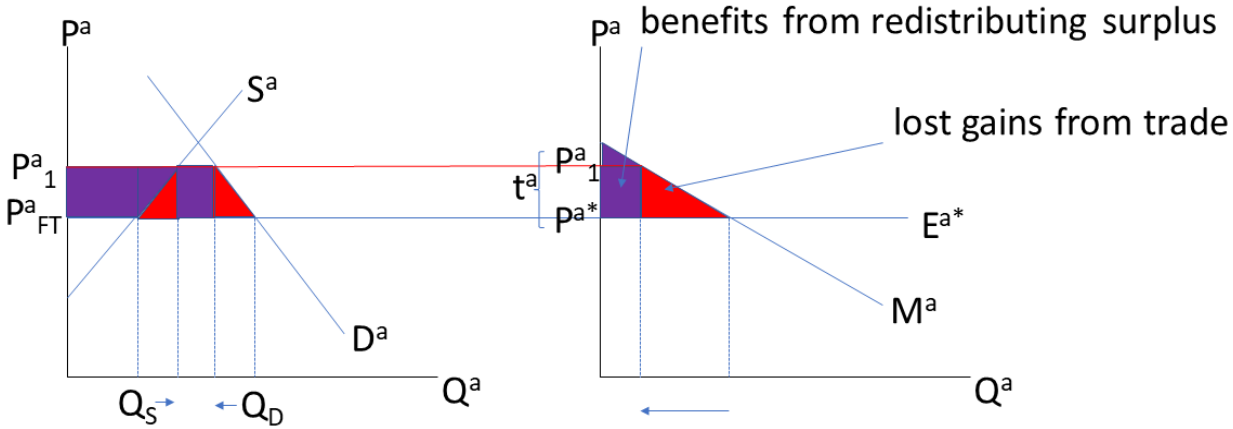
- A *small country's* unilateral tariff choice



- A *small* country's policy choices impose no externalities on the world
- $\Rightarrow$ Policy choices are *internationally efficient* in a world of small countries, given national government objectives
- No international inefficiency, nothing for a trade agreement to do!

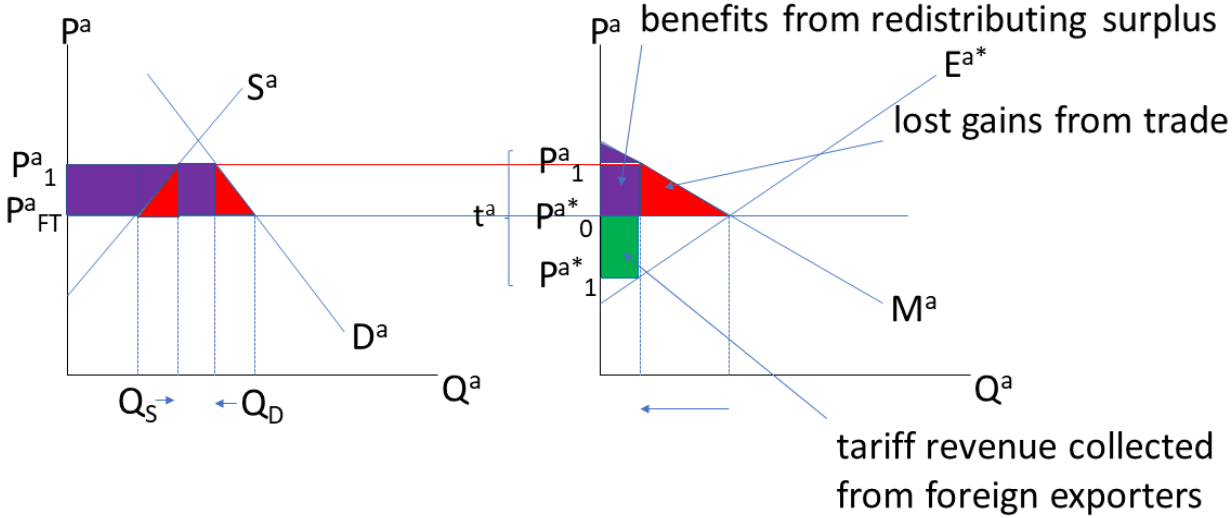
The purpose of Trade Agreements

- A *large country's* unilateral tariff choice (recall small country)



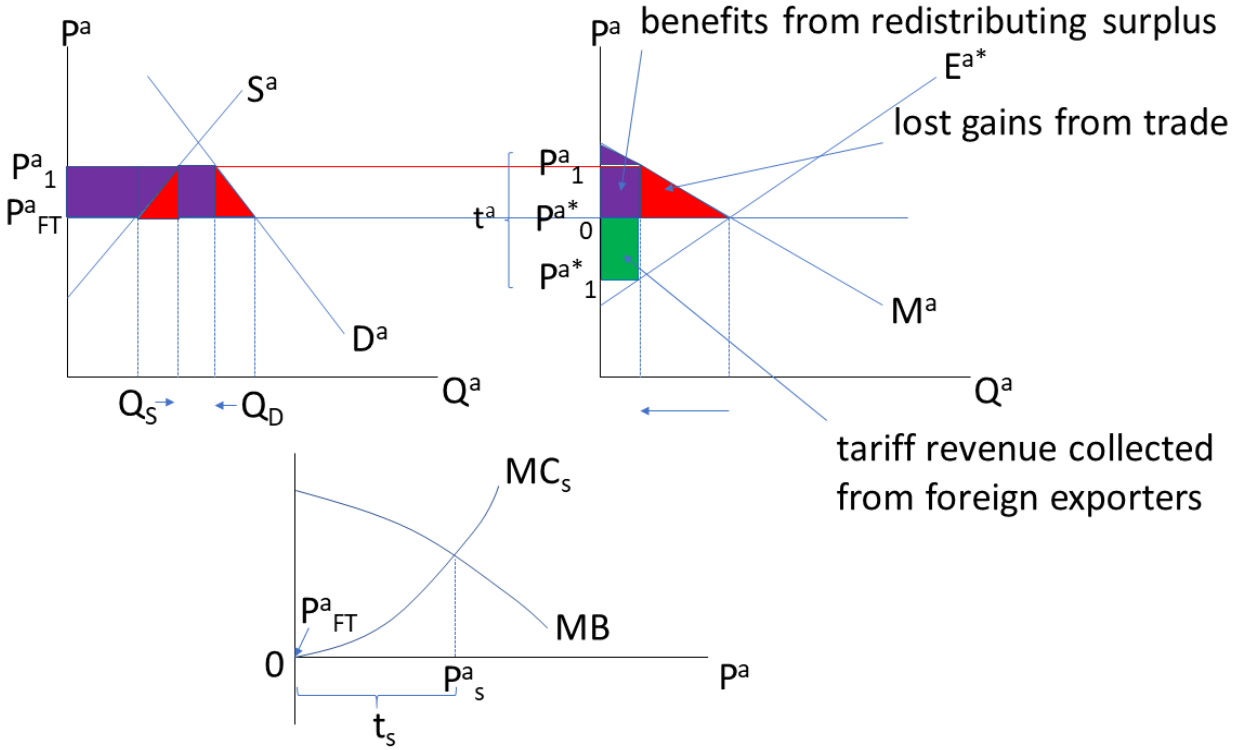
The purpose of Trade Agreements

- A *large country's* unilateral tariff choice



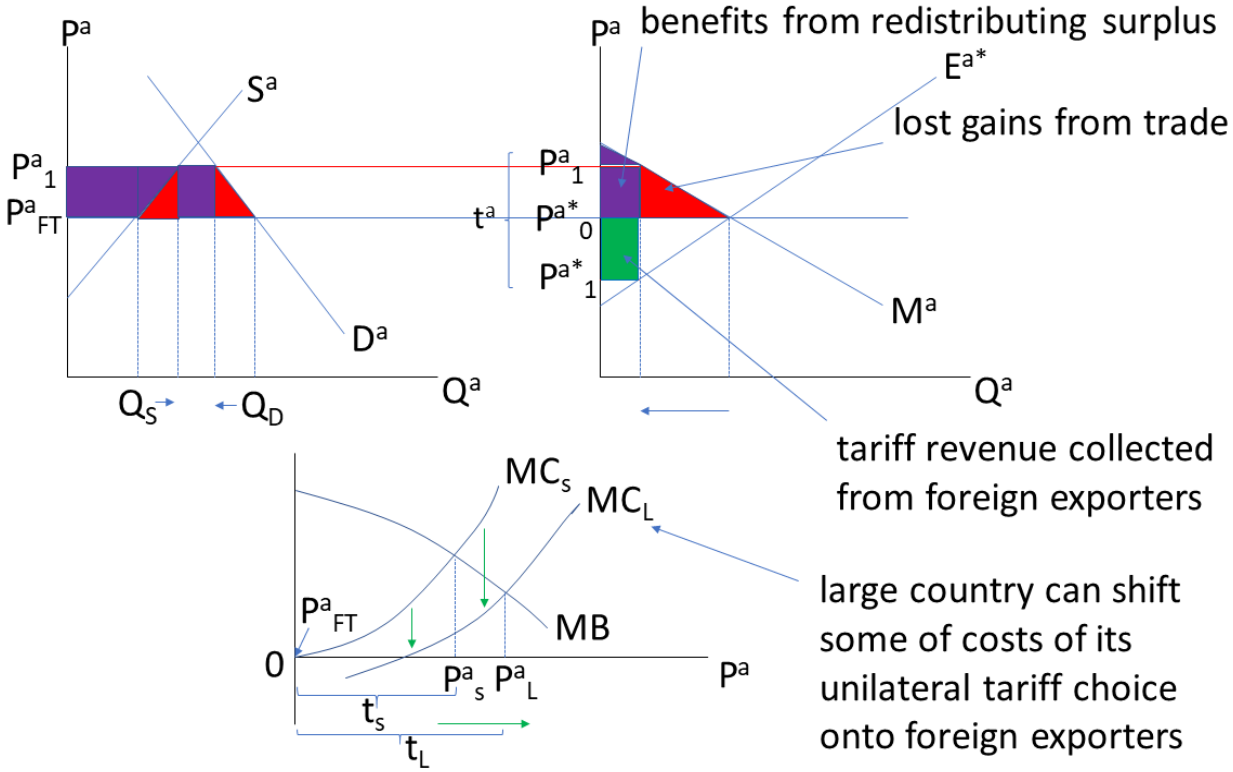
The purpose of Trade Agreements

- A *large country's* unilateral tariff choice



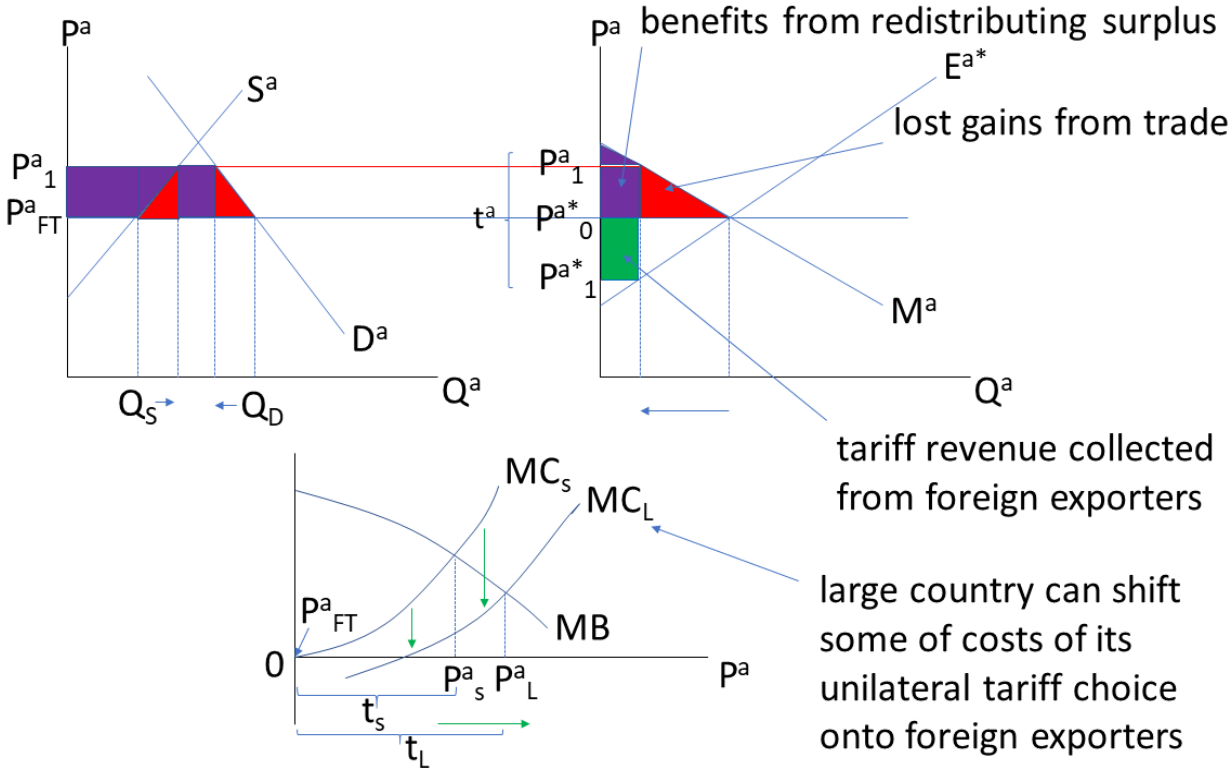
The purpose of Trade Agreements

- A *large country's* unilateral tariff choice



The purpose of Trade Agreements

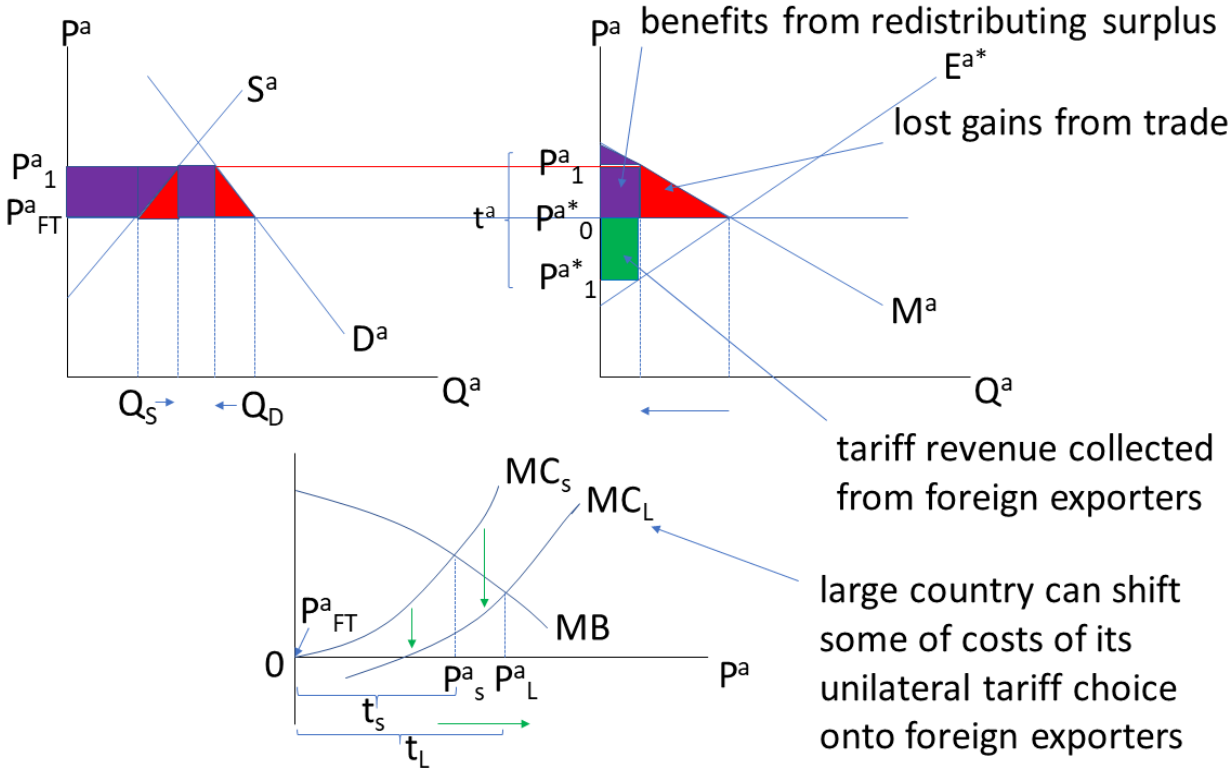
- A *large country's* unilateral tariff choice



- A large country's tariffs impose negative externalities on the world

The purpose of Trade Agreements

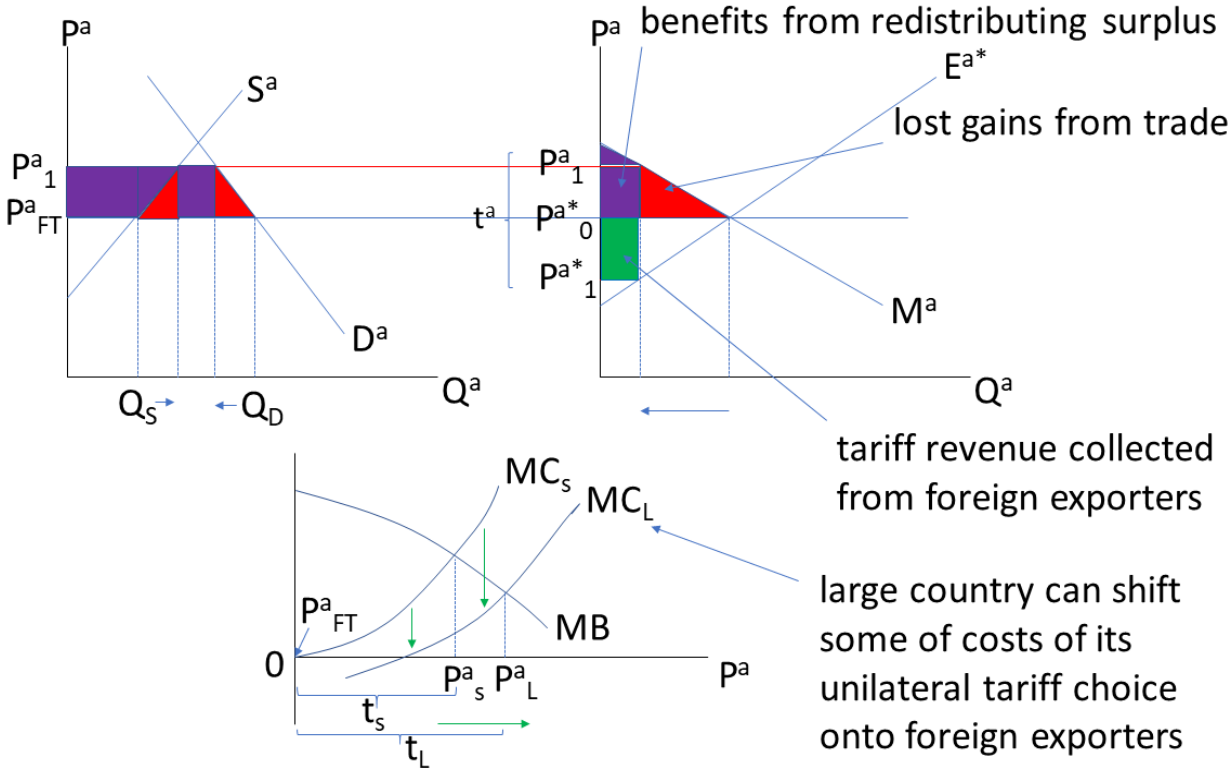
- A *large country's* unilateral tariff choice



- A large country's tariffs impose negative externalities on the world
- $\Rightarrow$ Tariff choices are *internationally inefficient* (too high) in a world with large countries, given national government objectives

The purpose of Trade Agreements

- A *large country's* unilateral tariff choice



- A large country's tariffs impose negative externalities on the world
- $\Rightarrow$ Tariff choices are *internationally inefficient* (too high) in a world with large countries, given national government objectives
- Address the inefficiency, and a mutually beneficial agreement possible!

Evidence

- If this is correct, the tariffs of non-WTO members should reflect their market power (monopsony power to depress foreign exporter prices)

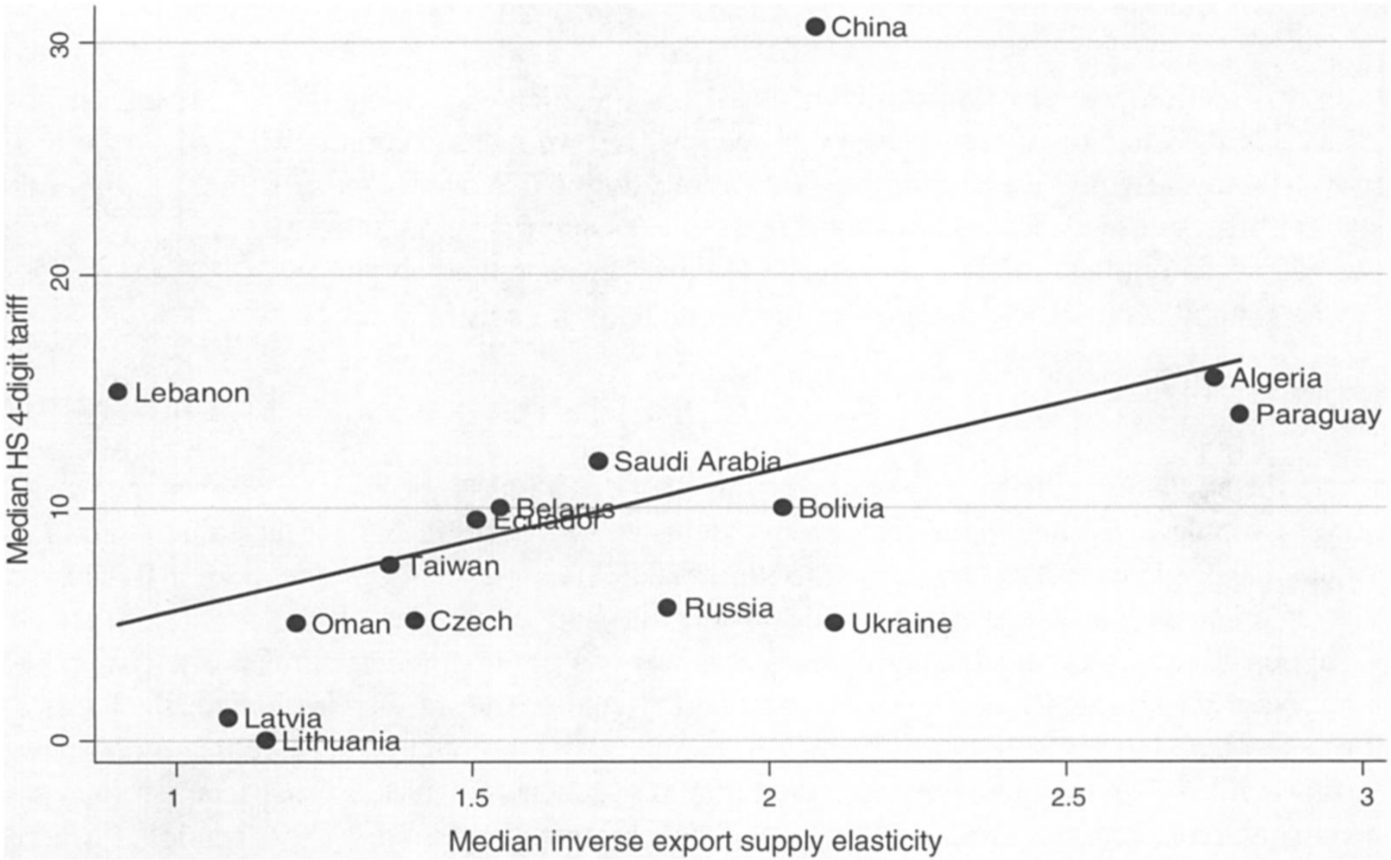


FIGURE 3. MEDIAN TARIFFS AND MARKET POWER ACROSS COUNTRIES

A key starting point

- The WTO's legitimacy is not built on the case for free trade
  - rather, it's built on the case for internalizing negative externalities

Is the WTO well-designed to serve this purpose?

- Generally, designing an effective institution to address an international externality is challenging (think climate change)
  - for a member-driven institution, what is important is not so much *what* policy is chosen as *how* it is chosen

Is the WTO well-designed to serve this purpose?

- Generally, designing an effective institution to address an international externality is challenging (think climate change)
  - for a member-driven institution, what is important is not so much *what* policy is chosen as *how* it is chosen

- Two pillars of the GATT/WTO architecture
  - Non-discrimination (MFN)
  - Reciprocity

Is the WTO well-designed to serve this purpose?

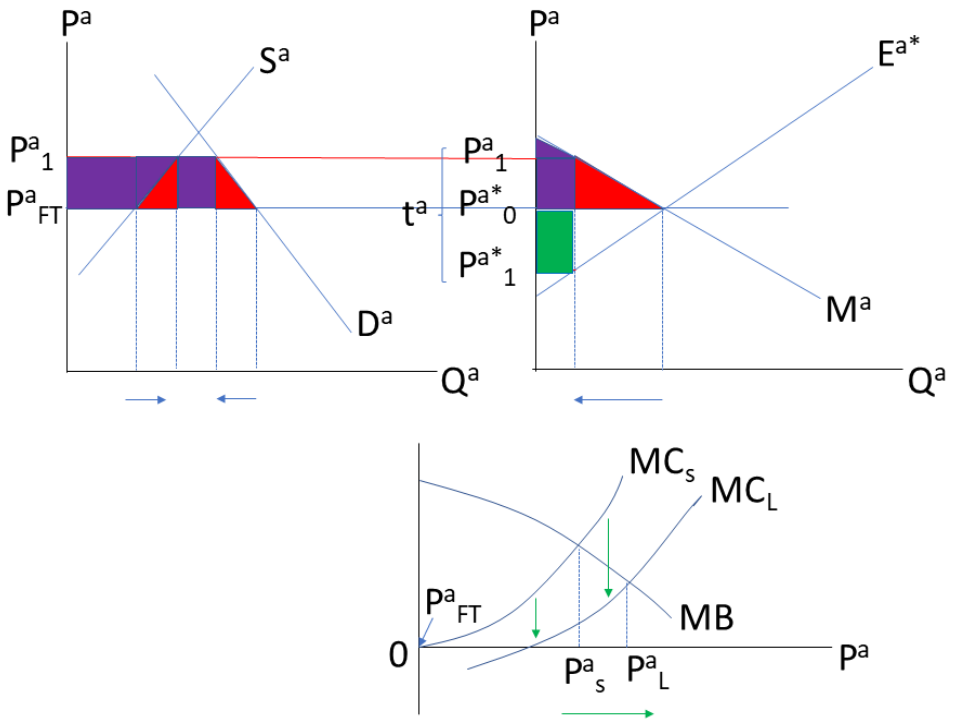
- Generally, designing an effective institution to address an international externality is challenging (think climate change)
  - for a member-driven institution, what is important is not so much *what* policy is chosen as *how* it is chosen
- Two pillars of the GATT/WTO architecture
  - Non-discrimination (MFN)
  - Reciprocity
- MFN
  - in a multi-country world, MFN keeps the trade policy externality as simple as in a 2-country world

Is the WTO well-designed to serve this purpose?

- Generally, designing an effective institution to address an international externality is challenging (think climate change)
  - for a member-driven institution, what is important is not so much *what* policy is chosen as *how* it is chosen
- Two pillars of the GATT/WTO architecture
  - Non-discrimination (MFN)
  - Reciprocity
- MFN
  - in a multi-country world, MFN keeps the trade policy externality as simple as in a 2-country world
- Reciprocity
  - defines a measured, *proportionate response* to a country's trade policy changes by its trading partners that *keeps it acting like a small country*

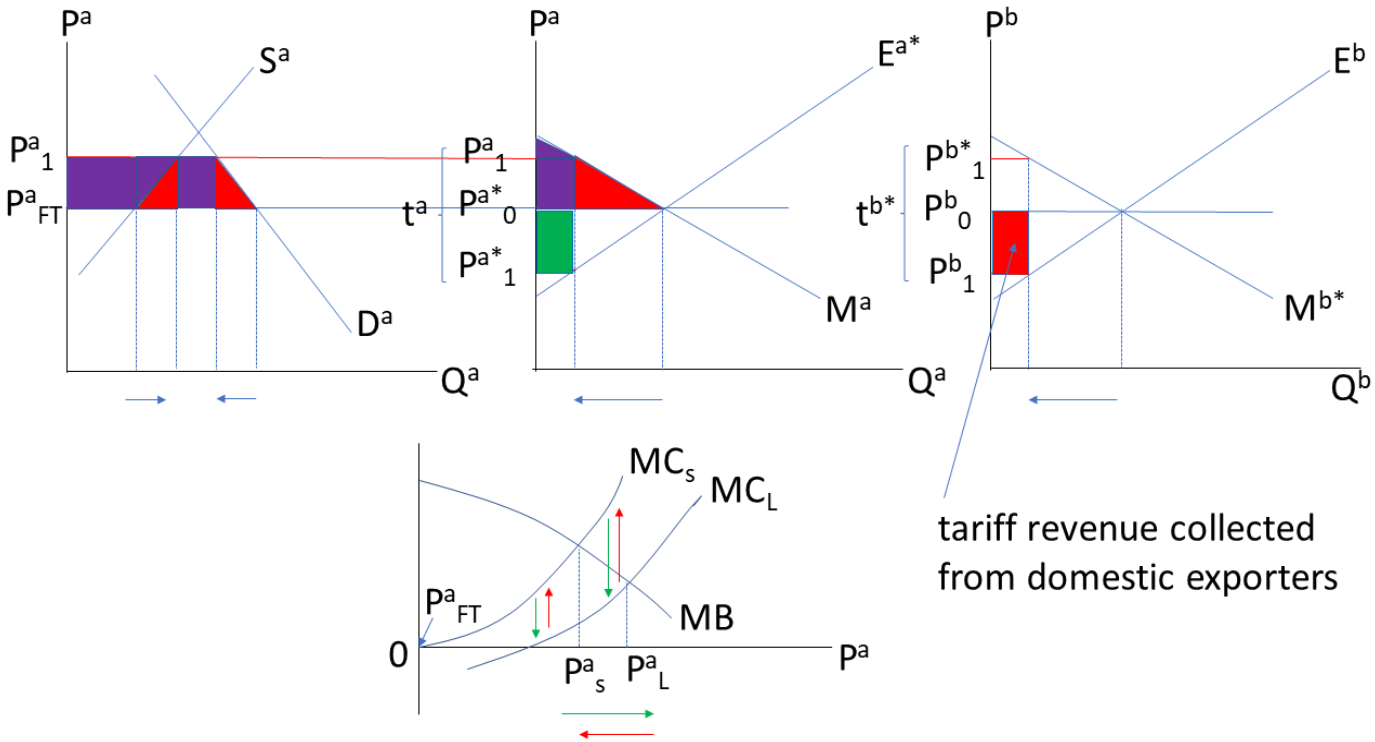
Reciprocity

- Recall a large country's unilateral MFN tariff choice



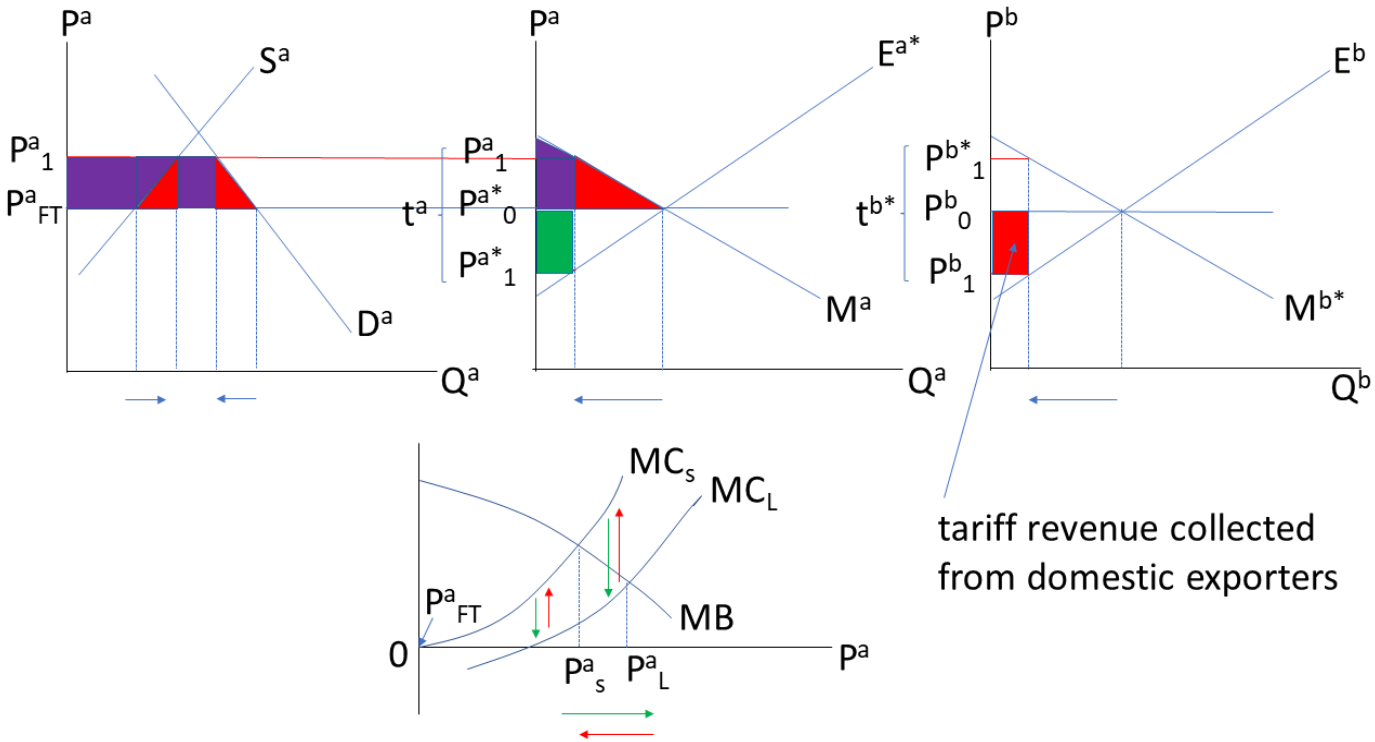
Unilateral MFN tariff choice in the presence of reciprocity

- A measured, *proportionate response* by its trading partners



Unilateral MFN tariff choice in the presence of reciprocity

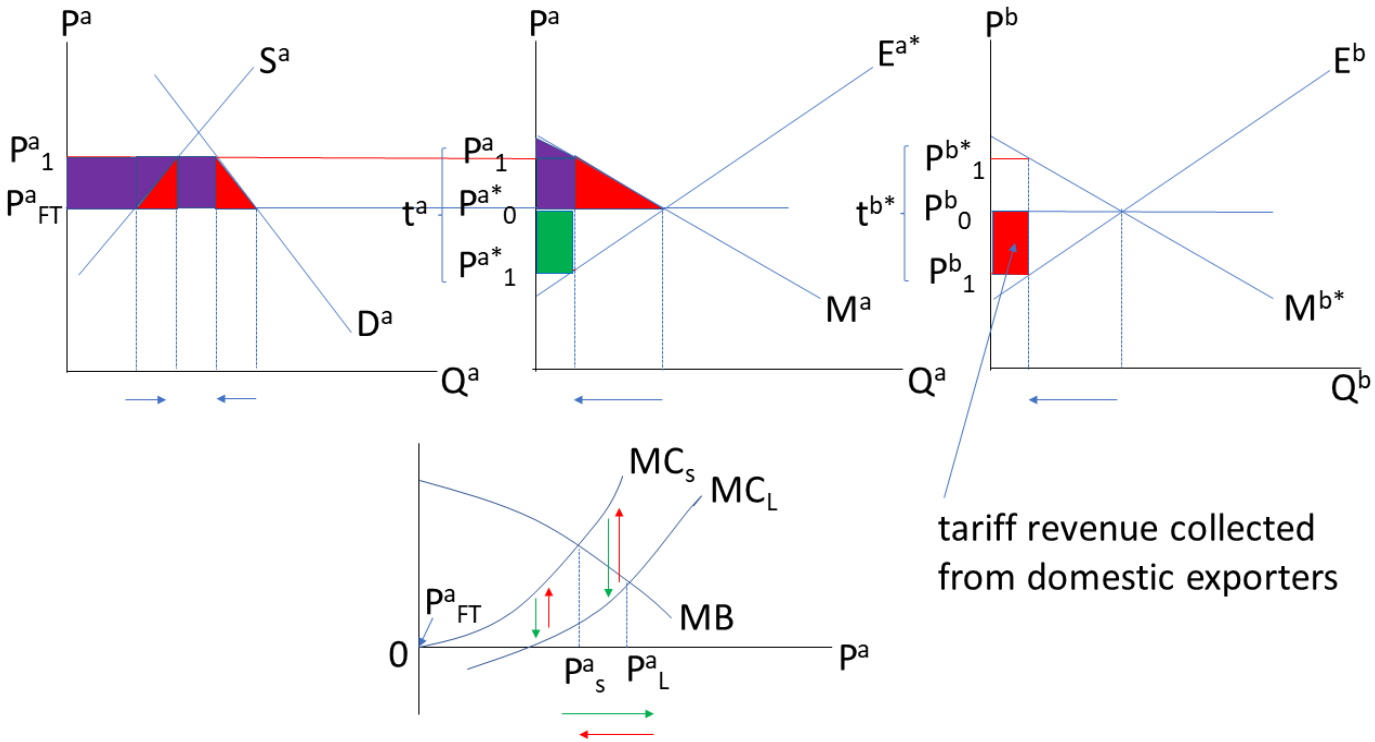
- A measured, *proportionate response* by its trading partners



- The large country faces the trade-offs of a small country

Unilateral MFN tariff choice in the presence of reciprocity

- A measured, *proportionate response* by its trading partners



- The large country faces the trade-offs of a small country
- $\Rightarrow$ Legitimacy: A multilateral trade institution built on the pillars of MFN and reciprocity should work well to help governments solve the fundamental trade agreement problem

Evidence

- If this is correct, the tariff cuts negotiated by WTO members should reflect their market power

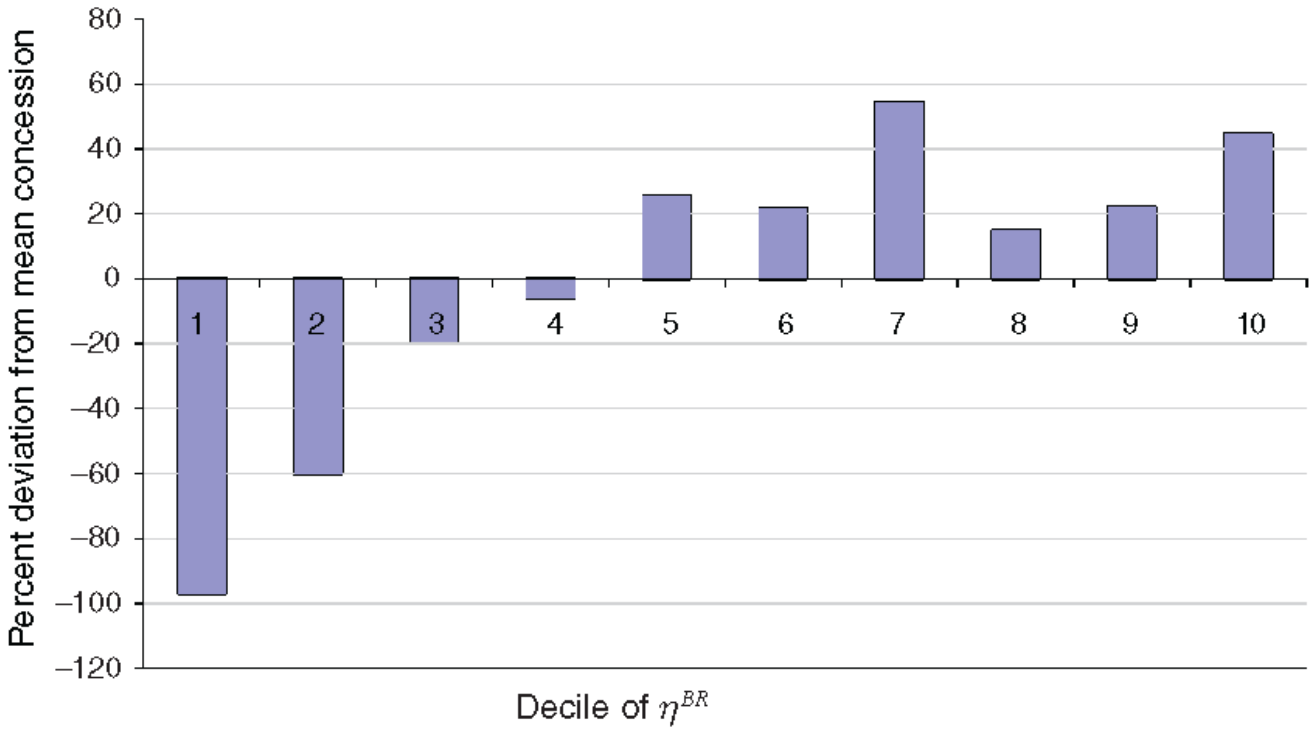


FIGURE 2. PERCENT DEVIATION FROM MEAN CONCESSION BY η^{BR} DECILE

Reciprocity in action

NYTimes March 2 2018

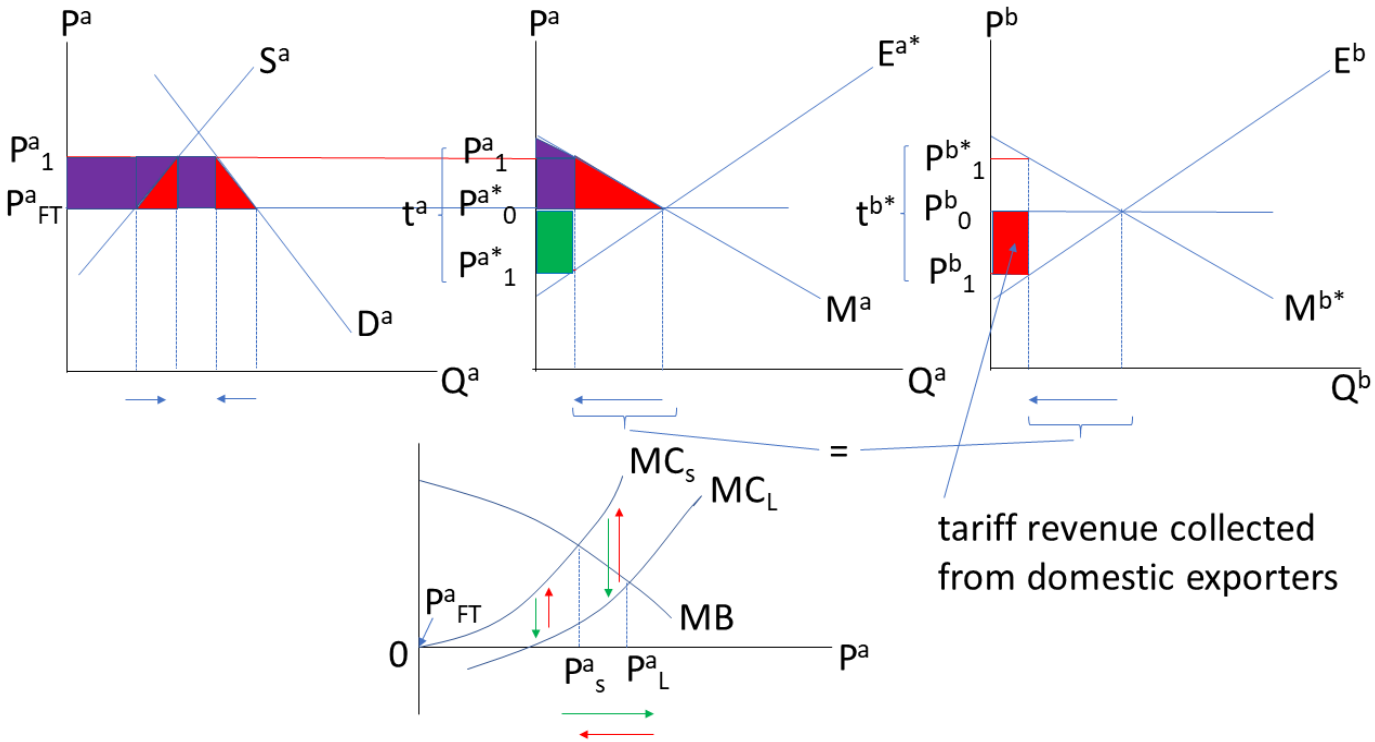
Trump's Tariffs Prompt Global Threats of Retaliation

... The European Union detailed a three-step plan to penalize $3.5 billion of American trade — the same amount of European steel and aluminum the bloc estimates would be harmed by the planned tariffs. It proposed taxing American exports including bourbon, bluejeans, orange juice, cranberries, rice and motorcycles. The European Union could then ... bring a case against the United States at the World Trade Organization.

A European Union official said that the bloc had been preparing for the announcement for months and that everything was in place for a swift, proportionate response. ...

Unilateral MFN tariff choice in the presence of reciprocity

- A *proportionate response* by its trading partners



- The large country faces the trade-offs of a small country
- $\Rightarrow$ Like a small country, it cannot reduce the costs to its citizens of its tariff choice by shifting some of those costs onto foreign companies

Reciprocity in action

- These WTO-legal threats of reciprocal retaliation are converting an attempted unilateral tariff action into a linked reciprocal tariff action
- They are having the intended effect

NYTimes March 6 2018

News Analysis

WASHINGTON — … In a sharply worded letter on Tuesday to Mr. Trump, Mr. Hatch said that the proposed tariffs would be paid by American manufacturers and consumers, not foreign companies, …

- This is not (yet) a trade war, it is the way the system is meant to work

What a trade war looks like

Escalating Trade Fight, Trump Threatens Higher Taxes on European Cars

By EMILY COCHRANE New York Times MARCH 3, 2018

WASHINGTON — President Trump warned on Saturday that he would apply higher taxes on imported European cars if the European Union carried through on its threat to retaliate against his proposed stiff new tariffs on steel and aluminum.

"If the E.U. wants to further increase their already massive tariffs and barriers on U.S. companies doing business there, we will simply apply a Tax on their Cars which freely pour into the U.S.," Mr. Trump wrote on Twitter from Florida, where he was spending part of the weekend. "They make it impossible for our cars (and more) to sell there. Big trade imbalance!"

Shallow versus Deep integration

- Externalities lead to inefficient choices, and cross-border policy externalities lead to internationally inefficient policies
  - GATT's original purpose: to *reduce* tariffs and expand market access to levels that internalized the negative externalities that large countries imposed on one another under their law-of-the-jungle trade policies

Shallow versus Deep integration

- Externalities lead to inefficient choices, and cross-border policy externalities lead to internationally inefficient policies
  - GATT's original purpose: to *reduce* tariffs and expand market access to levels that internalized the negative externalities that large countries imposed on one another under their law-of-the-jungle trade policies
- But economics $\Rightarrow$ a crucial point: under the law of the jungle, only trade policies, *not domestic policies*, would have been set inefficiently

Shallow versus Deep integration

- Externalities lead to inefficient choices, and cross-border policy externalities lead to internationally inefficient policies
  - GATT's original purpose: to *reduce* tariffs and expand market access to levels that internalized the negative externalities that large countries imposed on one another under their law-of-the-jungle trade policies
- But economics $\Rightarrow$ a crucial point: under the law of the jungle, only trade policies, *not domestic policies*, would have been set inefficiently
- If
  - market access can be expanded to efficient levels through negotiated tariff reductions
  - and accompanying rules prevent countries from distorting domestic policies for protective purposes once their tariffs are constrained
  - then international efficiency is achieved

Shallow versus Deep integration

- Externalities lead to inefficient choices, and cross-border policy externalities lead to internationally inefficient policies
  - GATT's original purpose: to *reduce* tariffs and expand market access to levels that internalized the negative externalities that large countries imposed on one another under their law-of-the-jungle trade policies
- But economics $\Rightarrow$ a crucial point: under the law of the jungle, only trade policies, *not domestic policies*, would have been set inefficiently
- If
  - market access can be expanded to efficient levels through negotiated tariff reductions
  - and accompanying rules prevent countries from distorting domestic policies for protective purposes once their tariffs are constrained
  - then international efficiency is achieved
- That is the logic of GATT/WTO shallow integration

The Trump Administration's ideal Global Trade Order

- What is the Trump Administration's vision for the Global Trade Order?
- Wilbur Ross, US Secretary of Commerce:
  - "An ideal global trading system would facilitate adoption of the lowest possible level of tariffs. In this ideal system, countries with the lowest tariffs would apply reciprocal tariffs to those with the highest and then automatically lower that reciprocal tariff as the other country lowers theirs. This leveling technique could be applied product by product or across the board on an aggregated basis. Such a modification would motivate high-tariff countries to reduce their tariffs on imports."

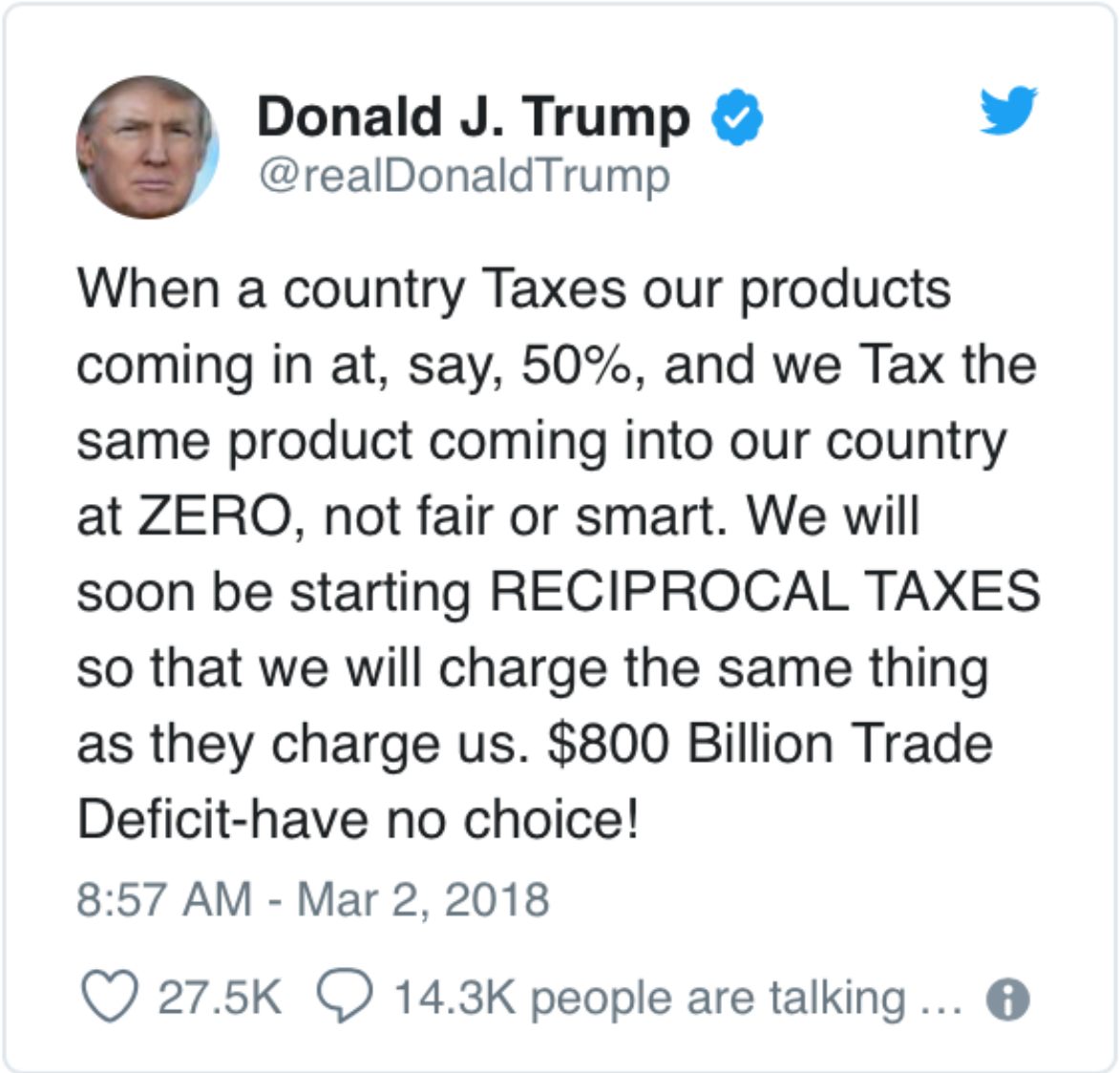
The Trump Administration's ideal Global Trade Order

- What is the Trump Administration's vision for the Global Trade Order?
- Wilbur Ross, US Secretary of Commerce:
  - "An ideal global trading system would facilitate adoption of the lowest possible level of tariffs. In this ideal system, countries with the lowest tariffs would apply reciprocal tariffs to those with the highest and then automatically lower that reciprocal tariff as the other country lowers theirs. This leveling technique could be applied product by product or across the board on an aggregated basis. Such a modification would motivate high-tariff countries to reduce their tariffs on imports."
- Purpose:
  - $\Longrightarrow$ Achieve reciprocal Free Trade (or at least a "level playing field")

The Trump Administration's ideal Global Trade Order

- What is the Trump Administration's vision for the Global Trade Order?
- Wilbur Ross, US Secretary of Commerce:
  - "An ideal global trading system would facilitate adoption of the lowest possible level of tariffs. In this ideal system, countries with the lowest tariffs would apply reciprocal tariffs to those with the highest and then automatically lower that reciprocal tariff as the other country lowers theirs. This leveling technique could be applied product by product or across the board on an aggregated basis. Such a modification would motivate high-tariff countries to reduce their tariffs on imports."
- Purpose:
  - $\Longrightarrow$ Achieve reciprocal Free Trade (or at least a "level playing field")
- Means:
  - $\Longrightarrow$ Abandon MFN
  - $\Longrightarrow$ Reciprocity in tariff *levels*

In case you doubt this...



The Trump Administration's Vision

- The Trump Administration's vision for the Global Trade Order appears to be "Repeal and Replace"

The Trump Administration's Vision

- The Trump Administration's vision for the Global Trade Order appears to be "Repeal and Replace"
- An existential challenge to the pillars of the GATT/WTO architecture
  - Abandons MFN
  - Emphasizes a form of reciprocity that is not found in GATT/WTO

The Trump Administration's Vision

- The Trump Administration's vision for the Global Trade Order appears to be "Repeal and Replace"
- An existential challenge to the pillars of the GATT/WTO architecture
  - Abandons MFN
  - Emphasizes a form of reciprocity that is not found in GATT/WTO
- Appears unhappy with the GATT/WTO shallow integration approach
  - Wilbur Ross: "...The second thing is the WTO doesn't really deal very much with non-tariff trade barriers..."

The Trump Administration's Vision

- The Trump Administration's vision for the Global Trade Order appears to be "Repeal and Replace"
- An existential challenge to the pillars of the GATT/WTO architecture
  - Abandons MFN
  - Emphasizes a form of reciprocity that is not found in GATT/WTO
- Appears unhappy with the GATT/WTO shallow integration approach
  - Wilbur Ross: "...The second thing is the WTO doesn't really deal very much with non-tariff trade barriers..."
  - $\Longrightarrow$ Perhaps support for "deep integration" together with assertion of US bargaining power

Whose interests does the WTO serve?

- Under MFN and reciprocity, the WTO is a rules-based multilateral system that serves the interests of the member governments
- These rules blunt the power of large dominant countries
  - Why would powerful countries submit to these rules?

Whose interests does the WTO serve?

- Under MFN and reciprocity, the WTO is a rules-based multilateral system that serves the interests of the member governments
- These rules blunt the power of large dominant countries
  - Why would powerful countries submit to these rules?
- If a country is sufficiently dominant, other countries may not participate in trade negotiations with it absent such rules of behavior
  - Judge Bowker's argument against Canada's participation in the US-Canada FTA negotiations
  - $\Rightarrow$ it is then in the country's interest to commit to these rules

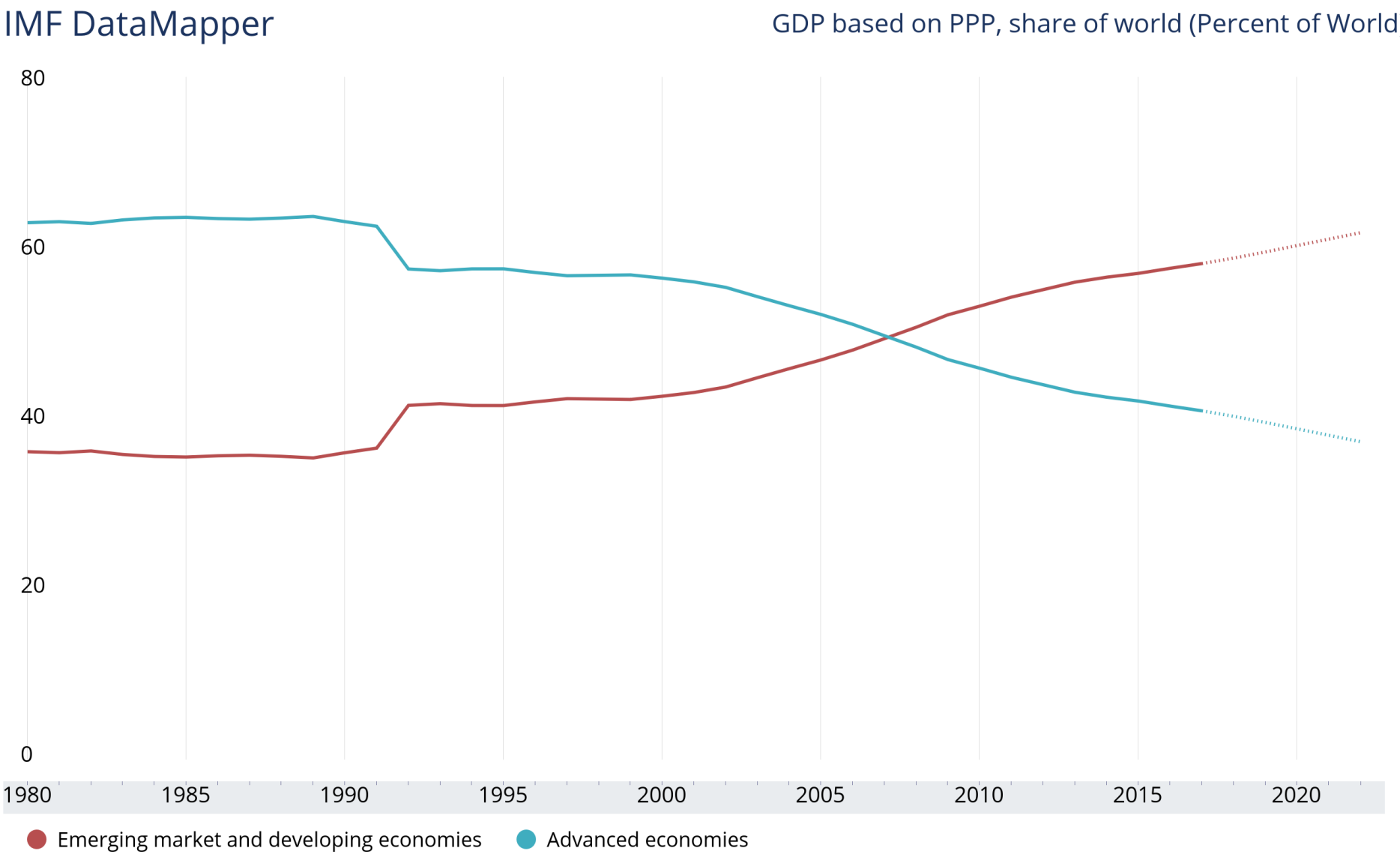
Whose interests does the WTO serve?

- Under MFN and reciprocity, the WTO is a rules-based multilateral system that serves the interests of the member governments
- These rules blunt the power of large dominant countries
  - Why would powerful countries submit to these rules?
- If a country is sufficiently dominant, other countries may not participate in trade negotiations with it absent such rules of behavior
  - Judge Bowker's argument against Canada's participation in the US-Canada FTA negotiations
  - $\Rightarrow$ it is then in the country's interest to commit to these rules
- But if a country's dominance wanes, its support for the WTO rules-based multilateral system could rationally erode
  - $\Rightarrow$ it may be in the country's interest to depart from these rules (this is accelerating with Trump, but didn't start with him)

Whose interests does the WTO serve?

- Under MFN and reciprocity, the WTO is a rules-based multilateral system that serves the interests of the member governments
- These rules blunt the power of large dominant countries
  - Why would powerful countries submit to these rules?
- If a country is sufficiently dominant, other countries may not participate in trade negotiations with it absent such rules of behavior
  - Judge Bowker's argument against Canada's participation in the US-Canada FTA negotiations
  - $\Rightarrow$ it is then in the country's interest to commit to these rules
- But if a country's dominance wanes, its support for the WTO rules-based multilateral system could rationally erode
  - $\Rightarrow$ it may be in the country's interest to depart from these rules (this is accelerating with Trump, but didn't start with him)
- The WTO may need a "hegemon" to support it

- Could Multilateralism be going into hibernation, awaiting the rise of the next hegemon?



- If so, then this is about something *much bigger than Trump*

The value of preserving the Global Trade Order

- So is Multilateralism dead?

The value of preserving the Global Trade Order

- If the diagnosis is one of declining hegemonic support
  - then the rules-based multilateral system may be entering a period of decline until the needed support arises from other quarters

The value of preserving the Global Trade Order

- If the diagnosis is one of declining hegemonic support
  - then the rules-based multilateral system may be entering a period of decline until the needed support arises from other quarters
  - but it is not dead, and it is worth trying to save

The value of preserving the Global Trade Order

- If the diagnosis is one of declining hegemonic support
  - then the rules-based multilateral system may be entering a period of decline until the needed support arises from other quarters
  - but it is not dead, and it is worth trying to save
- The shallow-integration approach of the WTO is well-designed to solve the fundamental trade agreement problem
  - a trade-off between sovereignty and globalization may be avoidable, but only if the WTO is supported and its approach strengthened

The value of preserving the Global Trade Order

- If the diagnosis is one of declining hegemonic support
  - then the rules-based multilateral system may be entering a period of decline until the needed support arises from other quarters
  - but it is not dead, and it is worth trying to save
- The shallow-integration approach of the WTO is well-designed to solve the fundamental trade agreement problem
  - a trade-off between sovereignty and globalization may be avoidable, but only if the WTO is supported and its approach strengthened
- Could China be the next hegemon that the WTO is looking for?
  - currently seems unlikely, but as its dominance grows, China may see it in its interest to more fully commit to these rules

The value of preserving the Global Trade Order

- If the diagnosis is one of declining hegemonic support
  - then the rules-based multilateral system may be entering a period of decline until the needed support arises from other quarters
  - but it is not dead, and it is worth trying to save
- The shallow-integration approach of the WTO is well-designed to solve the fundamental trade agreement problem
  - a trade-off between sovereignty and globalization may be avoidable, but only if the WTO is supported and its approach strengthened
- Could China be the next hegemon that the WTO is looking for?
  - currently seems unlikely, but as its dominance grows, China may see it in its interest to more fully commit to these rules
  - and until that time, the WTO deserves broad support as the legitimate constitution of the global trade order

The value of preserving the Global Trade Order

- If the diagnosis is one of declining hegemonic support
  - then the rules-based multilateral system may be entering a period of decline until the needed support arises from other quarters
  - but it is not dead, and it is worth trying to save
- The shallow-integration approach of the WTO is well-designed to solve the fundamental trade agreement problem
  - a trade-off between sovereignty and globalization may be avoidable, but only if the WTO is supported and its approach strengthened
- Could China be the next hegemon that the WTO is looking for?
  - currently seems unlikely, but as its dominance grows, China may see it in its interest to more fully commit to these rules
  - and until that time, the WTO deserves broad support as the legitimate constitution of the global trade order
- But the rise of offshoring provides an alternative, more dire, diagnosis

Why offshoring may have changed everything

- Offshoring may be changing nature of international policy externalities
  - Recall: for 20^{th}-century-style globalization, economics $\Rightarrow$ under the law of the jungle, only trade policies, not domestic policies, would be set inefficiently
  - But with offshoring, economics $\Rightarrow$ under law of the jungle, all policies, trade *and* domestic, may be set inefficiently
  - depends on how offshoring has changed nature of international price determination (think of the Boeing Dreamliner)

Why offshoring may have changed everything

- ∴The rise of offshoring may have altered (deepened) the kinds of rules needed to avoid "the law of the jungle"
  - ⇒the shallow-integration approach of the WTO is no longer well-designed to solve the fundamental trade agreement problem
  - a trade-off between sovereignty and globalization now unavoidable

Evidence

- If this is correct, WTO members should be less successful in negotiating deep tariff cuts for customized inputs

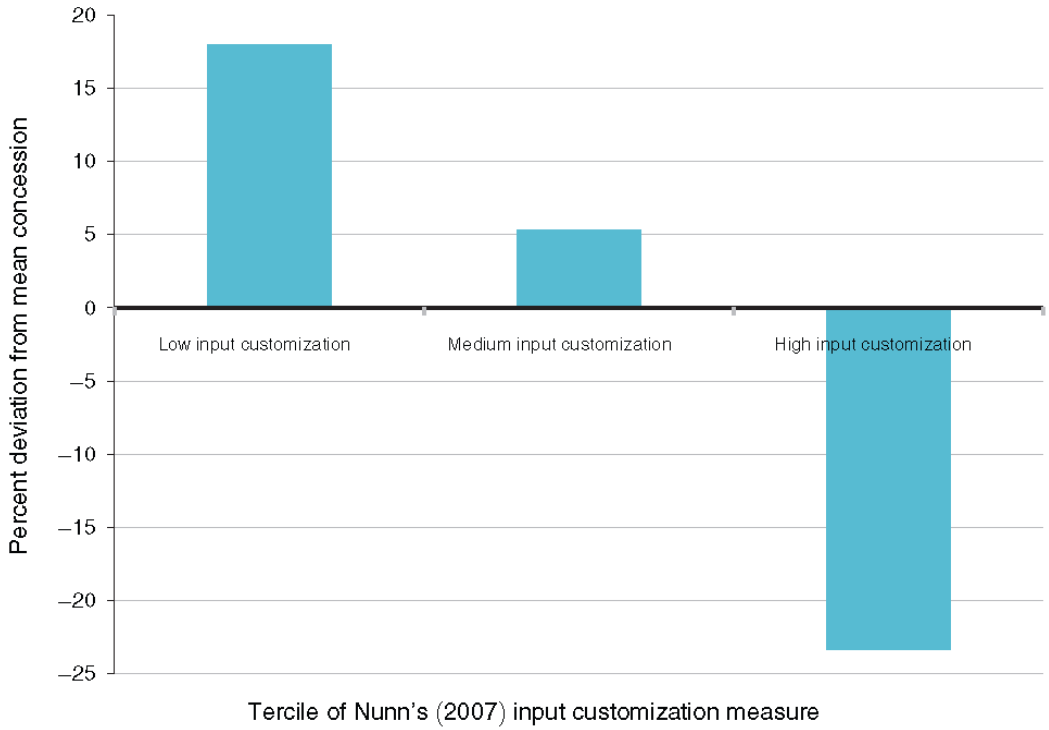


FIGURE 1. PERCENT DEVIATION FROM MEAN CONCESSION BY TERCILE OF INPUT CUSTOMIZATION MEASURE

Bottom Line

- It is possible that rise of offshoring has *not* fundamentally changed the nature of international policy externalities...
  - depends on subtle features of offshoring

Bottom Line

- It is possible that rise of offshoring has *not* fundamentally changed the nature of international policy externalities...
  - depends on subtle features of offshoring
- or has changed the nature of the policy externalities only temporarily...
  - offshoring itself may be a transitory phenomenon

Bottom Line

- It is possible that rise of offshoring has *not* fundamentally changed the nature of international policy externalities...
  - depends on subtle features of offshoring
- or has changed the nature of the policy externalities only temporarily...
  - offshoring itself may be a transitory phenomenon
- If so, the WTO has a strong claim of legitimacy in serving as the constitution for the global trade order

Bottom Line

- It is possible that rise of offshoring has *not* fundamentally changed the nature of international policy externalities...
  - depends on subtle features of offshoring
- or has changed the nature of the policy externalities only temporarily...
  - offshoring itself may be a transitory phenomenon
- If so, the WTO has a strong claim of legitimacy in serving as the constitution for the global trade order
- And if offshoring *has* fundamentally changed the nature of international policy externalities, building on the WTO foundation to address these 21^{st} century problems seems sensible

Bottom Line

- It is possible that rise of offshoring has *not* fundamentally changed the nature of international policy externalities...
  - depends on subtle features of offshoring
- or has changed the nature of the policy externalities only temporarily...
  - offshoring itself may be a transitory phenomenon
- If so, the WTO has a strong claim of legitimacy in serving as the constitution for the global trade order
- And if offshoring *has* fundamentally changed the nature of international policy externalities, building on the WTO foundation to address these 21^{st} century problems seems sensible
- Either way, "Repeal and Replace" seems like the wrong strategy
  - and by undercutting the WTO this strategy may undermine our best hope for balance between globalization and national sovereignty

Further thoughts on what's at stake

- There would also be broader implications of the demise of the WTO that are more difficult to assess but could be important
- The loss of an international institution that has built-in procedures for rethinking levels of market access commitments
  - GATT/WTO market access commitments are structured as "liability rules"
- The loss of an international institution that places multilateral restraints on the structure and negotiation of PTAs
  - imagine what it would be like to renegotiate the terms of NAFTA with the US if the US did not feel constrained by its WTO commitments

Oh, wait

- ... *if* the US did not feel constrained by its WTO commitments?

Oh, wait

- ... *if* the US did not feel constrained by its WTO commitments?

- To borrow from Paul Samuelson's remark about Milton Friedman
  - If Donald Trump did not exist it would be necessary to invent him

Further thoughts on what's at stake

- There would also be broader implications of the demise of the WTO that are more difficult to assess but could be important
- The loss of an international institution that has built-in procedures for rethinking levels of market access commitments
  - GATT/WTO market access commitments are structured as "liability rules"
- The loss of an international institution that places multilateral restraints on the structure and negotiation of PTAs
  - imagine what it would be like to renegotiate the terms of NAFTA with the US if the US did not feel constrained by its WTO commitments
- Collateral damage: the loss of the possibility of linkage between the WTO and International Environmental Agreements
  - participation linkage; negotiation linkage; enforcement linkage

Advice for Canada (and all of us)

Trade Agreements and Tariff Bargaining

CCER Mini Course Days One and Two

Robert W. Staiger

Dartmouth

June 2018

Introduction

- The GATT/WTO has presided over the largest and most sustained negotiated trade liberalization in history
- Yet the WTO faces challenges, evidenced by the now-suspended Doha Round of multilateral trade negotiations
  - Newcomers at the bargaining table creating *tariff asymmetries* across negotiating partners that are incompatible with reciprocity
  - *Externalities* associated with MFN and the potential for free riding
  - *PTAs* as potential stumbling blocks to GATT/WTO liberalization
  - Growing importance of *offshoring* and *trade in services*

Introduction

- What accounts for GATT's success as a bargaining forum?
- Is this bargaining forum still suited for the modern global economy?
- Focus on
  - Tariff bargaining in the GATT Torquay Round: "Multilateral Trade Bargaining: A First Look at the GATT Bargaining Records" (with Kyle Bagwell and Ali Yurukoglu), September 2017; and "Multilateral Trade Bargaining and Dominant Strategies" (with Kyle Bagwell), forthcoming
  - Quantitative trade modeling of tariff bargaining in the GATT Uruguay Round: "Quantitative Analysis of Multi-Party Tariff Negotiations" (with Kyle Bagwell and Ali Yurukoglu)
  - Implications of the rise in offshoring: "Trade Agreements and the Nature of Price Determination" (with Pol Antras), 2012a; and "Offshoring and the Role of Trade Agreements" (with Pol Antras), 2012b

Multilateral Trade Bargaining: A First Look at the GATT Bargaining Records

Kyle Bagwell, Robert W. Staiger and Ali Yurukoglu

Stanford, Dartmouth and Stanford

March 2017

Introduction

- The GATT/WTO has presided over the largest and most sustained negotiated trade liberalization in history
- Yet the WTO faces challenges, evidenced by the now-suspended Doha Round of multilateral trade negotiations
  - Newcomers at the bargaining table creating *tariff asymmetries* across negotiating partners that are incompatible with reciprocity
  - *Externalities* associated with MFN and the potential for free riding
  - *PTAs* as potential stumbling blocks to GATT/WTO liberalization
  - Growing importance of *trade in services*
- What accounts for GATT's success as a bargaining forum?
  - Is this bargaining forum still suited for the modern global economy?

Tariff Bargaining

- Detailed negotiation data, recently declassified by the WTO
  - First 5 GATT rounds span 1947-1961, involve more than 1,500 pairs of bargaining countries, resulted in over 70,000 agreed tariff cuts
  - Simultaneous bilateral bargaining between pairs of countries over multiple tariff lines, all subject to MFN
  - Bargaining records include full sequence of formal requests and offers, and outcomes (agreed tariffs or statement of no agreement)
- An initial look at a slice of the GATT bargaining records
  - Focus on Torquay Round (1950-51), where over a 10 month period 299 separate bilateral negotiations among 37 countries covering thousands of tariff-line products took place

Relevance

- Understanding these earlier negotiations is important for addressing the challenges facing modern trade agreements
  - Writings of the time emphasize trade bargaining challenges with clear counterparts today: tariff asymmetries, MFN externalities, PTAs
  - Doha attempting to adapt traditional bargaining protocols on goods trade to deal with new emphasis on liberalization of trade in services
- And analyzing these high stakes international negotiations contributes to economists' understanding of bargaining more generally

Approach

- Begin with a ToT-theory perspective on the trade negotiation problem
- Identify stylized facts from the GATT bargaining data
- Combine ToT theory with key GATT institutional features
  - Use the resulting theory to interpret the GATT bargaining data
- Look for evidence of multilateral as opposed to bilateral reciprocity in the GATT bargaining data
  - The ability of countries to seek multilateral rather than bilateral reciprocity was seen as the key institutional innovation of GATT

A ToT Perspective on the Trade Negotiation Problem

- ToT theory provides simple framework within which to interpret two of the most basic features of GATT tariff negotiations
- I) Provides reason why negotiators would view own-tariff cuts as "concessions" and seek foreign tariff cuts for their exporters
  - two-good two-country competitive general equilibrium trade model
  - gov objectives $W(p(\tau, \widetilde{p}^w), \widetilde{p}^w)$ and $W^*(p^*(\tau^*, \widetilde{p}^w), \widetilde{p}^w)$ satisfying $W_{\widetilde{p}^w} < 0 < W^*_{\widetilde{p}^w}$
  - Nash tariffs satisfy

$$\overset{(+)}{W_p}\frac{dp}{d\tau} + \overset{(-)}{W_{\widetilde{p}^w}}\frac{\overset{(-)}{\partial \widetilde{p}^w}}{d\tau} = 0; \quad \overset{(-)}{W^*_{p^*}}\frac{dp^*}{d\tau^*} + \overset{(+)}{W^*_{\widetilde{p}^w}}\frac{\overset{(+)}{\partial \widetilde{p}^w}}{d\tau^*} = 0$$

  - $\Longrightarrow$ $W_p < 0 < W^*_{p^*}$ at Nash tariff choices; own-tariff cut a concession but matched with foreign tariff cut we can both gain

Shallow Integration

- II) Provides basis for narrow focus on tariff negotiations
  - a domestic standard in each country, σ and σ^*, impacts that country's production possibilities: $\widetilde{p}^w = \widetilde{p}^w(\sigma, \sigma^*, \tau, \tau^*)$
  - gov objectives $W(\sigma, p(\tau, \widetilde{p}^w), \widetilde{p}^w)$ and $W^*(\sigma^*, p^*(\tau^*, \widetilde{p}^w), \widetilde{p}^w)$ satisfying $W_{\widetilde{p}^w}(\sigma, p, \widetilde{p}^w) < 0 < W^*_{\widetilde{p}^w}(\sigma^*, p^*, \widetilde{p}^w)$
  - conditions for efficient policy choices

$$\frac{[\tau W_p + W_{\widetilde{p}^w}]\frac{\partial \widetilde{p}^w}{\partial \tau^*}}{W_p \frac{dp}{d\tau} + W_{\widetilde{p}^w}\frac{\partial \widetilde{p}^w}{\partial \tau}} = \frac{W^*_{p^*}\frac{dp^*}{d\tau^*} + W^*_{\widetilde{p}^w}\frac{\partial \widetilde{p}^w}{\partial \tau^*}}{[\frac{1}{\tau^*}W^*_{p^*} + W^*_{\widetilde{p}^w}]\frac{\partial \widetilde{p}^w}{\partial \tau}}$$

$$W_\sigma + W_p \frac{dp}{d\tau}\frac{d\tau}{d\sigma}\Big|_{d\widetilde{p}^w=0} = 0 \text{ and } W^*_{\sigma^*} + W^*_{p^*}\frac{dp^*}{d\tau^*}\frac{d\tau^*}{d\sigma^*}\Big|_{d\widetilde{p}^w=0} = 0$$

  - top condition describes efficient trade volumes; bottom conditions describe each country's efficient policies to deliver this trade volume

Shallow Integration

$$\frac{[\tau W_p + W_{\widetilde{p}^w}]\frac{\partial \widetilde{p}^w}{\partial \tau^*}}{W_p \frac{dp}{d\tau} + W_{\widetilde{p}^w}\frac{\partial \widetilde{p}^w}{\partial \tau}} = \frac{W^*_{p^*}\frac{dp^*}{d\tau^*} + W^*_{\widetilde{p}^w}\frac{\partial \widetilde{p}^w}{\partial \tau^*}}{[\frac{1}{\tau^*}W^*_{p^*} + W^*_{\widetilde{p}^w}]\frac{\partial \widetilde{p}^w}{\partial \tau}}$$

$$W_\sigma + W_p \frac{dp}{d\tau}\frac{d\tau}{d\sigma}|_{d\widetilde{p}^w=0} = 0 \text{ and } W^*_{\sigma^*} + W^*_{p^*}\frac{dp^*}{d\tau^*}\frac{d\tau^*}{d\sigma^*}|_{d\widetilde{p}^w=0} = 0$$

- Nash violates top condition
  - $\Rightarrow$ tariffs too high/trade volumes too low
- Nash satisfies bottom conditions
  - $\Rightarrow$ conditional on trade volumes, Nash policy choices efficient
- $\Longrightarrow$ Shallow integration
  - expand market access to efficient levels with tariff commitments
  - apply "MA preservation" rules to subsequent policy adjustments
  - and achieve policy efficiency

Interdependence in a Multilateral World

- ToT theory also provides a basis for understanding nature of interdependence in a multilateral world
- Two-good three-country competitive general equilibrium trade model
  - home exports y to $*1$ and $*2$ and imports x from $*1$ and $*2$
- Discriminatory home tariffs $\tau^1 \neq \tau^2$ imply that $p^{w1} \neq p^{w2}$ through $p = \tau^1 p^{w1} = \tau^2 p^{w2}$, hence home has distinct ToT with $*1$ and $*2$
- But MFN requires $\tau^1 = \tau^2 \equiv \tau$, hence $p^{w1} = p^{w2} \equiv \tilde{p}^w(\tau, \tau^{*1}, \tau^{*2})$
  - $\Longrightarrow$ gov objectives still $W(p, \tilde{p}^w)$, $W^{*1}(p^{*1}, \tilde{p}^w)$, $W^{*2}(p^{*2}, \tilde{p}^w)$
- Each country's welfare impacted by the tariff choices of the remaining two countries through $\tilde{p}^w(\tau, \tau^{*1}, \tau^{*2})$
  - $\Longrightarrow$ In general a collection of bilateral MFN tariff negotiations represents a setting of bilateral bargaining with externalities

The Torquay Bargaining Protocol

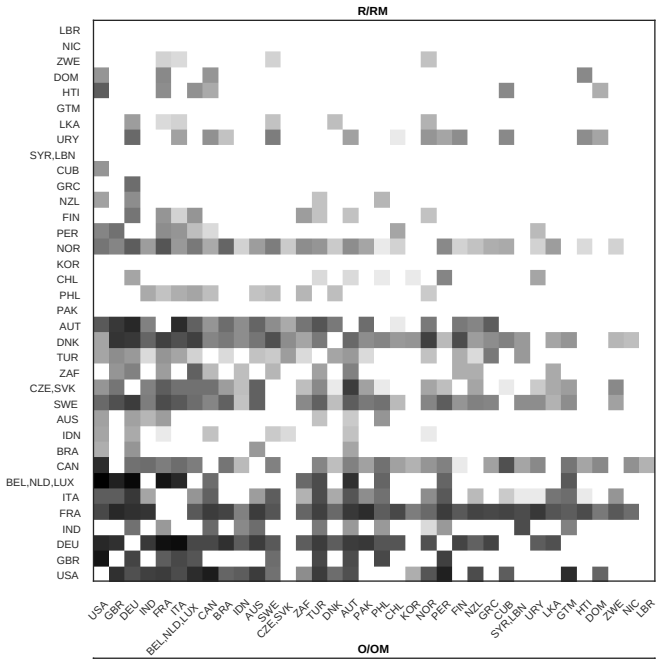
- Selective product-by-product MFN tariff bargaining on a bilateral request-offer basis
- The initial (first stage) requests were common knowledge
- The initial (second stage) offers were privately observed between the relevant pairs of countries
- A's initial request of B and A's initial offer to B forms A's initial bargaining proposal to B
    - the initial proposals served as the basis for the start of (third stage) bilateral offer/counteroffer bargaining, the outcome of which became common knowledge at the conclusion of the bilateral
- As outcomes of concluded bilaterals became common knowledge, some ability to make adjustments to previously concluded bilaterals

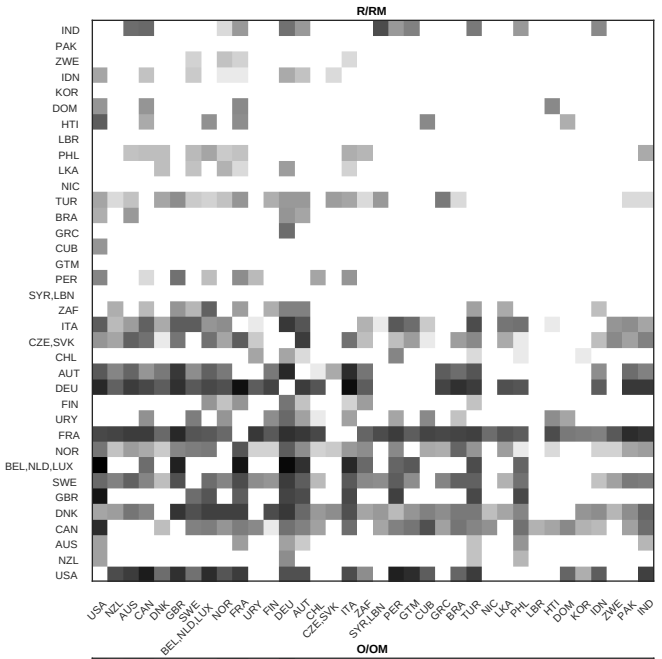
Overview of the Torquay Round

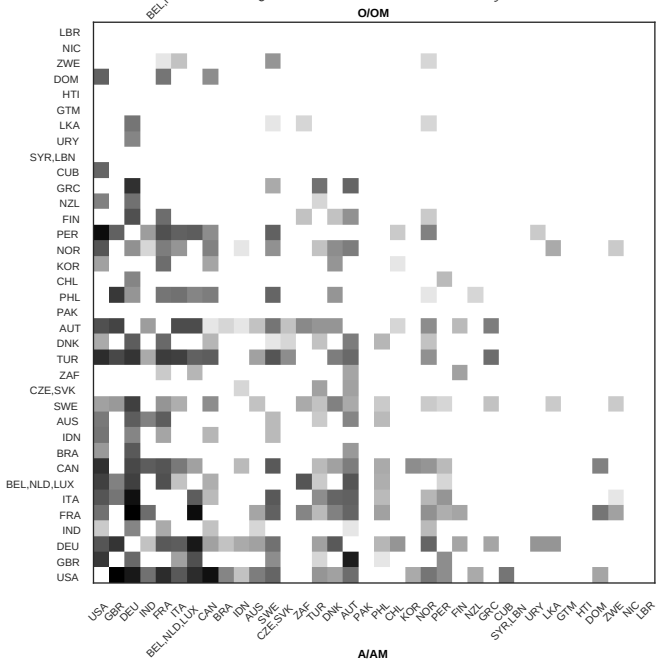
- Over a 10 month period, 299 separate bilateral negotiations among 37 countries covering thousands of tariff-line products took place

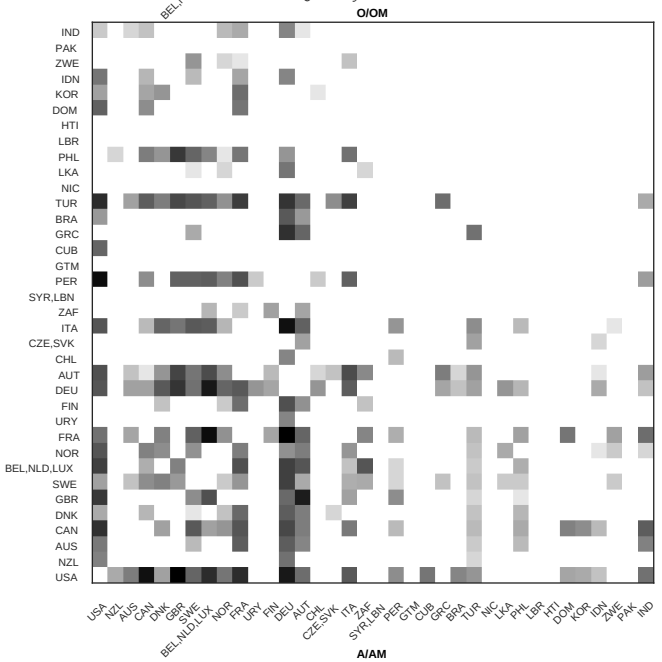
Overview of the Torquay Round

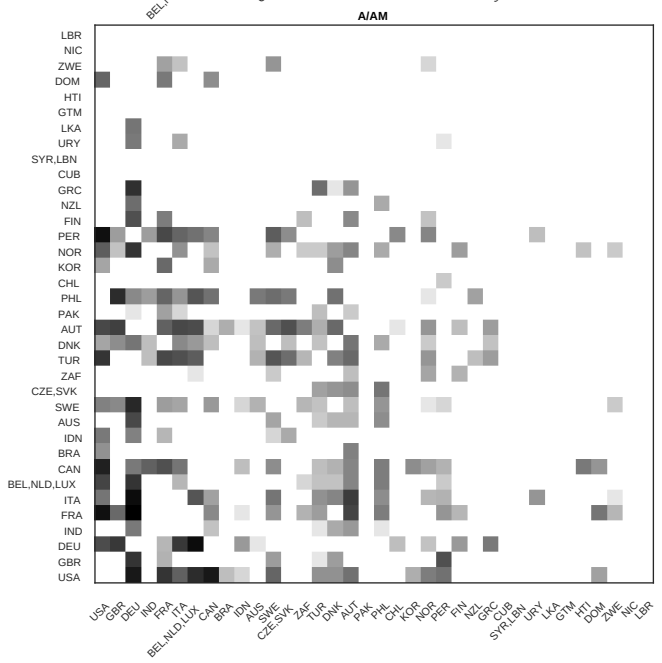
- Over a 10 month period, 299 separate bilateral negotiations among 37 countries covering thousands of tariff-line products took place
- Who did what with whom? Figure 3

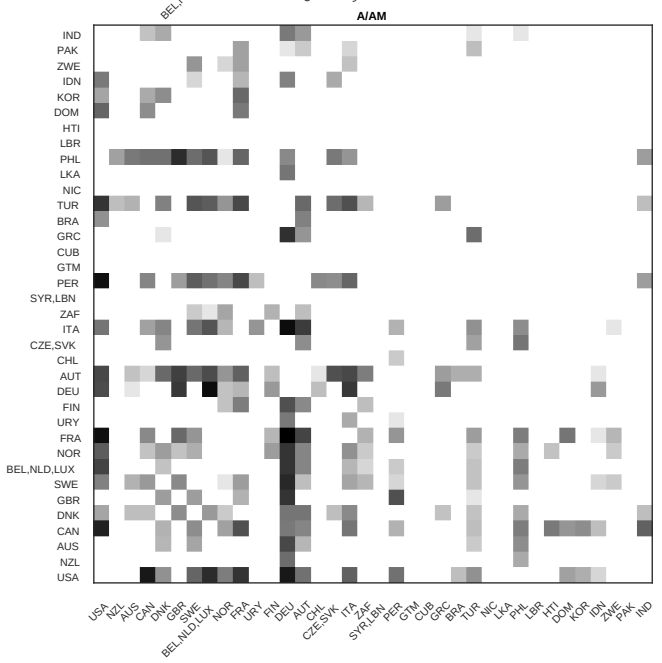

R/RM
LBR
NIC
ZWE
DOM
HTI
GTM
LKA
URY
SYR,LBN
CUB
GRC
NZL
FIN
PER
NOR
KOR
CHL
PHL
PAK
AUT
DNK
TUR
ZAF
CZE,SVK
SWE
AUS
IDN
BRA
CAN
BEL,NLD,LUX
ITA
FRA
IND
DEU
GBR
USA
USA GBR DEU IND FRA ITA BEL,NLD,LUX CAN BRA IDN AUS SWE CZE,SVK ZAF TUR DNK AUT PAK PHL CHL KOR NOR PER FIN NZL GRC CUB SYR,LBN URY LKA GTM HTI DOM ZWE NIC LBR


R/RM
IND
PAK
ZWE
IDN
KOR
DOM
HTI
LBR
PHL
LKA
NIC
TUR
BRA
GRC
CUB
GTM
PER
SYR,LBN
ZAF
ITA
CZE,SVK
CHL
AUT
DEU
FIN
URY
FRA
NOR
BEL,NLD,LUX
SWE
GBR
DNK
CAN
AUS
NZL
USA
USA NZL AUS CAN DNK GBR SWE BEL,NLD,LUX NOR FRA URY FIN DEU AUT CHL CZE,SVK ITA ZAF SYR,LBN PER GTM CUB GRC BRA TUR NIC LKA PHL LBR HTI DOM KOR IDN ZWE PAK IND


O/OM
LBR
NIC
ZWE
DOM
HTI
GTM
LKA
URY
SYR,LBN
CUB
GRC
NZL
FIN
PER
NOR
KOR
CHL
PHL
PAK
AUT
DNK
TUR
ZAF
CZE,SVK
SWE
AUS
IDN
BRA
CAN
BEL,NLD,LUX
ITA
FRA
IND
DEU
GBR
USA
USA GBR DEU IND FRA ITA BEL,NLD,LUX CAN BRA IDN AUS SWE CZE,SVK ZAF TUR DNK AUT PAK PHL CHL KOR NOR PER FIN NZL GRC CUB SYR,LBN URY LKA GTM HTI DOM ZWE NIC LBR

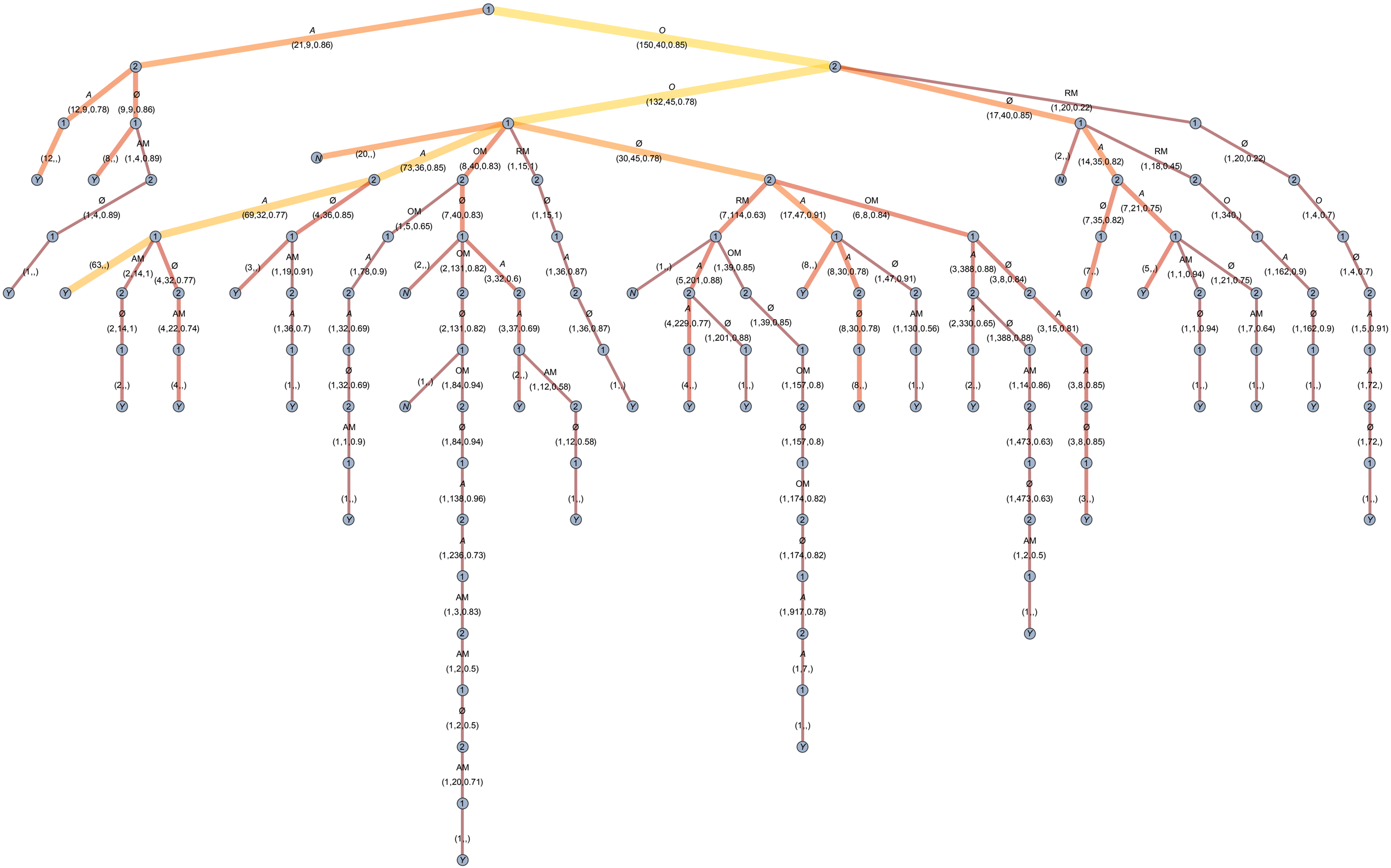

O/OM
IND
PAK
ZWE
IDN
KOR
DOM
HTI
LBR
PHL
LKA
NIC
TUR
BRA
GRC
CUB
GTM
PER
SYR,LBN
ZAF
ITA
CZE,SVK
CHL
AUT
DEU
FIN
URY
FRA
NOR
BEL,NLD,LUX
SWE
GBR
DNK
CAN
AUS
NZL
USA
USA NZL AUS CAN DNK GBR SWE BEL,NLD,LUX NOR FRA URY FIN DEU AUT CHL CZE,SVK ITA ZAF SYR,LBN PER GTM CUB GRC BRA TUR NIC LKA PHL LBR HTI DOM KOR IDN ZWE PAK IND


A/AM
LBR
NIC
ZWE
DOM
HTI
GTM
LKA
URY
SYR,LBN
CUB
GRC
NZL
FIN
PER
NOR
KOR
CHL
PHL
PAK
AUT
DNK
TUR
ZAF
CZE,SVK
SWE
AUS
IDN
BRA
CAN
BEL,NLD,LUX
ITA
FRA
IND
DEU
GBR
USA
USA GBR DEU IND FRA ITA BEL,NLD,LUX CAN BRA IDN AUS SWE CZE,SVK ZAF TUR DNK AUT PAK PHL CHL KOR NOR PER FIN NZL GRC CUB SYR,LBN URY LKA GTM HTI DOM ZWE NIC LBR


A/AM
IND
PAK
ZWE
IDN
KOR
DOM
HTI
LBR
PHL
LKA
NIC
TUR
BRA
GRC
CUB
GTM
PER
SYR,LBN
ZAF
ITA
CZE,SVK
CHL
AUT
DEU
FIN
URY
FRA
NOR
BEL,NLD,LUX
SWE
GBR
DNK
CAN
AUS
NZL
USA
USA NZL AUS CAN DNK GBR SWE BEL,NLD,LUX NOR FRA URY FIN DEU AUT CHL CZE,SVK ITA ZAF SYR,LBN PER GTM CUB GRC BRA TUR NIC LKA PHL LBR HTI DOM KOR IDN ZWE PAK IND

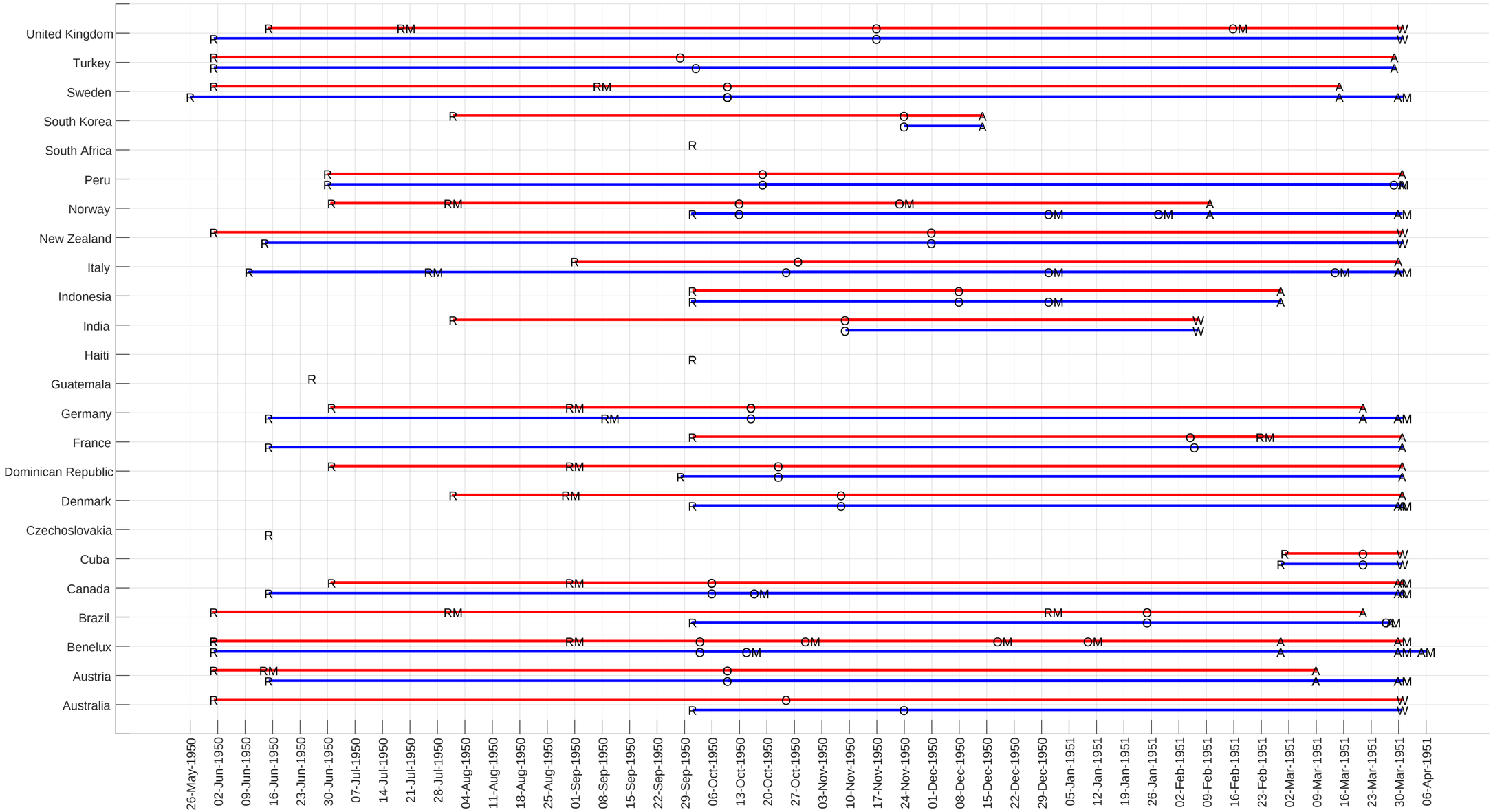
Overview of the Torquay Round

- Over a 10 month period, 299 separate bilateral negotiations among 37 countries covering thousands of tariff-line products took place
- Who did what with whom? Figure 3
- A "summary" Game Tree. Figure 4


1
A
(21,9,0.86)
O
(150,40,0.85)
2
A
(12,9,0.78)
Ø
(9,9,0.86)
1
(12,,)
Y
1
(8,,)
Y
AM
(1,4,0.89)
2
Ø
(1,4,0.89)
1
(1,,)
Y
2
O
(132,45,0.78)
Ø
(17,40,0.85)
RM
(1,20,0.22)
1
N
(20,,)
A
(73,36,0.85)
OM
(8,40,0.83)
RM
(1,15,1)
Ø
(30,45,0.78)
2
A
(69,32,0.77)
Ø
(4,36,0.85)
1
(63,,)
Y
AM
(2,14,1)
Ø
(4,32,0.77)
2
Ø
(2,14,1)
AM
(4,22,0.74)
1
(2,,)
Y
1
(4,,)
Y
1
(3,,)
Y
AM
(1,19,0.91)
2
A
(1,36,0.7)
1
(1,,)
Y
OM
(1,5,0.65)
Ø
(7,40,0.83)
Ø
(1,15,1)
1
A
(1,78,0.9)
2
A
(1,32,0.69)
1
Ø
(1,32,0.69)
2
AM
(1,1,0.9)
1
(1,,)
Y
1
(2,,)
N
OM
(2,131,0.82)
A
(3,32,0.6)
1
A
(1,36,0.87)
2
Ø
(2,131,0.82)
A
(3,37,0.69)
Ø
(1,36,0.87)
1
(1,,)
N
OM
(1,84,0.94)
2
Ø
(1,84,0.94)
1
A
(1,138,0.96)
2
A
(1,236,0.73)
1
AM
(1,3,0.83)
2
AM
(1,2,0.5)
1
Ø
(1,2,0.5)
2
AM
(1,20,0.71)
1
(1,,)
Y
1
(2,,)
Y
AM
(1,12,0.58)
2
Ø
(1,12,0.58)
1
(1,,)
Y
2
RM
(7,114,0.63)
A
(17,47,0.91)
OM
(6,8,0.84)
1
(1,,)
N
A
(5,201,0.88)
OM
(1,39,0.85)
2
A
(4,229,0.77)
Ø
(1,201,0.88)
1
(4,,)
Y
1
(1,,)
Y
Ø
(1,39,0.85)
1
OM
(1,157,0.8)
2
Ø
(1,157,0.8)
1
OM
(1,174,0.82)
2
Ø
(1,174,0.82)
1
A
(1,917,0.78)
2
A
(1,7,)
1
(1,,)
Y
1
(8,,)
Y
A
(8,30,0.78)
Ø
(1,47,0.91)
2
Ø
(8,30,0.78)
1
(8,,)
Y
AM
(1,130,0.56)
1
(1,,)
Y
1
A
(3,388,0.88)
Ø
(3,8,0.84)
2
A
(2,330,0.65)
Ø
(1,388,0.88)
1
(2,,)
Y
1
AM
(1,14,0.86)
2
A
(1,473,0.63)
1
Ø
(1,473,0.63)
2
AM
(1,2,0.5)
1
(1,,)
Y
A
(3,15,0.81)
1
A
(3,8,0.85)
2
Ø
(3,8,0.85)
1
(3,,)
Y
1
(2,,)
N
A
(14,35,0.82)
RM
(1,18,0.45)
2
Ø
(7,35,0.82)
A
(7,21,0.75)
1
(7,,)
Y
1
(5,,)
Y
AM
(1,1,0.94)
Ø
(1,21,0.75)
2
Ø
(1,1,0.94)
AM
(1,7,0.64)
1
(1,,)
Y
1
(1,,)
Y
Ø
(1,20,0.22)
2
O
(1,340,)
A
(1,162,0.9)
2
Ø
(1,162,0.9)
1
(1,,)
Y
O
(1,4,0.7)
1
Ø
(1,4,0.7)
2
A
(1,5,0.91)
1
A
(1,72,)
2
Ø
(1,72,)
1
(1,,)
Y

Overview of the Torquay Round

- Over a 10 month period, 299 separate bilateral negotiations among 37 countries covering thousands of tariff-line products took place
- Who did what with whom? Figure 3
- A "summary" Game Tree. Figure 4
- The US bilaterals. Figure 5

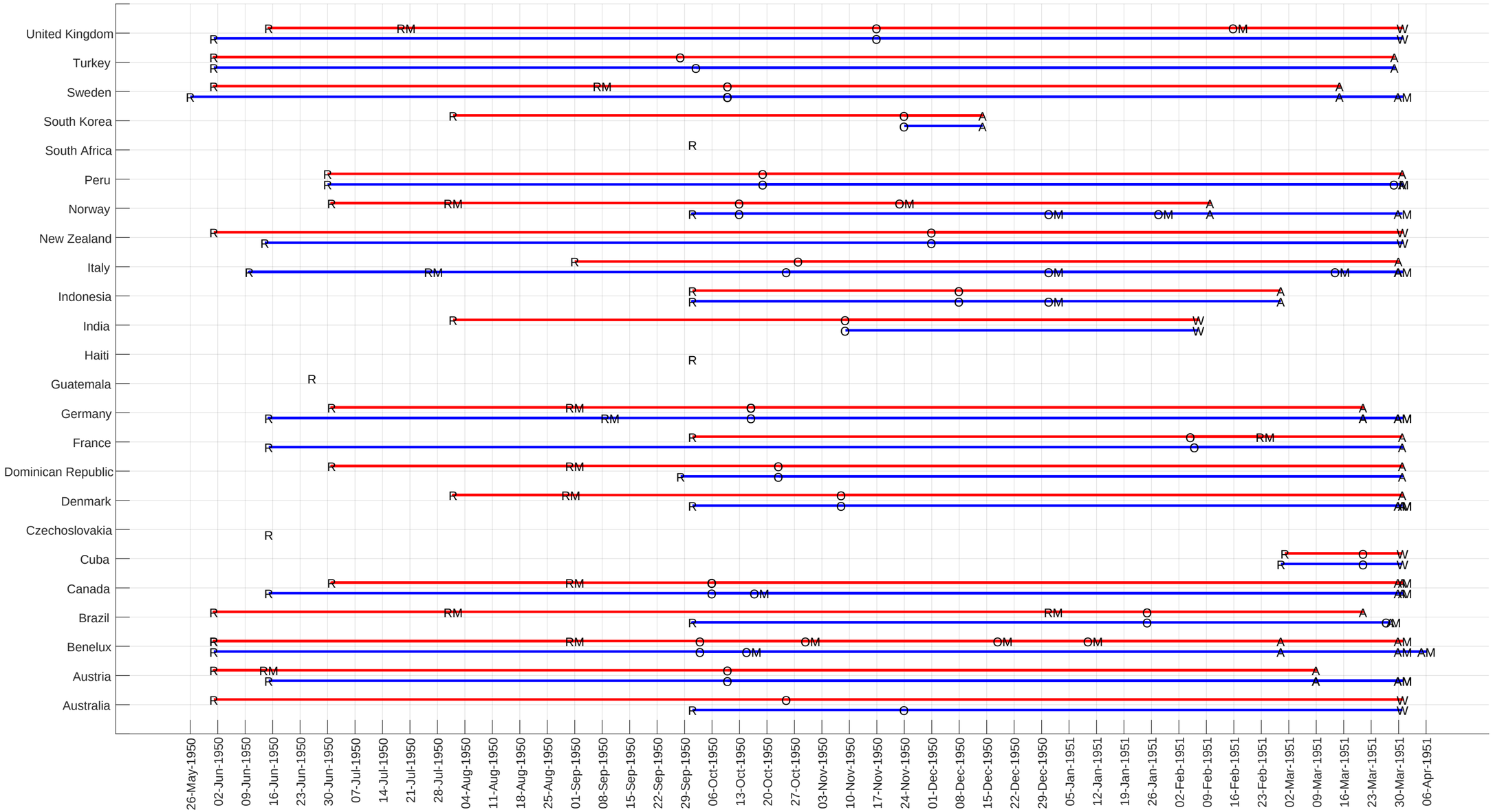

United Kingdom
Turkey
Sweden
South Korea
South Africa
Peru
Norway
New Zealand
Italy
Indonesia
India
Haiti
Guatemala
Germany
France
Dominican Republic
Denmark
Czechoslovakia
Cuba
Canada
Brazil
Benelux
Austria
Australia
26-May-1950
02-Jun-1950
09-Jun-1950
16-Jun-1950
23-Jun-1950
30-Jun-1950
07-Jul-1950
14-Jul-1950
21-Jul-1950
28-Jul-1950
04-Aug-1950
11-Aug-1950
18-Aug-1950
25-Aug-1950
01-Sep-1950
08-Sep-1950
15-Sep-1950
22-Sep-1950
29-Sep-1950
06-Oct-1950
13-Oct-1950
20-Oct-1950
27-Oct-1950
03-Nov-1950
10-Nov-1950
17-Nov-1950
24-Nov-1950
01-Dec-1950
08-Dec-1950
15-Dec-1950
22-Dec-1950
29-Dec-1950
05-Jan-1951
12-Jan-1951
19-Jan-1951
26-Jan-1951
02-Feb-1951
09-Feb-1951
16-Feb-1951
23-Feb-1951
02-Mar-1951
09-Mar-1951
16-Mar-1951
23-Mar-1951
30-Mar-1951
06-Apr-1951

Stylized Facts

- *The numbers of back-and-forth offers and counteroffers in any bilateral are relatively small, and initial offers often sit dormant on the table for long periods of time and are then finalized with a single modification at the time that other bargains are concluded*

Stylized Facts

- *The numbers of back-and-forth offers and counteroffers in any bilateral are relatively small, and initial offers often sit dormant on the table for long periods of time and are then finalized with a single modification at the time that other bargains are concluded*
  - Fig 5 and Table 1


United Kingdom
Turkey
Sweden
South Korea
South Africa
Peru
Norway
New Zealand
Italy
Indonesia
India
Haiti
Guatemala
Germany
France
Dominican Republic
Denmark
Czechoslovakia
Cuba
Canada
Brazil
Benelux
Austria
Australia
26-May-1950
02-Jun-1950
09-Jun-1950
16-Jun-1950
23-Jun-1950
30-Jun-1950
07-Jul-1950
14-Jul-1950
21-Jul-1950
28-Jul-1950
04-Aug-1950
11-Aug-1950
18-Aug-1950
25-Aug-1950
01-Sep-1950
08-Sep-1950
15-Sep-1950
22-Sep-1950
29-Sep-1950
06-Oct-1950
13-Oct-1950
20-Oct-1950
27-Oct-1950
03-Nov-1950
10-Nov-1950
17-Nov-1950
24-Nov-1950
01-Dec-1950
08-Dec-1950
15-Dec-1950
22-Dec-1950
29-Dec-1950
05-Jan-1951
12-Jan-1951
19-Jan-1951
26-Jan-1951
02-Feb-1951
09-Feb-1951
16-Feb-1951
23-Feb-1951
02-Mar-1951
09-Mar-1951
16-Mar-1951
23-Mar-1951
30-Mar-1951
06-Apr-1951

	Mean	SD	Min	Max	N
Number of offers per good-country	1.363	0.516	1	5	19560
Number of offers per country	1.787	0.659	1	6	324
Number of requests per good-country	1.021	0.148	1	3	38591
Number of requests per country	1.130	0.370	1	3	437
Conditional on Final agreement					
Number of offers per good-country	1.532	0.546	1	5	13030
Number of offers per country	1.969	0.596	1	6	259
Number of requests per good-country	1.047	0.215	1	3	6974
Number of requests per country	1.191	0.444	1	3	241
Number of weeks from the last offer (O or OM) to the first agreement (A)	11.771	7.405	0.143	26.286	124
Fraction of goods for which agreement was later modified	0.035	0.197	0	2	145

Table 1: Back-and-Forth Offers and Counteroffers in the Torquay Round: This table presents statistics on the amount of back and forth on goods and with negotiating partners over concessions negotiated by all particpating countries in the Torquay Round. Offer statistics reflect averages conditional on at least one offer; Request statistics reflect averages conditional on at least one request.

	Mean	SD	Min	Max	N
Number of offers per good-country	1.363	0.516	1	5	19560
Number of offers per country	1.787	0.659	1	6	324
Number of requests per good-country	1.021	0.148	1	3	38591
Number of requests per country	1.130	0.370	1	3	437
Conditional on Final agreement					
Number of offers per good-country	1.532	0.546	1	5	13030
Number of offers per country	1.969	0.596	1	6	259
Number of requests per good-country	1.047	0.215	1	3	6974
Number of requests per country	1.191	0.444	1	3	241
Number of weeks from the last offer (O or OM) to the first agreement (A)	11.771	7.405	0.143	26.286	124
Fraction of goods for which agreement was later modified	0.035	0.197	0	2	145

Table 1: Back-and-Forth Offers and Counteroffers in the Torquay Round: This table presents statistics on the amount of back and forth on goods and with negotiating partners over concessions negotiated by all particpating countries in the Torquay Round. Offer statistics reflect averages conditional on at least one offer; Request statistics reflect averages conditional on at least one request.

	Mean	SD	Min	Max	N
Number of offers per good-country	1.363	0.516	1	5	19560
Number of offers per country	1.787	0.659	1	6	324
Number of requests per good-country	1.021	0.148	1	3	38591
Number of requests per country	1.130	0.370	1	3	437
Conditional on Final agreement					
Number of offers per good-country	1.532	0.546	1	5	13030
Number of offers per country	1.969	0.596	1	6	259
Number of requests per good-country	1.047	0.215	1	3	6974
Number of requests per country	1.191	0.444	1	3	241
Number of weeks from the last offer (O or OM) to the first agreement (A)	11.771	7.405	0.143	26.286	124
Fraction of goods for which agreement was later modified	0.035	0.197	0	2	145

Table 1: Back-and-Forth Offers and Counteroffers in the Torquay Round: This table presents statistics on the amount of back and forth on goods and with negotiating partners over concessions negotiated by all particpating countries in the Torquay Round. Offer statistics reflect averages conditional on at least one offer; Request statistics reflect averages conditional on at least one request.

	Mean	SD	Min	Max	N
Number of offers per good-country	1.363	0.516	1	5	19560
Number of offers per country	1.787	0.659	1	6	324
Number of requests per good-country	1.021	0.148	1	3	38591
Number of requests per country	1.130	0.370	1	3	437
Conditional on Final agreement					
Number of offers per good-country	1.532	0.546	1	5	13030
Number of offers per country	1.969	0.596	1	6	259
Number of requests per good-country	1.047	0.215	1	3	6974
Number of requests per country	1.191	0.444	1	3	241
Number of weeks from the last offer (O or OM) to the first agreement (A)	11.771	7.405	0.143	26.286	124
Fraction of goods for which agreement was later modified	0.035	0.197	0	2	145

Table 1: Back-and-Forth Offers and Counteroffers in the Torquay Round: This table presents statistics on the amount of back and forth on goods and with negotiating partners over concessions negotiated by all particpating countries in the Torquay Round. Offer statistics reflect averages conditional on at least one offer; Request statistics reflect averages conditional on at least one request.

	Mean	SD	Min	Max	N
Number of offers per good-country	1.363	0.516	1	5	19560
Number of offers per country	1.787	0.659	1	6	324
Number of requests per good-country	1.021	0.148	1	3	38591
Number of requests per country	1.130	0.370	1	3	437
Conditional on Final agreement					
Number of offers per good-country	1.532	0.546	1	5	13030
Number of offers per country	1.969	0.596	1	6	259
Number of requests per good-country	1.047	0.215	1	3	6974
Number of requests per country	1.191	0.444	1	3	241
Number of weeks from the last offer (O or OM) to the first agreement (A)	11.771	7.405	0.143	26.286	124
Fraction of goods for which agreement was later modified	0.035	0.197	0	2	145

Table 1: Back-and-Forth Offers and Counteroffers in the Torquay Round: This table presents statistics on the amount of back and forth on goods and with negotiating partners over concessions negotiated by all particpating countries in the Torquay Round. Offer statistics reflect averages conditional on at least one offer; Request statistics reflect averages conditional on at least one request.

	Mean	SD	Min	Max	N
Number of offers per good-country	1.363	0.516	1	5	19560
Number of offers per country	1.787	0.659	1	6	324
Number of requests per good-country	1.021	0.148	1	3	38591
Number of requests per country	1.130	0.370	1	3	437
Conditional on Final agreement					
Number of offers per good-country	1.532	0.546	1	5	13030
Number of offers per country	1.969	0.596	1	6	259
Number of requests per good-country	1.047	0.215	1	3	6974
Number of requests per country	1.191	0.444	1	3	241
Number of weeks from the last offer (O or OM) to the first agreement (A)	11.771	7.405	0.143	26.286	124
Fraction of goods for which agreement was later modified	0.035	0.197	0	2	145

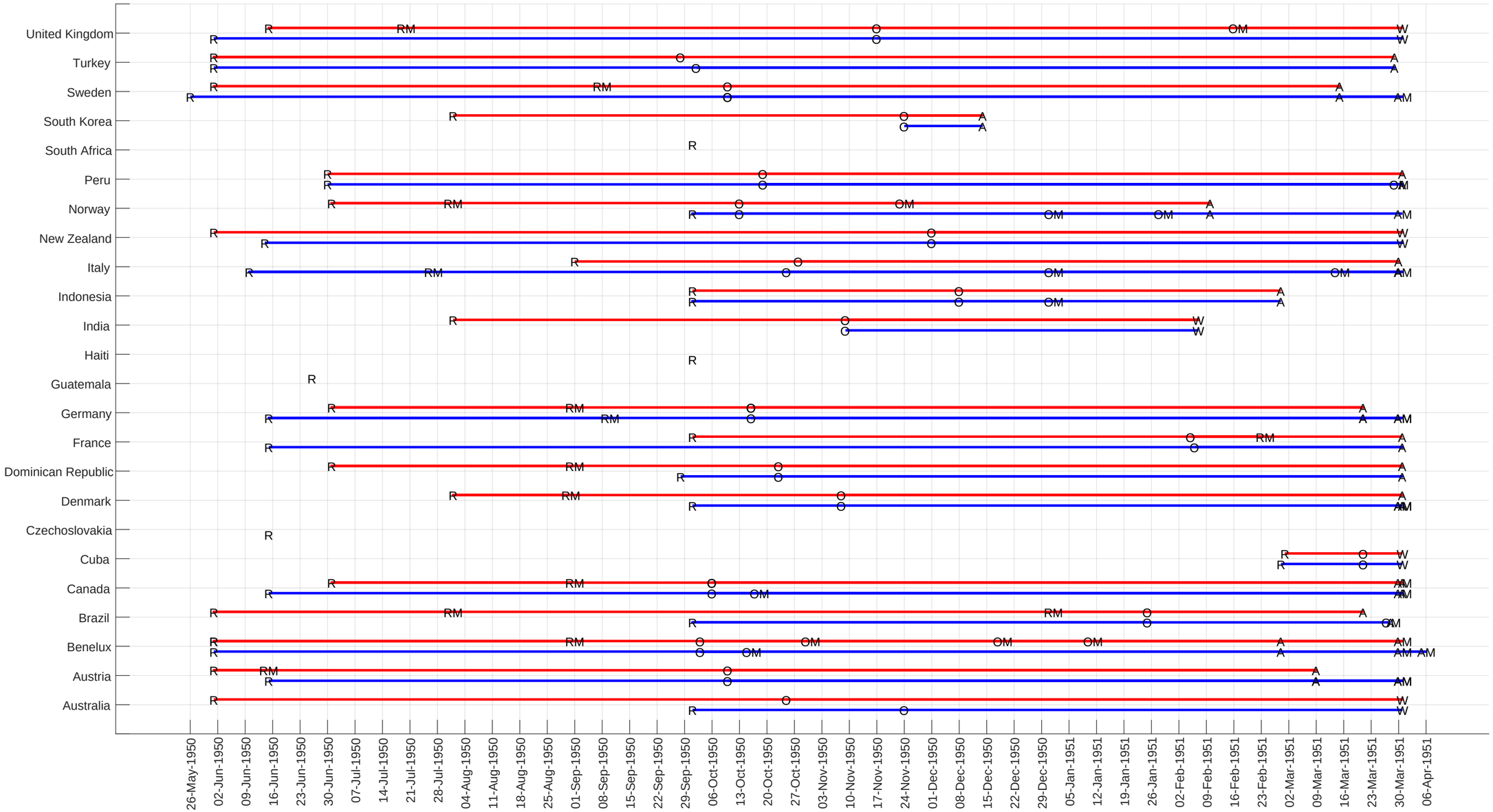
Table 1: Back-and-Forth Offers and Counteroffers in the Torquay Round: This table presents statistics on the amount of back and forth on goods and with negotiating partners over concessions negotiated by all particpating countries in the Torquay Round. Offer statistics reflect averages conditional on at least one offer; Request statistics reflect averages conditional on at least one request.

Stylized Facts

- *The numbers of back-and-forth offers and counteroffers in any bilateral are relatively small, and initial offers often sit dormant on the table for long periods of time and are then finalized with a single modification at the time that other bargains are concluded*
  - Fig 5 and Table 1
- *Once the initial proposals were on the table, the focus of bargaining narrowed to each country's own-tariff-cut offers, and countries responded to imbalances in the outstanding offers primarily by adjusting their offers rather than the requests they had made of others*

Stylized Facts

- *The numbers of back-and-forth offers and counteroffers in any bilateral are relatively small, and initial offers often sit dormant on the table for long periods of time and are then finalized with a single modification at the time that other bargains are concluded*
  - Fig 5 and Table 1
- *Once the initial proposals were on the table, the focus of bargaining narrowed to each country's own-tariff-cut offers, and countries responded to imbalances in the outstanding offers primarily by adjusting their offers rather than the requests they had made of others*
  - Fig 5; 82% of the counter-proposals at Torquay modified the offer


United Kingdom
Turkey
Sweden
South Korea
South Africa
Peru
Norway
New Zealand
Italy
Indonesia
India
Haiti
Guatemala
Germany
France
Dominican Republic
Denmark
Czechoslovakia
Cuba
Canada
Brazil
Benelux
Austria
Australia
26-May-1950
02-Jun-1950
09-Jun-1950
16-Jun-1950
23-Jun-1950
30-Jun-1950
07-Jul-1950
14-Jul-1950
21-Jul-1950
28-Jul-1950
04-Aug-1950
11-Aug-1950
18-Aug-1950
25-Aug-1950
01-Sep-1950
08-Sep-1950
15-Sep-1950
22-Sep-1950
29-Sep-1950
06-Oct-1950
13-Oct-1950
20-Oct-1950
27-Oct-1950
03-Nov-1950
10-Nov-1950
17-Nov-1950
24-Nov-1950
01-Dec-1950
08-Dec-1950
15-Dec-1950
22-Dec-1950
29-Dec-1950
05-Jan-1951
12-Jan-1951
19-Jan-1951
26-Jan-1951
02-Feb-1951
09-Feb-1951
16-Feb-1951
23-Feb-1951
02-Mar-1951
09-Mar-1951
16-Mar-1951
23-Mar-1951
30-Mar-1951
06-Apr-1951

Stylized Facts

- *The numbers of back-and-forth offers and counteroffers in any bilateral are relatively small, and initial offers often sit dormant on the table for long periods of time and are then finalized with a single modification at the time that other bargains are concluded*
  - Fig 5 and Table 1
- *Once the initial proposals were on the table, the focus of bargaining narrowed to each country's own-tariff-cut offers, and countries responded to imbalances in the outstanding offers primarily by adjusting their offers rather than the requests they had made of others*
  - Fig 5; 82% of the counter-proposals at Torquay modified the offer
- *Offers for given import products were rarely deepened over the course of the negotiations; instead, adjustments typically involved a country "shopping around" its initial tariff-cut offers and ultimately reducing as necessary the depth of its overall (multilateral) offer*

Stylized Facts

- *The numbers of back-and-forth offers and counteroffers in any bilateral are relatively small, and initial offers often sit dormant on the table for long periods of time and are then finalized with a single modification at the time that other bargains are concluded*
  - Fig 5 and Table 1
- *Once the initial proposals were on the table, the focus of bargaining narrowed to each country's own-tariff-cut offers, and countries responded to imbalances in the outstanding offers primarily by adjusting their offers rather than the requests they had made of others*
  - Fig 5; 82% of the counter-proposals at Torquay modified the offer
- *Offers for given import products were rarely deepened over the course of the negotiations; instead, adjustments typically involved a country "shopping around" its initial tariff-cut offers and ultimately reducing as necessary the depth of its overall (multilateral) offer*
  - Fig 2 and Table 4; Fig 6 and Table 2

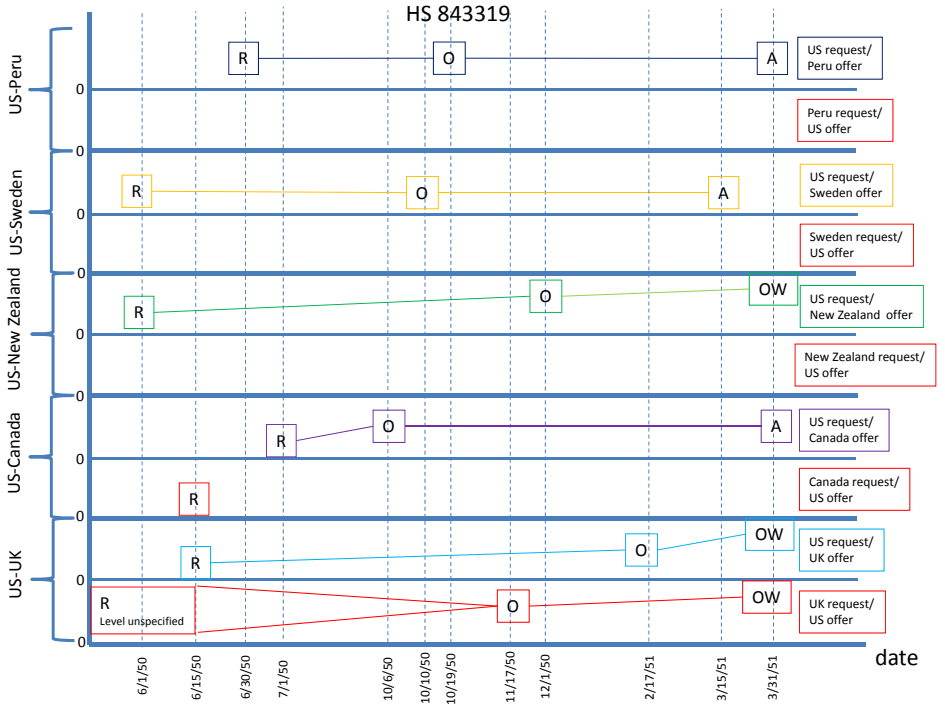


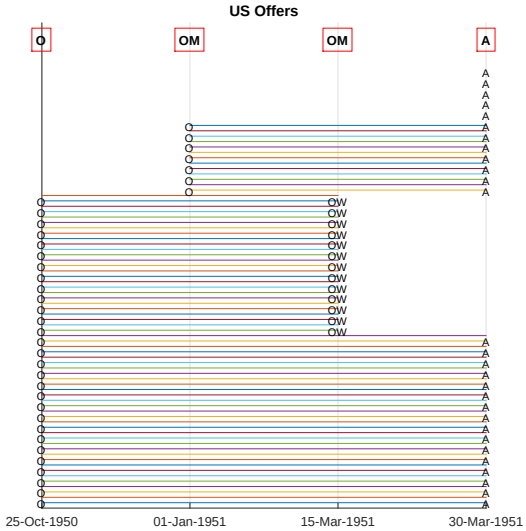
Figure 2: Requests and Offers on Lawn Mowers in US Torquay Bilaterals.

		Sales			Purchases		
		Ad Val	Specific	All	Ad Val	Specific	All
		Country-Specific					
Initial request over existing tariff	Mean	0.529	0.592	0.552	0.529	0.592	0.552
	SD	0.250	0.313	0.276	0.250	0.313	0.276
	Min	0	0	0	0	0	0
	Max	1	1	1	1	1	1
	N	21956	12595	34551	21956	12595	34551
Initial offer over existing tariff	Mean	0.807	0.840	0.820	0.807	0.840	0.820
	SD	0.202	0.221	0.210	0.202	0.221	0.210
	Min	0	0	0	0	0	0
	Max	1	1	1	1	1	1
	N	9781	6805	16586	9781	6805	16586
Final concession over existing tariff	Mean	0.788	0.842	0.811	0.788	0.842	0.811
	SD	0.199	0.228	0.214	0.199	0.228	0.214
	Min	0	0	0	0	0	0
	Max	1	1	1	1	1	1
	N	6247	4665	10912	6247	4665	10912
		Cross-Country					
Initial request over existing tariff	Mean	0.528	0.594	0.554			
	SD	0.252	0.316	0.281			
	Min	0	0	0			
	Max	1	1	1			
	N	16118	10351	26469			
Initial offer over existing tariff	Mean	0.811	0.848	0.827			
	SD	0.203	0.219	0.211			
	Min	0	0	0			
	Max	1	1	1			
	N	7573	5661	13234			
Final offer over existing tariff	Mean	0.799	0.834	0.814			
	SD	0.206	0.236	0.220			
	Min	0	0	0			
	Max	1	1	1			
	N	7549	5477	13026			

Table 4: Initial requests, initial offers and final offers and concessions over existing tariffs for all participating countries in the Torquay Round. "Sales" records requests, offers and final concessions that refer to own tariffs. "Purchases" records requests, offers and final concessions that refer to the tariffs of the bargaining partner. Country-Specific numbers condition on a final agreed concession being reached and refer to a given Seller-Purchaser-HS6. Some goods appear in both the ad valorem and specific columns. Cross-Country numbers refer to a given Seller-HS6.

		Sales			Purchases		
		Ad Val	Specific	All	Ad Val	Specific	All
		Country-Specific					
Initial request over existing tariff	Mean	0.529	0.592	0.552	0.529	0.592	0.552
	SD	0.250	0.313	0.276	0.250	0.313	0.276
	Min	0	0	0	0	0	0
	Max	1	1	1	1	1	1
	N	21956	12595	34551	21956	12595	34551
Initial offer over existing tariff	Mean	0.807	0.840	0.820	0.807	0.840	0.820
	SD	0.202	0.221	0.210	0.202	0.221	0.210
	Min	0	0	0	0	0	0
	Max	1	1	1	1	1	1
	N	9781	6805	16586	9781	6805	16586
Final concession over existing tariff	Mean	0.788	0.842	0.811	0.788	0.842	0.811
	SD	0.199	0.228	0.214	0.199	0.228	0.214
	Min	0	0	0	0	0	0
	Max	1	1	1	1	1	1
	N	6247	4665	10912	6247	4665	10912
				Cross-Country			
Initial request over existing tariff	Mean	0.528	0.594	0.554			
	SD	0.252	0.316	0.281			
	Min	0	0	0			
	Max	1	1	1			
	N	16118	10351	26469			
Initial offer over existing tariff	Mean	0.811	0.848	0.827			
	SD	0.203	0.219	0.211			
	Min	0	0	0			
	Max	1	1	1			
	N	7573	5661	13234			
Final offer over existing tariff	Mean	0.799	0.834	0.814			
	SD	0.206	0.236	0.220			
	Min	0	0	0			
	Max	1	1	1			
	N	7549	5477	13026			

Table 4: Initial requests, initial offers and final offers and concessions over existing tariffs for all participating countries in the Torquay Round. "Sales" records requests, offers and final concessions that refer to own tariffs. "Purchases" records requests, offers and final concessions that refer to the tariffs of the bargaining partner. Country-Specific numbers condition on a final agreed concession being reached and refer to a given Seller-Purchaser-HS6. Some goods appear in both the ad valorem and specific columns. Cross-Country numbers refer to a given Seller-HS6.



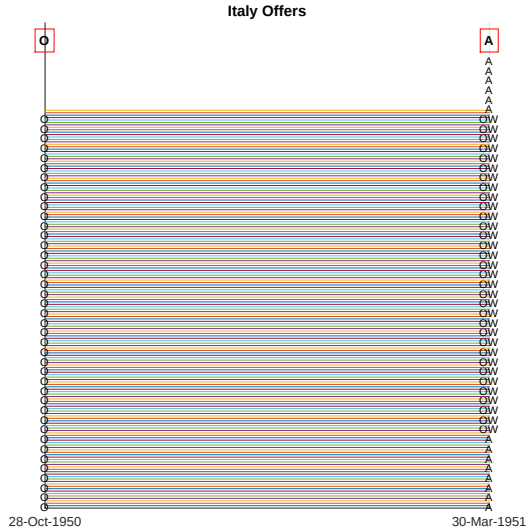


Figure 6: Extensive margin adjustments in US negotiations with Italy.

	By Negotiating Partner						
	Unique	Total	Total/Unique	Mean	SD	Min	Max
Sales							
Number of HS6 requests	29341	38591	1.315	67.232	135.388	0	1259
Number of HS6 request modifications	2202	2302	1.045	4.010	21.699	0	267
Number of HS6 offers	15683	19560	1.247	34.077	98.357	0	1111
Number of HS6 offer modifications	1292	1330	1.029	2.317	20.982	0	337
Number of HS6 offers on requests	11064	10436	0.943	18.181	57.566	0	589
Fraction of HS6 offers on requests	70.55%			31.19%	0.370	0	1
Number of HS6 offers without request	4619	9124	1.975	15.895	49.433	0	554
Fraction of HS6 offers without request	29.45%			25.26%	0.334	0	1
Number of HS6 final concessions	11106	13030	1.173	22.700	77.321	0	917
Number of HS6 final concessions with requests	7944	6974	0.878	12.150	46.615	0	555
Fraction of final concession with request	71.53%			24.36%	0.351	0	1
Number of HS6 final concession without request	3162	6056	1.915	10.551	38.797	0	464
Fraction of final concessions without request	28.47%			20.77%	0.322	0	1
Purchases							
Number of HS6 requests	18836	38591	2.049	67.232	135.388	0	1259
Number of HS6 request modifications	2050	2302	1.123	4.010	21.699	0	267
Number of HS6 offers	12775	19560	1.531	34.077	98.357	0	1111
Number of HS6 offer modifications	1313	1330	1.013	2.317	20.982	0	337
Number of HS6 offers on requests	9224	10436	1.131	18.181	57.566	0	589
Fraction of HS6 offers on requests	58.82%			31.19%	0.370	0	1
Number of HS6 offers without request	3551	9124	2.569	15.895	49.433	0	554
Fraction of HS6 offers without request	22.64%			25.26%	0.334	0	1
Number of HS6 final concessions	9064	13030	1.438	22.700	77.321	0	917
Number of HS6 final concessions with requests	6787	6974	1.028	12.150	46.615	0	555
Fraction of final concession with request	61.11%			24.36%	0.351	0	1
Number of HS6 final concession without request	2277	6056	2.660	10.551	38.797	0	464
Fraction of final concessions without request	20.50%			20.77%	0.322	0	1

Table 2: Sales and Purchases by all participating countries in the Torquay Round. "Sales" records requests, offers and concessions that refer to own tariffs. "Purchases" records requests, offers and concessions that refer to the tariffs of the bargaining partner. "Unique" refers to the number of unique HS6 products across all bargaining partners. "Total" refers to the number of HS6 product-country pairs.

Interpreting Tariff Bargaining at Torquay

- Our stylized facts lend support to two features that are seen by GATT practitioners and legal scholars as hallmarks of the tariff bargaining that occurred in the early GATT rounds
  - a surprising lack of strategic behavior among the participating governments
  - the presence of an important multilateral element to the bilateral bargains

Lack of Strategic Behavior

"...Their requests cannot be higher than their offers and negotiations start from this maximum position: if all requests are granted all the offers will be fulfilled. ... As some of the requests are rejected, some of the offers are withdrawn. This procedure has been raised to a Gatt principle and is not laid down by any rule. It is a convention but one which creates a much better negotiating climate than the opposite trend which was a feature of the classical bilateral negotiations. Then, everyone put forward very low offers with the intention of increasing gradually if the bargaining proved profitable. A country never knew, however, when it had reached the maximum its partner was willing to concede." (Curzon, 1966)

A Multilateral Element

"Multilateral tariff bargaining, as devised at the London Session of the Preparatory Committee in October 1946 and as worked out in practice at Geneva and Annecy, is one of the most remarkable developments in economic relations between nations that has occurred in our time. It has produced a technique whereby governments, in determining the concessions they are prepared to offer, are able to take into account the indirect benefits they may expect to gain as a result of simultaneous negotiations between other countries, and whereby world tariffs may be scaled down within a remarkably short time." (ICITO, 1949)

ToT Theory plus Key GATT Institutional Features

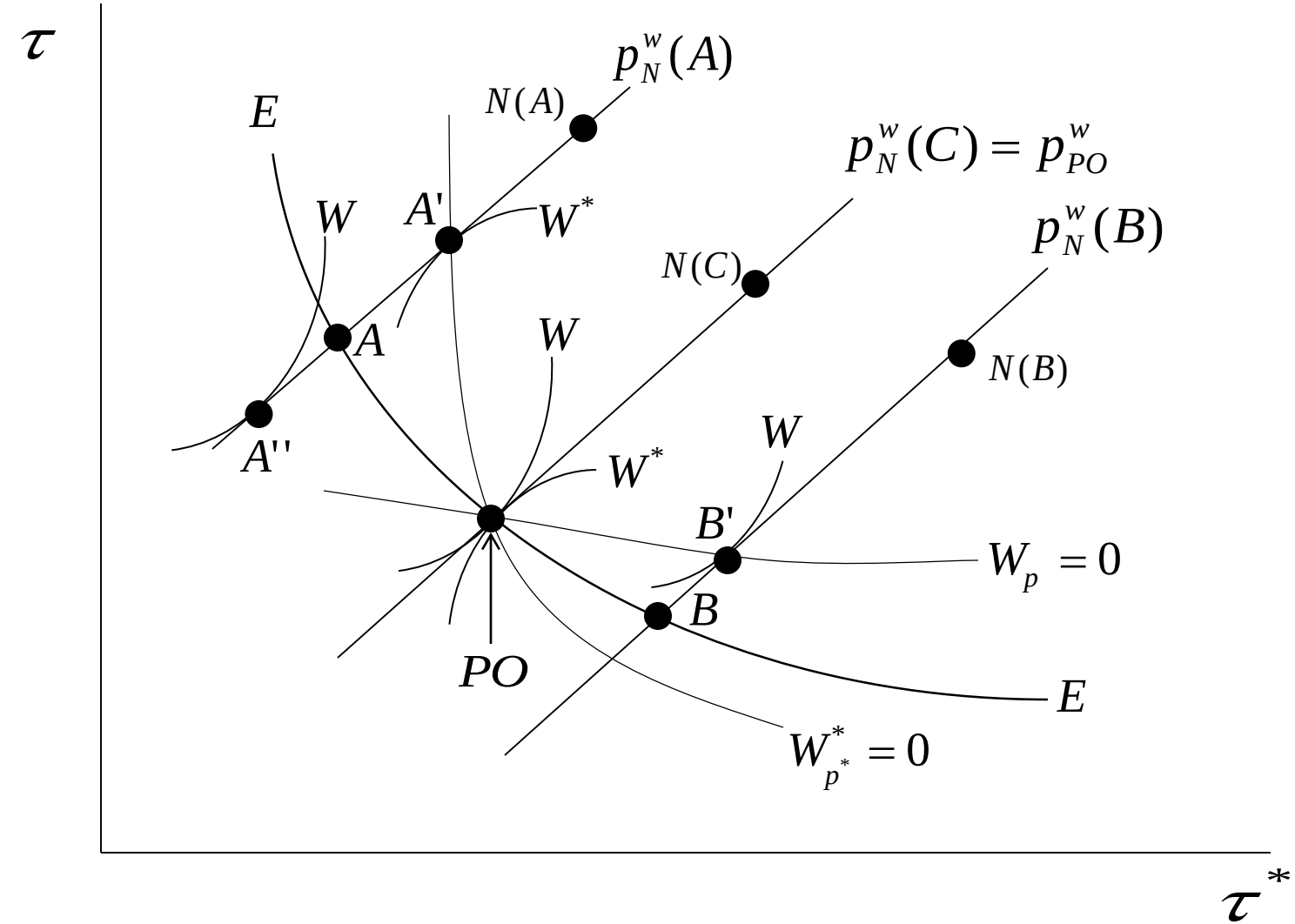
- Through the lens of ToT theory, *reciprocity* and *MFN* can be seen as offering pragmatic approach to simplifying tariff bargaining

ToT Theory plus Key GATT Institutional Features

- Through the lens of ToT theory, *reciprocity* and *MFN* can be seen as offering pragmatic approach to simplifying tariff bargaining
- Strict adherence to reciprocity and MFN together

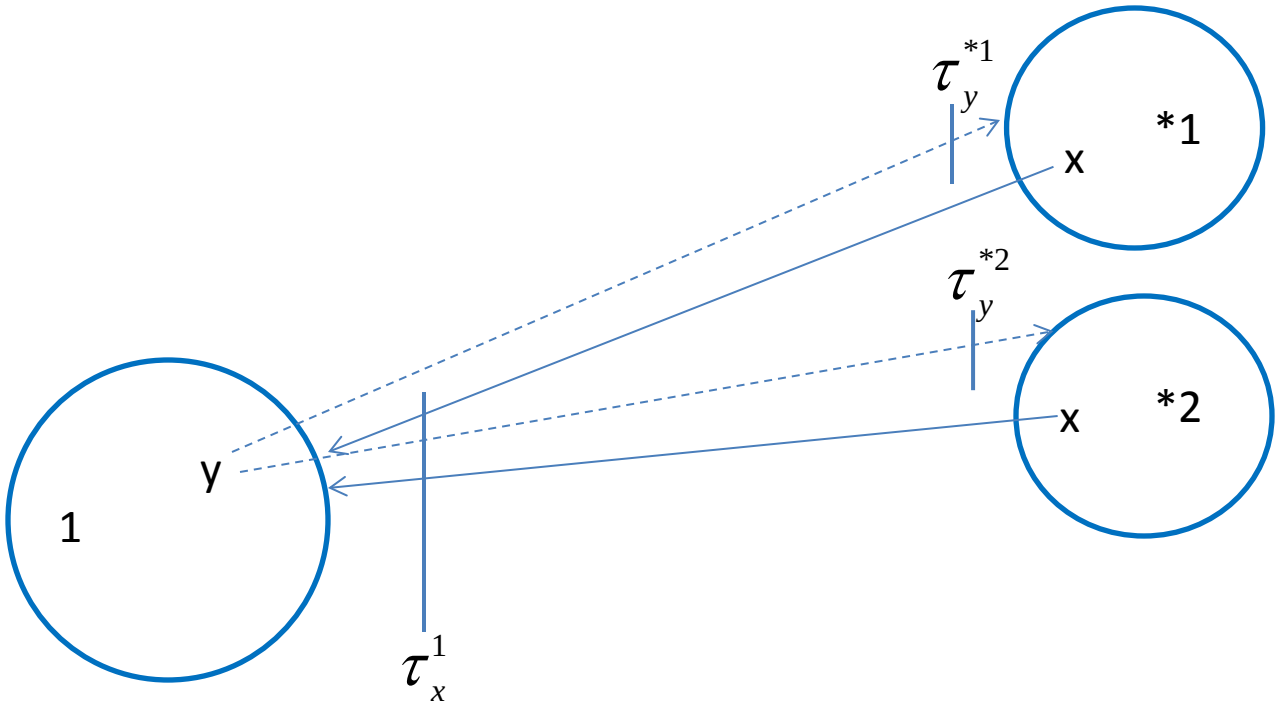
ToT Theory plus Key GATT Institutional Features

- Through the lens of ToT theory, *reciprocity* and *MFN* can be seen as offering pragmatic approach to simplifying tariff bargaining
- Strict adherence to reciprocity and MFN together
  - can induce truth-telling on the part of govs


τ
$p_N^w(A)$
$N(A)$
E
$p_N^w(C) = p_{PO}^w$
W
A'
W^*
$p_N^w(B)$
$N(C)$
A
W
$N(B)$
A''
W^*
W
B'
$W_p = 0$
B
PO
E
$W_{p^*}^* = 0$
τ^*

ToT Theory plus Key GATT Institutional Features

- Through the lens of ToT theory, *reciprocity* and *MFN* can be seen as offering pragmatic approach to simplifying tariff bargaining
- Strict adherence to reciprocity and MFN together
  - can induce truth-telling on the part of govs
  - and eliminate bargaining externalities across bargaining pairs



Reciprocity and MFN

ToT Theory plus Key GATT Institutional Features

- Through the lens of ToT theory, *reciprocity* and *MFN* can be seen as offering pragmatic approach to simplifying tariff bargaining
- Strict adherence to reciprocity and MFN together
  - can induce truth-telling on the part of govs
  - and eliminate bargaining externalities across bargaining pairs
- And only multilateral reciprocity, not bilateral reciprocity, required

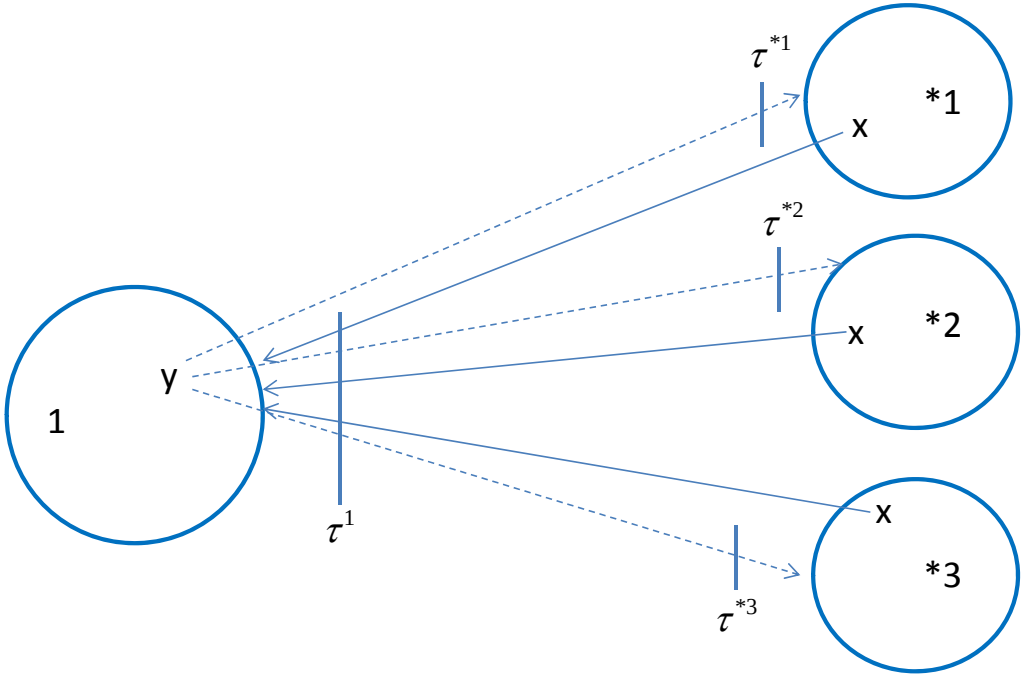
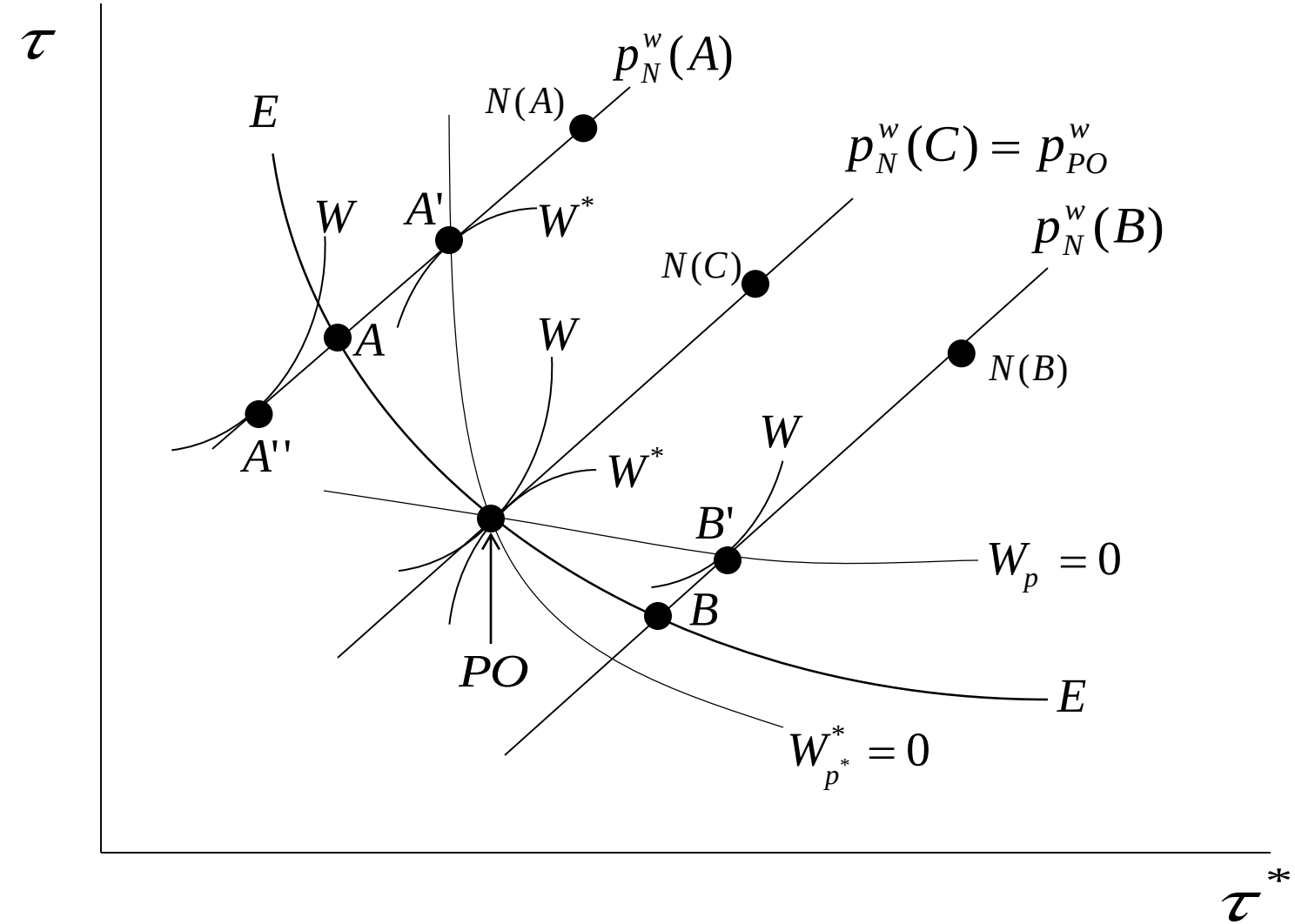


Figure 8: Multilateral Reciprocity

ToT Theory plus Key GATT Institutional Features

- But simplicity comes at potential cost
  - If GATT bargaining partners are asymmetric
  - strict adherence to reciprocity and MFN implies rationing, prevents govs from reaching the full information efficiency frontier


τ
$p_N^w(A)$
$N(A)$
E
$p_N^w(C) = p_{PO}^w$
W
A'
W^*
$p_N^w(B)$
$N(C)$
A
W
$N(B)$
A''
W^*
W
B'
$W_p = 0$
B
PO
E
$W_{p^*}^* = 0$
τ^*

ToT Theory plus Key GATT Institutional Features

- But simplicity comes at potential cost
  - If GATT bargaining partners are asymmetric
  - strict adherence to reciprocity and MFN implies rationing, prevents govs from reaching the full information efficiency frontier
- $\therefore$ ToT theory plus strict adherence to multilateral reciprocity and MFN implies
  - a dominant strategy for each gov to offer own-tariff cuts that deliver the import volume it desires at the fixed terms of trade, followed by
  - a phase of multilateral rebalancing to ensure dual requirements of multilateral reciprocity and voluntary exchange are respected

Interpretation of Tariff Bargaining at Torquay

- Bargaining behavior expected according to our framework, if govs make dominant-strategy proposals that adhere strictly to the twin institutional constraints of MFN and multilateral reciprocity
  - a country would propose for a given import good the tariff that generated its preferred trade volume for a fixed terms of trade
  - with the expectation that any subsequent "rebalancing" of offers necessary for multilateral reciprocity would arise later in the round after all offers had been recorded
  - and that this might lead to a reduction in the depth of its overall (multilateral) offer
- $\Longrightarrow$ According to ToT theory, MFN & multilateral reciprocity were the institutional features that made the "convention" described by Curzon a dominant bargaining strategy

Commonwealth Partners

- Tariff preferences between the UK and its commonwealth partners represents an important deviation from MFN at Torquay
  - but as a group their bargaining behavior conformed to the stylized facts of the round
- The positive (though not normative) features of our dominant-strategy arguments would apply
  - if Commonwealth partners were committed to preserve preference margins under their proposals
  - We find evidence of this behavior at Torquay. Table 6

Country	Existing Preference		Proposed Preference		Preference Change	
	Ad Valorem	Specific	Ad Valorem	Specific	Ad Valorem	Specific
UNITED KINGDOM	1.091	0.009	1.077	0.007	-0.012	-0.002
AUSTRALIA	1.200	27.078	1.180	26.670	-0.017	-0.409
NEW ZEALAND	1.188	1.000	1.172	0.000	-0.013	-1.000

Table 6: Changes in tariff preference margins at Torquay. Each row corresponds to a Commonwealth country who, in its bilateral tariff bargains at Torquay, offered MFN tariff cuts on HS6 products for which it granted preferential tariff access to its Commonwealth partners. See text for definition of preference margins; ad valorem entries are one plus the preference margin, ad valorem preference margin change is the ratio of proposed over existing minus one.

Newcomers to GATT

- According to the ICITO, the bargaining technique at Torquay was "worked out in practice at Geneva and Annecy"
- Six countries were negotiating their accession to GATT at Torquay

  "Several newcomers to GATT unaware of this new technique and starting with low offers found that in the course of negotiations they were unable to reach the level of requests they aimed for. Their initially low offers were taken as proof of their intentions and they either had to go home with a tariff higher than expected or had to increase their offers in the course of the negotiations." (Curzon, 1966)

- We find evidence that the six newcomers
  - *did* deepen their tariff-cut offers as the round progressed. Tables 7 & 8
  - were twice as likely as existing GATT members to make counter-proposals by modifying their requests of others. Fig 9

		Sales			Purchases		
		Ad Val	**Specific**	**All**	**Ad Val**	**Specific**	**All**
				Country-Specific			
Initial Request	Mean	0.471	0.611	0.544	0.571	0.617	0.585
over	SD	0.294	0.327	0.319	0.223	0.290	0.246
Existing Tariff	Min	0	0	0	0	0	0
	Max	1	1	1	1	1	1
	N	4303	4689	8992	6365	2756	9121
Initial Offer	Mean	0.824	0.867	0.852	0.826	0.837	0.830
over	SD	0.231	0.204	0.215	0.178	0.226	0.197
Existing Tariff	Min	0	0	0	0	0	0
	Max	1	1	1	1	1	1
	N	1724	3339	5063	3409	1951	5360
Finalized Concession	Mean	0.725	0.858	0.828	0.806	0.849	0.820
over	SD	0.179	0.220	0.219	0.183	0.232	0.201
Existing Tariff	Min	0	0	0	0	0	0
	Max	1	1	1	1	1	1
	N	668	2271	2939	2863	1324	4187
				Cross-Country			
Initial Request	Mean	0.473	0.628	0.560			
over	SD	0.300	0.330	0.326			
Existing Tariff	Min	0	0	0			
	Max	1	1	1			
	N	2828	3605	6433			
Initial Offer	Mean	0.832	0.872	0.858			
over	SD	0.238	0.200	0.215			
Existing Tariff	Min	0	0	0			
	Max	1	1	1			
	N	1376	2695	4071			
Finalized Concession	Mean	0.790	0.845	0.830			
over	SD	0.229	0.238	0.236			
Existing Tariff	Min	0	0	0			
	Max	1	1	1			
	N	936	2530	3466			

Table 7: Initial requests, initial offers and final offers and concessions over existing tariffs for all acceding countries in the Torquay Round. "Sales" records requests, offers and final concessions that refer to own tariffs. "Purchases" records requests, offers and final concessions that refer to the tariffs of the bargaining partner. Country-Specific numbers condition on a final agreed concession being reached and refer to a given Seller-Purchaser-HS6. Some goods appear in both the ad valorem and specific columns. Cross-Country numbers refer to a given Seller-HS6.

		Sales			Purchases		
		Ad Val	**Specific**	**All**	**Ad Val**	**Specific**	**All**
					Country-Specific		
Initial Request	Mean	0.543	0.581	0.555	0.512	0.585	0.540
over	SD	0.235	0.303	0.259	0.257	0.319	0.285
Existing Tariff	Min	0	0	0	0	0	0
	Max	1	1	1	1	1	1
	N	17653	7906	25559	15591	9839	25430
Initial Offer	Mean	0.803	0.815	0.806	0.796	0.841	0.816
over	SD	0.194	0.234	0.207	0.212	0.219	0.216
Existing Tariff	Min	0	0	0	0	0	0
	Max	1	1	1	1	1	1
	N	8057	3466	11523	6372	4854	11226
Finalized Concession	Mean	0.796	0.826	0.805	0.773	0.839	0.806
over	SD	0.200	0.235	0.212	0.211	0.227	0.221
Existing Tariff	Min	0	0	0	0	0	0
	Max	1	1	1	1	1	1
	N	5579	2394	7973	3384	3341	6725
					Cross-Country		
Initial Request	Mean	0.540	0.576	0.552			
over	SD	0.239	0.307	0.264			
Existing Tariff	Min	0	0	0			
	Max	1	1	1			
	N	13290	6746	20036			
Initial Offer	Mean	0.807	0.826	0.813			
over	SD	0.194	0.233	0.208			
Existing Tariff	Min	0	0	0			
	Max	1	1	1			
	N	6197	2966	9163			
Finalized Concession	Mean	0.800	0.825	0.808			
over	SD	0.203	0.235	0.214			
Existing Tariff	Min	0	0	0			
	Max	1	1	1			
	N	6613	2947	9560			

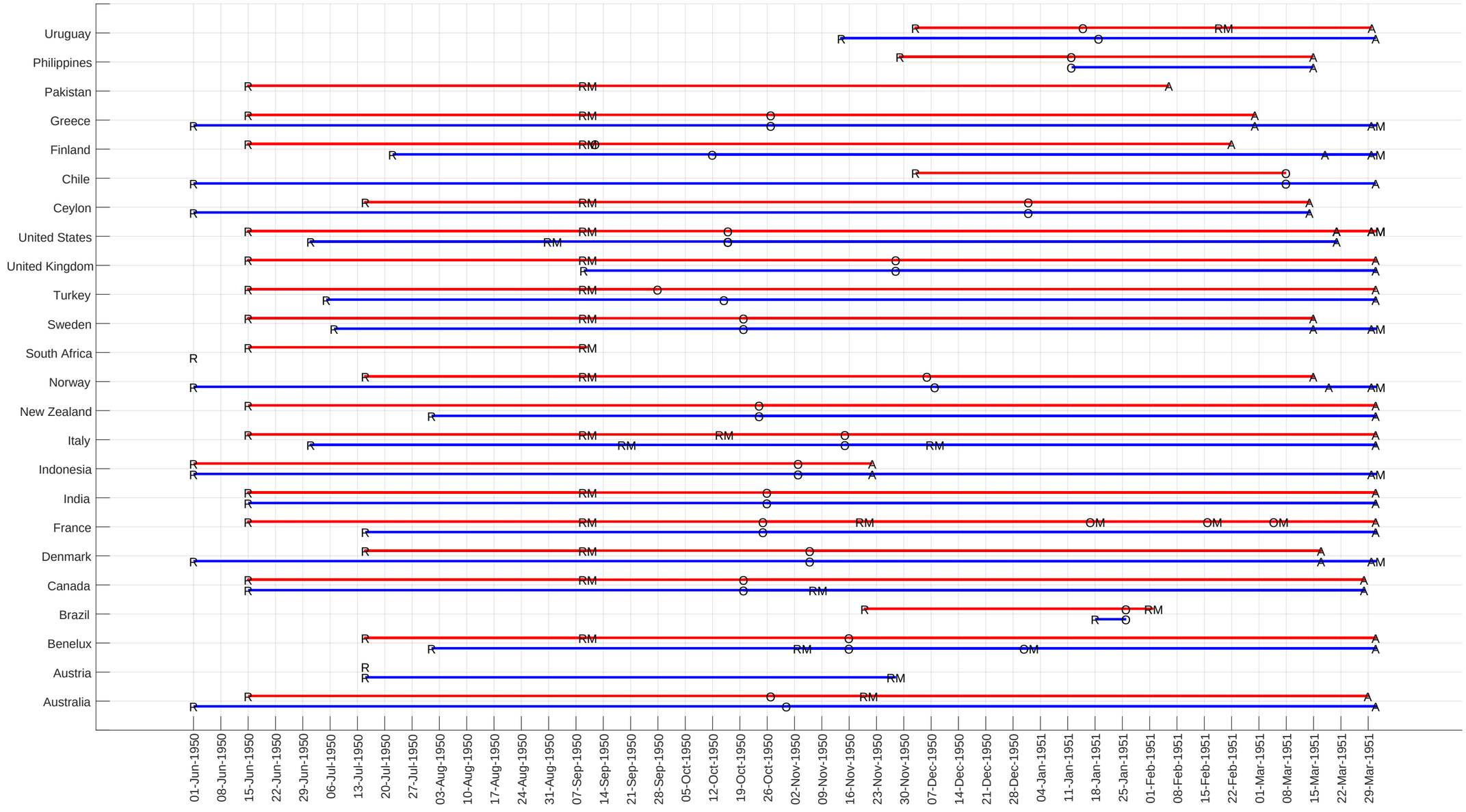
Table 8: Initial requests, initial offers and final offers and concessions over existing tariffs for all non-acceding countries in the Torquay Round. "Sales" records requests, offers and final concessions that refer to own tariffs. "Purchases" records requests, offers and final concessions that refer to the tariffs of the bargaining partner. Country-Specific numbers condition on a final agreed concession being reached and refer to a given Seller-Purchaser-HS6. Some goods appear in both the ad valorem and specific columns. Cross-Country numbers refer to a given Seller-HS6.

		Sales			Purchases		
		Ad Val	**Specific**	**All**	**Ad Val**	**Specific**	**All**
					Country-Specific		
Initial Request	Mean	0.471	0.611	0.544	0.571	0.617	0.585
over	SD	0.294	0.327	0.319	0.223	0.290	0.246
Existing Tariff	Min	0	0	0	0	0	0
	Max	1	1	1	1	1	1
	N	4303	4689	8992	6365	2756	9121
Initial Offer	Mean	0.824	0.867	0.852	0.826	0.837	0.830
over	SD	0.231	0.204	0.215	0.178	0.226	0.197
Existing Tariff	Min	0	0	0	0	0	0
	Max	1	1	1	1	1	1
	N	1724	3339	5063	3409	1951	5360
Finalized Concession	Mean	0.725	0.858	0.828	0.806	0.849	0.820
over	SD	0.179	0.220	0.219	0.183	0.232	0.201
Existing Tariff	Min	0	0	0	0	0	0
	Max	1	1	1	1	1	1
	N	668	2271	2939	2863	1324	4187
					Cross-Country		
Initial Request	Mean	0.473	0.628	0.560			
over	SD	0.300	0.330	0.326			
Existing Tariff	Min	0	0	0			
	Max	1	1	1			
	N	2828	3605	6433			
Initial Offer	Mean	0.832	0.872	0.858			
over	SD	0.238	0.200	0.215			
Existing Tariff	Min	0	0	0			
	Max	1	1	1			
	N	1376	2695	4071			
Finalized Concession	Mean	0.790	0.845	0.830			
over	SD	0.229	0.238	0.236			
Existing Tariff	Min	0	0	0			
	Max	1	1	1			
	N	936	2530	3466			

Table 7: Initial requests, initial offers and final offers and concessions over existing tariffs for all acceding countries in the Torquay Round. "Sales" records requests, offers and final concessions that refer to own tariffs. "Purchases" records requests, offers and final concessions that refer to the tariffs of the bargaining partner. Country-Specific numbers condition on a final agreed concession being reached and refer to a given Seller-Purchaser-HS6. Some goods appear in both the ad valorem and specific columns. Cross-Country numbers refer to a given Seller-HS6.

		Sales			Purchases		
		Ad Val	**Specific**	**All**	**Ad Val**	**Specific**	**All**
				Country-Specific			
Initial Request	Mean	0.543	0.581	0.555	0.512	0.585	0.540
over	SD	0.235	0.303	0.259	0.257	0.319	0.285
Existing Tariff	Min	0	0	0	0	0	0
	Max	1	1	1	1	1	1
	N	17653	7906	25559	15591	9839	25430
Initial Offer	Mean	0.803	0.815	0.806	0.796	0.841	0.816
over	SD	0.194	0.234	0.207	0.212	0.219	0.216
Existing Tariff	Min	0	0	0	0	0	0
	Max	1	1	1	1	1	1
	N	8057	3466	11523	6372	4854	11226
Finalized Concession	Mean	0.796	0.826	0.805	0.773	0.839	0.806
over	SD	0.200	0.235	0.212	0.211	0.227	0.221
Existing Tariff	Min	0	0	0	0	0	0
	Max	1	1	1	1	1	1
	N	5579	2394	7973	3384	3341	6725
				Cross-Country			
Initial Request	Mean	0.540	0.576	0.552			
over	SD	0.239	0.307	0.264			
Existing Tariff	Min	0	0	0			
	Max	1	1	1			
	N	13290	6746	20036			
Initial Offer	Mean	0.807	0.826	0.813			
over	SD	0.194	0.233	0.208			
Existing Tariff	Min	0	0	0			
	Max	1	1	1			
	N	6197	2966	9163			
Finalized Concession	Mean	0.800	0.825	0.808			
over	SD	0.203	0.235	0.214			
Existing Tariff	Min	0	0	0			
	Max	1	1	1			
	N	6613	2947	9560			

Table 8: Initial requests, initial offers and final offers and concessions over existing tariffs for all non-acceding countries in the Torquay Round. "Sales" records requests, offers and final concessions that refer to own tariffs. "Purchases" records requests, offers and final concessions that refer to the tariffs of the bargaining partner. Country-Specific numbers condition on a final agreed concession being reached and refer to a given Seller-Purchaser-HS6. Some goods appear in both the ad valorem and specific columns. Cross-Country numbers refer to a given Seller-HS6.


Uruguay
Philippines
Pakistan
Greece
Finland
Chile
Ceylon
United States
United Kingdom
Turkey
Sweden
South Africa
Norway
New Zealand
Italy
Indonesia
India
France
Denmark
Canada
Brazil
Benelux
Austria
Australia
01-Jun-1950
08-Jun-1950
15-Jun-1950
22-Jun-1950
29-Jun-1950
06-Jul-1950
13-Jul-1950
20-Jul-1950
27-Jul-1950
03-Aug-1950
10-Aug-1950
17-Aug-1950
24-Aug-1950
31-Aug-1950
07-Sep-1950
14-Sep-1950
21-Sep-1950
28-Sep-1950
05-Oct-1950
12-Oct-1950
19-Oct-1950
26-Oct-1950
02-Nov-1950
09-Nov-1950
16-Nov-1950
23-Nov-1950
30-Nov-1950
07-Dec-1950
14-Dec-1950
21-Dec-1950
28-Dec-1950
04-Jan-1951
11-Jan-1951
18-Jan-1951
25-Jan-1951
01-Feb-1951
08-Feb-1951
15-Feb-1951
22-Feb-1951
01-Mar-1951
08-Mar-1951
15-Mar-1951
22-Mar-1951
29-Mar-1951

GATT's Multilateralization of Reciprocity

- The multilateralization of the reciprocity constraint viewed as key innovation of GATT (ICITO, 1949)
- Was the relaxation of bilateral reciprocity afforded by the multilateral nature of the GATT bargaining forum a key to GATT's success?
- Look for indirect evidence
  - exploit unexpected breakdown in US-Commonwealth bilaterals

GATT's Multilateralization of Reciprocity

"The fact that certain of the more important negotiations initiated between existing contracting parties did not result in agreements inevitably had some reactions on other negotiations. If, for example, the other countries engaged in tariff negotiations at Torquay had been sure that substantial concessions were going to be exchanged between the United Kingdom, Australia and New Zealand on the one hand, and the United States on the other, they might have been prepared, in the light of the benefits which they would have enjoyed from the automatic extension of these concessions to them, to go somewhat further in reducing their own tariffs. (ICITO, 1952)"

GATT's Multilateralization of Reciprocity

- If govs expected indirect trade benefits from the MFN tariff cuts negotiated between 3^{rd}-countries to achieve multilateral reciprocity
  - then we should see evidence of efforts to rebalance their bargains when they learned of the collapse of the US-Commonwealth bilaterals
  - whereas no such reaction would be expected if strictly bilateral reciprocity had been demanded and achieved all along
- Two ways to rebalance
  - 3^{rd} countries could retrench on offers to US, UK, Australia and New Zealand, or
  - these four countries could reorient offers directly to 3^{rd} countries

GATT's Multilateralization of Reciprocity

- Did 3^{rd} countries retrench on their offers to the US, UK, Australia and New Zealand once news of the failed bilaterals was out?
  - "News" date 2/18/51
  - Yes, if France is excluded as special: share of product-level offers made to these four countries by the others at Torquay dropped from 40% to 37% after news broke of the failed bilaterals
- Did the failure of the US-Commonwealth bilaterals lead the US, UK, Australia and New Zealand to reorient their offers to 3^{rd} countries?
  - Yes, strong evidence of this. Table 9
- $\therefore$ These four countries re-oriented their offers toward the rest of the participants at Torquay at the same time that the rest of the participants were re-orienting their offers away from these countries

	Probit	Probit	OLS	OLS
OfferPre	0.303**	0.647***	0.068**	0.099***
	(0.148)	(0.161)	(0.032)	(0.031)
Observations	3031	2277	3031	3031
R-squared			0.162	0.563
Country FE	Yes	No	Yes	No
Country Pair FE	No	Yes	No	Yes
HS1 FE	No	Yes	No	Yes
Cluster SE	Yes	Yes	Yes	Yes

Table 9: Regression of whether an HS6 product - country pairing offered by the US, the UK, Australia or New Zealand to countries outside this set was added after 2/18/1951 (after the breakdown of the US-UK, US-Australia and US-New Zealand bilaterals) on whether the product in question had been offered by that country in one of these bilaterals prior to their breakdown. A positive coefficient implies that a product is more likely to be offered by one of these countries to countries outside this set following the breakdown of the US-UK, US-Australia and US-New Zealand bilaterals if that country was offering a concession on this product in one of these bilaterals prior to their breakdown. Standard errors clustered by negotiating partner. *, **, and *** denote significance at the 90%, 95%, and 99% confidence levels, respectively.

Takeaway on Torquay

- We have identified a set of stylized facts about tariff negotiations which point to two features that are seen as hallmarks of the tariff bargaining that occurred in the early GATT rounds
  - a lack of strategic behavior among the participating governments
  - and an important multilateral element to the bilateral bargains
- We have shown that, when viewed through the lens of the ToT theory, these features can be understood as emerging from a tariff bargaining forum built on the GATT pillars of MFN and multilateral reciprocity
- We have provided the first evidence for the claim that the relaxation of strict bilateral reciprocity facilitated by the GATT multilateral bargaining forum was important to the success of GATT
- As more and more of this data becomes accessible to researchers, we view our initial look at the GATT bargaining data as providing a promising view for the road ahead

Reciprocity

- Reciprocity in GATT/WTO
  - A change in trade policies from (τ^0, τ^{*0}) to (τ^1, τ^{*1}) satisfies the principle of reciprocity iff it offers a balance of concessions in that

$$\tilde{P}^w(0)[M(1) - M(0)] = E(1) - E(0).$$

  - Fixes the terms of trade (terms of exchange of market access)

- Norm of negotiation (reciprocity going down)
  - Govs make tariff proposals that satisfy reciprocity
  - $\Longrightarrow$ No bargaining over the terms of exchange

- Rule of renegotiation (reciprocity going up)
  - Voluntary exchange: no gov can be forced to import more volume than it proposes at the fixed terms of trade
  - $\Longrightarrow$ No bargaining over the volume of exchange

The French are Special

- A November 8 1950 *New York Times* article ran with the headline

  French Now Seek New Tariff Duties: Torquay Trade Body Amazed as Paris Negates Efforts to Relax Import Curbs

- A March 11 1951 *New York Times* article stated

  France, which was frightening all participants in November with the number of items on which she wanted to raise duties (mostly items on which the French granted reductions in the earlier meetings at Geneva and Annecy) has mollified most of her trading partners..., all after prolonged and sometimes acrimonious bargaining in dozens of hotel rooms.

Quantitative Analysis of Multi-Party Tariff Negotiations

Kyle Bagwell, Robert W. Staiger and Ali Yurukoglu

Stanford, Dartmouth and Stanford

April 2018

Introduction

- The GATT/WTO has made extensive use of simultaneous bilateral tariff bargaining, subject to
  - a non-discrimination rule (MFN)
  - principal supplier and reciprocity norms
- These features of the bargaining protocol shape the externalities stemming from bilateral tariff bargains
- In this paper we analyze bilateral tariff bargaining in a multi-country quantitative trade model
- We build on the quantitative trade model of Costinot et al (2011)
  - use the model to explore the properties of alternative tariff bargaining protocols for the GATT Uruguay Round (1986-1994)
  - the last completed GATT/WTO multilateral negotiating round

Introduction

- To model bilateral tariff bargaining in this environment, we adopt the "Nash-in-Nash" solution concept of Horn and Wolinsky (1988)
  - Each bilateral negotiation results in the Nash bargaining solution taking as given the outcomes of the other negotiations
- We use our quantitative trade model to calculate the HW bargaining solution
  - beginning from the 1990 (pre-Uruguay Round) tariffs, and under three institutional constraints: MFN, principal supplier rule, tariff bindings

Introduction

- Use predicted principal supplier patterns to identify viable bargaining pairs; allow costly transfers as part of the negotiations
- Solve the model for the HW solution under different values of transfer costs and bargaining powers for each country in each of its bilaterals
- Select as our estimates of transfer cost and bargaining parameters
    - the set of parameters that generates the HW solution within our model that best matches the tariff outcomes of the Uruguay Round

Introduction

- With our chosen transfer-cost and bargaining parameters, our HW model solution
  - explains about 60% of the variation in actual Uruguay Round tariff bargaining outcomes across 190 country-sector tariff reductions
  - indicates that the prior GATT rounds collectively and the Uruguay Round itself each achieved 1/3 of potential world-wide welfare gains from negotiating over the tariffs that were under negotiation in Uruguay

- $\Longrightarrow$ "Unfinished business" for the WTO: roughly a third of the potential world-wide welfare gains from negotiating over the tariffs that were under negotiation in Uruguay

Introduction

- Finally, we consider a counterfactual bargaining protocol for the Uruguay Round: What would have been the outcome of tariff bargaining if countries had bargained over discriminatory tariff cuts?
- We remove the MFN requirement and the principal supplier rule
  - we solve for the HW solution when countries can bargain over discriminatory tariff changes
- We find that discriminatory negotiations are worse for world-wide welfare than MFN negotiations, and developing and emerging countries are among the biggest losers from the abandonment of MFN
  - Among industrialized countries, Japan gains the most from abandonment of MFN while South Korea loses the most, and the EU and Canada also lose (the US gains slightly)

Model

- Our model consists of two parts
- A model world economy
  - building on the multi-sector version of the Eaton-Kortum model from CDK
  - extended to include tariffs and sector-specific productivity-dispersion parameters as in Caliendo and Parro (2014)
- A model of simultaneous Nash-in-Nash bilateral tariff bargaining

Model World Economy

- A K-sector N-country Ricardian trade model, with a countably infinite number of varieties indexed by ω within each sector
- Ad valorem import tariffs (possibly discriminatory) t_{ji}^k imposed by country i against imports from j at the sector level
- Utility for a representative consumer in country i

$$u_i = \Pi_{k=1}^{K} (C_i^k)^{\alpha_i^k} \quad \text{with } C_i^k = \left(\sum_{\omega=1}^{\infty} c^k(\omega)^{\frac{\sigma-1}{\sigma}} \right)^{\frac{\sigma}{\sigma-1}}$$

- Production technology for each variety drawn from a Frechet distribution with CDF

$$F_i^k(z) = \exp\left(-(\frac{z}{z_i^k})^{-\theta_k} \right)$$

where z_i^k is country i's productivity parameter in sector k and θ_k is a sector-specific productivity shape parameter

  - higher $\theta_k \implies$ less within-sector comparative advantage and higher responsiveness of trade to trade costs

Model World Economy

- Iceberg trade costs parameterized by

$$\log d_{ji}^k = \alpha_j + \gamma_i + \beta_{0k} + \beta_{1k} dist_{ji} + \beta_{2k} PTA_{ji} + \beta_3 lang_{ji} + \beta_4 border_{ji} + \sum_{n \in Q} \beta_{5n} Quad_{n,ji}$$

- Price of sector k's variety ω in country i given vector of wages w_i

$$p_i^k(\omega) = \min_{j \in 1,\ldots,N} \frac{w_j}{z_j^k(\omega)} d_{ji}^k (1 + t_{ji}^k)$$

- Equilibrium of the model for given set of tariffs
  - a vector of wages w_i and national incomes E_i such that labor markets clear, trade is balanced and consumers and firms behave optimally

Tariff Bargaining

- We first describe tariff negotiations in the Uruguay Round as a web of simultaneous bilateral negotiations over vectors of tariffs
- We measure country welfare by real national income, and apply the Nash-in-Nash solution concept
  - each pair of negotiating countries maximizes its Nash product given the actions of the other pairs

Tariff Bargaining

- Let $\pi_i(\mathbf{t})$ be country i's welfare when the world vector of tariffs is $\mathbf{t}$
- When country i negotiates with j, they select the levels of the tariffs that they negotiate $\boldsymbol{\tau}$ to maximize their Nash product $np_{ij}(\boldsymbol{\tau}, \mathbf{t}_{-ij})$

$$\left(\pi_i(\boldsymbol{\tau}, \mathbf{t}_{-ij}) - \pi_i(\boldsymbol{\tau}_0, \mathbf{t}_{-ij})\right)^{\zeta_{ij}} \left(\pi_j(\boldsymbol{\tau}, \mathbf{t}_{-ij}) - \pi_j(\boldsymbol{\tau}_0, \mathbf{t}_{-ij})\right)^{1-\zeta_{ij}}$$

with ζ_{ij} the bargaining power parameter of country i in its bilateral with j and where $\boldsymbol{\tau}_0$ is the disagreement (1990) level of $\boldsymbol{\tau}$

Tariff Bargaining

- We parameterize pairwise bargaining powers according to

$$\zeta_{ij} = \frac{\exp(a_i)}{\exp(a_i) + \exp(a_j)}$$

- An *equilibrium in tariffs* is a vector $\mathbf{t}$ s.t. for each pair ij the tariffs negotiated by this pair maximize $np_{ij}(\boldsymbol{\tau}, \mathbf{t}_{-ij})$ given $\mathbf{t}_{-ij}$

- To reflect the tariff bargaining environment of the Uruguay Round, we introduce three institutional constraints
  - MFN
  - principal supplier rule
  - tariff bindings

Tariff-and-Transfer Bargaining

- We augment the model of tariff bargaining described above to allow countries to also bargain over costly transfers
- A country's welfare is its real national income, now augmented by the net international transfer it receives
  - a direct utility transfer rather than an income transfer, with no general equilibrium effects as a result
  - we do not allow transfers to relax the requirement of a "double coincidence of wants" for viable bargaining pairs
- Let $\Pi_i(\mathbf{t}, \mathbf{m})$ be country i's welfare when the world vector of tariffs is $\mathbf{t}$ and the world vector of net transfers is $\mathbf{m}$

Tariff-and-Transfer Bargaining

- When country i negotiates with j, they select the levels of the tariffs that they negotiate $\boldsymbol{\tau}$ and the net transfer μ_{ij} that i pays to j to maximize their Nash product $NP_{ij}(\boldsymbol{\tau}, \mathbf{t}_{-ij}, \mu_{ij}, \mathbf{m}_{-ij})$

$$\left(\Pi_i(\boldsymbol{\tau}, \mathbf{t}_{-ij}, \mu_{ij}, \mathbf{m}_{-ij}) - \Pi_i(\boldsymbol{\tau}_0, \mathbf{t}_{-ij}, \mu_0, \mathbf{m}_{-ij})\right)^{\zeta_{ij}} \cdot \left(\Pi_j(\boldsymbol{\tau}, \mathbf{t}_{-ij}, \mu_{ij}, \mathbf{m}_{-ij}) - \Pi_j(\boldsymbol{\tau}_0, \mathbf{t}_{-ij}, \mu_0, \mathbf{m}_{-ij})\right)^{1-\zeta_{ij}}$$

  with $\boldsymbol{\tau}_0$ the disagreement (1990) level of $\boldsymbol{\tau}$ and μ_0 the disagreement level (zero) of μ_{ij}

- If i makes a positive net transfer to its bargaining partners in total (i.e., if $\sum_j \mu_{ij} > 0$), then i pays an additional utility cost $\kappa(\sum_j \mu_{ij})^2$

- An *equilibrium in tariffs and transfers* is a vector $\mathbf{t}$ and a vector $\mathbf{m}$ s.t. for each pair ij the tariffs and transfer negotiated by this pair maximize $NP_{ij}(\boldsymbol{\tau}, \mathbf{t}_{-ij}, \mu_{ij}, \mathbf{m}_{-ij})$ given $\mathbf{t}_{-ij}$ and $\mathbf{m}_{-ij}$

Data

- We aggregate the world economy into
  - the 25 largest countries by GDP in 1990 with the rest of the world aggregated into 5 additional regions; 49 sectors
- Assemble data on 1990 (pre-Uruguay Round) trade flows, production, and tariffs at the country-sector level
  - together with data on a set of gravity variables
- We use the 1990 MFN applied tariffs from TRAINS for the pre-Uruguay Round tariffs, and the 2000 MFN applied tariffs to represent the negotiated tariff outcomes from the Round
  - we ignore an important distinction between applied and bound tariffs
  - we also abstract from Uruguay Round phase-in periods
  - our representation of Uruguay Round tariff outcomes with applied MFN tariffs in 2000 is an attempt to capture these complexities while maintaining tractability

Estimation

- We first estimate the taste, productivity and iceberg cost parameters
- The α_i^k can be inferred from the data on expenditure shares directly
- The vectors of productivity and dispersion-of-productivity parameters $(z,\, \theta)$ and iceberg cost parameters (β) are then chosen according to

$$\min_{z,\theta,\beta} G(z,\theta,\beta)' W G(z,\theta,\beta) \quad \text{where}$$

$$G(z,\theta,\beta) = \begin{bmatrix} \frac{x_{ij}^k}{\sum_i x_{ij}^k} - \frac{\hat{x}_{ij}^k(z,\theta,\beta)}{\sum_i \hat{x}_{ij}^k(z,\theta,\beta)} \\ \frac{\sum_{j,k} x_{ij}^k}{\sum_{j,k} x_{USA,j}^k} - \frac{\sum_{j,k} \hat{x}_{ij}^k(z,\theta,\beta)}{\sum_{j,k} \hat{x}_{USA,j}^k(z,\theta,\beta)} \\ \min\left(JS_{ij}(\tau_{ij}^{POST}) - JS_{ij}(\tau_{ij}^0), 0\right) \end{bmatrix}$$

and JS_{ij} is the joint surplus of the negotiating pair ij, τ_{ij}^{POST} is the observed post-Uruguay-Round tariffs, and τ_{ij}^0 is the pre-Uruguay-Round levels of the tariffs being negotiated by the pair ij together with the observed post-Uruguay-Round levels for all other tariffs.

Model Estimates and Benchmarks

- We estimate cost-of-transfers and bargaining parameters by solving

$$\min_{\hat{\kappa},\hat{a}} \Sigma_{i,k} \left(\hat{\tau}_i^k(\hat{\kappa},\hat{a}) - \tau_i^k\right)^2$$

  where $\hat{\tau}_i^k(\kappa, a)$ is the model's prediction for country i's MFN tariff in sector k for a candidate κ and vector a, and τ_i^k is the observed MFN tariff of country i in sector k in the year 2000.
- Trade parameter estimates
  - θ_k: Table 2
  - Estimated average iceberg cost across all sectors and country pairs is 109.0%; 75.3% average-across-sectors incurred iceberg costs
  - z_i^k: Figure 1
- Model benchmarks–welfare change relative to status quo 1990 tariffs
  - autarky, zero trade frictions; free trade, world-welfare maximizing tariffs, Nash tariffs: Table 3

Cost-of-Transfers and Bargaining Parameter Estimates

- We let predicted principal supplier patterns guide our set of bilateral bargains
  - observed v predicted principal supplier patterns: Table 4
  - 12 bargaining pairs involving 6 countries observed; 7 bargaining pairs involving 5 countries predicted
  - 14 major industrialized countries compose our set of bilateral bargains (Canada does not make the cut)

- Cost-of-transfer and bargaining parameter estimates: Table 5
  - transfers were possible but not costless: average cost of transfers is 84.68%, marginal cost of the last unit of utility transferred is 129.06%
  - Japan the strongest bargainer in the Uruguay Round, followed in descending order by the US, South Korea, Australia and the EU

Cost-of-Transfers and Bargaining Parameter Estimates

- Bargaining parameters reflect how evenly the surplus in a bilateral is split *and* slope of bilateral bargaining frontier
  - slope of the bilateral bargaining frontier not always -1: Figures 2 and 3
  - the slope is a function of degree of asymmetries in market power, position of initial tariffs relative to best-response, and third-party spillovers from tariff cuts: Table 6
- Bargaining parameters reflect position of HW disagreement point, *not* 1990 status quo welfares

MFN Tariff Bargaining in the Uruguay Round: Table 7

- About 60% of the variation in 190 tariffs under negotiation in the Uruguay Round explained with 5 parameters
- Small world-wide welfare impacts
  - an order of magnitude smaller than Caliendo et al (2017)
- But large cross-country variation in gains, higher for some emerging/ developing countries, smaller for some industrialized countries
  - not all countries gain, but all countries engaged in bargaining gain
  - Japan gains more than US, Australia and EU, but less that South Korea, despite Japan's stronger bargaining power
- Achieved roughly 1/3 of potential world-wide welfare gains from negotiating over these tariffs, same as all previous rounds together
  - 1/3 of the potential gains in moving from Nash to world welfare maximizing levels for these tariffs remain as "unfinished business"
  - by comparison, Ossa (2014) reports roughly 15% unfinished business

Counterfactuals

- What would have been the outcome of tariff bargains in the Uruguay Round if countries had bargained over discriminatory tariff cuts?
- We consider an alternative bargaining protocol under which the MFN requirement and the principal supplier rule are removed
  - HW solution when countries bargain over discriminatory tariff cuts
- We focus primarily on the intensive margin
  - for each country, the set of its tariffs being negotiated is constrained to include only the sectors that were negotiated under MFN
  - and the set of countries negotiating on these tariffs is constrained to include only the countries that it negotiated with under MFN

Counterfactuals

- Average tariffs drop more under discriminatory tariff bargaining
  - limiting comparison to product-and-country pairs also in play under MFN, a drop of 107.35% versus 46.95%
- But world-wide welfare declines relative to MFN tariff bargaining
  - developing/emerging countries (along with South Korea) the biggest losers: Table 7

Interpretation

- We would expect the positive spillovers from the MFN tariff cuts reported in Table 6 to turn negative under discriminatory tariff cuts
  - Table 8: with two exceptions, uniformly negative spillovers
- Drives down levels of negotiated tariffs in discriminatory settings from what these levels would be under MFN
  - in an analysis of Nash-in-Nash tariff bargaining in a three-country two-good GE trade model, Bagwell et al (2017) show that discriminatory tariff bargaining results in over-liberalization: intuition

Interpretation

- Developing/emerging countries are big losers because they are 3^{rd} parties to every bargain in the Uruguay Round
- South Korea a big loser because it no longer benefits via MFN from Japan's strong bargaining power against the EU, the US and Australia
  - Japan the biggest gainer because MFN limits its ability to exploit its strong bargaining power

A Key Takeaway

- The free-rider issue created by the positive third-party externality from the GATT/WTO's MFN requirement is widely emphasized as a shortcoming of the GATT/WTO approach
  - we find that the abandonment of MFN in tariff bargaining would create negative third-party externalities that are even more powerful
  - and that would ultimately lead to tariff bargaining outcomes that are worse from the perspective of world welfare

Conclusion

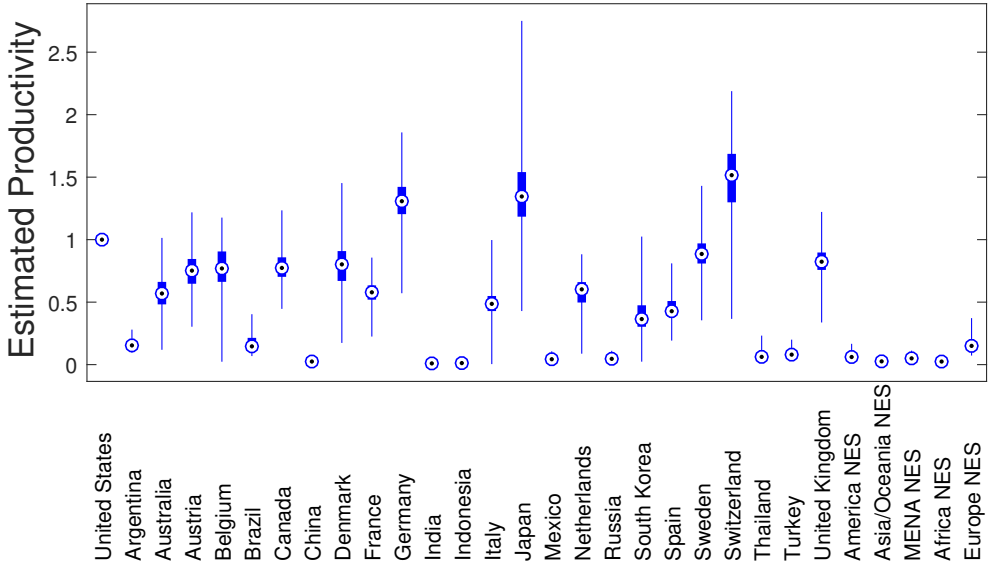
- Framework for trade negotiations that features
  - comparative advantage and distance driven trade patterns
  - multi-party bilateral bargaining with externalities
  - flexible bargaining parameters
- Findings:
  - MFN performs better for liberalization than discriminatory tariffs
  - Demonstration of method that can be used for other eras and bargaining protocols

Table 2: θ Estimates by Industry.

Sector	$\hat{\theta}$	SE	Sector	$\hat{\theta}$	SE
Live animals	40.87	2.10	Footwear	8.50	5.12
Misc. Edible	24.44	10.75	Chemical	8.32	5.03
Petroleum	22.38	11.31	Non-metallic mineral manufactures	8.31	8.00
Dairy	21.77	10.22	Crude rubber	8.09	4.73
All others	18.45	9.45	Office machines	8.02	3.42
Cereals	17.16	5.86	Specialized Machinery	7.82	4.15
Feeding stuff	16.94	7.19	Pulp and waste paper	7.77	2.10
Plumbing, heating and lighting	15.86	6.18	Crude materials,n.e.s.	7.74	3.31
Furniture and parts thereof	15.03	7.75	Travel goods and bags	7.67	3.80
Paper manufactures	11.98	10.67	Road vehicles	7.51	4.03
Electrical machinery	11.91	3.91	Meat	7.50	3.64
Wood manufactures	11.82	6.63	Non-ferrous metals	7.42	3.89
Vegetables and fruit	11.78	8.01	Fertilizers	7.32	4.91
Beverages	11.73	1.71	Tobacco	7.15	4.31
Misc manufactures	10.92	4.28	Fabrics	7.07	4.36
Rubber manufactures	10.81	5.49	Organic chemicals	6.99	5.25
Animal oils and fats	10.63	3.29	Iron and steel	6.94	5.87
Coffee, Tea, Spices	10.46	10.30	Scientific instruments	6.91	3.63
Power generating machinery	10.23	4.99	Other transport equipment	6.42	4.13
Inorganic chemicals	10.19	5.42	Seafood	5.67	3.83
Hides and skins	9.44	4.59	Coal	5.38	1.65
Sugar	9.35	3.52	Pharmaceutical	4.36	1.29
Cork and wood	9.07	5.63	Metal Ores	4.13	0.92
Resins	8.94	4.97	Textile fibres	3.98	0.98
Dyeing and tanning	8.78	4.85			

Notes: Non-linear least squares estimates of θ by sector in descending order of estimate.

Figure 1: Productivity Distributions by Country



Notes: For each country, the target is the median estimated productivity across sectors. The box represents the interquartile range. The line represents the full range. Each sector in the US is normalized to a productivity level one.

Table 3: Model Benchmarks

Country	Autarky	Zero Iceberg Costs	Free Trade	Total Welfare Maximizing	Nash
United States	-1.76%	18.82%	0.03%	-1.13%	-0.21%
EU	-5.44%	47.28%	0.00%	-1.62%	-0.01%
Austria	-10.20%	58.09%	0.00%	-2.01%	-0.02%
Belgium	-17.05%	79.49%	-0.04%	-1.63%	0.00%
Denmark	-5.19%	90.64%	-0.02%	-1.47%	-0.01%
France	-4.98%	64.75%	-0.01%	-1.08%	-0.02%
Germany	-2.86%	29.75%	-0.06%	-2.10%	0.03%
Italy	-5.07%	44.12%	-0.05%	-2.08%	0.00%
Netherlands	-11.74%	85.97%	0.05%	-1.77%	-0.02%
Spain	-6.42%	62.85%	0.02%	-1.79%	0.01%
Sweden	-8.92%	51.38%	0.00%	-1.78%	-0.06%
United Kingdom	-4.61%	36.92%	0.15%	-0.86%	-0.07%
Argentina	-1.20%	107.26%	0.11%	0.66%	-0.08%
Australia	-3.31%	103.94%	0.20%	1.67%	0.09%
Brazil	-1.14%	86.00%	0.10%	1.52%	-0.08%
Canada	-6.88%	51.62%	0.07%	0.35%	-0.21%
China	-2.41%	52.99%	0.60%	1.27%	-0.01%
India	-2.44%	89.39%	0.53%	3.16%	0.12%
Indonesia	-2.35%	76.23%	0.34%	0.67%	-0.07%
Japan	-1.81%	23.45%	0.20%	0.85%	0.06%
Mexico	-2.67%	59.80%	0.01%	0.32%	-0.06%
Russia	-3.52%	75.16%	0.21%	0.83%	-0.49%
South Korea	-5.11%	54.65%	0.42%	1.45%	-0.03%
Switzerland	-5.78%	60.00%	-0.05%	-0.12%	0.01%
Thailand	-4.98%	152.18%	0.70%	2.86%	0.04%
Turkey	-3.43%	59.62%	-0.12%	-0.15%	0.05%
America NES	-3.88%	119.63%	0.28%	6.55%	-0.29%
Asia/Oceania NES	-5.58%	58.74%	0.77%	2.39%	-0.41%
MENA NES	-5.45%	94.58%	0.29%	1.13%	-0.90%
Africa NES	-2.20%	55.41%	0.13%	2.58%	-0.19%
Europe NES	-5.46%	43.00%	0.92%	2.95%	-0.61%
Total Welfare	-3.42%	47.26%	0.17%	0.25%	-0.10%

Notes: Estimated model's predicted percentage change in national welfare from estimated 1990 status quo for benchmark scenarios. In column 1, we set iceberg costs for all countries in all sectors to 5000%, effectively shutting down trade across countries. In column 2, we set iceberg costs to zero for all countries in all sectors. In column 3, we set all non-agricultural tariffs for the US, Australia, EU, Japan, and South Korea to zero. These four countries and the EU make up the set of negotiating countries based on principal supplier status according to our estimates. In column 4, we solve for the total welfare maximizing levels of non-agricultural tariffs for the five negotiating countries. In column 5, we compute a Nash equilibrium in non-agricultural tariffs for the five negotiating countries. Tariffs in columns 4 and 5 are non-discriminatory.

Table 4: Principal Supplier Relationships

	US	Argentina	Australia	EU	Brazil	Canada	China	India	Indonesia	Japan	Mexico	Russia	Korea	Switzerland	Thailand
US															
Argentina	12,0														
Australia	[11,2]	0,1													
EU	[25,26]	0,11	[1,21]												
Brazil	9,0	0,0	0,0	11,0											
Canada	0,0	0,0	[1,1]	[30,3]	0,0										
China	4,0	0,0	2,0	15,0	0,0	1,0									
India	8,0	0,0	1,0	21,0	0,0	0,0	0,0								
Indonesia	6,0	0,0	4,0	12,0	0,0	0,0	0,0	0,0							
Japan	[18,5]	0,0	[3,3]	[13,3]	0,0	0,3	0,12	0,2	0,10						
Mexico	35,0	0,0	0,0	2,0	0,0	0,0	0,0	0,0	0,0	0,0					
Russia	0,0	0,0	1,0	33,0	0,0	1,0	0,0	0,0	0,0	0,0	0,0				
Korea	[13,2]	0,0	[2,1]	[4,2]	0,0	0,1	0,0	0,0	0,2	[17,4]	0,0	0,0			
Switzerland	0,0	0,0	0,0	39,0	0,0	0,0	0,1	0,0	0,0	0,1	0,0	0,0	0,0		
Thailand	7,0	0,0	0,0	13,0	0,0	0,0	0,0	0,0	0,0	14,0	0,0	0,0	2,0	0,0	
Turkey	3,0	0,0	0,0	34,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	1,0	0,0	0,0

	US	Argentina	Australia	EU	Brazil	Canada	China	India	Indonesia	Japan	Mexico	Russia	Korea	Switzerland	Thailand
USA															
Argentina	17,0														
Australia	[20,1]	0,0													
EU	[30,24]	0,17	0,7												
Brazil	9,0	0,0	0,0	17,0											
Canada	0,0	0,0	1,0	27,0	0,0										
China	3,0	0,0	2,0	19,0	0,0	0,0									
India	3,0	0,0	1,0	25,0	0,0	0,0	0,0								
Indonesia	2,0	0,0	4,0	19,0	0,0	0,0	0,0	0,0							
Japan	[28,9]	0,0	0,8	[7,3]	0,0	0,5	0,11	0,2	0,8						
Mexico	0,0	0,0	2,0	28,0	0,0	0,0	0,0	0,0	0,0	1,0					
Russia	3,0	0,0	0,0	32,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0				
Korea	4,0	0,0	[2,2]	[16,2]	0,0	0,0	0,2	0,0	0,0	[14,2]	0,1	0,1			
Switzerland	1,0	0,0	0,0	37,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0		
Thailand	3,0	0,0	2,0	21,0	0,0	0,0	0,0	0,0	0,0	7,0	0,0	0,0	0,0	0,0	
Turkey	1,0	0,0	0,0	36,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0

Notes: The top panel presents principal supplier relationships according to the data. The bottom panel represents principal supplier relationships according to the trade model at the estimated parameter vector. For each cell in the table, the first entry gives the number of products for which the column country is the principal supplier into the row country, and the second entry gives the number of products for which the row country is the principal supplier into the column country. For the numbers in this table, trade with fellow PTA members has been netted out. Square brackets indicate the bilateral relationships where both entries are positive.

Table 5: Bargaining Model Parameter Estimates

Country	Bargaining Parameter	SE
USA	0	-
Australia	-10.981	0.174
EU	-12.017	0.224
Japan	6.841	0.453
South Korea	-3.349	0.928
	Parameter	SE
Cost of Transfers Coefficient	277.613	0.928

Notes: Estimated bargaining parameters (a_i) and coefficient on quadratic transfer cost. The parameter for the US is normalized to 0.

Figure 2: US and EU Welfare Frontier

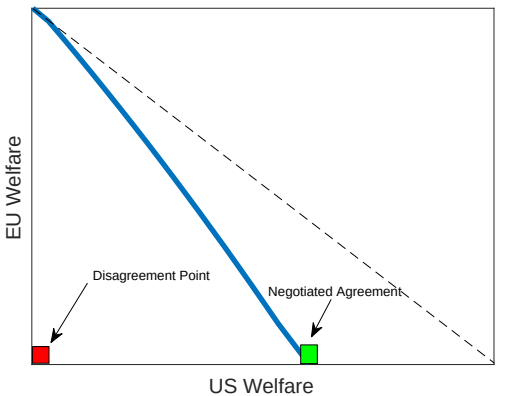
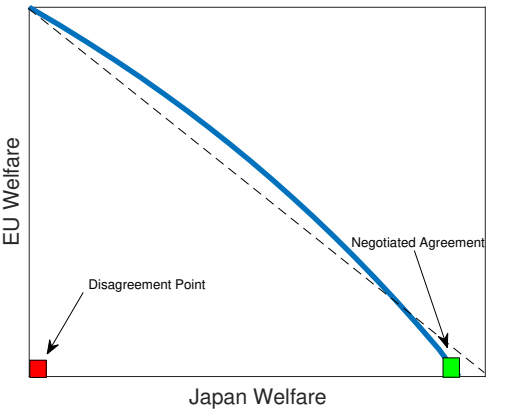


Figure 3: EU and Japan Welfare Frontier



Notes: These curves represents the frontier of feasible welfare pairs for the US-EU bilateral (left panel) and Japan-EU bilateral (right panel) negotiations holding the other pairs fixed at the equilibrium outcomes. The dashed line has slope equal to minus one.

Table 6: Spillover Benefits to Third Parties (MFN Negotiations)

			Tariff Reduction from Agreement			Tariff Reduction from Binding		
Country 1	Country 2	Reducing Country	Δ Welfare Country 1 (1)	Δ Welfare Country 2 (2)	Δ Welfare 3rd Parties (3)	Δ Welfare Country 1 (4)	Δ Welfare Country 2 (5)	Δ Welfare 3rd Parties (6)
US	Aus	US	-1.000	2.677	3.594	-1.000	3.285	4.520
US	Aus	Aus	0.083	-1.000	0.384	0.090	-1.000	0.398
US	EU	US	-1.000	1.557	1.231	-1.000	2.516	2.144
US	EU	EU	0.335	-1.000	1.410	0.405	-1.000	1.728
US	Japan	US	-1.000	1.166	0.712	-1.000	2.240	1.347
US	Japan	Japan	0.501	-1.000	0.460	0.576	-1.000	0.564
Aus	Korea	Aus	-1.000	0.731	3.909	1.000	0.048	0.240
Aus	Korea	Korea	0.786	-1.000	1.015	0.725	-1.000	1.134
EU	Japan	EU	-1.000	0.609	0.677	-1.000	15.438	19.550
EU	Japan	Japan	0.739	-1.000	0.573	1.495	-1.000	1.382
EU	Korea	EU	-1.000	0.513	4.766	1.000	0.160	1.361
EU	Korea	Korea	0.783	-1.000	1.972	0.928	-1.000	2.658
Japan	Korea	Japan	-1.000	0.826	1.555	1.000	0.629	1.103
Japan	Korea	Korea	0.991	-1.000	1.275	5.723	1.000	8.413

Notes: Each row corresponds to a unilateral marginal decrease in tariffs by the "reducing country." The reducing country reduces tariffs on all goods that it negotiates with the partner country in that row. The welfare changes are normalized so that the reducing country has an absolute welfare change equal to one. The first set of welfare columns presents changes in welfare when all tariffs begin from the negotiated agreement. The second set of welfare columns presents changes in welfare when all tariffs begin from 1990 levels.

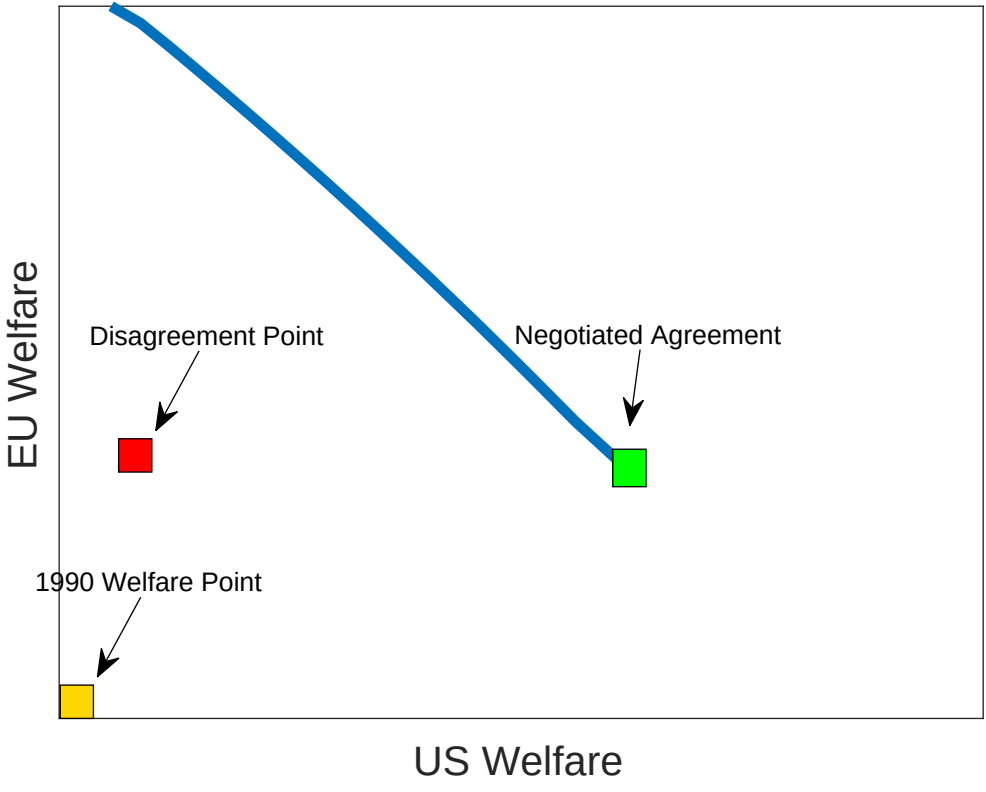

EU Welfare
Disagreement Point
Negotiated Agreement
1990 Welfare Point
US Welfare

Table 7: Estimated Uruguay Round and Counterfactual Outcomes

	MFN		No MFN
	Tariffs		
Average Tariffs	-46.95%		
Weighted Average Tariffs	-54.50%		
	Country Welfare		
		with transfers	with transfers
United States	0.00%	0.04%	
EU	0.04%	0.02%	
Austria	0.07%	0.05%	
Belgium	0.01%	0.00%	
Denmark	0.02%	0.00%	
France	0.03%	0.00%	
Germany	0.00%	-0.01%	
Italy	0.02%	-0.02%	
Netherlands	0.05%	0.03%	
Spain	0.07%	0.02%	
Sweden	0.06%	0.04%	
United Kingdom	0.14%	0.12%	
Argentina	0.05%	0.05%	
Australia	0.08%	0.04%	
Brazil	0.05%	0.05%	
Canada	0.00%	0.00%	
China	0.35%	0.35%	
India	0.31%	0.31%	
Indonesia	0.14%	0.14%	
Japan	0.21%	0.20%	
Mexico	0.00%	0.00%	
Russia	0.07%	0.07%	
South Korea	0.47%	0.43%	
Switzerland	-0.04%	-0.04%	
Thailand	0.42%	0.42%	
Turkey	-0.08%	-0.08%	
America NES	0.11%	0.11%	
Asia/Oceania NES	0.36%	0.36%	
MENA NES	0.06%	0.06%	
Africa NES	0.05%	0.05%	
Europe NES	0.40%	0.40%	
Total Welfare	0.12%	0.11%	

Notes: Each column represents changes in the row relative to the pre-Uruguay tariff levels. The first set of columns represents the Horn-Wolinsky MFN solution at the estimated bargaining parameters. The second set of columns represents the Horn-Wolinsky discriminatory solution at the estimated bargaining parameters.

Table 7: Estimated Uruguay Round and Counterfactual Outcomes

	MFN		No MFN	
	Tariffs			
Average Tariffs	-46.95%		-47.43%	
Weighted Average Tariffs	-54.50%		-48.96%	
	Country Welfare			
		with transfers		with transfers
United States	0.00%	0.04%	0.03%	0.09%
EU	0.04%	0.02%	-0.03%	-0.05%
Austria	0.07%	0.05%	-0.02%	-0.04%
Belgium	0.01%	0.00%	0.00%	-0.01%
Denmark	0.02%	0.00%	-0.04%	-0.05%
France	0.03%	0.00%	0.05%	0.03%
Germany	0.00%	-0.01%	-0.09%	-0.10%
Italy	0.02%	-0.02%	0.01%	-0.02%
Netherlands	0.05%	0.03%	0.02%	0.01%
Spain	0.07%	0.02%	-0.07%	-0.10%
Sweden	0.06%	0.04%	0.02%	0.00%
United Kingdom	0.14%	0.12%	-0.03%	-0.04%
Argentina	0.05%	0.05%	-0.02%	-0.02%
Australia	0.08%	0.04%	0.22%	-0.03%
Brazil	0.05%	0.05%	-0.02%	-0.02%
Canada	0.00%	0.00%	-0.10%	-0.10%
China	0.35%	0.35%	-0.10%	-0.10%
India	0.31%	0.31%	-0.06%	-0.06%
Indonesia	0.14%	0.14%	-0.05%	-0.05%
Japan	0.21%	0.20%	0.29%	0.28%
Mexico	0.00%	0.00%	-0.04%	-0.04%
Russia	0.07%	0.07%	-0.04%	-0.04%
South Korea	0.47%	0.43%	-1.86%	-2.02%
Switzerland	-0.04%	-0.04%	-0.07%	-0.07%
Thailand	0.42%	0.42%	-0.07%	-0.07%
Turkey	-0.08%	-0.08%	-0.06%	-0.06%
America NES	0.11%	0.11%	0.02%	0.02%
Asia/Oceania NES	0.36%	0.36%	-0.16%	-0.16%
MENA NES	0.06%	0.06%	-0.08%	-0.08%
Africa NES	0.05%	0.05%	-0.02%	-0.02%
Europe NES	0.40%	0.40%	-0.12%	-0.12%
Total Welfare	0.12%	0.11%	0.00%	-0.01%

Notes: Each column represents changes in the row relative to the pre-Uruguay tariff levels. The first set of columns represents the Horn-Wolinsky MFN solution at the estimated bargaining parameters. The second set of columns represents the Horn-Wolinsky discriminatory solution at the estimated bargaining parameters.

Table 8: Spillover Benefits to Third Parties (Discriminatory Negotiations)

			Tariff Reduction from Agreement			Tariff Reduction from Binding		
Country 1	Country 2	Reducing Country	Δ Welfare Country 1 (1)	Δ Welfare Country 2 (2)	Δ Welfare 3rd Parties (3)	Δ Welfare Country 1 (4)	Δ Welfare Country 2 (5)	Δ Welfare 3rd Parties (6)
US	Aus	US	-1.000	2.138	-0.270	-1.000	11.018	-1.598
US	Aus	Aus	0.201	-1.000	-0.004	0.312	-1.000	0.011
US	EU	US	-1.000	1.450	-0.538	-1.000	4.588	-1.136
US	EU	EU	0.521	-1.000	-0.060	1.717	-1.000	-0.180
US	Japan	US	-1.000	1.397	-0.197	-1.000	3.619	-0.633
US	Japan	Japan	0.608	-1.000	-0.120	1.004	-1.000	-0.066
Aus	Korea	Aus	-1.000	0.729	-0.720	1.000	1.672	-1.060
Aus	Korea	Korea	1.805	-1.000	-0.345	8.255	-1.000	-1.635
EU	Japan	EU	-1.000	0.941	-0.016	-1.000	4.635	-0.327
EU	Japan	Japan	0.944	-1.000	-0.267	1.596	-1.000	-0.079
EU	Korea	EU	-1.000	0.716	-0.294	-1.000	2.873	0.436
EU	Korea	Korea	1.026	-1.000	-0.985	20.792	-1.000	-2.628
Japan	Korea	Japan	-1.000	1.101	-0.712	-1.000	9.263	-3.009
Japan	Korea	Korea	0.936	-1.000	-0.374	89.785	1.000	-8.289

Notes: Each row corresponds to a unilateral marginal decrease in tariffs by the "reducing country." The reducing country reduces tariffs on all goods that it negotiates with the partner country in that row. The welfare changes are normalized so that the reducing country has an absolute welfare change equal to one. The first set of welfare columns presents changes in welfare from a discriminatory reduction when all tariffs begin from the negotiated agreement. The second set of welfare columns presents changes in welfare from a discriminatory reduction when all tariffs begin from 1990 levels.

Figure 1
Efficient Tariffs

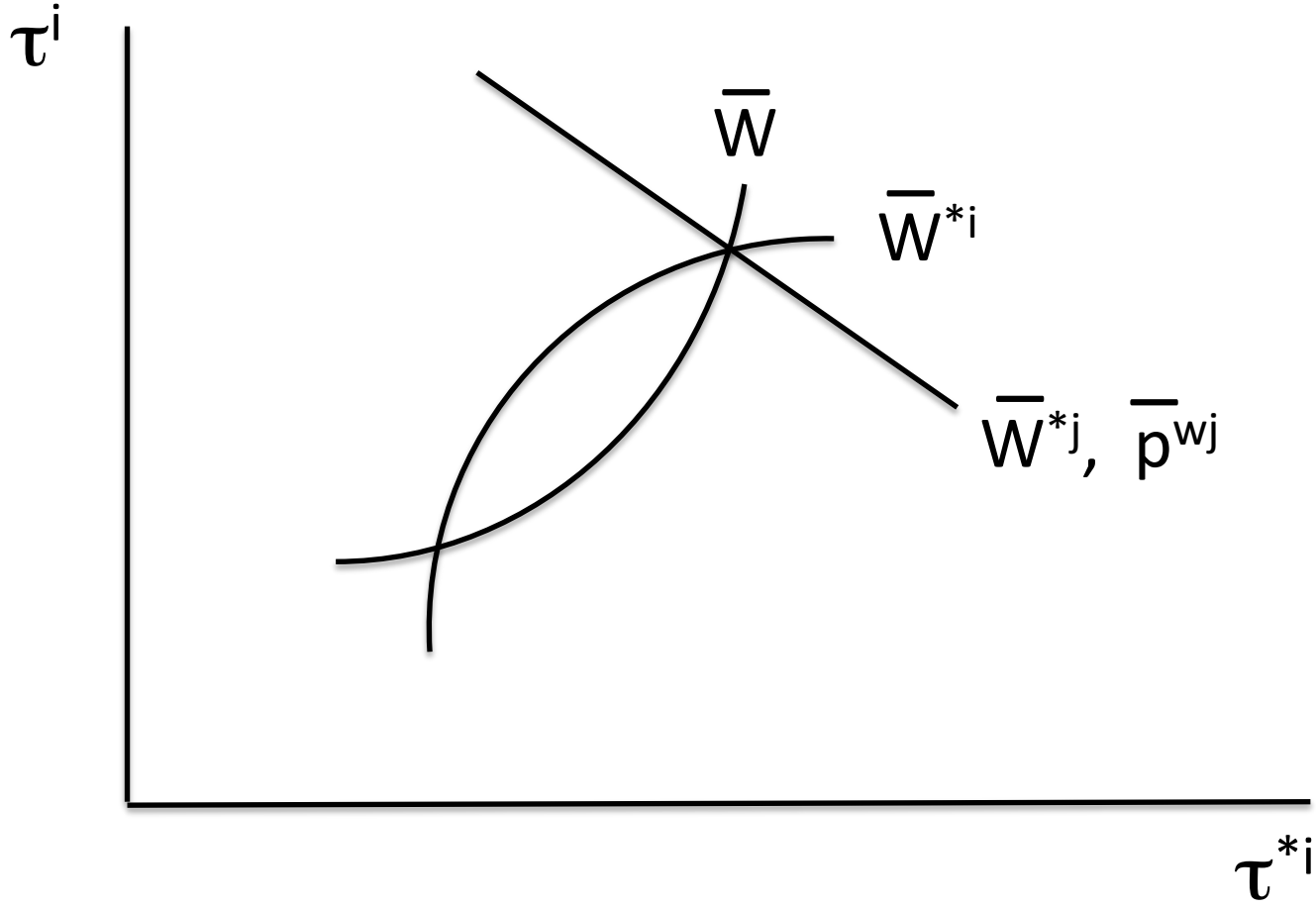


Table 1: Summary Statistics

Country	Pop(M)	Mnfctring V.A. per capita(000)	Import ratio	1990 Average Tariffs	1990 Trade Weighted Tariffs	2000 Average Tariffs	2000 Trade Weighted Tariffs	Largest Trading Partner
USA	249.6	4258.8	0.187	0.045	0.048	0.032	0.043	Canada
Argentina	32.6	768.9	0.017	0.115	0.099	0.142	0.118	USA
Australia	17.1	2546.9	0.096	0.136	0.109	0.069	0.054	Japan
Austria	7.7	3265.8	0.503	0.061	0.066	0.033	0.034	Germany
Belgium	10.0	3428.3	0.386	0.061	0.054	0.033	0.028	Germany
Brazil	149.4	742.1	0.019	0.259	0.169	0.136	0.094	USA
Canada	27.8	3138.7	0.336	0.080	0.081	0.041	0.030	USA
China	1140.9	72.1	0.084	0.102	0.111	0.076	0.071	USA
Denmark	5.1	3596.6	0.213	0.061	0.057	0.033	0.029	Germany
France	56.7	2315.9	0.241	0.061	0.059	0.033	0.030	Germany
Germany	79.4	5421.1	0.228	0.061	0.062	0.033	0.032	France
India	849.5	23.8	0.038	0.772	0.576	0.323	0.238	MENA NES
Indonesia	178.2	61.6	0.058	0.196	0.133	0.076	0.052	Japan
Italy	56.7	2051.8	0.259	0.061	0.052	0.033	0.027	Germany
Japan	123.5	5804.5	0.122	0.053	0.027	0.035	0.019	USA
Mexico	83.2	226.5	0.081	0.118	0.110	0.149	0.124	USA
Netherlands	15.0	2425.4	0.240	0.061	0.057	0.033	0.028	Germany
Russia	148.3	236.1	0.128	0.087	0.056	0.104	0.076	Europe NES
S. Korea	42.9	1875.7	0.176	0.109	0.089	0.083	0.049	USA
Spain	38.8	1815.3	0.410	0.061	0.054	0.033	0.027	France
Sweden	8.6	3731.1	0.383	0.061	0.061	0.033	0.030	Germany
Switzerland	6.7	6255.8	0.299	0.199	0.113	0.063	0.033	Germany
Thailand	54.6	408.7	0.091	0.397	0.317	0.136	0.096	Japan
Turkey	56.2	413.3	0.134	0.079	0.067	0.052	0.034	Germany
UK	57.6	3541.4	0.305	0.061	0.061	0.033	0.031	Germany
America NES	183.1	243.9	0.077	0.119	0.100	0.107	0.087	USA
AsiaPac NES	671.3	104.7	0.207	0.129	0.108	0.068	0.049	USA
MENA NES	207.5	181.9	0.140	0.167	0.151	0.192	0.136	Japan
Africa NES	480.8	48.1	0.041	0.153	0.136	0.118	0.106	USA
Europe NES	207.5	608.7	0.273	0.075	0.059	0.074	0.055	Germany

Notes: Trade and tariff summary statistics at the level aggregation used for the analysis.

Table 9: Product Classification

Product Category	Corresponding SITC rev.2	Description
1	0	Live animals chiefly for food
2	1	Meat and meat preparations
3	2	Dairy products and birds'eggs
4	3	Fish,crustaceans,mollucs,preparations thereof
5	4	Cereals and cereal preparations
6	5,22	Vegetables and fruit; Oil seeds and oleaginous fruit
7	6	Sugar,sugar preparations and honey
8	7	Coffee,tea,cocoa,spices,manufactures thereof
9	8	Feeding stuff for animals,not incl.unmil.cereals
10	9	Miscel.edible products and preparations
11	11	Beverages
12	12	Tobacco and tobacco manufactures
13	21,61	Hides,skins and furskins,raw; Leather, leather manuf., n.e.s.and dressed furskisg
14	23	Crude rubber (including synthetic and reclaimed)
15	24	Cork and wood
16	25	Pulp and waste paper
17	26	Textile fibres (except wool tops) and their wastes
18	27,55,56,57	Crude materials; Essential oils & perfume mat.;toilet-cleansing mat; Fertilizers; Pyrotechnic products
19	28	Metalliferous ores and metal scrap
20	29	Crude animal and vegetable materials,n.e.s.
21	32	Coal,coke and briquettes
22	33,34	Petroleum,petroleum products and related; Gas,natural and manufactured materials
23	41,42,43	Animal oils and fats; Fixed vegetable oils and fats; Animal-vegetable oils-fats,processed,and waxes
24	51	Organic chemicals
25	52	Inorganic chemicals
26	53	Dyeing,tanning and colouring materials
27	54	Medicinal and pharmaceutical products
28	58	Artif.resins,plastic mat.,cellulose esters/ethers
29	59	Chemical materials and products,n.e.s.
30	62	Rubber manufactures,n.e.s.
31	63	Cork and wood manufactures (excl.furniture)
32	64	Paper,paperboard,artic.of paper,paper-pulp/board
33	65	Textile yarn,fabrics,made-upart.,related products
34	66	Non-metallic mineral manufactures,n.e.s.
35	67	Iron and steel
36	68,69	Non-ferrous metals; Manufactures of metal,n.e.s.
37	71	Power generating machinery and equipment
38	72,73,74	Machinery specialized for particular industries; Metalworking machinery; General industrial machinery & equipment,and parts
39	75,76	Office machines & automatic data processing; Telecommunications & sound recording apparatus equip.
40	77	Electrical machinery,apparatus & appliances n.e.s.
41	78	Road vehicles (incl. air cushion vehicles
42	79	Other transport equipment
43	81	Sanitary,plumbing,heating and lighting fixtures
44	82	Furniture and parts thereof
45	83,84	Travel goods,handbags and similair containers; Articles of apparel and clothing accessories
46	85	Footwear
47	87,88	Professional,scientific & controling instruments ; Photographic apparatus,optical goods,watches
48	89	Miscellaneous manufactured articles,n.e.s.
49	90,91,93,94,95,96,97	Others

Takeaway on Tariff Bargaining

- The free-rider issue created by the positive third-party externality from the GATT/WTO's MFN requirement is widely emphasized as a shortcoming of the GATT/WTO approach

- We find that MFN plus multilateral reciprocity can create a tariff bargaining forum where strategic behavior is minimized
  - that absent reciprocity, there are strong third-party externalities associated with MFN tariff bargaining
  - but that the abandonment of MFN in tariff bargaining would create negative third-party externalities that are even more powerful
  - and that would ultimately lead to tariff bargaining outcomes that are worse from the perspective of world welfare

- Open question: Can the addition of multilateral reciprocity improve the performance of MFN tariff bargaining?

Offshoring

- A fundamental question for modern research on commercial policy: What is the purpose of international trade agreements?
  - Answer has implications for understanding the design and operation of trade agreements that we observe
- International externality view dominates in accounting for observed features and operation of trade agreements
  - But what form does the international externality take?
  - And if form changes, must agreements change to remain successful?

Approach

- Theme 1: Nature of international price determination a key determinant of the nature of the international externality, can have profound impact on the design of an effective trade agreement
- Theme 2: Rise of offshoring may alter the design of effective trade agreements through its impact on the nature of price determination
- First discuss trade agreements and the nature of price determination
- Then through this lens discuss implications for trade agreements of rise in offshoring

Trade Agreements and the Nature of Price Determination

- ToT Theory of Trade Agreements:
  - in the Nash equilibrium, tariffs are inefficiently high but domestic policies are internationally efficient
  - $\Longrightarrow$ basis for shallow integration coupled with MA preservation rules
- Nature of international price determination is important for these predictions:
  - "deep" integration needed when prices are not fully disciplined by market clearing (bilateral bargaining)

Market Clearing with Perfect Competition

- Perfectly competitive trade model: **F**oreign ('$*$') exports a single good to **H**ome
- Measure $\frac{1}{2}$ of H consumers with demand $D(p)$
- Measure $\frac{1}{2}$ of F consumers with demand $D(p^*)$
- Measure 1 of firms in F with increasing-concave production technology $y^* = F(L^*)$
- Measure Λ of workers in each country paid a wage of 1 (pinned down by outside sector)

Market Clearing with Perfect Competition

- H has import tariff τ, F has both export tax τ^* and labor subsidy s^* (applied only to the export sector), all defined in specific terms
- Govs are social welfare maximizers (W and W^*)
- Efficient policies maximize world welfare and deliver $T^e \equiv \tau^e + \tau^{*e} = 0$, $s^{*e} = 0$. No surprise (no frictions)
- Nash policies: FOCs $\Rightarrow \tau^N = \hat{p}^*/\eta_E^*$, $\tau^{*N} = \hat{p}/\eta_M$ and $s^{*N} = 0$ (where all prices and elasticities are evaluated at the Nash policies)
- Why isn't s^{*N} distorted?
  - τ^* is first best for ToT manipulation in this setting

Market Clearing with Perfect Competition

- **Shallow integration:** Suppose H agrees to eliminate its tariff and F agrees to eliminate its tariff and in addition F agrees to a **"market access preservation" constraint** on its future choices of s^*:

$$\frac{d\tau^*}{ds^*} = \frac{-d\hat{p}/ds^*}{d\hat{p}/d\tau^*}$$

- Reflects essential mission of GATT/WTO rules: provide secure property rights over negotiated market access
- Then F solves

$$\frac{dW^*}{ds^*} = \frac{\partial W^*}{\partial s^*} - \frac{\partial W^*}{\partial \tau^*}\frac{d\hat{p}/ds^*}{d\hat{p}/d\tau^*} = 0$$

  with W^* evaluated at $\tau = 0$
- Delivers $s^{*R} = 0$ and $\tau^{*R} = 0$; with $\tau = 0$, efficiency frontier achieved

Market Clearing with Market Power

- Does this result depend on absence of market power?
- A monopoly firm in F; H and F markets segmented
  - special form of imperfect competition, but insights are more general
- Efficient policies $T^e = 0, \;\; s^{*e} = 1/\eta_D^*$: No role for tariffs, but F subsidizes labor to ensure price equals marginal cost in each market
- Nash: FOCs $\Rightarrow \tau^N = -\hat{x}/\left(d\hat{x}/d\tau\right) - \hat{p}/\eta_D, \;\; \tau^{*N} = \hat{p}^*/\eta_D^*$ and $s^{*N} = 1/\eta_D^*$ (with all prices/elasticities evaluated at Nash policies)
- Note: $s^{*N} \neq s^{*e}$, but conditional on trade volume s^{*N} is efficient

Market Clearing with Market Power

- **Shallow integration:** Suppose H agrees to eliminate its tariff and F agrees to set its tariff at a level $\bar{\tau}^*$ s.t. $\hat{x}(s^{*N}, 0 + \bar{\tau}^*) = \hat{x}(s^{*e}, T^e)$, and F agrees to constrain its future choices of s^* according to

$$\frac{d\tau^*}{ds^*} = \frac{-d\hat{x}/ds^*}{d\hat{x}/d\tau^*}$$

- Then F solves

$$\frac{dW^*}{ds^*} = \frac{\partial W^*}{\partial s^*} - \frac{\partial W^*}{\partial \tau^*}\frac{d\hat{x}/ds^*}{d\hat{x}/d\tau^*} = 0$$

  with W^* evaluated at $\tau = 0$

- Delivers $s^{*R} = s^{*e}$ and $\tau^{*R} = 0$; with $\tau = 0$, efficiency frontier again achieved (key: $s^{*R} = s^{*e}$ *conditional* on efficient trade volume)

Matching Model

- Now suppose international prices determined by bilateral bargaining
- Measure 1 of consumers each matched with measure 1 of producers; no possibility of rematching (0 outside option of the agents)
  - extreme assumption but results generalize to any pricing not fully disciplined by market clearing
- Each producer produces an amount of x with the production function $F(L)$ in anticipation of payoff obtained upon matching
- Consumer utility $u(x)$, where u is increasing and concave
- Cost of producing x sunk at time of matching, consumer and producer Nash bargain over surplus, with producer capturing share $\alpha \in (0, 1)$

Matching Model

- **International match**: F seller takes her good to H market; tariff costs not yet sunk, so ex-post surplus over which parties negotiate is $S\left(L, \tau+\tau^{*}\right) \equiv u\left(F\left(L\right)\right)-\left(\tau+\tau^{*}\right) F\left(L\right)$
- Labor L hired by F selling to H is then determined by maxing $\alpha S\left(L, \tau+\tau^{*}\right)-\left(1-s^{*}\right) L$; defines $\hat{L}(s^{*}, \tau+\tau^{*})$, trade volume $F(\hat{L})$
- **Local (F) match**: tariffs irrelevant to bargaining surplus, so labor hired by F selling to F is $\hat{L}^{*}(s^{*})$ and production for local sales is $F(\hat{L}^{*})$
- Efficient policies $T^{e}=0, \;\; s^{*}=1-\alpha$: no role for tariffs, and F labor subsidy resolves the under-investment in L
- Nash policies: FOCs $\Rightarrow \tau^{N}+\tau^{*N}>0, \;\; s^{*N}>1-\alpha$
- Hence, $T^{N}>T^{e}$, but now s^{*N} is inefficient **even conditional on trade volume**

Matching Model: Shallow Integration

- Consider F's preferred τ^* and s^* to deliver efficient trade volume
- Efficient trade volume is $F(\hat{L}(1-\alpha,0))$, so starting from efficient policies changes in τ^* and s^* must satisfy

$$\frac{d\tau^*}{ds^*} = -\frac{d\hat{L}/ds^*}{d\hat{L}/d\tau^*}$$

- Then F solves

$$\frac{dW^*}{ds^*} = \frac{\partial W^*}{\partial s^*} - \frac{\partial W^*}{\partial \tau^*}\frac{d\hat{L}/ds^*}{d\hat{L}/d\tau^*} = 0$$

- Delivers $s^{*R} > s^{*e}$. Hence, shallow negotiations **cannot** achieve the efficiency frontier

Matching Model: Interpretation

- "World"/exporter price:

$$\hat{p}^w = \frac{\alpha u(F(\hat{L}))}{F(\hat{L})} + \underbrace{(1-\alpha)\,\tau^*}\ -\alpha\tau$$

- But

$$\frac{d\tau^*}{ds^*} = -\frac{d\hat{L}/ds^*}{d\hat{L}/d\tau^*} > 0,$$

  so F maintains trade volume with **an increase in** τ^* and s^* while raising $\hat{p}^w$ and improving its ToT

- $\Longrightarrow$ Shallow integration cannot fully eliminate ToT manipulation when international prices are determined through bargaining

- But if negotiations impose $s^* = s^{*e}$ (i.e., **"deep" integration**), then efficiency frontier is immediately achieved

Takeaway on Offshoring

- According to ToT theory, market access/shallow integration approach can achieve efficiency
- But when prices are not fully disciplined by market clearing (bilateral bargaining), deep integration needed

Takeaway on Offshoring

- According to ToT theory, market access/shallow integration approach can achieve efficiency
- But when prices are not fully disciplined by market clearing (bilateral bargaining), deep integration needed
- How much are international prices disciplined by market clearing?
  - arguably less and less so with the increase in offshoring

Takeaway on Offshoring

- According to ToT theory, market access/shallow integration approach can achieve efficiency
- But when prices are not fully disciplined by market clearing (bilateral bargaining), deep integration needed
- How much are international prices disciplined by market clearing?
  - arguably less and less so with the increase in offshoring
- How sensitive is the performance of the market-access/shallow integration approach to the nature of international price determination?
  - some suggestive evidence: rise of deep-integration FTAs (Orefice and Rocha 2011); signs of greater difficulty liberalizing trade through WTO negotiations in sectors where customized inputs are especially prevalent

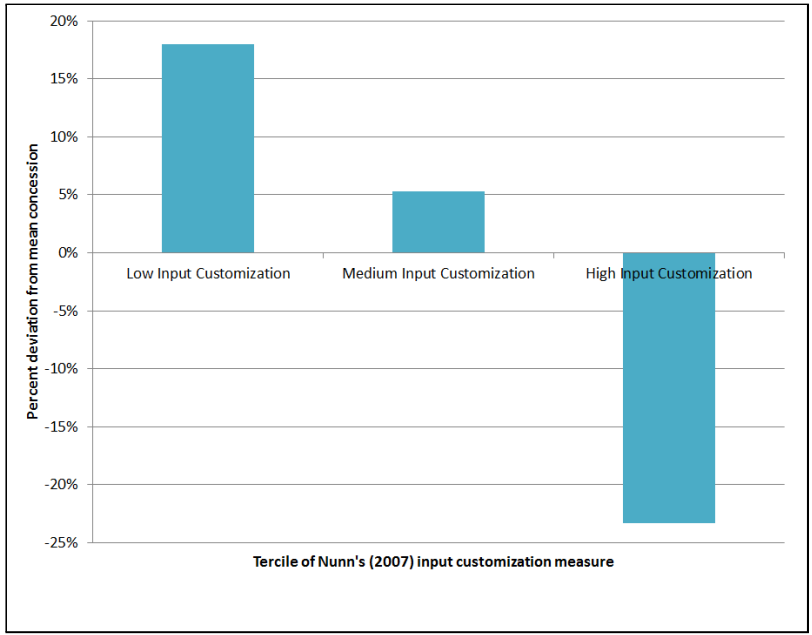


Figure 1: Percent deviation from mean concession by tercile of input customization measure

Takeaway on Offshoring

- According to ToT theory, market access/shallow integration approach can achieve efficiency
- But when prices are not fully disciplined by market clearing (bilateral bargaining), deep integration needed
- How much are international prices disciplined by market clearing?
  - arguably less and less so with the increase in offshoring
- How sensitive is the performance of the market-access/shallow integration approach to the nature of international price determination?
  - some suggestive evidence: rise of deep-integration FTAs (Orefice and Rocha 2011); signs of greater difficulty liberalizing trade through WTO negotiations in sectors where customized inputs are especially prevalent
- Important questions for the architecture of the WTO moving forward

Trade Agreements as Incomplete Contracts

CCER Mini Course Days Three and Four

Robert W. Staiger

Dartmouth

June 2018

Introduction

- Many puzzling features of real-world trade agreements
- ...Design of rules
  - mix of rigidity and discretion (GATT/WTO: tariff bindings, escape clause, domestic policies, national treatment)
- ...Settlement of disputes
  - role of court (GATT/WTO: interpretive, gap-filling)
- Hard to square with complete contracts perspective

Introduction

- Trade agreements are obviously incomplete contracts
  - WTO agreement fills 24,000 pages and is still far from anything resembling a complete contract

Introduction

- Trade agreements are obviously incomplete contracts
  - WTO agreement fills 24,000 pages and is still far from anything resembling a complete contract
- Can design and operation of trade agreements be understood from *incomplete contracts* perspective?

Introduction

- Trade agreements are obviously incomplete contracts
  - WTO agreement fills 24,000 pages and is still far from anything resembling a complete contract
- Can design and operation of trade agreements be understood from *incomplete contracts* perspective?
- Focus on
  - *rules*: "Trade Agreements as Endogenously Incomplete Contracts" (with Henrik Horn and Giovanni Maggi), 2010
  - *disputes*: "The Role of Dispute Settlement Procedures in International Trade Agreements" (with Giovanni Maggi), 2011
  - *the non-violation clause*: "How Important can the Non-Violation Clause be for the GATT/WTO" (with Alan Sykes), 2017
  - *investor-state dispute settlement*: work in progress with Ralph Ossa and Alan Sykes

Rules

- Real-world trade agreements display an interesting combination of *rigidity* and *discretion*
- Consider the GATT/WTO
  - trade instruments bound; domestic instruments largely left to discretion, but must satisfy National Treatment, and now (WTO) regulation of subsidies
  - bindings rigid, but with "escape clauses"
- Why?
- An incomplete contracts perspective can account for these features

Sources of Incompleteness

- A number of possible sources of contract incompleteness
- Focus on two features of fundamental importance to trade negotiators

- Wide array of trade-relevant policies
  - border instruments but also internal/domestic instruments
  - controlling opportunism requires *comprehensive policy coverage*
- Uncertainty about future economic/political conditions
  - calls for agreements that are *highly contingent*

Approach

- Introduce *contracting costs* (along the lines of Battigalli and Maggi, 2002) explicitly into economic analysis of trade agreements
- Study their implications for the structure of the optimal (incomplete) agreement
- Show that contracting costs can help explain some of the core features of the GATT/WTO

The Model

- Partial-equilibrium analysis
- Two countries, H and F, two non-numeraire goods, 1 and 2
- H a natural importer of good 1/exporter of good 2
- Sectors 1 and 2 are mirror-image, so focus on sector 1
- Illustrate main points with linear demand/supply case
  - Demand: $D(p) = \alpha - \beta p$; $D^*(p^*) = \alpha^* - \beta^* p^*$
  - Supply: $X(q) = \lambda q$; $X^*(q^*) = \lambda^* q^*$
- H chooses tariff τ, separate consumption taxes on domestic and foreign products (t_h and t_f), production subsidy (s)
- F does not intervene in this sector

The Model

- Arbitrage: $q^* = p^*; \quad q = p - t_h + s; \quad p^* = \quad p - \tau - t_f$
- The price relationships more compactly:

$$p = p^* + T; \quad q = p^* + T + S$$

where $T \equiv \tau + t_f$ and $S \equiv s - t_h$

- Market clearing: $p = p(T, S); q = q(T, S); p^* = q^* = p^*(T, S)$
- Importing country H experiences a negative consumption externality equal to $-\gamma D$ with $\gamma > 0$
- Govs maximize welfare, so (with focus on sector 1):

$$\begin{aligned} W &= CS + PS + T \cdot M - S \cdot X - \gamma D \\ W^* &= CS^* + PS^* \end{aligned}$$

Efficient and Nash Policies

- Globally efficient policies maximize $W^G \equiv W + W^*$, yielding

$$T^{eff} = \gamma; \;\; S^{eff} = -\gamma$$

(with $T \equiv \tau + t_f$ and $S \equiv s - t_h$, e.g. $t_f = \gamma = t_h$ and $\tau = 0 = s$)

- Nash equilibrium policies:

$$\begin{aligned} T^{NE} &= \gamma + \frac{p^*}{\eta^*} \\ S^{NE} &= -\gamma \end{aligned}$$

- Note: $T^{NE} > T^{eff}; \;\; S^{NE} = S^{eff}$
- $\Longrightarrow$ Nash trade taxes inefficiently high: ToT manipulation
- $\Longrightarrow$ Nash domestic instruments set at efficient levels

Uncertainty

- To simplify, focus on one-dimensional uncertainty
- Consider two possible sources of uncertainty
  - consumption externality (γ)
  - import demand level (α)
- Timing:
  (1) The agreement is drafted
  (2) Uncertainty is resolved
  (3) Policies are chosen subject to the constraints set by the agreement

The Costs of Contracting

- Focus on *instrument-based* agreements
- Key idea: more detailed agreements are more costly to write
  - c_p: cost of including a *policy* variable (τ, t_f, s, t_h)
  - c_s cost of including a *state* variable (γ, α)
- Cost of writing an agreement: $C = c_s \cdot n_s + c_p \cdot n_p$, with n_s (n_p) the number of state (policy) variables in the agreement
- $\Omega \equiv EW^G(\cdot)$: expected gross-of-contracting-costs global welfare
- An *optimal agreement* maximizes expected net global welfare, $\omega \equiv \Omega - C$

Optimal Agreements

- Recall: $T = \tau + t_f$; $S = s - t_h$. Hence T and S the relevant policy variables, with cost $2c$ for each

$\Longrightarrow$ *An agreement that constrains the effective subsidy S while leaving the import tax T to discretion cannot improve over the Nash equilibrium, and therefore cannot be an optimal agreement.*

- Broad intuition: contracting over S alone is useless because inefficiency in the NE concerns T, not S

Optimal Agreements

- Recall: $T = \tau + t_f$; $S = s - t_h$. Hence T and S the relevant policy variables, with cost $2c$ for each

$\Longrightarrow$ *An agreement that constrains the effective subsidy S while leaving the import tax T to discretion cannot improve over the Nash equilibrium, and therefore cannot be an optimal agreement.*

- Broad intuition: contracting over S alone is useless because inefficiency in the NE concerns T, not S
- $\Longrightarrow$ If contracting costs lead to incomplete policy coverage, focus of contract will be on import taxes, not domestic instruments

Uncertainty about the Consumption Externality

- Assume γ uncertain
- Note: $\{FB\}$ agreement is $\{T = \gamma; S = -\gamma\}$, which costs $4c_p + c_s$
  - if c_p and c_s small enough, $\{FB\}$ optimal
  - if large enough, empty agreement (NE payoffs) optimal
  - What happens between these two extremes?
- Two ways to save on contracting costs relative to $\{FB\}$
  - agreement can be *rigid* (i.e. non-contingent)
  - and/or it can leave some policies to *discretion*
- Consider simple instrument-based agreements that impose separate equality constraints on T and S (e.g. $(T = \gamma)$ or $(S = 10)$)

Uncertainty about the Consumption Externality

- Can focus on three kinds of agreement (aside from $\{FB\}$ and $\{\emptyset\}$)
  - $\{T, S\}$ (rigidity)
  - $\{T(\gamma)\}$ (discretion)
  - $\{T\}$ (both rigidity and discretion)
- Basic trade-off:
  - rigid agreement prevents ToT manipulation, but Pigouvian intervention only "on average"
  - discretion creates scope for manipulating ToT, but achieves state-contingency "for free"
- Two basic questions
  - When is it optimal to leave S out of the contract (discretion)?
  - When is it optimal to leave γ out of the contract (rigidity)?

Discretion

- Benefits of excluding S from the contract
  - saves $2c_p$
  - achieves state-contingency in S "for free" (a benefit if contract is *rigid*)
- Costs of excluding S from the contract
  - comes in form of S distortions to manipulate ToT
  - higher when S a *good substitute* for T for ToT manipulation
  - higher when *monopoly power* in trade higher
  - higher when *import volume* higher

Discretion

- Benefits of excluding S from the contract
  - saves $2c_p$
  - achieves state-contingency in S "for free" (a benefit if contract is *rigid*)
- Costs of excluding S from the contract
  - comes in form of S distortions to manipulate ToT
  - higher when S a *good substitute* for T for ToT manipulation
  - higher when *monopoly power* in trade higher
  - higher when *import volume* higher
- $\Longrightarrow$ Possible explanation for GATT/WTO evolution toward regulation of domestic instruments: rising trade volume

Discretion

- Benefits of excluding S from the contract
  - saves $2c_p$
  - achieves state-contingency in S "for free" (a benefit if contract is *rigid*)
- Costs of excluding S from the contract
  - comes in form of S distortions to manipulate ToT
  - higher when S a *good substitute* for T for ToT manipulation
  - higher when *monopoly power* in trade higher
  - higher when *import volume* higher
- $\Longrightarrow$ Possible explanation for GATT/WTO evolution toward regulation of domestic instruments: rising trade volume
- $\Longrightarrow$ Possible explanation for why WTO exempts developing country members from many domestic instrument commitments

Discretion

- Benefits of excluding S from the contract
  - saves $2c_p$
  - achieves state-contingency in S "for free" (a benefit if contract is *rigid*)
- Costs of excluding S from the contract
  - comes in form of S distortions to manipulate ToT
  - higher when S a *good substitute* for T for ToT manipulation
  - higher when *monopoly power* in trade higher
  - higher when *import volume* higher
- $\Longrightarrow$ Possible explanation for GATT/WTO evolution toward regulation of domestic instruments: rising trade volume
- $\Longrightarrow$ Possible explanation for why WTO exempts developing country members from many domestic instrument commitments
- $\Longrightarrow$ Possible explanation for rising tension between trade agreements and national sovereignty

Rigidity

- Unsurprising result: large uncertainty in γ makes it less likely that optimal agreement is rigid

Rigidity

- Unsurprising result: large uncertainty in γ makes it less likely that optimal agreement is rigid
- But suppose γ now fixed at $\bar{\gamma}$ and α uncertain
  - $\{FB\}$ agreement is rigid/non-contingent: $\{T = \bar{\gamma}; S = -\bar{\gamma}\}$
- Can focus on two kinds of agreements: $\{T(\alpha)\}$ and $\{T\}$
  - $\{T(\alpha)\}$ can be optimal as a way to manage incentives to distort S
  - novel interpretation of escape clause (import volume effect)
- If uncertainty over α grows large enough, optimum can switch from $\{T(\alpha)\}$ to $\{T = \bar{\gamma}; S = -\bar{\gamma}\}$

Rigidity

- Unsurprising result: large uncertainty in γ makes it less likely that optimal agreement is rigid
- But suppose γ now fixed at $\bar{\gamma}$ and α uncertain
  - $\{FB\}$ agreement is rigid/non-contingent: $\{T = \bar{\gamma}; S = -\bar{\gamma}\}$
- Can focus on two kinds of agreements: $\{T(\alpha)\}$ and $\{T\}$
  - $\{T(\alpha)\}$ can be optimal as a way to manage incentives to distort S
  - novel interpretation of escape clause (import volume effect)
- If uncertainty over α grows large enough, optimum can switch from $\{T(\alpha)\}$ to $\{T = \bar{\gamma}; S = -\bar{\gamma}\}$
- $\Longrightarrow$ Surprising result: large uncertainty in α can make it *more* likely that optimal agreement is rigid
- $\Longrightarrow$ More broadly, source of uncertainty matters for tradeoff between rigidity and discretion in optimal agreement

National Treatment

- Return to world of uncertain γ and consider rationale for NT clause
- Extend feasible set of agreements by allowing for an NT clause, that is a constraint $t_h = t_f$, costing $2c_p$
- An *NT-based* agreement includes the NT clause
  - the price relationships are now: $p = p^* + \tau + t$; $q = p^* + \tau + s$
  - recall for non-NT: $p = p^* + T$; $q = p^* + T + S$
- $\{NT, \tau, s\}$ costs less than $\{FB\}$ and ties down producer price wedge $q - p^*$, leaves consumer price wedge $p - p^*$ to discretion
  - not possible with non-NT agreements

National Treatment

- Return to world of uncertain γ and consider rationale for NT clause
- Extend feasible set of agreements by allowing for an NT clause, that is a constraint $t_h = t_f$, costing $2c_p$
- An *NT-based* agreement includes the NT clause
  - the price relationships are now: $p = p^* + \tau + t$; $q = p^* + \tau + s$
  - recall for non-NT: $p = p^* + T$; $q = p^* + T + S$
- $\{NT, \tau, s\}$ costs less than $\{FB\}$ and ties down producer price wedge $q - p^*$, leaves consumer price wedge $p - p^*$ to discretion
  - not possible with non-NT agreements
- $\Longrightarrow$ NT-based agreement optimal if low substitutability between t and τ for ToT manipulation
  - gets close to first best ($\{t^{eff} = \gamma, \tau^{eff} = 0, s^{eff} = 0\}$) by achieving state-contingency "for free" via discretion over internal taxes

Takeaway on Rules

- An analysis of trade agreements as *endogenously* incomplete contracts
- Provides a novel explanation for:
  - the emphasis on border instruments in real world trade agreements and evolution toward behind-the-border liberalization
  - "escape clauses" in response to surging import demand
  - the National Treatment provision in GATT/WTO
- The potential appeal of a dispute settlement body, as a mechanism to "complete" the incomplete contract?

Disputes

- Most models of trade agreements treat disputes as synonymous with enforcement
- But in a typical WTO dispute, role played by DSB amounts to "completing" various dimensions of an incomplete contract
  - disagreements over what was signed on to: *Interpretation*
  - instances where legal text of the agreement is silent: *Gap-filling*
  - DSB might even grant exceptions to rigid obligations: *Modification*
- Evaluate potential role of DSB in completing an incomplete contract
- Highlight interaction between design of contract and design of DSB

Approach

- Along with *rigidity* and *discretion*, introduce a third form of contractual incompleteness: *vagueness*
- Three possible (non-enforcement) roles of the DSB
  - *interpret* aspects of contract that are *vague*
  - *fill gaps* where contract is silent and therefore leaves *discretion*
  - grant exceptions and thereby *modify* aspects of contract that are *rigid*
- Or, the DSB can serve none of these functions and simply enforce contractual obligations that are unambiguous
- What is contract form and DSB role maximize the ex-ante joint payoff of the govs, i.e., the optimal *institution*?

The Model

- A single industry; importing gov chooses $T \in \{FT, P\}$ to maximize $\omega(T; s)$, where $s \equiv (s_1, s_2, ..., s_N)$ is a state vector
- The exporting gov is passive in this industry; its payoff is $\omega^*(T; s)$
- Each state variable represents a binary event, such as "there is/is not an import surge" or "the domestic industry does/does not shut down"

- Importing gov's gain from protection:
  $\gamma(s) \equiv \omega(P; s) - \omega(FT; s) > 0$ for all s
- Exporting gov's loss from protection:
  $\gamma^*(s) \equiv \omega^*(FT; s) - \omega^*(P; s) > 0$ for all s
- Joint (positive or negative) gain from protection:
  $\Gamma(s) \equiv \gamma(s) - \gamma^*(s)$; $\Gamma(s) < 0$ for $s \in \sigma^{FT}$ and $\Gamma(s) > 0$ for $s \in \sigma^P$

Contracts

- State variables s_i are verifiable, but too costly to describe in contract
- Consider the following possible contracts:
  - *Rigid* (R) contract: $T = FT$ for all s
  - *Discretionary* (D) contract: P allowed for all s. (Same as no contract)
  - *Vague* (V) contract: P is allowed if and only if v (where v is a vague sentence such as "there is substantial injury to the domestic industry")

    The truth function of v is the following:

$$\text{Sentence } v \text{ is } \begin{cases} \textit{True} & \textit{if} \quad s \in \mathbf{T} \\ \textit{False} & \textit{if} \quad s \in \mathbf{F} \\ \textit{Undefined} & \textit{otherwise} \end{cases}$$

  where $\mathbf{T}$ ($\mathbf{F}$) a set of "extreme" states where v clearly true (false)

- Assume $\mathbf{T} \subset \sigma^P$ and $\mathbf{F} \subset \sigma^{FT}$ and truth function of v is common knowledge to govs and DSB

The DSB

- DSB operates within mandate (if no applicable mandate, not invoked)
- Enforcement role of DSB kept in background
- If the DSB invoked to settle a dispute, the exporter (complainant) incurs cost c^* and the importer (defendant) incurs cost c
- If invoked, DSB observes s and a noisy (unbiased) signal of $\Gamma(s)$, and it issues a *ruling*, T^{DSB}
  - attempts to complete contract as govs would have, by choosing T^{DSB} to maximize the expected joint payoff of govs given the signal
  - ruling automatically enforced
- DSB recommends the wrong policy with probability $q(s)$
  - let $q(s) \equiv qk(s)$ where $k(s) \in [0, \frac{1}{2}]$ for all s and $q \in [0, 1]$

Candidate Institutions

- The contract can be silent (D), rigid (R) or vague (V)
- The DSB can be given an "activist" mandate to
  - *fill gaps* (g) where contract is silent and therefore leaves *discretion*
  - grant exceptions and thereby *modify* (m) *rigid* aspects of contract
  - *interpret* (i) *vague* aspects of contract
- Or, the DSB can be given a "non-activist" mandate (n) to simply enforce contractual obligations that are unambiguous

Contract / DSB Role	Silent	Rigid	Vague
Non-activist	D_n	R_n	V_n
Activist	D_g: DSB fills gaps	R_m: DSB allows exceptions	V_i: DSB interprets

Timing

Stage 0 The institution is designed

Stage 1 The state of the world s is realized

Stage 2 The importer gov chooses policy $T \in \{FT, P\}$

Stage 3 The exporter gov decides whether to file with the DSB

Stage 4 If invoked, the DSB issues a ruling $T^{DSB} \in \{FT, P\}$

Stage 5 Payoffs are realized

Analysis

Disputes with an Activist DSB

- Exporter gov files a complaint iff $T = P$ and

$$\Pr(\text{DSB ruling is } FT \mid s) \cdot \gamma^*(s) > c^* \tag{F}$$

- Importer gov chooses $T = P$ if either (F) fails, or if (F) holds but

$$\Pr(\text{DSB ruling is } P \mid s) \cdot \gamma(s) > c$$

- Focus on small filing costs:

$$\frac{1}{2}\gamma^*(s) > c^* \text{ and } \frac{1}{2}\gamma(s) > c \text{ for all } s$$

Disputes with an Activist DSB

- Consider the D_g institution
- In states $s \in \sigma^{FT}$:
  - if $qk(s) < \frac{c}{\gamma(s)}$ then $T = FT$ and DSB not invoked
  - if $qk(s) > \frac{c}{\gamma(s)}$ then $T = P$ and DSB invoked
- In states $s \in \sigma^{P}$:
  - if $qk(s) < \frac{c^*}{\gamma^*(s)}$ then $T = P$ and DSB not invoked
  - if $qk(s) > \frac{c^*}{\gamma^*(s)}$ then $T = P$ and DSB invoked
- Notice: two kinds of disputes, always caused by opportunism
  - importer tries to "get away with protection"
  - exporter tries to "get away with forcing free trade"
- With an activist DSB, first best achieved in states with no dispute, where DSB works *off-equilibrium*

The Optimal Institution

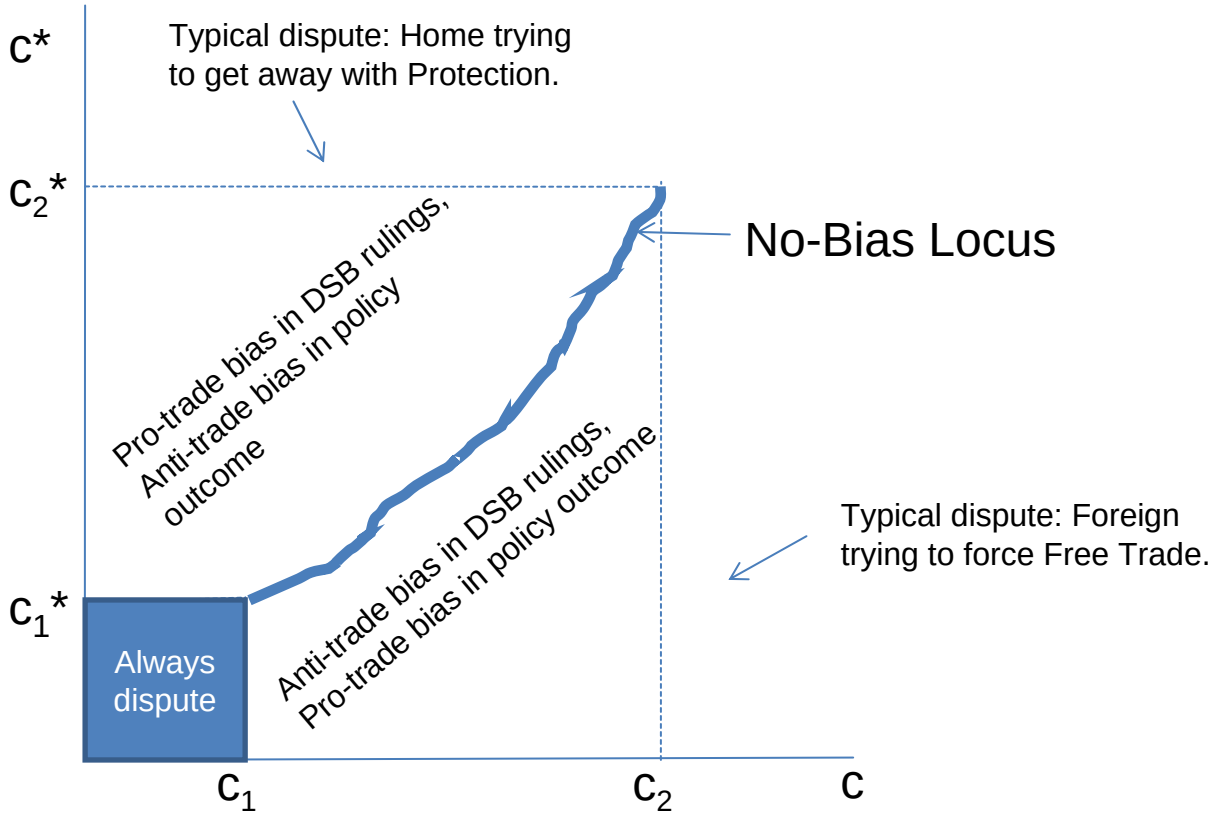
$\Longrightarrow$ *There exist critical levels* q_1 *and* q_2 *(with* $0 < q_1 \leq q_2 \leq 1$*) such that: for* $q < q_1$ *the optimal institution is* D_g*; for* $q_1 < q < q_2$ *the optimal institution is* V_i*; and for* $q > q_2$ *the optimal institution is either* V_n *or* R_n*.*

- Leave govs with greater discretion and provide DSB with mandate to reign in that discretion the better the DSB information
- If q sufficiently small, the first-best outcome achieved even though
  - the contract is highly incomplete
  - the use of DSB is costly
  - DSB rulings are imperfect
  - but DSB must be given activist mandate
- No "modification" role for the DSB in the optimal institution
- Non-monotonic relationship between frequency of equilibrium disputes and performance of optimal institution relative to first best

A Pro-Trade Bias in the DSB?

- Empirically, an apparent "pro-trade bias" in DSB rulings
  - complainants win 85% – 90% of GATT/WTO cases
- What can account for this?
- Could be result of a *selection bias* in DSB rulings
- When c^* is high relative to c,
  - disputes mostly about importer trying to get away with protection
  - $\Longrightarrow$ *Rulings* exhibit a "pro-trade bias" (b/c complainant mostly right)
  - but *equilibrium policies* exhibit an "anti-trade bias" (b/c importer acts opportunistically more often than exporter)
  - Fig 1

Figure 1


c*
Typical dispute: Home trying to get away with Protection.
c2*
No-Bias Locus
Pro-trade bias in DSB rulings, Anti-trade bias in policy outcome
Typical dispute: Foreign trying to force Free Trade.
c1*
Always dispute
Anti-trade bias in DSB rulings, Pro-trade bias in policy outcome
c1
c2
c

Precedent Setting

- Should DSB rulings set legal *precedent* for future rulings?
  - govs create the contract ("civil law") and provide DSB with a mandate
  - precedent $\Rightarrow$ DSB rulings help complete the contract ("common law")
- Consider a two-period version of the static model developed above
  - in a prior *Period* 0, the institution is created
  - *Period* 1 and *Period* 2 then proceed as in the static model
- The state s is *iid* across the two periods
- If rulings set precedent, a *Period*-1 ruling for the realized state s' will apply also in *Period* 2 if the realized state is again s'
- Trade-off: precedent induces more filings (bad); saves on duplicative filing costs in states where filing would occur anyway (good)

Precedent Setting

$\Longrightarrow$ *Consider a given activist DSB role (g or i). As q increases from 0, first the introduction of precedent has no effect, then it becomes strictly undesirable, and finally it is strictly desirable as q approaches 1.*

- Intuition:
  - when DSB sufficiently well-informed, little chance of equilibrium filing absent precedent, so little expected savings of duplicative filing costs
  - when sufficiently poorly informed, DSB invoked in most every state, so little chance that precedent will induce additional filings

$\Longrightarrow$ *There exists an intermediate range of q such that, for a given activist DSB role (g or i), it is optimal to give the DSB precedent-setting authority if δ is sufficiently low, while it is preferable not to do so if δ is sufficiently high.*

- Intuition: high δ magnifies additional filing that comes with precedent

Takeaway on Disputes

- Trade disputes can play important roles beyond enforcement
  - A contract that has gaps or is vague, and a gap-filling/interpretive DSB, is optimal if quality of DSB information sufficiently high
- Relationship between frequency of disputes and performance of optimal institution is non-monotonic
- Selection effects can explain "pro-trade bias" in WTO DSB rulings
  - but same conditions imply an "anti-trade bias" in policy outcomes
- Giving the DSB precedent-setting authority is sub-optimal unless:
  - the DSB is poorly informed/govs care little about the future
- Can court learning be an important feature in this institutional environment?

How Important can the Non-Violation Clause be for the GATT/WTO?

Robert W. Staiger and Alan O. Sykes

Wisconsin and NYU

April 2014

Introduction: Law

- GATT Article XXIII:1

If *any contracting party should consider that* **any benefit** *accruing to it directly or indirectly under this Agreement* **is being nullified or impaired** *or that the attainment of any objective of the Agreement is being impeded* **as the result of**

(a) the failure of another contracting party to carry out its obligations under this Agreement, or

(b) **the application by another contracting party of any measure, whether or not it conflicts with the provisions of this Agreement**, *or*

(c) the existence of any other situation,

the contracting party may [have recourse to the dispute resolution process]. . .

Introduction: Economics

- Incomplete contracts and the non-violation clause:
  - Intriguing attempt to address contractual incompleteness
- Shallow integration and the non-violation clause (ToT Theory):
  - Globally efficient policies achievable with negotiations over tariffs and "market access preservation rule" to handle domestic policies
  - Nash domestic policies efficient; market access preservation rule prevents deflection of ToT-manipulation to domestic policies
  - Non-violation clause looks a lot like market access preservation rule

Introduction: Practice

- Observed performance of non-violation claims in GATT/WTO disputes seems weak relative to violation claims
  - *Rulings* on non-violation claims are *rare* compared to violation claims: $\leq 8\%$ of disputes with rulings
  - *Success* of non-violation claims is *low* compared to violation claims: 35% versus 73% success rate
- Despite this, non-violation *claims* made in 20% of disputes with rulings

Introduction: Questions

- Can a model account for the weak performance measures of non-violation claims?
- What is implied about the (on- and off-) equilibrium impacts of the non-violation clause on the joint welfare of GATT/WTO members?
- Answer requires a model that predicts disputes in equilibrium
  - Introduce non-violation claims into Maggi and Staiger (2011); identify conditions under which model delivers broad features described above
  - Use model under these conditions to consider nature and potential importance of role that non-violation claims can play in GATT/WTO

Introduction: Findings

- Model consistent with the broad stylized facts when:
  - domestic measures a poor second to tariffs for ToT manipulation
  - efficiency of GATT/WTO compensation mechanism in disputes (tariff retaliation) is low
  - accuracy of GATT/WTO court (DSB) is high
- Under these conditions, non-violation clause can play important role:
  - functions mostly off-equilibrium to reroute policy interventions into forms that are explicitly addressed by the GATT/WTO contract
  - prevents circumvention of negotiated market access commitments
  - in line with the role emphasized by economists and legal scholars and envisioned by the drafters of GATT

Model Overview

- Maggi and Staiger (2011): importing gov chooses trade policy $\tau \in \{FT, P\}$
  - Ex ante, importing and exporting govs can write an incomplete contract, set up DSB and define its mandate
  - Ex post, uncertainty resolved, importing gov makes trade policy choice and exporting gov decides whether to initiate dispute, which if initiated is resolved by DSB according to mandate and a noisy signal
- We extend this model in two ways
- In addition to $\tau \in \{FT, P\}$, we allow importing gov to also make a domestic regulatory choice $r \in \{FT, R\}$
  - but while τ is contractible, r is non-contractible
- In addition to violation claim (against τ), we introduce possibility of bringing a non-violation claim (against r or τ)
  - and while violation claim a "property rule," non-violation claim a "liability rule"

Economic Environment

- A single industry; importing gov chooses $\tau \in \{FT, P\}$ and $r \in \{FT, R\}$ to maximize $\omega(\tau, r; s)$, $s \equiv (s_1, s_2, ..., s_N)$ a state vector
- Each state variable represents a binary event, such as "there is/is not an import surge" or "the product does/does not contain asbestos"
- The exporting gov is passive in this industry; its payoff is $\omega^*(\tau, r; s)$
- Assume never efficient/unilaterally optimal for Home to protect and regulate simultaneously, so 3 relevant policy settings:
  - $\mathcal{FT} \equiv \{\tau = FT, r = FT\}$
  - $\mathcal{P} \equiv \{\tau = P, r = FT\}$
  - $\mathcal{R} \equiv \{\tau = FT, r = R\}$

Economic Environment

- Importing gov's gain from $\mathcal{P}$: $\gamma^{\mathcal{P}}(s) \equiv \omega(\mathcal{P};s) - \omega(\mathcal{FT};s) > 0$
- Importing gov's gain from $\mathcal{R}$: $\gamma^{\mathcal{R}}(s) \equiv \omega(\mathcal{R};s) - \omega(\mathcal{FT};s) > 0$
- Exporting gov's loss from $\mathcal{P}$ or $\mathcal{R}$: $\gamma^{*}(s) \equiv \omega^{*}(\mathcal{FT};s) - \omega^{*}(\mathcal{P};s)$ $= \omega^{*}(\mathcal{FT};s) - \omega^{*}(\mathcal{R};s) > 0$ for all s
  - Joint (positive or negative) gain from $\mathcal{P}$: $\Gamma^{\mathcal{P}}(s) \equiv \gamma^{\mathcal{P}}(s) - \gamma^{*}(s)$
  - Joint (positive or negative) gain from $\mathcal{R}$: $\Gamma^{\mathcal{R}}(s) \equiv \gamma^{\mathcal{R}}(s) - \gamma^{*}(s)$
- First best policy:

$$\begin{aligned} \sigma^{\mathcal{FT}} &\equiv \{s|\max[\Gamma^{\mathcal{P}}(s),\Gamma^{\mathcal{R}}(s)] \leq 0\} \\ \sigma^{\mathcal{P}} &\equiv \{s|\Gamma^{\mathcal{P}}(s) > \max[0,\Gamma^{\mathcal{R}}(s)]\} \\ \sigma^{\mathcal{R}} &\equiv \{s|\Gamma^{\mathcal{R}}(s) > \max[0,\Gamma^{\mathcal{P}}(s)]\} \end{aligned}$$

Contract

- Realized state s observed by govs and DSB, but s too costly to write in a contract
- $\Gamma^{\mathcal{P}}$ and $\Gamma^{\mathcal{R}}$ observed by govs but not by DSB, so can't contract directly over payoffs
- Costless to write τ in a "vague" contract:
  - "$\tau = P$ allowed if and only if ν"
  - ν a vague sentence such as "there is serious injury to the domestic industry due to increased imports"
  - off-the-shelf language
  - ambiguous meaning in some states of the world
- Too costly to write r in a vague contract

DSB Mandate

- DSB can be asked to address a *violation complaint* against Home choice of $\tau = P$
  - If meaning of vague contract unambiguous, contract enforced (always off equilibrium in this model)
  - If meaning of vague contract ambiguous in state s, DSB observes an unbiased but noisy signal of $\Gamma^{\mathcal{P}}$ and issues "ruling" τ^{DSB} that max's expected joint payoff of govs given signal
  - DSB ruling τ^{DSB} automatically enforced in case of violation complaint
- DSB can be asked to address a *non-violation complaint* against Home choice of $\tau = P$ or $r = R$
  - If non-violation claim against $\tau = P$, then DSB proceeds as above, except only rules on non-violation claim if it has not already ruled affirmatively on a violation claim
  - If non-violation claim against $r = R$, then DSB proceeds as above
  - But in the case of non-violation complaint, Home has option of implementing DSB ruling or paying damages $b(s)$

Basic Assumptions

- Assumption 1: protection better for ToT manipulation than regulation

$$\gamma^{\mathcal{R}}(s) = \theta \cdot \gamma^{\mathcal{P}}(s) \text{ with } \theta \in (0,1) \text{ for } s \in \sigma^{\mathcal{FT}}$$

- Assumption 2: damages set at level of harm to Foreign

$$b(s) = \gamma^{*}(s) \text{ for } s \in \Sigma$$

- Assumption 3: damage payments are inefficient

$$b^{*}(s) \equiv \delta \cdot b(s) \text{ with } \delta \in (0,1) \text{ for } s \in \Sigma$$

- Probability of "wrong" DSB ruling is $q \in (0, 1/2)$; per claim cost of dispute to Foreign (claimant) is c^{*}, to Home (defendant) is c

Timing

Stage 0. The state s is realized

Stage 1. Home chooses $\tau \in \{FT, P\}$ and $r \in \{FT, R\}$

Stage 2. Foreign decides whether to file a V and/or an NV complaint with the DSB

Stage 3. If invoked for a V complaint, the DSB issues a ruling $\tau^{DSB} \in \{FT, P\}$; if invoked for an NV complaint, the DSB issues a ruling $\tau^{DSB} \in \{FT, P\}$ or $r^{DSB} \in \{FT, R\}$; if invoked for a V&NV complaint, the DSB issues a first (V) ruling $\tau^{DSB} \in \{FT, P\}$, and issues a second (NV) ruling $\tau^{DSB} \in \{FT, P\}$ if and only if its first ruling is $\tau^{DSB} = P$

Stage 4. If the DSB is invoked and issues an NV ruling that goes against Home, then Home chooses whether to revert to FT or maintain its policy and pay damages b

Stage 5. Payoffs are realized

When the first best policy is regulation – Proposition 1

- For $s \in \sigma^{\mathcal{R}}$, Figure 1a summarizes
- Note: NVs in $\sigma^{\mathcal{R}}$
  - $\Longrightarrow$ Foreign trying to inefficiently force $\mathcal{FT}$
  - NV claim $\Longrightarrow$ NV ruling, succeeds with probability q
  - $\therefore$ Paucity of NV rulings $\Longrightarrow$ $\frac{c^*}{\delta q}$ high relative to $\gamma^*(s)$ for almost all $s \in \sigma^{\mathcal{R}}$; Figure 1a
  - Later will need $\frac{c^*}{q}$ low, so small δ implied

Figure 1a: $s \in \sigma^R$ for fixed $\gamma^P(s)$

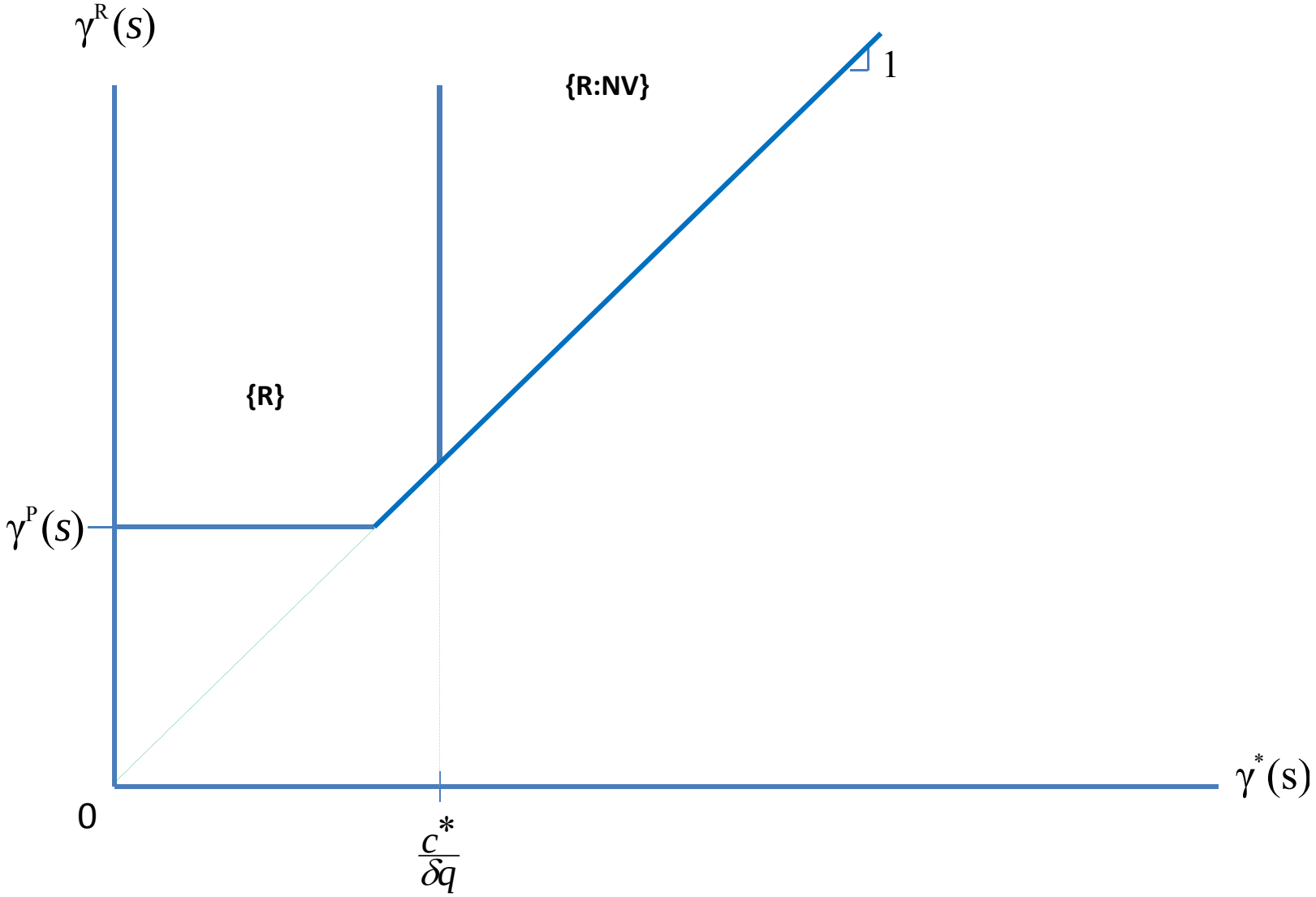
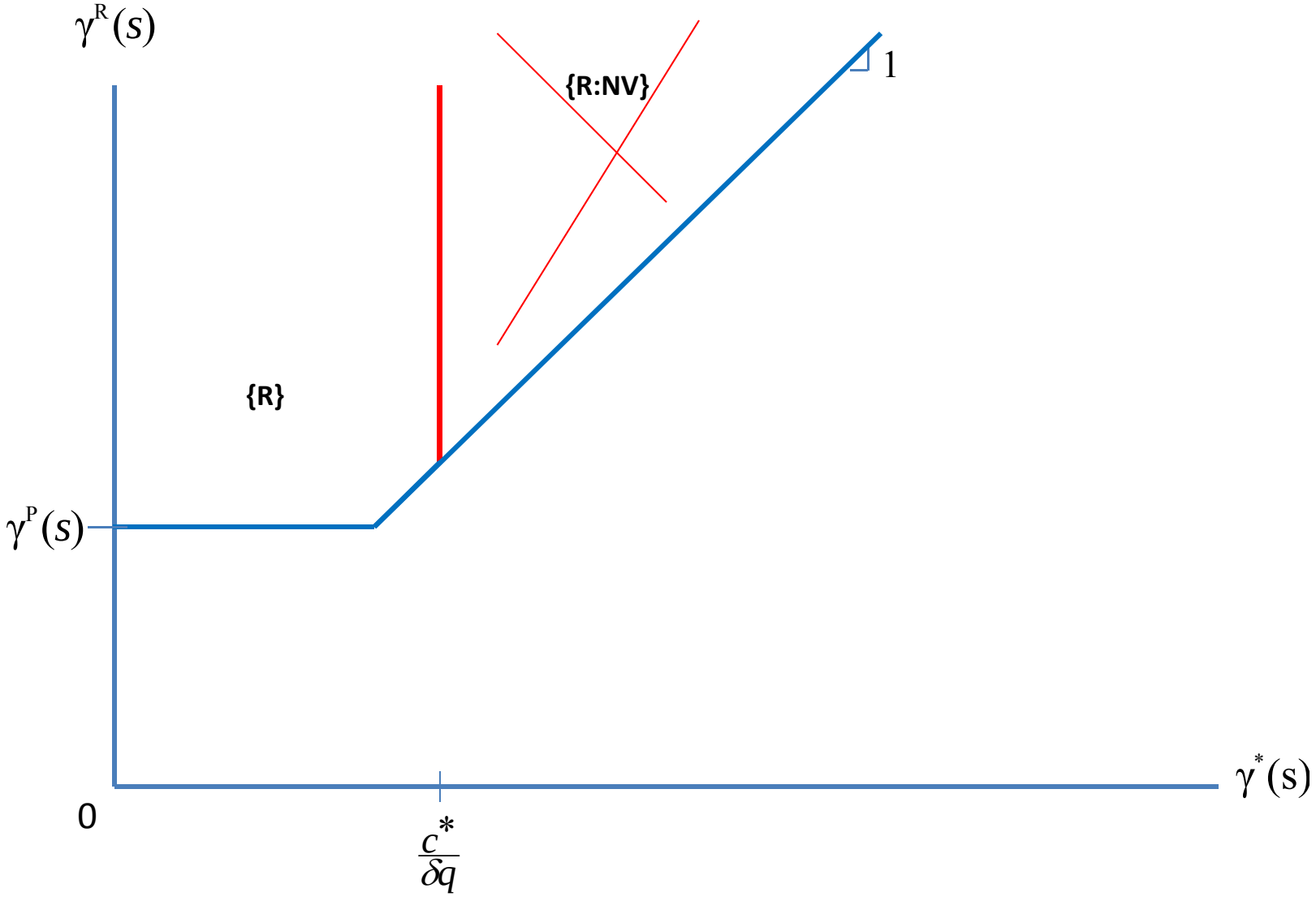


Figure 1a: $s \in \sigma^R$ for fixed $\gamma^P(s)$



When the first best policy is protection – Proposition 3

- For $s \in \sigma^{\mathcal{P}}$, Figure 1b summarizes
- Note: NVs in $\sigma^{\mathcal{P}}$
- NV claim alone
  - NV claim alone $\Longrightarrow$ NV ruling
  - $\therefore$ Paucity of NV rulings $\Longrightarrow$ $\frac{c^*}{\delta q}$ high relative to $\gamma^*(s)$ for almost all $s \in \sigma^{\mathcal{P}}$: small δ implied
- V&NV claim
  - V&NV claim $\Longrightarrow$ NV ruling with probability $(1-q)$
  - But V&NV claim rare in $\sigma^{\mathcal{P}}$ under small δ; Figure 1b

Figure 1b: $s \in \sigma^P$ for fixed $\gamma^P(s)$

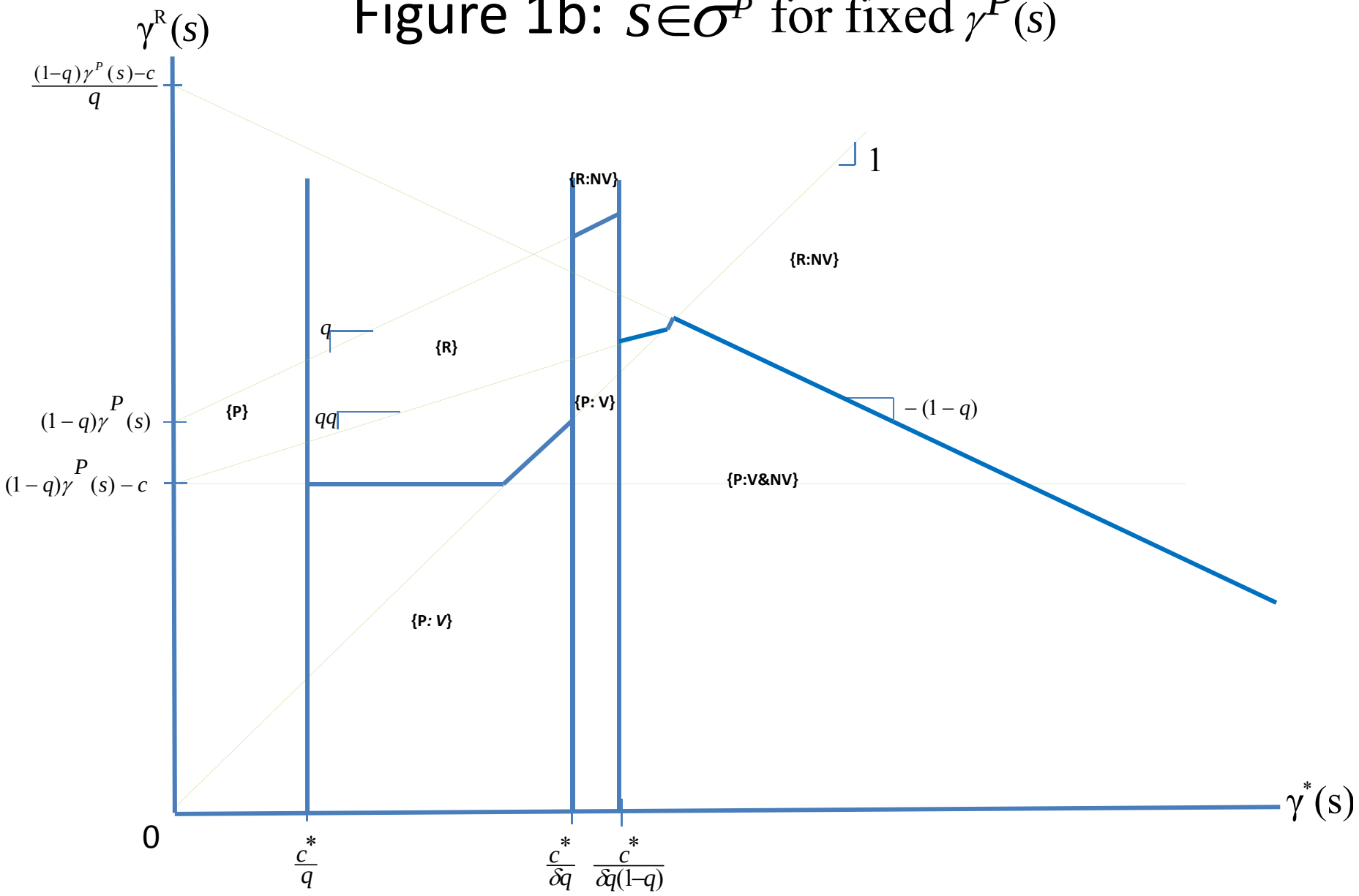
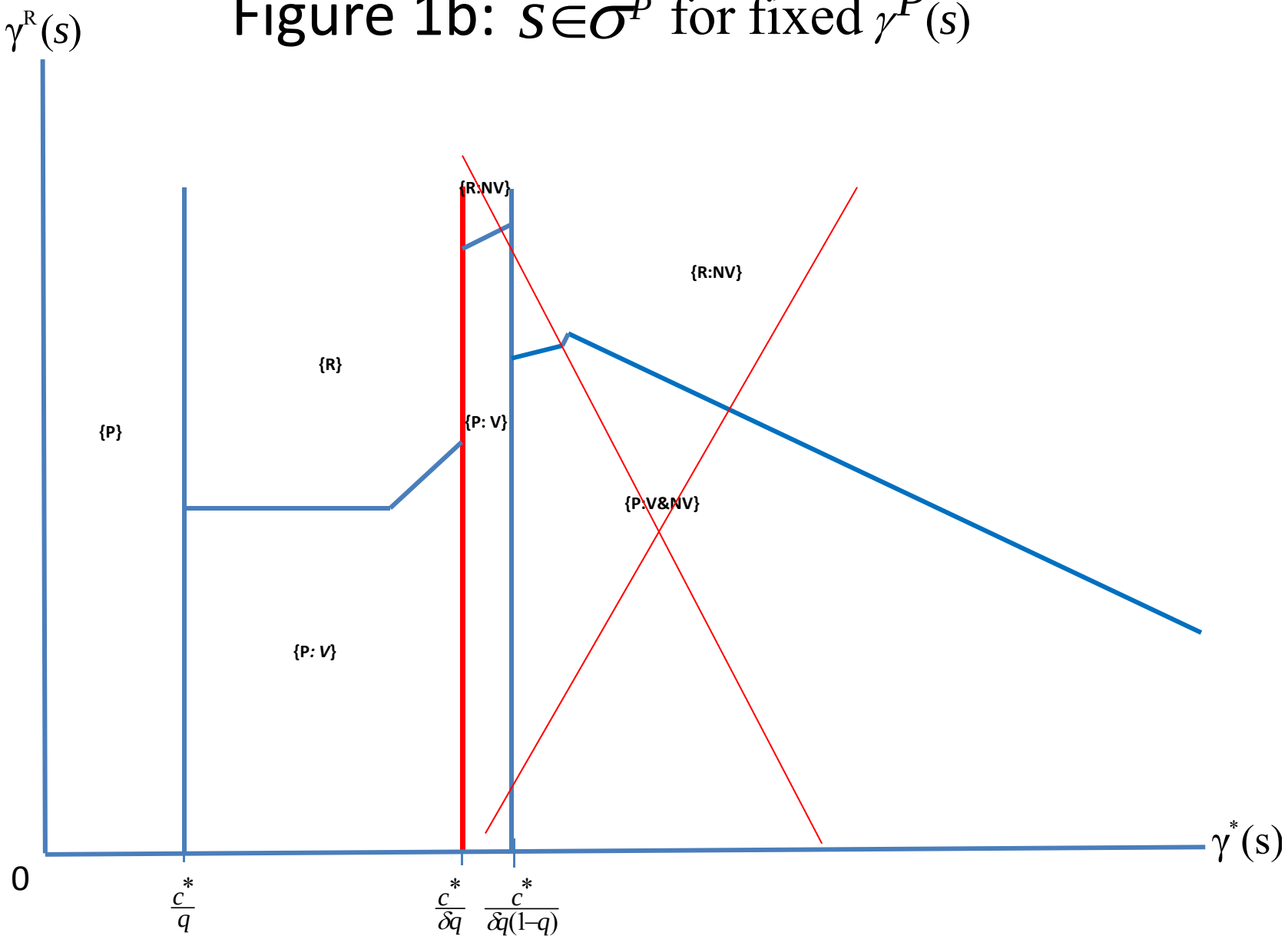


Figure 1b: $s \in \sigma^P$ for fixed $\gamma^P(s)$



When the first best policy is free trade – Proposition 2

- For $s \in \sigma^{\mathcal{FT}}$, Figure 1c summarizes
- Note: NVs in $\sigma^{\mathcal{FT}}$
  - $\Longrightarrow$ Home trying to get away with inefficient intervention
  - NV claim alone $\Longrightarrow$ NV ruling
  - V&NV claim $\Longrightarrow$ NV ruling with probability q,
  - NV succeeds with probability $(1-q)$
  - NV rulings in $\sigma^{\mathcal{FT}}$ will be rare if $\theta \lessapprox \frac{q}{2}$ and q low
  - But NV *claims* will not be rare in $\sigma^{\mathcal{FT}}$ when $\frac{c^*}{(1-q)q}$ low relative to $\gamma^*(s)$ and $\frac{c}{qq}$ low relative to $\gamma^{\mathcal{P}}(s)$ for substantial $s \in \sigma^{\mathcal{FT}}$; Figure 1c

Figure 1c: $s \in \sigma^{FT}$ for $\theta \in (0,1)$

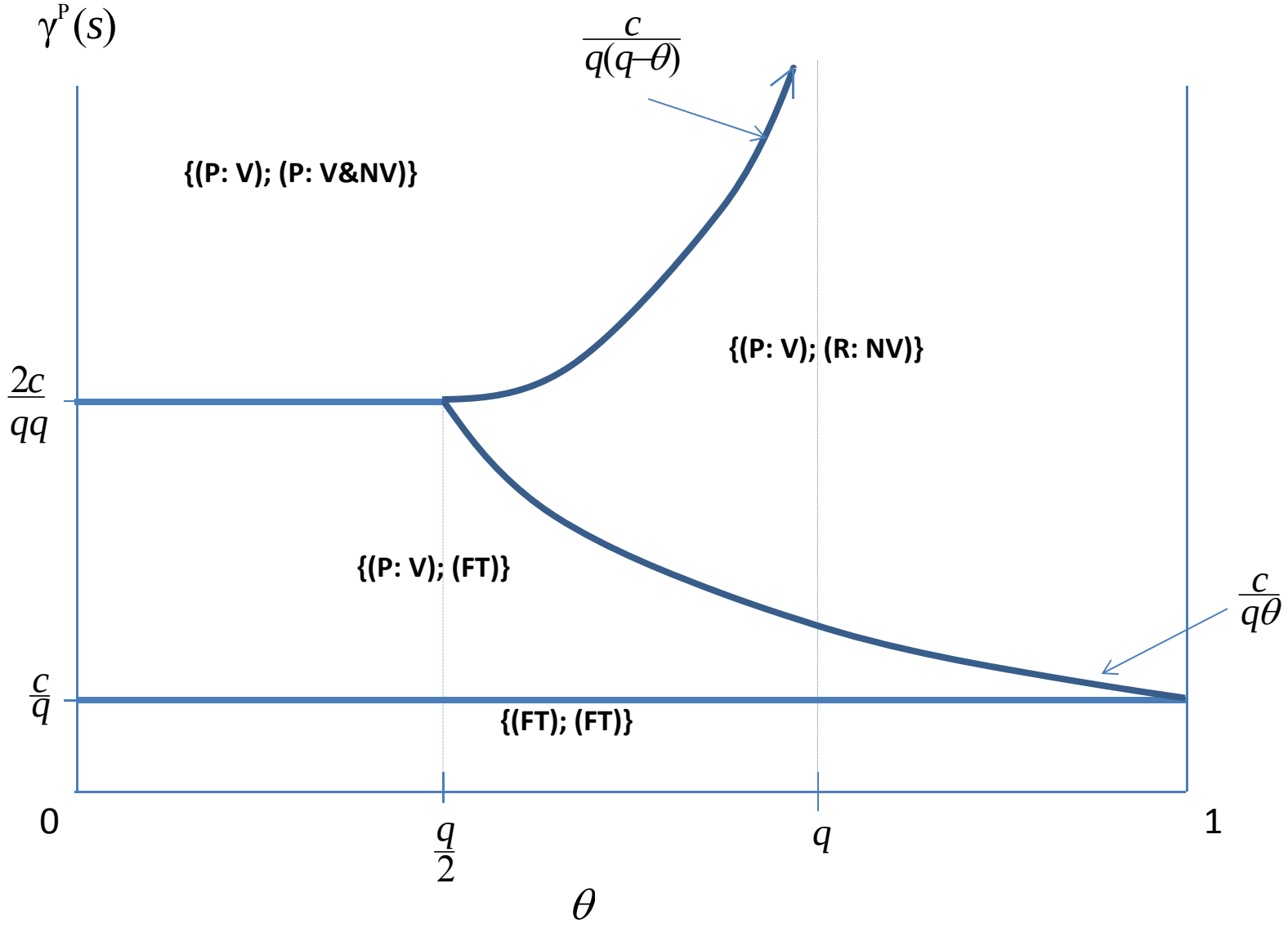
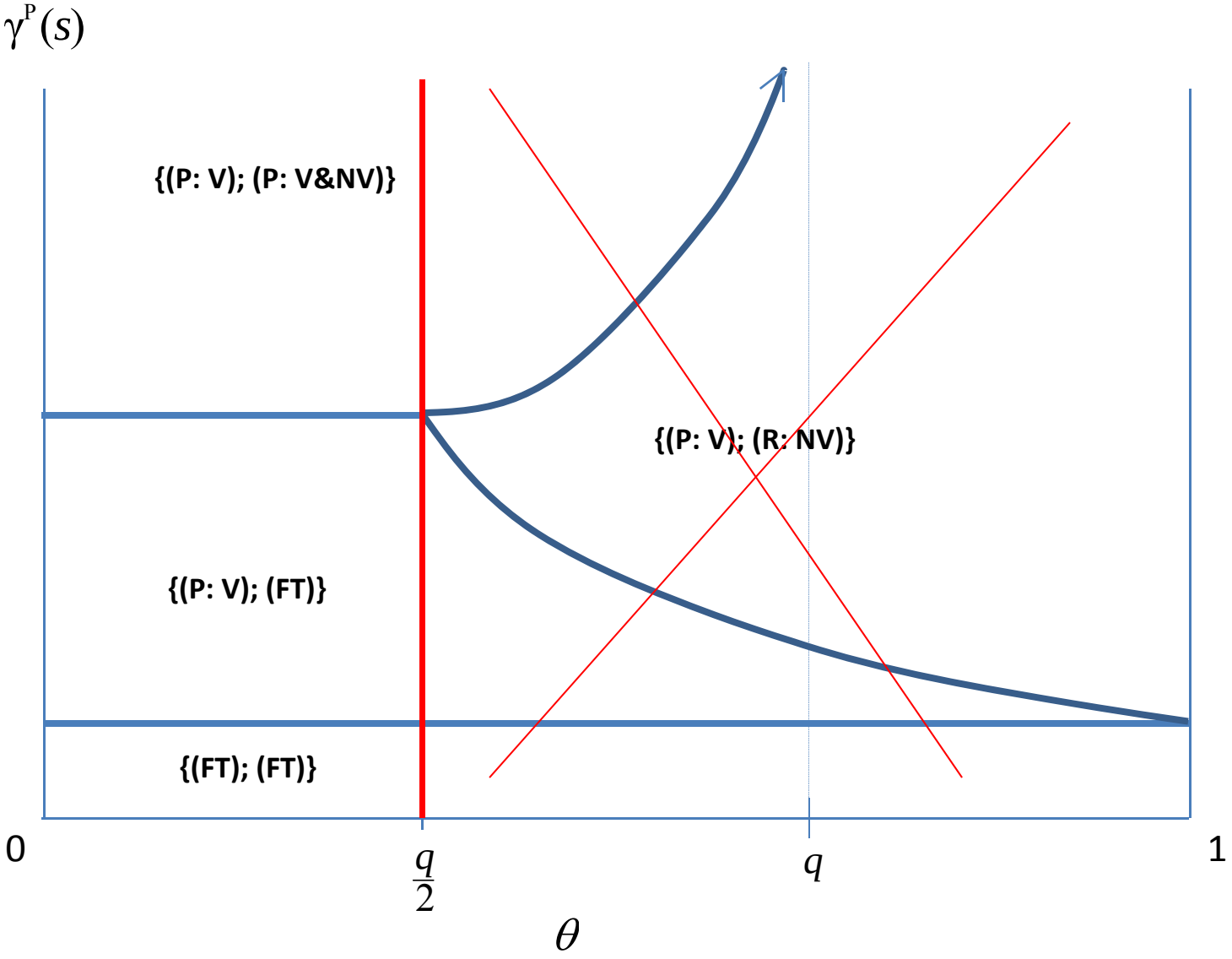


Figure 1c: $s \in \sigma^{FT}$ for $\theta \in (0,1)$



Interpreting the weak performance measures of NV claims

- According to the model:
  - disputes arise with opportunistic behavior – either the claimant seeks to remove globally efficient policies, or the defendant hopes to get away with globally inefficient intervention
  - govs rarely use NV claims opportunistically, because even if successful GATT's NV remedy of self-help reciprocity would be worth little (low δ)
  - govs rarely set domestic policies opportunistically, because those policies typically a poor second to tariffs for ToT manipulation (low θ)
  - success of NV claims low compared to V claims, because most NV claims serve as backup to V claims against policies that violate GATT/WTO contract, and with accurate DSB the V claims typically succeed and rulings on these (likely successful) NV claims not observed (low q)

The Value of the Non-Violation Clause

- **Corollary to Proposition 7.** *For δ, θ and q sufficiently small, the impact of the non-violation clause on expected joint surplus is strictly positive, and is approximated by*
  - $\nabla E[\Omega] \cong \sum_{s \in \sigma_1^{\mathcal{P}}} p(s) \cdot [\gamma^{\mathcal{P}}(s) - \gamma^{\mathcal{R}}(s)] + \sum_{s \in \{\sigma_1^{\mathcal{FT}} \cup \sigma_2^{\mathcal{FT}} \cup \sigma_3^{\mathcal{FT}}\}} p(s) \cdot \gamma^*(s)$
- Figures 2a-2c

- Under these conditions, non-violation clause can play important role:
  - functions mostly off-equilibrium to reroute policy interventions into forms that are explicitly addressed by the GATT/WTO contract
  - prevents circumvention of negotiated market access commitments
  - in line with the role emphasized by economists and legal scholars and envisioned by the drafters of GATT

Figure 2a: $s \in \sigma^R$ for fixed $\gamma^P(s)$

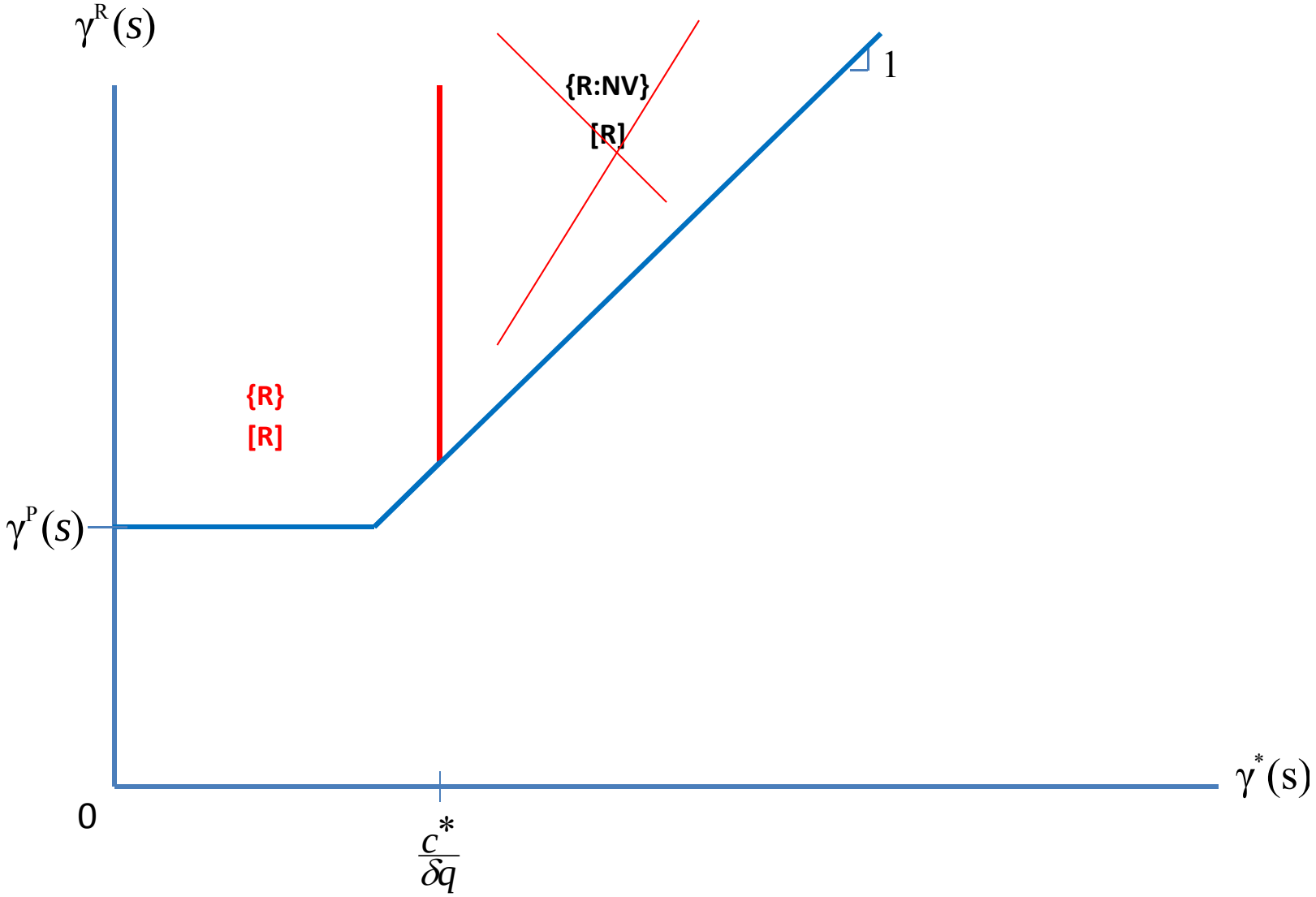


Figure 2b: $s \in \sigma^P$ for fixed $\gamma^P(s)$

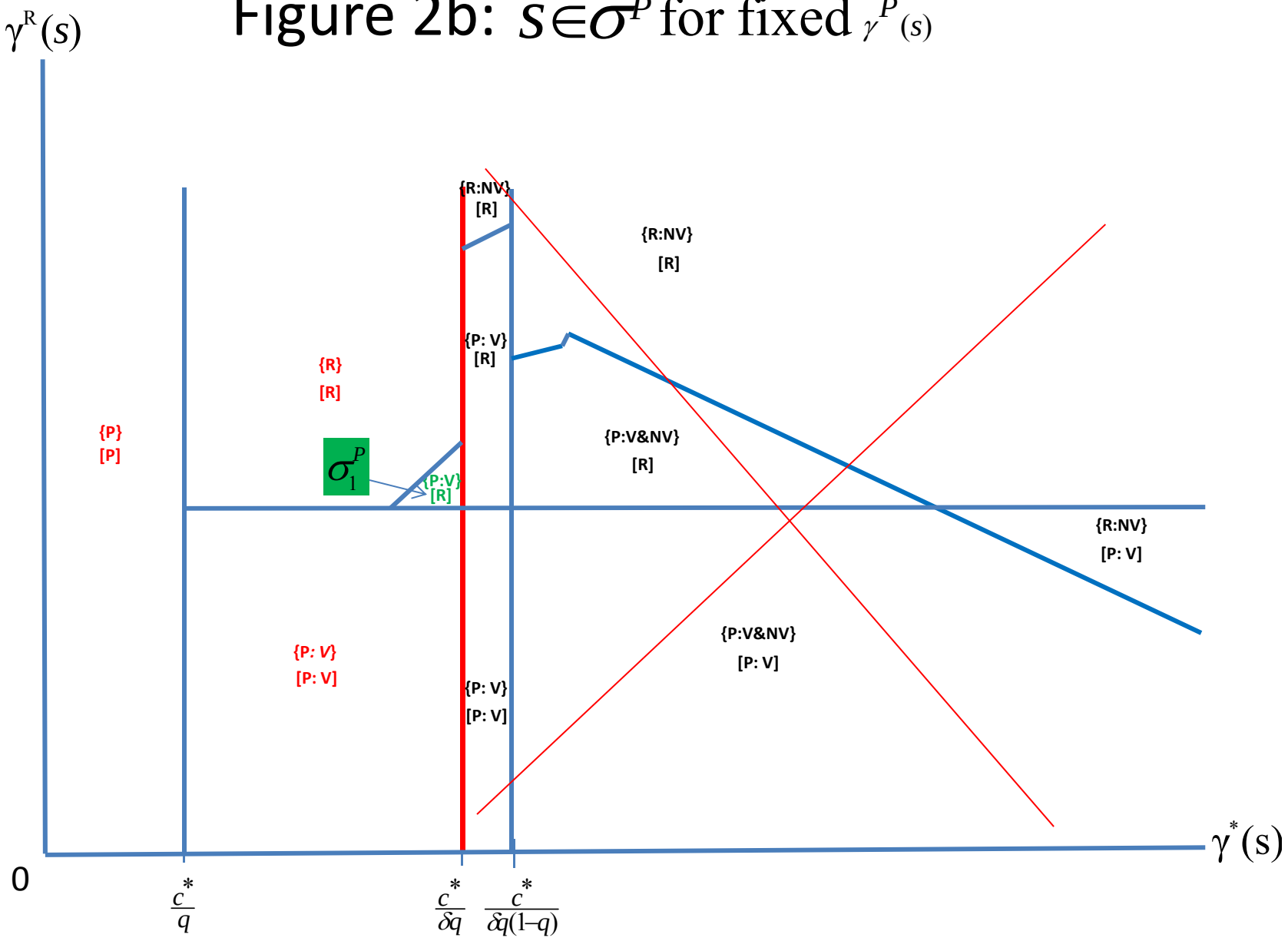
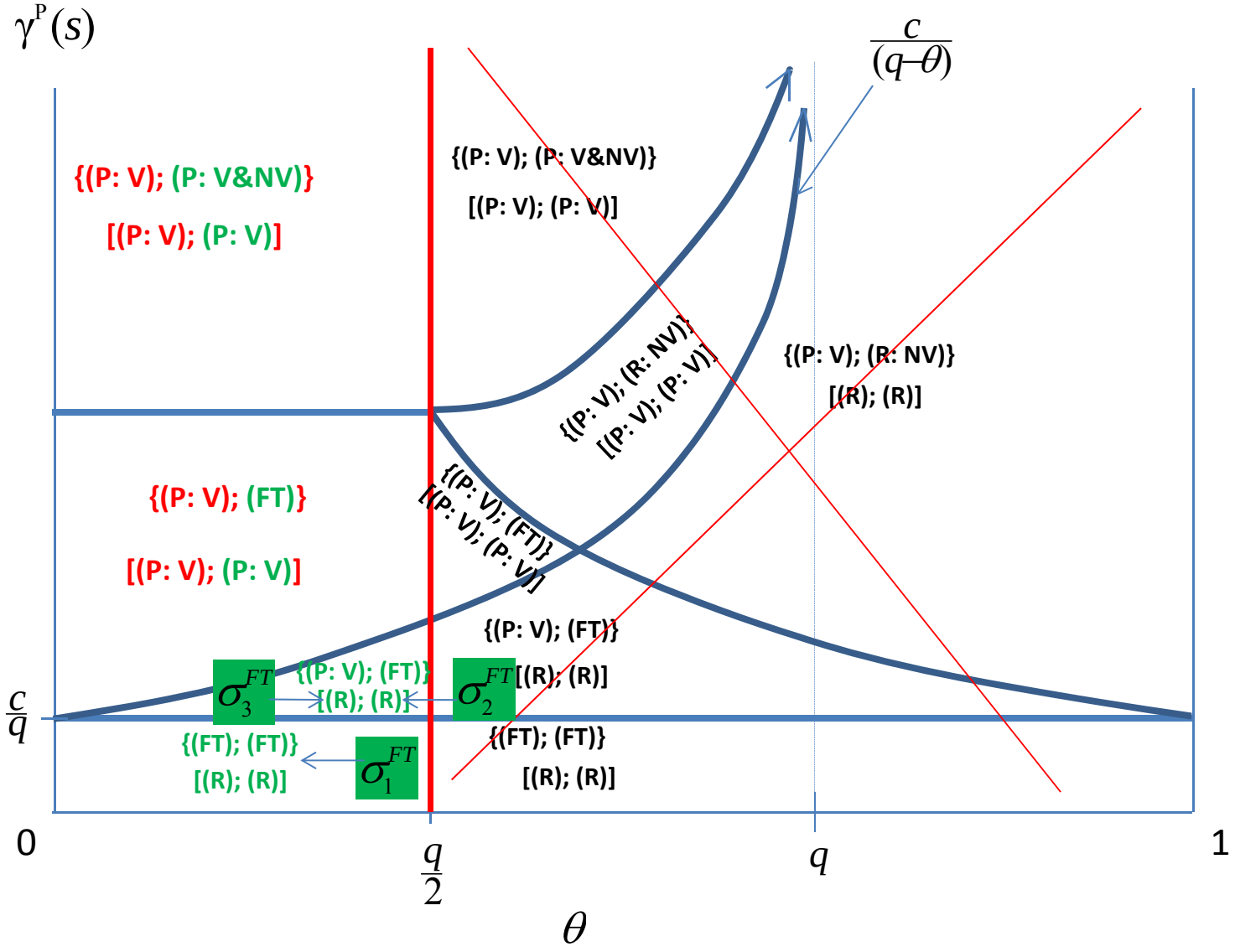


Figure 2c: $s \in \sigma^{FT}$ for $\theta \in (0,1)$



Takeaway on the Non-Violation Clause

- What explains the limited use and weak performance measures associated with non-violation claims in GATT/WTO disputes?
- In our model, disputes arise with opportunistic behavior: either the claimant seeks to remove globally efficient policies, or the defendant hopes to get away with globally inefficient intervention
- According to the model:
  - govs rarely use NV claims opportunistically, because even if successful GATT's NV remedy of self-help reciprocity would be worth little
  - govs rarely set domestic policies opportunistically, because those policies are typically a poor second to tariffs for ToT manipulation
  - success of NV claims low compared to V claims, because most NV claims serve as backup to V claims against policies that violate GATT/WTO contract, and with accurate DSB the V claims typically succeed and rulings on these (likely successful) NV claims not observed
  - an important off-equilibrium role for NV claims still exists
- Future directions: optimality of institutional features; ex-post transfers; V claims as liability rules; broader themes

Thoughts on Investor-State Dispute Settlement

- The following are preliminary notes from Ossa, Staiger and Sykes (June 2018)

The Simple Economics of Investor-State Dispute Settlement

Ralph Ossa Robert W. Staiger Alan O. Sykes

Preliminary and Incomplete Draft June 2018

Abstract

[TBA]

1. Introduction [TBA]

2. Legal Background [TBA]

3. Standing for Market Access Disputes in Trade Agreements

We first consider issues of standing, and hence the question of whether to include a state-to-state dispute settlement procedure (SSDS) or rather an exporter-to-state or investor-to-state dispute settlement procedure (ESDS or ISDS) in an optimally designed agreement. We begin in this section with consideration of the standing issue in the context of a trade agreement, assuming for simplicity for now that the trade agreement is only concerned with market access issues (i.e., we abstract from any sunk investment issues associated with foreign exporters), and using the model straight out of Maggi and Staiger (2011) under the vague contract (we do not optimize the contract) with an interpretive court (we do not optimize the court mandate). We focus on the issue of standing, comparing the inclusion of an SSDS with the alternative of inclusion of an ESDS. Under an SSDS, the foreign government makes the filing decision; under an ESDS, the foreign exporting industry/firm makes the filing decision.

3.1. State-to-State dispute settlement

[Note: This subsection needs to be rewritten to eliminate cut-and-pasted material from Maggi and Staiger (2011).]

Under an SSDS, the basic setup tracks closely that of Maggi and Staiger (2011). There is a single industry in which an importing government chooses a binary import policy $\tau \in \{FT, P\}$ (Free Trade or Protection) to maximize the payoff $\omega(\tau; s)$, where $s \equiv (s_1, s_2, ..., s_N)$ is a vector of state variables. Each state variable s_i represents a binary event, such as "there is/is not an import surge" or "the domestic industry does/does not shut down." We will often refer to the random vector s simply as the "state." We let $p(s)$ denote the probability that state s occurs, and we let Σ denote the set of possible states. The exporting government is assumed to remain passive in this industry (i.e., there is no exporter policy), and its payoff is given by $\omega^*(\tau; s)$.

Let $\gamma_G(s) \equiv \omega(P; s) - \omega(FT; s)$ denote the importing government's gain from protection. This gain may be thought of as arising from some combination of terms-of-trade and political considerations. We assume that $\gamma_G(s) > 0$ for all states s. Similarly, for the foreign government let $\gamma^*_G(s) \equiv \omega^*(P; s) - \omega^*(FT; s)$. We assume that $\gamma^*_G(s) < 0$ for all s: the exporting government

always dislikes import barriers. Finally, we assume that there cannot be transfers between governments at the ex-post stage (after the state s is realized).[1] For future reference, we define the "first-best" policy for a given state s as the policy that maximizes the governments' joint payoff $\Omega(\tau; s) \equiv \omega(\tau; s) + \omega^*(\tau; s)$.

Let $\Gamma(s) \equiv \gamma_G(s) + \gamma_G^*(s) = \Omega(P; s) - \Omega(FT; s)$ denote the joint (positive or negative) gain from protection for the two governments. We let σ^{FT} and σ^P denote the sets of states for which the first-best policy is respectively FT and P, or equivalently, $\Gamma(s) \leq 0$ for $s \in \sigma^{FT}$ and $\Gamma(s) > 0$ for $s \in \sigma^P$. We assume that the realized state s is observed by the governments and by the DSB. On the other hand, we assume that Γ is observed by the governments but not by the DSB. That payoff levels are not verifiable is a standard assumption in contracting models; if Γ were verifiable, the first-best outcome could be trivially achieved with a contract that requires FT if and only if $\Gamma < 0$.

We next describe the language that is available to write a contract and the possible contracts that can be written. The first-best outcome could in principle be implemented by a contract that specifies in detail the contingencies σ^{FT} and σ^P, by describing precisely all the relevant state variables $(s_1, s_2, ..., s_N)$, but such a contract would likely be very costly to write.[2] We focus instead on a *vague* language that provides an imprecise but inexpensive short-hand to describe the circumstances under which P is desirable. The language is vague in the sense that its meaning is partially defined.

Formally, we consider a sentence ν with the following *truth function*:

$$\text{Sentence } \nu \text{ is } \begin{cases} True & \text{if } s \in \mathbf{T} \\ False & \text{if } s \in \mathbf{F} \\ Undefined & \text{otherwise,} \end{cases}$$

where $\mathbf{T}$ is a set of "extreme" states where sentence ν is clearly true, $\mathbf{F}$ is a set of states (disjoint from $\mathbf{T}$) at the opposite extreme where ν is clearly false; and the remaining states constitute

[1] In practice, direct transfers are rarely used in trade negotiations, but indirect transfers may be feasible (e.g., agreed-upon adjustments in intellectual property rights protection). We could allow for *ex-ante* transfers (i.e., transfers that occur at the stage of writing the contract), and need only rule out *ex-post* transfers (i.e., transfers that occur at the time of a dispute). The resolution of WTO disputes almost never involve direct transfers (the two exceptions to date are the US-Copyright case – see WTO, 2007, pp. 283-286 – and the Brazil-Cotton case – see Schnepf, 2010), and indirect transfers of the sort described above are typically not feasible in the context of dispute resolution. Nevertheless, a more realistic assumption might be that transfers can be enacted ex-post at some cost. In a later section we will introduce a limited role for ex-post transfers when we allow the court to determine monetary damages. For models of trade agreements that allow for costly ex-post transfers see Maggi and Staiger (2015, 2018).

[2] See Dye (1985) and Battigalli and Maggi (2002) for two examples of models that formalize the costs of writing contracts.

a "grey area" where ν is neither clearly true nor clearly false – in other words, in these states the meaning of ν is ambiguous.[3]

This formalism can be illustrated with a simple example. The vague sentence ν could sound for example like "there is substantial injury to the domestic industry due to increased imports." To exemplify the truth function of this sentence, suppose there are only three relevant state variables, with $s_1 = 1$ ($s_1 = 0$) indicating that there is (is not) an import surge, $s_2 = 1$ ($s_2 = 0$) that the domestic industry does (does not) shut down, and $s_3 = 1$ ($s_3 = 0$) that the majority of workers in the domestic industry are (are not) unemployed. Suppose also that the set $\mathbf{T}$ includes only the state $s = (1, 1, 1)$ and the set $\mathbf{F}$ only includes the state $s = (0, 0, 0)$, while all other states fall in the "grey area." Thus, in this example, sentence ν is clearly true if there is an import surge, the domestic industry shuts down and the majority of workers in the industry are unemployed; sentence ν is clearly false if none of these events has occurred; but in the remaining states it is not defined whether or not sentence ν is true.

We assume that if ν is clearly true then P is desirable, and if ν is clearly false then FT is desirable, or more formally, $\mathbf{T} \subset \sigma^P$ and $\mathbf{F} \subset \sigma^{FT}$. In our previous example, if it is clearly true that there is substantial injury (i.e. if $s = (1, 1, 1)$) then P is desirable, while if there is clearly no substantial injury (i.e. if $s = (0, 0, 0)$) then FT is desirable. We also assume that the truth function of sentence ν is common knowledge to the governments and the DSB, so the governments anticipate perfectly what truth function the DSB will assign to ν.

This formalization of vagueness captures a key feature of many real-world contracts, namely, that "off-the-shelf" phrases (such as "substantial injury") are commonly employed to convey the gist of contingencies. When it is very costly to describe precisely whether or not a certain action is allowed in each possible state of the world, the use of such phrases in a contract seems natural, even given the knowledge that with such phrases there will be some states of the world where it is a matter of interpretation whether or not the action is allowed.[4] What our model does not capture is the possibility of disagreement over the truth value of a vague sentence,

[3] The type of logic we are using here is known as three-valued (or "ternary") logic, a simple form of multi-valued logic, which extends the classical propositional logic by allowing for more than two truth values. Ternary logic was first introduced by Łukasiewicz (1920). Notice also that we use the word "vague" to refer to a contract or sentence, while we use the word "ambiguous" when the contract/sentence has undefined meaning for a given state s.

[4] Notice that it could be very costly to achieve such partial state-contingency in a contract *directly* – rather than with the use of a vague sentence – by describing precisely what the "extreme" states are. Indeed, it is the use of an "off-the-shelf" language that gives vague sentences their possible appeal for inclusion in contracts, as compared to describing precisely a list of state variables that apply to the particular situation at hand.

which may also be an important consideration for real-world contracts. On balance, though, we view our formalization of vagueness as a useful starting point, and in our online Appendix we consider a richer model of language that allows for further possibilities in writing vague contracts.

The vague language can be used to write the *vague* (V) contract: "P allowed if and only if ν." This contract specifies a crisp right to choose the trade policy in states $s \in \mathbf{T}$, it specifies a crisp obligation to practice free trade in states $s \in \mathbf{F}$, and it is ambiguous in all other states.[5]

Note that, under the vague contract, there are three possibilities for each state s: (1) the contract may impose a clear FT obligation, (2) it may assign a clear right to choose P, (3) it may be ambiguous. For our purposes here, below we will assume that possibilities (1) and (2) are measure zero, effectively allowing us to ignore such states and focus our analysis entirely on possibility (3) where the meaning of the vague contract is ambiguous.

We now discuss the potential roles played by the DSB. A first, basic, role is to oversee enforcement of the obligations that are specified unambiguously in the contract. To the extent that the DSB is able to ensure enforcement, this role is clearly desirable; we therefore take enforcement for granted and keep it in the background of the model. In particular, we assume that any crisp obligation is automatically enforced.[6] Beyond the enforcement role, the DSB can interpret obligations or rights that are ambiguous in the contract.

It is important to be clear about our notion of "interpretation." In principle one can distinguish between two levels of interpretation. A first level is the process by which the DSB reads and analyzes the text of the contract to deduce what the contract prescribes for the given state of the world (a crisp provision, or an ambiguous provision). If the first level of interpretation determines that the contract is ambiguous, then the second ("higher") level of interpretation may kick in: this is the process by which the DSB chooses a meaning for that state of the world. The distinction between these two levels of interpretation is important because, as we discuss below, it is the higher level of interpretation, not the lower level, that is at the center of ongoing debate concerning the role of the WTO DSB. In the richer model of vague language

[5] One could consider alternative ways to utilize the vague sentence ν in the contract. For example, the contract could specify just a necessary condition for FT, as in "If $\neg\nu$ then FT"; or it could *force* protection (e.g. "P if and only if ν"); but it is easy to see that these alternative contracts cannot improve on the contract V in our basic model.

[6] We could dispense with the automatic-enforcement assumption and assume instead that crisp obligations are enforced "on demand," in which case compliance with these obligations would be ensured by the *threat* of invoking the DSB, provided litigation costs are not too high.

considered by Maggi and Staiger (2011) in their online Appendix, where multiple elementary vague sentences can be combined into composite sentences and the logical analysis of the text is non-trivial, these two levels of interpretation can be captured in a meaningful way. The basic model we develop in the present section captures the higher level of interpretation, but with its single vague sentence it is too simple to capture the first level of interpretation. Thus, when we speak of "interpretation," we mean the higher level of interpretation just described.

Recall that the DSB is assumed to observe the realized state s but not the value of Γ; thus, the DSB does not know what the "best" (joint-payoff-maximizing) policy is for the realized state s. We assume that, if invoked, the DSB observes a noisy signal of Γ, which can be interpreted as the outcome of an independent investigation. The DSB then issues a *ruling* – that is a policy determination τ^{DSB}, which we assume to be automatically enforced – with the objective of maximizing the expected joint payoff of the governments given the signal.[7]

We let $q(s)$ denote the probability that the DSB issues the "wrong" ruling in state s. We assume that $q(s)$ is bounded above by $1/2$, that is, the DSB cannot do worse than a coin flip. We could model the probability of DSB error in a more "structural" way as resulting from a process of Bayesian updating, whereby the DSB uses the signal to update its prior beliefs on Γ and then maximizes the expected joint surplus given the updated beliefs; but in the analysis that follows, $q(s)$ is all that matters, so we keep the DSB's updating process in the background.[8]

For the purposes of comparative-static analysis, we will consider equi-proportional changes in the precision of the DSB signal, letting $q(s) \equiv q \times k(s)$, where $k(s) \in [0, 1/2]$ for all s and

[7] Our assumption that the DSB seeks to maximize the governments' joint payoff – and therefore attempts to complete the contract as the governments would have done ex ante – is broadly in line with the rules set out by the Vienna Convention (and adhered to by the WTO). And in the context of domestic legal settings, Posner (2005, p.8) writes: "Gap filling and disambiguating are both 'interpretive' in the sense that they are efforts to determine how the parties would have resolved the issue that has arisen had they foreseen it when they negotiated their contract." That said, in reality the interpretive role of the court in the context of trade agreements is more circumscribed than our model reflects. In particular, rather than undertaking a broad assessment of the international efficiency of a particular policy measure, in reality a typical DSB ruling would focus on whether the measure was in compliance with various explicit (but vaguely worded) commitments contained in the contract – such as national treatment or MFN – which themselves can be interpreted as attributes of internationally efficient policy intervention. For simplicity our model does not include this extra layer of mapping between vague contractual commitments and the international efficiency properties of measures which conform to these commitments, but the model could be extended in this direction at the cost of some extra notation and modeling complexity.

[8] We note that the assumption $q(s) \leq 1/2$ would be satisfied in terms of the underlying process of Bayesian updating under plausible conditions. For example, one simple sufficient condition is that the signal of Γ is unbiased and the DSB's prior beliefs are uninformative. But in any event, the condition $q(s) \leq 1/2$ only serves to create a simple "worst case" benchmark in which the DSB has essentially no information and its ruling is equivalent to a coin toss ($q(s) = 1/2$).

$q \in [0,1]$ is a parameter that captures (inversely) the overall quality of the DSB information. We will vary q while keeping $k(s)$ fixed. The case $q = 0$ corresponds to the case in which the DSB has perfect information.

Finally, we assume that disputes are costly. In particular, whenever the exporter government (complainant) invokes the DSB, the exporter government incurs cost $c^* > 0$ and the importer government (defendant) incurs cost $c > 0$. We have in mind the costs of litigation, which may reflect administrative costs, the costs of lawyers, the burden of proof, etc., but in the model we treat these costs as parameters.

Consider first the exporter government's filing behavior under the SSDS. This government files a complaint if and only if $\tau = P$ and the expected benefit to the exporter government of filing exceeds the exporter government's cost of filing, that is

$$\Pr(\text{DSB ruling is } FT \mid s) \times |\gamma_G^*(s)| > c^*. \tag{F SSDS}$$

Condition (F SSDS) is the "filing" condition for the exporter government to invoke the DSB under the SSDS in response to a policy choice by the importer government of $\tau = P$.

Next consider the importer government's policy choice. This government chooses $\tau = P$ if either (F SSDS) fails – because then the importer government can set $\tau = P$ without triggering a dispute – or if (F SSDS) holds and the expected benefit to the importer government from trade protection exceeds the cost to the importer government of a DSB dispute:

$$\Pr(\text{DSB ruling is } P \mid s) \times \gamma_G(s) > c. \tag{P SSDS}$$

It is now direct to derive the equilibrium actions of the governments for each state. For simplicity and as noted above, in what follows we assume the states where the vague contract is unambiguous are measure zero, so we can focus only on states where the court if invoked must interpret the contract.

There are two cases to consider. If dispute costs are low relative to the dispute stakes for each disputant in the specific sense that[9]

$$\frac{c}{\gamma_G(s)} + \frac{c^*}{|\gamma_G^*(s)|} < 1, \tag{3.1}$$

[9]Maggi and Staiger (2011) impose a condition on the upper limit for dispute costs in order to avoid a taxonomy of cases which rules out some of the regions of behavior that we consider below. We do not impose any such conditions here (we consider the full space of cases) in part because our analysis of BITs would make imposing such conditions overly restrictive and we want to maintain symmetric treatment across our formal analysis of trade agreements and BITs.

then

$$\frac{c}{\gamma_G(s)} < \frac{|\gamma^*_G(s)| - c^*}{|\gamma^*_G(s)|}; \quad \frac{c^*}{|\gamma^*_G(s)|} < \frac{\gamma_G(s) - c}{\gamma_G(s)}$$

is implied, and we have the following:

1. In states $s \in \sigma^{FT}$: if $qk(s) < \frac{c}{\gamma_G(s)}$ then $\tau = FT$ and the DSB is not invoked; if $qk(s) \in [\frac{c}{\gamma_G(s)}, \frac{|\gamma^*_G(s)|-c^*}{|\gamma^*_G(s)|}]$ then $\tau = P$ and the DSB is invoked under the SSDS; if $qk(s) > \frac{|\gamma^*_G(s)|-c^*}{|\gamma^*_G(s)|}$ then $\tau = P$ and the DSB is not invoked.

2. In states $s \in \sigma^P$: if $qk(s) < \frac{c^*}{|\gamma^*_G(s)|}$ then $\tau = P$ and the DSB is not invoked; if $qk(s) \in [\frac{c^*}{|\gamma^*_G(s)|}, \frac{\gamma_G(s)-c}{\gamma_G(s)}]$ then $\tau = P$ and the DSB is invoked under the SSDS; if $qk(s) > \frac{\gamma_G(s)-c}{\gamma_G(s)}$ then $\tau = FT$ and the DSB is not invoked.

And if dispute costs are high relative to the dispute stakes for each disputant in the specific sense that

$$\frac{c}{\gamma_G(s)} + \frac{c^*}{|\gamma^*_G(s)|} \geq 1, \tag{3.2}$$

then

$$\frac{c}{\gamma_G(s)} \geq \frac{|\gamma^*_G(s)| - c^*}{|\gamma^*_G(s)|}; \quad \frac{c^*}{|\gamma^*_G(s)|} \geq \frac{\gamma_G(s) - c}{\gamma_G(s)}$$

is implied, and we have the following:

1. In states $s \in \sigma^{FT}$: if $qk(s) < \frac{|\gamma^*_G(s)|-c^*}{|\gamma^*_G(s)|}$ then $\tau = FT$ and the DSB is not invoked; if $qk(s) > \frac{|\gamma^*_G(s)|-c^*}{|\gamma^*_G(s)|}$ then $\tau = P$ and the DSB is not invoked.

2. In states $s \in \sigma^P$: if $qk(s) < \frac{\gamma_G(s)-c}{\gamma_G(s)}$ then $\tau = P$ and the DSB is not invoked; if $qk(s) > \frac{\gamma_G(s)-c}{\gamma_G(s)}$ then $\tau = FT$ and the DSB is not invoked.

Notice that for the low-relative-dispute-cost case defined by (3.1), there will be disputes in equilibrium for a middle range of DSB accuracy, while there are no equilibrium disputes for the high-relative-dispute-cost case defined by (3.2). For this reason, we will focus henceforth on the low-relative-dispute-cost case defined by (3.1), and simply note here that the qualitative nature of our results hold also in the remaining high-relative-dispute-cost case.

Notice also that the court has its best impact off-equilibrium, when due to its high accuracy it induces the governments to behave efficiently in order to avoid a dispute. Where a dispute arises in equilibrium, there must be opportunistic behavior on the part of either the importer

government (if the importer government is exploiting the incompleteness of the contract and the inaccuracy of the DSB and trying to get away with protection when free trade is efficient) or the exporter government (if the exporter government is exploiting the incompleteness of the contract and the inaccuracy of the DSB and trying to force free trade when protection is efficient). And finally, if the DSB is inaccurate enough its beneficial off-equilibrium impact will erode, and such opportunistic behavior can arise while the DSB sits on the sideline.

We can write down the expected efficiency loss associated with the SSDS in combination with the vague contract, which we refer to as the *SSDS institution* and denote by V_{SSDS}, relative to the first-best outcome. For the low-relative-dispute-cost case defined by (3.1), this loss is given by:

$$L(V_{SSDS}) = \sum_{s \in \hat{\sigma}_2^{FT} \cup \hat{\sigma}_2^{P}} p(s)\{qk(s)|\Gamma(s)| + [c + c^*]\} + \sum_{s \in \hat{\sigma}_3^{FT} \cup \hat{\sigma}_3^{P}} p(s)|\Gamma(s)|. \tag{3.3}$$

Here, $\hat{\sigma}_2^{FT}$ denotes the set of states for which FT is efficient, the importing government chooses P, and the exporting government files a complaint (i.e., s such that $s \in \sigma^{FT}$ and $qk(s) \in [\frac{c}{\gamma_G(s)}, \frac{|\gamma_G^*(s)|-c^*}{|\gamma_G^*(s)|}]$). Similarly, $\hat{\sigma}_2^{P}$ denotes the set of states for which P is efficient, the importing government chooses P, and the exporting government files a complaint (i.e., s such that $s \in \sigma^{P}$ and $qk(s) \in [\frac{c^*}{|\gamma_G^*(s)|}, \frac{\gamma_G(s)-c}{\gamma_G(s)}]$). And finally, $\hat{\sigma}_3^{FT}$ denotes the set of states for which FT is efficient, the importing government chooses P, and the exporting government does not file a complaint (i.e., s such that $s \in \sigma^{FT}$ and $qk(s) > \frac{|\gamma_G^*(s)|-c^*}{|\gamma_G^*(s)|}$), while $\hat{\sigma}_3^{P}$ denotes the set of states for which P is efficient, the importing government chooses FT, and the exporting government does not file a complaint (i.e., s such that $s \in \sigma^{P}$ and $qk(s) > \frac{\gamma_G(s)-c}{\gamma_G(s)}$).

As (3.3) makes clear, the institution V_{SSDS} entails three sources of inefficiencies relative to the first best: one arising from the probability of DSB error; one arising from the cost of a dispute; and one arising from distorted choices made "in the shadow of the court." The expected loss $L(V_{SSDS})$ can then be written as the sum of two terms. The first term captures the first two inefficiencies summed over two sets of states: the set of states $\hat{\sigma}_2^{FT}$, where it is the importing government who acts opportunistically and exploits the incompleteness of the contract, thereby triggering a dispute; and the set of states $\hat{\sigma}_2^{P}$, where it is the exporting government who acts opportunistically and exploits the incompleteness of the contract, thereby triggering a dispute. The second term captures the third inefficiency summed over two sets of states: the set of states $\hat{\sigma}_3^{FT}$, where it is the importing government who acts opportunistically and exploits the incompleteness of the contract with impunity; and the set of states $\hat{\sigma}_3^{P}$, where it is the ability

of the exporting government to act opportunistically and exploit the incompleteness of the contract that induces the importing government to avoid a dispute with an inefficient policy choice.

Also note from (3.3) that no loss arises ($L(V_{SSDS}) = 0$) if q is lower than a critical level. This is the level of q below which the DSB is not invoked in any state ($\hat{\sigma}_2^{FT}$ and $\hat{\sigma}_2^{P}$ are empty) and in addition no distorted choices are made in the shadow of the court in any state ($\hat{\sigma}_3^{FT}$ and $\hat{\sigma}_3^{P}$ are empty). Intuitively, if q is small then the governments, expecting the DSB to make the right decision with high probability, will act efficiently and avoid the DSB intervention to save on the dispute cost (the importer will always choose the first-best policy and the exporter will never file complaints). This reflects the desirable off-equilibrium impacts of the DSB described above.

3.2. Exporter-to-State dispute settlement

We now evaluate the desirability of adopting an ESDS, rather than the SSDS embodied in the V_{SSDS} institution considered in the previous subsection. Under an ESDS in combination with the vague contract, which we refer to as the *ESDS institution* and denote by V_{ESDS}, the foreign exporting industry/firm has standing, in the sense that it has the right to file a dispute. In reality, the relevant thought experiment would more likely be to add an ESDS to an SSDS so that both the foreign government and the foreign exporter have standing: for simplicity, we chose to proceed formally in this more parsimonious way, and then draw observations relevant to the more realistic possibility of an ESDS as an addition to (rather than a replacement for) an SSDS.

We assume that the cost of filing for the foreign exporting industry is the same as the cost of filing for the foreign government, namely, c^*. Our key assumption is that the loss from protection suffered by the foreign exporting industry is *greater* than the loss suffered by the foreign government, or

$$|\gamma_E^*(s)| > |\gamma_G^*(s)| \qquad \text{(Assumption I)}$$

where we now use $\gamma_E^*(s)$ to denote the loss suffered by the foreign exporting industry.[10] We

[10] We are abstracting here from a potentially important free-rider issue that could arise under an ESDS, namely, the same free-rider issue that can arise in an industry lobbying setting. If the firms in an industry cannot overcome this free-rider issue, filing might not occur under an ESDS even though it would be in the collective interest of the firms in the industry to file. This could be captured in our model with the possibility that $|\gamma_E^*(s)| < |\gamma_G^*(s)|$, just the opposite of what we assume in Assumption I. However, as we noted at the

have in mind for example a Ricardo-Viner logic whereby home protection will create losers (those interests tied to the foreign export industry, with losses $\gamma_E^*(s) < 0$) but also winners (those interests tied to the foreign import-competing industry, with gains $\gamma_M^*(s) > 0$), implying Assumption I provided only that the foreign government places some weight on the gains enjoyed by the foreign import-competing industry when home protection is imposed. More generally, Assumption I reflects the fact that governments can maintain a "political filter" when deciding what cases to bring under an SSDS, and that political filter is lost under an ESDS.

Consider first the foreign exporting industry's filing behavior under the ESDS. The exporting industry files a complaint if and only if $\tau = P$ and the expected benefit to the exporting industry of filing exceeds the cost of filing, that is

$$\Pr(\text{DSB ruling is } FT \mid s) \times |\gamma_E^*(s)| > c^*. \tag{F ESDS}$$

Next consider the importer government's policy choice. This government chooses $\tau = P$ if either (F ESDS) fails – because then the importer government can set $\tau = P$ without triggering a dispute – or if (F ESDS) holds and the expected benefit to the importer government from trade protection exceeds the cost to the importer government of a DSB dispute:

$$\Pr(\text{DSB ruling is } P \mid s) \times \gamma_G(s) > c. \tag{P ESDS}$$

As before, for the institution V_{ESDS} there are two cases to consider. If dispute costs are low relative to the dispute stakes for each disputant in the specific sense that

$$\frac{c}{\gamma_G(s)} + \frac{c^*}{|\gamma_E^*(s)|} < 1, \tag{3.4}$$

then

$$\frac{c}{\gamma_G(s)} < \frac{|\gamma_E^*(s)| - c^*}{|\gamma_E^*(s)|}; \quad \frac{c^*}{|\gamma_E^*(s)|} < \frac{\gamma_G(s) - c}{\gamma_G(s)}$$

is implied, and we have the following:

1. In states $s \in \sigma^{FT}$: if $qk(s) < \frac{c}{\gamma_G(s)}$ then $\tau = FT$ and the DSB is not invoked; if $qk(s) \in [\frac{c}{\gamma_G(s)}, \frac{|\gamma_E^*(s)|-c^*}{|\gamma_E^*(s)|}]$ then $\tau = P$ and the DSB is invoked under the ESDS; if $qk(s) > \frac{|\gamma_E^*(s)|-c^*}{|\gamma_E^*(s)|}$ then $\tau = P$ and the DSB is not invoked.

outset of this subsection, while we formally evaluate the desirability of adopting an ESDS *rather* than an SSDS, in reality, the relevant thought experiment would more likely be to add an ESDS to an SSDS so that both the foreign government and the foreign exporter have standing. And in that case, the SSDS would handle filings for situations where the free-rider issue resulted in $|\gamma_E^*(s)| < |\gamma_G^*(s)|$, and the ESDS would only be relevant for cases where Assumption I applies. Hence, we are abstracting from this free-rider issue without loss of generality.

2. In states $s \in \sigma^P$: if $qk(s) < \frac{c^*}{|\gamma_E^*(s)|}$ then $\tau = P$ and the DSB is not invoked; if $qk(s) \in [\frac{c^*}{|\gamma_E^*(s)|}, \frac{\gamma_G(s)-c}{\gamma_G(s)}]$ then $\tau = P$ and the DSB is invoked under the ESDS; if $qk(s) > \frac{\gamma_G(s)-c}{\gamma_G(s)}$ then $\tau = FT$ and the DSB is not invoked.

And if dispute costs are high relative to the dispute stakes for each disputant in the specific sense that

$$\frac{c}{\gamma_G(s)} + \frac{c^*}{|\gamma_E^*(s)|} \geq 1, \tag{3.5}$$

then

$$\frac{c}{\gamma_G(s)} \geq \frac{|\gamma_E^*(s)| - c^*}{|\gamma_E^*(s)|}; \quad \frac{c^*}{|\gamma_E^*(s)|} \geq \frac{\gamma_G(s) - c}{\gamma_G(s)}$$

is implied, and we have the following:

1. In states $s \in \sigma^{FT}$: if $qk(s) < \frac{|\gamma_E^*(s)|-c^*}{|\gamma_E^*(s)|}$ then $\tau = FT$ and the DSB is not invoked; if $qk(s) > \frac{|\gamma_E^*(s)|-c^*}{|\gamma_E^*(s)|}$ then $\tau = P$ and the DSB is not invoked.

2. In states $s \in \sigma^P$: if $qk(s) < \frac{\gamma_G(s)-c}{\gamma_G(s)}$ then $\tau = P$ and the DSB is not invoked; if $qk(s) > \frac{\gamma_G(s)-c}{\gamma_G(s)}$ then $\tau = FT$ and the DSB is not invoked.

For simplicity we continue our focus on the low-relative-dispute-cost case, here defined by (3.4), and note that under Assumption I the condition (3.4) is implied by (3.2). Notice that relative to the institution V_{SSDS} there are two changes in the switch to an ESDS that follow from condition Assumption I: first, for some states $s \in \sigma^{FT}$ where the importing government chose the inefficient $\tau = P$ with impunity under the V_{SSDS} institution, a court filing will now occur under the ESDS; and second, for some states $s \in \sigma^P$ where the exporting government allowed the the efficient choice $\tau = P$ to go unchallenged under the V_{SSDS} institution, a court filing will now occur under the ESDS.

We can write down the expected efficiency loss associated with the ESDS in combination with the vague contract, which we refer to as the *ESDS institution* and denote by V_{ESDS}, relative to the first-best outcome. Importantly, for this purpose we continue to use the measure of joint surplus as that surplus is viewed by the *governments,* $\Gamma(s)$: relative to the SSDS institution, the ESDS institution simply gives standing to foreign exporters to bring disputes against the importing government. For the low-relative-dispute-cost case defined by (3.4), the expected efficiency loss associated with the ESDS institution is given by:

$$L(V_{ESDS}) = \sum_{s \in \tilde{\sigma}_2^{FT} \cup \tilde{\sigma}_2^P} p(s)\{qk(s)|\Gamma(s)| + [c + c^*]\} + \sum_{s \in \tilde{\sigma}_3^{FT} \cup \hat{\sigma}_3^P} p(s)|\Gamma(s)|. \tag{3.6}$$

Here, $\tilde{\sigma}_2^{FT}$ denotes the set of states for which FT is efficient, the importing government chooses P, and foreign exporters file a complaint (i.e., s such that $s \in \sigma^{FT}$ and $qk(s) \in [\frac{c}{\gamma_G(s)}, \frac{|\gamma_E^*(s)|-c^*}{|\gamma_E^*(s)|}]$). Similarly, $\tilde{\sigma}_2^{P}$ denotes the set of states for which P is efficient, the importing government chooses P, and foreign exporters file a complaint (i.e., s such that $s \in \sigma^{P}$ and $qk(s) \in [\frac{c^*}{|\gamma_E^*(s)|}, \frac{\gamma_G(s)-c}{\gamma_G(s)}]$). And finally, $\tilde{\sigma}_3^{FT}$ denotes the set of states for which FT is efficient, the importing government chooses P, and foreign exporters do not file a complaint (i.e., s such that $s \in \sigma^{FT}$ and $qk(s) > \frac{|\gamma_E^*(s)|-c^*}{|\gamma_E^*(s)|}$), while $\hat{\sigma}_3^{P}$ is defined as before (i.e., s such that $s \in \sigma^{P}$ and $qk(s) > \frac{\gamma_G(s)-c}{\gamma_G(s)}$). Notice that under condition Assumption I, $\hat{\sigma}_2^{FT}$ is a subset of $\tilde{\sigma}_2^{FT}$ and $\hat{\sigma}_2^{P}$ is a subset of $\tilde{\sigma}_2^{P}$, while $\tilde{\sigma}_3^{FT}$ is a subset of $\hat{\sigma}_3^{FT}$; and these will typically be strict subsets.

The comparison between the V_{SSDS} and V_{ESDS} institutions can be made by comparing their respective losses relative to the first best. To facilitate this comparison, we define the sets

$$\begin{aligned} \Delta^{FT} &\equiv \{s \in \sigma^{FT} \mid \frac{|\gamma_G^*(s)| - c^*}{|\gamma_G^*(s)|} < qk(s) < \frac{|\gamma_E^*(s)| - c^*}{|\gamma_E^*(s)|}\} \\ \Delta^{P} &\equiv \{s \in \sigma^{P} \mid \frac{c^*}{|\gamma_E^*(s)|} < qk(s) < \frac{c^*}{|\gamma_G^*(s)|}\}. \end{aligned} \tag{3.7}$$

These sets embody the two changes in the switch to ESDS that follow from Assumption I as highlighted just above: first, for $s \in \Delta^{FT}$ the importing government chose the inefficient $\tau = P$ with impunity under the V_{SSDS} institution but a court filing will now occur under V_{ESDS}; and second, for $s \in \Delta^{P}$ the exporting government allowed the efficient choice $\tau = P$ to go unchallenged under the V_{SSDS} institution but a court filing will now occur under V_{ESDS}.

Making use of the sets defined in (3.7), we can now write

$$\begin{aligned} L(V_{ESDS}) - L(V_{SSDS}) &= \sum_{s \in \Delta^{FT}} p(s)\{qk(s)|\Gamma(s)| + [c + c^*] - |\Gamma(s)|\} + \\ &\quad \sum_{s \in \Delta^{P}} p(s)\{qk(s)|\Gamma(s)| + [c + c^*]\} \\ &= \sum_{s \in \Delta^{P}} p(s)\{qk(s)|\Gamma(s)| + [c + c^*]\} - \sum_{s \in \Delta^{FT}} p(s)\{[1 - qk(s)] \times |\Gamma(s)| - [c + c^*]\}. \end{aligned} \tag{3.8}$$

The first term in the last line of (3.8) is positive, reflecting the loss of joint government surplus that occurs as we switch from V_{SSDS} to V_{ESDS} due to the states in which the efficient choice $\tau = P$ was unchallenged under the V_{SSDS} institution but leads to a court filing under V_{ESDS}. The second term in the last line of (3.8) reflects the change in joint government surplus that occurs as we switch from V_{SSDS} to V_{ESDS} due to the states in which the importing government chose the inefficient $\tau = P$ with impunity under the V_{SSDS} institution but a court filing will now occur

under V_{ESDS}. To sign this second term, note that for $s \in \Delta^{FT}$ we have $qk(s) > \frac{|\gamma_G^*(s)|-c^*}{|\gamma_G^*(s)|}$ and hence $c^* > [1-qk(s)]|\gamma_G^*(s)|$. But with $|\gamma_G^*(s)| = [-\gamma_G^*(s)]$, and with $\Gamma(s) \equiv \gamma_G(s) + \gamma_G^*(s) < 0$ in $s \in \Delta^{FT}$ as well so that $|\Gamma(s)| = [-\gamma_G(s) - \gamma_G^*(s)]$, we then have

$$\begin{aligned}
\sum_{s\in\Delta^{FT}} p(s)\{[1-qk(s)] \times |\Gamma(s)| - [c+c^*]\} &= \sum_{s\in\Delta^{FT}} p(s)\{[1-qk(s)] \times [-\gamma_G(s) - \gamma_G^*(s)] - [c+c^*]\} \\
&< \sum_{s\in\Delta^{FT}} p(s)\{[1-qk(s)] \times [-\gamma_G^*(s)] - c^*\} \\
&= \sum_{s\in\Delta^{FT}} p(s)\{[1-qk(s)] \times |\gamma_G^*(s)| - c^*\} < 0.
\end{aligned}$$

Hence, the second term in the last line of (3.8) is negative. Intuitively, for $s \in \Delta^{FT}$ the exporter *government* does not see a filing as worth the dispute cost, and the fact that foreign exporters would nevertheless choose to file simply reduces the value of the agreement to the two governments. We may conclude from this fact together with (3.8) that $L(V_{ESDS}) - L(V_{SSDS}) > 0$ provided that at least one of the sets Δ^P or Δ^{FT} is non-empty.

The two governments would therefore choose to include an SSDS rather than an ESDS in their trade agreement. And it is immediate that including *both* SSDS and ESDS would be outcome equivalent to including ESDS *instead of* SSDS. Hence, if given a choice between including both an SSDS and an ESDS in a trade agreement or including just an SSDS, the two government would choose the latter option.

We summarize with

Proposition 1. *Governments, but not their exporters, should have standing to bring disputes in an optimally designed trade agreement. That is, an optimally designed trade agreement should include an SSDS, but not an ESDS.*

3.3. Standing for market access disputes more generally

In the previous subsection we have analyzed market access issues within the context of trade agreements. But it might be expected that similar issues would arise in the context of BITs. In fact, we now describe a formal equivalence between market access/terms-of-trade issues in trade agreements and BITs in a benchmark model.

[TBA]

We record this formal equivalence here with the following:

Proposition 2. *The market access/terms-of-trade issues that lead to inefficient unilateral trade policy choices are formally equivalent to the market access/terms-of-trade issues that lead to inefficient unilateral investment policy choices.*

And with the formal equivalence summarized in Proposition 2, we may then state the following corollary of Propositions 1 and 2:

Corollary 1. *With regard to market access/terms-of-trade issues, only governments should have standing to bring disputes in an optimally designed trade or investment agreement. That is, for the purpose of settling market access disputes, an optimally designed trade agreement should include an SSDS, but not an ESDS, while an optimally designed investment treaty should include an SSDS, but not an ISDS.*

4. Standing for Disputes over Commitments to Investors in BITs

We next consider the issue of standing in BITs, assuming for simplicity for now that BITs are only concerned with the host government making policy commitments to foreign investors (i.e., we abstract from any market access issues associated with foreign investors). To capture this, we make two changes to the model of the previous section. First, the home (which we now refer to as host) government investment policy, which we now denote by ι, can be either T for "Taking" or FT for "Free Trade." We have in mind that the policy T is a stand-in for a wide variety of investment policies (e.g., tax, regulatory, nationalization) that if put in place once investments are sunk could amount to a taking as traditionally defined. And second, we introduce an ex-ante foreign investment stage.

For example, we can think of the vague contract in the context of a BIT as stating the following (corresponding to Article 3 of the US Model BIT):

> "Each Party shall accord to investors of the other Party treatment no less favorable than that it accords, in like circumstances, to its own investors with respect to the establishment, acquisition, expansion, management, conduct, operation, and sale or other disposition of investments in its territory."

Here, what constitutes "like circumstances" is clearly a matter of interpretation. Alternatively, we could think of the vague contract as stating the following (roughly corresponding to provisions in Article 6 of the US Model BIT):

> "Foreign investments may be expropriated for a public purpose, provided that adequate and effective compensation is promptly paid."

Here, what constitutes "a public purpose," and what suffices for "adequate and effective compensation" paid "promptly," are matters of interpretation.

We again focus on the issue of standing, comparing the inclusion of an ISDS with the alternative of inclusion of an SSDS. Under an ISDS, the foreign firm makes the filing decision; under an SSDS, the foreign government makes the filing decision.

4.1. Investor-to-State dispute settlement

To fix ideas, we consider a specific foreign direct investment (FDI) opportunity that requires a sunk investment to exploit, and imagine that there are two possibilities: either the investment results in a production facility that produces safe products with positive social value; or the investment results in a production facility that produces unsafe products with negative social value. In the latter states of the world, the first best policy is complete expropriation (a "taking") and shutdown of the facility with no compensation to foreign investors (T): we denote these states by $s \in \sigma^T$, reflecting an implicit assumption that these states are defined independently of the level of foreign direct investment I^* (i.e., the level of I^* has no bearing on whether or not the resulting production facility has positive social value). In the former states of the world, the first best policy is no expropriation, amounting to a government policy that allows the production facility to operate unhindered (FT): we denote these states by $s \in \sigma^{FT}$.

Formally, let us define the ex-post (conditional on investment) gain that the host government enjoys from a taking in state s

$$\gamma_G(I^*, s) \equiv \omega(I^*, T, s) - \omega(I^*, FT, s)$$

and the lost rents suffered by foreign investors

$$\gamma_I^*(I^*, s) \equiv -\pi(I^*, s).$$

Then the joint gain from a taking for the host government and foreign investors is given by

$$\Gamma(I^*, s) \equiv \gamma_G(I^*, s) + \gamma_I^*(I^*, s).$$

In states $s \in \sigma^T$, a taking results in shutting down the productive facility and so we have $\omega(I^*, T, s) = 0$, but for these states it would be even worse for the host government if the

facility were allowed to operate (i.e., $\omega(I^*, FT, s) < 0$) and so $\gamma_G(I^*, s) \equiv -\omega(I^*, FT, s) > 0$: the host government always benefits from a taking. And with the social value of FDI negative by definition in these states, we also have $\omega(I^*, FT, s) + \pi(I^*, s) < 0$ and hence $\Gamma(I^*, s) = -[\omega(I^*, FT, s) + \pi(I^*, s)] > 0$: in states $s \in \sigma^T$, the joint surplus of the host government and foreign investors rises with a taking.

In states $s \in \sigma^{FT}$, a taking results in a transfer of rents from foreign investors to the host government, possibly with some inefficiency losses. Hence, in states $s \in \sigma^{FT}$ we have $\omega(I^*, T, s) = \kappa \times [\omega(I^*, FT, s) + \pi(I^*, s)]$ with $\kappa = 1$ corresponding to the case where a taking represents a pure transfer of rents from foreign investors to the host government and $\kappa < 1$ representing the case of (ex-post) inefficiencies associated with the taking. So for these states we have $\gamma_G(I^*, s) > 0$ and the host government benefits from a taking provided that κ is not too small (i.e., provided that the host government has a means of expropriation which is not too inefficient), which we henceforth assume; so again the host government always benefits from a taking. And for these states, we also have $\Gamma(I^*, s) = (\kappa - 1) \times [\omega(I^*, FT, s) + \pi(I^*, s)] \leq 0$: in states $s \in \sigma^{FT}$, the joint surplus of the host government and foreign investors falls with a taking. Summarizing, we have

$$\begin{aligned}
\gamma_G(I^*, s) &> 0 \text{ and } \gamma_I^*(I^*, s) < 0 \text{ for all } s, \\
\Gamma(I^*, s) &= -[\omega(I^*, FT, s) + \pi(I^*, s)] > 0 \text{ for } s \epsilon \sigma^T, \\
\Gamma(I^*, s) &= (\kappa - 1) \times [\omega(I^*, FT, s) + \pi(I^*, s)] \leq 0 \text{ for } s \epsilon \sigma^{FT}.
\end{aligned}$$

We now turn to the consideration of a BIT. As before, we assume that the realized state s is observed by the governments and by the DSB. On the other hand, we assume that Γ is observed by the governments but not by the DSB (and we are assuming implicitly that the DSB cannot observe what the host government does with the production facility if it expropriates it, i.e., whether or not the production facility is shut down). As in the previous subsection, we will think of the DSB as issuing a policy ruling, in the present context denoted by ι^{DSB} and corresponding either to FT or T, to maximize the expected joint payoff of the host government and foreign investors given its noisy signal of Γ.

Under the interpretation that T represents a regulatory taking, the DSB ruling could be seen in a richer model (as we discussed in the previous subsection, see note 7) as corresponding to a determination of whether the regulation complies with some explicit (but vaguely worded) commitment included in the contract, such as national treatment or the MFN clause, which itself

can be interpreted as an attribute of internationally efficient policy intervention. Alternatively, under the interpretation that T represents an explicit expropriation, the decision to expropriate could be left in the hands of the host government subsequent to the DSB ruling under the interpretation that the DSB rules on a level of compensation to be paid by the host government to the foreign investors in the event of expropriation, with the ruling FT then corresponding to a level of compensation sufficiently high to prevent the host government from following through with the expropriation and the ruling T corresponding to a level of compensation (which could be set arbitrarily to zero) under which the host government would go through with expropriation.[11]

We begin our analysis with the ex-post stage, when the FDI level I^* is already sunk. Consider first the foreign investor's filing behavior under the ISDS (we assume the existence of a single foreign investor for simplicity, abstracting from any free-rider issues with filing decisions that might arise with multiple investors on the grounds that the free-rider problem should be second-order given the investor-specific remedies provided under ISDS clauses). The foreign investor files a complaint if and only if $\iota = T$ and the expected benefit to the foreign investor of filing exceeds the foreign investor's cost of filing, that is

$$\Pr(\text{DSB ruling is } FT \mid s) \times |\gamma_I^*(I^*, s)| > c^*. \qquad \text{(F ISDS)}$$

Condition (F ISDS) is the "filing" condition for the foreign investor to invoke the DSB under the ISDS in response to a policy choice by the host government of $\iota = T$.

Next consider the host government's policy choice. The host government chooses $\iota = T$ if either (F ISDS) fails – because then the host government can set $\iota = T$ without triggering a dispute – or if (F ISDS) holds and the expected benefit to the host government from a taking

[11] More specifically, in the case of explicit expropriation there would typically be no question that this expropriation has occurred, and the main legal question before the court is then simply to determine the level of damages if it is called upon to do so. To map our model over to this case, and in analogy with our simplification of two policies T and FT, we assume that there are two possible levels of damages associated with expropriation, $High$ and Low, and σ^T then corresponds to states of the world where damages are Low and expropriation is efficient, while σ^{FT} corresponds to states of the world where damages are $High$ and expropriation is inefficient. And we assume that the host country would choose to expropriate in every state of the world if it only had to pay Low damages but would never choose to expropriate in any state of the world if it had to pay $High$ damages. With these assumptions, if the host country expropriates and foreign investors invoke the court, then if the court rules for Low damages the host country will pay the Low damages and maintain its decision to expropriate (the analogue of a ruling of T, which is efficient if we are in σ^T but inefficient if we are in σ^{FT}), while if the court rules for $High$ damages the host country will reverse its decision to expropriate (give back the property to the foreign investors) to avoid paying the high damages (the analogue of a ruling of FT, which is efficient if we are in σ^{FT} but inefficient if we are in σ^T).

exceeds the cost to the host government of a DSB dispute:

$$\Pr(\text{DSB ruling is } T \mid s) \times \gamma_G(I^*, s) > c. \qquad \text{(T ISDS)}$$

It is now direct to derive the equilibrium (ex-post) actions of the host government and foreign investors for each state. For simplicity and as noted above, in what follows we assume the states where the vague contract is unambiguous are measure zero, so we can focus only on states where the court if invoked must interpret the contract.

There are again two cases to consider. If dispute costs are low relative to the dispute stakes for each disputant in the specific sense that

$$\frac{c}{\gamma_G(I^*, s)} + \frac{c^*}{|\gamma_I^*(I^*, s)|} < 1, \tag{4.1}$$

then

$$\frac{c}{\gamma_G(I^*, s)} < \frac{|\gamma_I^*(I^*, s)| - c^*}{|\gamma_I^*(I^*, s)|}; \quad \frac{c^*}{|\gamma_I^*(I^*, s)|} < \frac{\gamma_G(I^*, s) - c}{\gamma_G(I^*, s)}$$

is implied, and we have the following:

1. In states $s \in \sigma^{FT}$: if $qk(s) < \frac{c}{\gamma_G(I^*,s)}$ then $\iota = FT$ and the DSB is not invoked; if $qk(s) \in [\frac{c}{\gamma_G(I^*,s)}, \frac{|\gamma_I^*(I^*,s)|-c^*}{|\gamma_I^*(I^*,s)|}]$ then $\iota = T$ and the DSB is invoked under the ISDS; if $qk(s) > \frac{|\gamma_I^*(I^*,s)|-c^*}{|\gamma_I^*(I^*,s)|}$ then $\iota = T$ and the DSB is not invoked.

2. In states $s \in \sigma^T$: if $qk(s) < \frac{c^*}{|\gamma_I^*(I^*,s)|}$ then $\iota = T$ and the DSB is not invoked; if $qk(s) \in [\frac{c^*}{|\gamma_I^*(I^*,s)|}, \frac{\gamma_G(I^*,s)-c}{\gamma_G(I^*,s)}]$ then $\iota = T$ and the DSB is invoked under the ISDS; if $qk(s) > \frac{\gamma_G(I^*,s)-c}{\gamma_G(I^*,s)}$ then $\iota = FT$ and the DSB is not invoked.

And if dispute costs are high relative to the dispute stakes for each disputant in the specific sense that

$$\frac{c}{\gamma_G(I^*, s)} + \frac{c^*}{|\gamma_I^*(I^*, s)|} \geq 1, \tag{4.2}$$

then

$$\frac{c}{\gamma_G(I^*, s)} \geq \frac{|\gamma_I^*(I^*, s)| - c^*}{|\gamma_I^*(I^*, s)|}; \quad \frac{c^*}{|\gamma_I^*(I^*, s)|} \geq \frac{\gamma_G(I^*, s) - c}{\gamma_G(I^*, s)}$$

is implied, and we have the following:

1. In states $s \in \sigma^{FT}$: if $qk(s) < \frac{|\gamma_I^*(I^*,s)|-c^*}{|\gamma_I^*(I^*,s)|}$ then $\iota = FT$ and the DSB is not invoked; if $qk(s) > \frac{|\gamma_I^*(I^*,s)|-c^*}{|\gamma_I^*(I^*,s)|}$ then $\iota = T$ and the DSB is not invoked.

2. In states $s \in \sigma^T$: if $qk(s) < \frac{\gamma_G(I^*,s)-c}{\gamma_G(I^*,s)}$ then $\iota = T$ and the DSB is not invoked; if $qk(s) > \frac{\gamma_G(I^*,s)-c}{\gamma_G(I^*,s)}$ then $\iota = FT$ and the DSB is not invoked.

Notice that, as in the previous subsection, for the low-relative-dispute-cost case defined by (4.1), there will be disputes in equilibrium for a middle range of DSB accuracy, while there are no equilibrium disputes for the high-relative-dispute-cost case defined by (4.2). For this reason, as in the previous subsection we will focus henceforth on the low-relative-dispute-cost case defined by (4.1), which in the present circumstance amounts to maintaining our focus on ranges of I^* for which (4.1) is satisfied, and simply note here that the qualitative nature of our results hold also in the remaining case.

Two further observations are warranted. First, for low levels of I^*, an occurrence of *regulatory chill* can arise, in the specific sense here that the host government may choose the policy FT for $s \in \sigma^T$ rather than the first-best policy T in order to avoid a costly dispute with foreign investors: this occurs for $s \in \sigma^T$ when $qk(s) > \frac{\gamma_G(I^*,s)-c}{\gamma_G(I^*,s)}$. And second, an interesting implication in the context of BITs is that, as we next demonstrate, the level of investment may be either too low (if the host government opportunism described just above is dominant) or too high (if the foreign investor opportunism described above is dominant), and this can have implications for the relative desirability of an SSDS versus an ISDS in the context of BITs.

We now turn to the ex-ante stage, and determine the level of I^* that is supported by a BIT with an ISDS in combination with the vague contract, which we refer to as the *BIT ISDS institution* and denote by V_{ISDS}^{BIT}. Denoting the world interest rate by r^*, we assume that foreign investors receive return $r(I^*, s)$ under domestic policy FT in state s, where, due to a fixed factor in the host country (e.g., land), $r(0, s) = \bar{r}(s)$ for some finite $\bar{r}(s) > r^*$, $r(\bar{I}^*(s), s) = 0$ for some finite and positive $\bar{I}^*(s)$, and $r^{/}(I^*, s) < 0$; and we assume that foreign investors receive nothing under domestic policy T. Taking account of the possibility of disputes as enumerated above, and focusing on the range of I^* satisfying (4.1), the expected return earned by foreign investors who invest the level I^* in the host market in the presence of the ISDS institution V_{ISDS}^{BIT} is given

by

$$\rho^*_{V^{BIT}_{ISDS}}(I^*) \equiv \sum_{s\epsilon\bar{\sigma}_1^{FT}(I^*)} p(s)\times r(I^*,s) + \sum_{s\epsilon\bar{\sigma}_2^{FT}(I^*)} p(s)\{[1-qk(s)]\times r(I^*,s) - \frac{c^*}{I^*}\} \quad (4.3)$$
$$+ \sum_{s\epsilon\bar{\sigma}_1^{T}(I^*)} p(s)\times 0 + \sum_{s\epsilon\bar{\sigma}_2^{T}(I^*)} p(s)\{qk(s)\times r(I^*,s) - \frac{c^*}{I^*}\}$$
$$+ \sum_{s\epsilon\bar{\sigma}_3^{FT}(I^*)} p(s)\times 0 + \sum_{s\epsilon\bar{\sigma}_3^{T}(I^*)} p(s)\times r(I^*,s)$$

where $\bar{\sigma}_1^{FT}(I^*)$ is the set of states for which FT is efficient, the host government chooses FT and the DSB is not invoked (i.e., s such that $s \in \sigma^{FT}$ and $qk(s) < \frac{c}{\gamma_G(I^*,s)}$), $\bar{\sigma}_2^{FT}(I^*)$ is the set of states for which FT is efficient, the host government chooses T and foreign investors file a complaint under ISDS (i.e., s such that $s \in \sigma^{FT}$ and $qk(s) \in [\frac{c}{\gamma_G(I^*,s)}, \frac{|\gamma_I^*(I^*,s)|-c^*}{|\gamma_I^*(I^*,s)|}]$), $\bar{\sigma}_1^{T}(I^*)$ is the set of states for which T is efficient, the host government chooses T and the DSB is not invoked (i.e., s such that $s \in \sigma^{T}$ and $qk(s) < \frac{c^*}{|\gamma_I^*(I^*,s)|}$), and $\bar{\sigma}_2^{T}(I^*)$ is the set of states for which T is efficient, the host government chooses T and foreign investors file a complaint under ISDS (i.e., s such that $s \in \sigma^{T}$ and $qk(s) \in [\frac{c^*}{|\gamma_I^*(I^*,s)|}, \frac{\gamma_G(I^*,s)-c}{\gamma_G(I^*,s)}]$). And finally $\bar{\sigma}_3^{FT}(I^*)$ is the set of states for which FT is efficient, the host government chooses T and the DSB is not invoked (i.e., s such that $s \in \sigma^{FT}$ and $qk(s) > \frac{|\gamma_I^*(I^*,s)|-c^*}{|\gamma_I^*(I^*,s)|}$), while $\bar{\sigma}_3^{T}(I^*)$ is the set of states for which T is efficient, the importing government chooses FT and the DSB is not invoked (i.e., s such that $s \in \sigma^{T}$ and $qk(s) > \frac{\gamma_G(I^*,s)-c}{\gamma_G(I^*,s)}$). As we confirm below, $r(I^*,s)$ is equal to $|\gamma_I^*(I^*,s)|/I^*$, implying that the last term in the second line of (4.3) is positive.

Notice an interesting feature of (4.3): for any given investment level I^*, the expected return earned by foreign investors will be reduced to the extent that states of the world fall in $\bar{\sigma}_2^{FT}(I^*)$ rather than $\bar{\sigma}_1^{FT}(I^*)$, that is, to the extent that there are more disputes occurring in σ^{FT}; but this expected return will be *increased* to the extent that states of the world fall in $\bar{\sigma}_2^{T}(I^*)$ rather than $\bar{\sigma}_1^{T}(I^*)$, that is, to the extent that there are more disputes occurring in σ^{T}. As we confirm below, this feature raises the possibility that the FDI level could be either too low or too high under the BIT ISDS institution V^{BIT}_{ISDS} relative to the first best level of investment.

We assume that ex ante the host country is a small country in world capital markets (and in this way abstract from any market access issues associated with foreign investors), so foreign investors (who we also assume are risk neutral) invest in the host country up to the point where the expected return from investment in the host country is equal to the world interest rate r^*. Under the regularity assumption that $\rho^*_{V^{BIT}_{ISDS}}(I^*)$ is monotonically decreasing in I^* and

continuing with our focus for simplicity on the range of I^* satisfying (4.1), the equilibrium FDI level in the presence of the BIT ISDS institution is then uniquely determined by $\rho^*_{V^{BIT}_{ISDS}}(I^*) = r^*$, yielding

$$I^*_{V^{BIT}_{ISDS}} = {\rho^*_{V^{BIT}_{ISDS}}}^{-1}(r^*).$$

We then also have the equilibrium return earned on FDI in states where the host government adopts a policy of FT without dispute given by $r(I^*_{V^{BIT}_{ISDS}}, s)$, with the associated rents earned by investors in these states given by

$$\pi(I^*_{V^{BIT}_{ISDS}}, s) \equiv r(I^*_{V^{BIT}_{ISDS}}, s) \times I^*_{V^{BIT}_{ISDS}}.$$

Let us now compare the payoffs under the BIT ISDS institution V^{BIT}_{ISDS} to the first best payoffs. We do this in two steps. We first develop a comparison of the level of FDI under the BIT ISDS institution relative to the first best level of FDI. We then characterize the expected ex-post efficiency loss under the BIT ISDS institution relative to the first best, conditional on the level of FDI delivered under the BIT ISDS institution.

To compare the level of FDI under the BIT ISDS institution to the first best level, we observe that under the first best there will be no disputes. And under the first best there will be takings if and only if $s \in \sigma^T$. Hence, conditional on a level of FDI I^* in the first best foreign investors will receive

$$\rho^*_{FB}(I^*) \equiv \sum_{s \in \sigma^{FT}} p(s) r(I^*, s). \tag{4.4}$$

Comparing the first best expected return schedule $\rho^*_{FB}(I^*)$ to $\rho^*_{V^{BIT}_{ISDS}}(I^*)$ yields

$$\begin{aligned} \rho^*_{V^{BIT}_{ISDS}}(I^*) - \rho^*_{FB}(I^*) \;=\; & -\sum_{s \epsilon \bar{\sigma}^{FT}_2(I^*)} p(s)\{qk(s)) \times r(I^*, s) + \frac{c^*}{I^*}\} \\ & + \sum_{s \epsilon \bar{\sigma}^{T}_2(I^*)} p(s)\{qk(s) \times r(I^*, s) - \frac{c^*}{I^*}\} \\ & - \sum_{s \epsilon \bar{\sigma}^{FT}_3(I^*)} p(s) \times r(I^*, s) + \sum_{s \epsilon \bar{\sigma}^{T}_3(I^*)} p(s) \times r(I^*, s). \end{aligned} \tag{4.5}$$

As (4.5) demonstrates, returns to FDI under the BIT ISDS institution V^{BIT}_{ISDS} can be either too low or too high relative to the first best depending on whether the right-hand side of (4.5) is dominated by the first and third terms or rather the second and fourth terms (recall that the second term on the right-hand side of (4.5) is positive); that is, depending on whether the host

country or rather foreign investors are most able to exploit the incompleteness of the contract and act opportunistically within the limits allowed by this incompleteness.

Hence, compared to the first best, the BIT ISDS institution can entail ex-ante distortions in the level of FDI that can be either too high (when the expression in (4.5) is positive) or too low (when the expression in (4.5) is negative) relative to the first best level of FDI. The outcome of too much investment corresponds to a form of under-regulation or regulatory chill, where either too many regulations are struck down by the court (the second term in (4.5) dominates the first term), so there is an "on-equilibrium" under-regulatory bias (i.e. due to court rulings for $s \in \bar{\sigma}_2^T(I^*)$ relative to court rulings for $s \in \bar{\sigma}_2^{FT}(I^*)$), or else the first-best regulations are never imposed in the first place in order to avoid disputes (the fourth term in (4.5) dominates the third term), amounting to the "off-equilibrium" regulatory chill discussed above (occurring for $s \in \bar{\sigma}_3^T(I^*)$).

Put differently, absent a BIT the opportunism problem associated with a lack of commitment is all on the side of the host government, who has a unilateral incentive to engage in (regulatory or direct) expropriation of sunk foreign investments, and this incentive leads unambiguously to inefficiently low equilibrium investment. A BIT helps to reduce this government opportunism. Of course, unless the court is perfectly accurate, government opportunism can be reduced by a BIT but it is not eliminated. Importantly, however, under a BIT and in the presence of an imperfect court, a new possibility is also introduced: the possibility of *investor* opportunism. And this raises the possibility that investment may be inefficiently high rather than inefficiently low under a BIT.

Making use of the definitions of the sets $\bar{\sigma}_2^T(I^*)$, $\bar{\sigma}_2^{FT}(I^*)$, $\bar{\sigma}_3^T(I^*)$ and $\bar{\sigma}_3^{FT}(I^*)$, it is direct to verify that the relative sizes of the host government and the foreign investor dispute costs c and c^* are key determinants of the relative sizes of these sets. In particular, as c^* rises and c falls, the sets $\bar{\sigma}_2^T(I^*)$ and $\bar{\sigma}_3^T(I^*)$ shrink while the sets $\bar{\sigma}_2^{FT}(I^*)$ and $\bar{\sigma}_3^{FT}(I^*)$ grow. Using (4.5), this implies in turn that returns to FDI will be lower than efficient under the BIT ISDS institution V_{ISDS}^{BIT} when c^* is sufficiently high relative to c, and will be higher than efficient under the BIT ISDS institution V_{ISDS}^{BIT} when c^* is sufficiently low relative to c.

We record this in

Proposition 3. *The ex ante distortions in investment levels under the BIT ISDS institution V_{ISDS}^{BIT} can go in either direction, and depend on the balance between the sets $\bar{\sigma}_2^T(I^*)$ and $\bar{\sigma}_3^T(I^*)$ on the one hand, and the sets $\bar{\sigma}_2^{FT}(I^*)$ and $\bar{\sigma}_3^{FT}(I^*)$ on the other. Moreover, this balance hinges*

on the relative size of c^* as compared to c: returns to FDI will be (i) lower than efficient under V_{ISDS}^{BIT} when c^* is sufficiently high relative to c, and (ii) higher than efficient under V_{ISDS}^{BIT} when c^* is sufficiently low relative to c.

An interesting observation (related to a point made by Maggi and Staiger, 2011) is that the "win" rate of plaintiffs can, according to the model, reveal something about whether case (i) or case (ii) of Proposition 3 is most relevant empirically in investor-state disputes. In particular, according to the model under case (i) of Proposition 3 investors should win most of the disputes, because in this case it will more often be states rather than investors who are behaving opportunistically, and the court will then rule for investors more often as long as it is more accurate than a coin flip; while under case (ii) of Proposition 3 it is the state that should mostly win because in this case it will more often be investors rather than states who are behaving opportunistically, and the court will then rule for states more often as long as it is more accurate than a coin flip.

From this perspective, the findings of UNCTAD's 2017 *World Investment Report* on the outcomes of worldwide ISDS proceedings for 2016 are relevant:

> By the end of 2016, some 495 ISDS proceedings had been concluded. The relative shares of case outcomes changed only slightly from those of 2015. About one third of concluded cases were decided in favour of the State (claims were dismissed either on jurisdictional grounds or on the merits), and about one quarter were decided in favour of the investor, with monetary compensation awarded. A quarter of cases were settled ... In the remaining proceedings, either cases were discontinued or the tribunal found a treaty breach but did not award monetary compensation. (UNCTAD, 2017, p. 117)

Focusing on the 2016 concluded cases that were neither settled nor discontinued, the numbers reported by UNCTAD indicate that roughly 60% of these cases ended in a win for the states, and 40% ended in a win for investors, suggesting that case (ii) of Proposition 3 may be the more empirically relevant case, and hence suggesting that returns to FDI may be inefficiently high under the investor-state dispute mechanisms of existing BITs.[12]

[12] That said, the 60% win rate for defendants in BIT disputes reported by UNCTAD is not nearly as asymmetric as the 88% win rate for plaintiffs in WTO cases that Maggi and Staiger (2011) cite as evidence that, in the context of trade disputes and viewed through the context of their model, it is usually the importer govern-

We next write down the expected ex-post efficiency loss associated with the BIT ISDS institution, maintaining our focus on the range of I^* satisfying (4.1) and conditional on the level of FDI $I^*_{V^{BIT}_{ISDS}}$, relative to the first-best outcome conditional on the same FDI level $I^*_{V^{BIT}_{ISDS}}$. This loss is given by:

$$\begin{aligned} L(V^{BIT}_{ISDS}, I^*_{V^{BIT}_{ISDS}}) &= \sum_{s \in \bar{\sigma}^{FT}_2(I^*) \cup \bar{\sigma}^{T}_2(I^*)} p(s)\{qk(s)|\Gamma(I^*_{V^{BIT}_{ISDS}}, s)| + [c + c^*]\} \\ &+ \sum_{s \epsilon \bar{\sigma}^{FT}_3(I^*) \cup \bar{\sigma}^{T}_3(I^*)} p(s) \times |\Gamma(I^*_{V^{BIT}_{ISDS}}, s)|. \end{aligned} \tag{4.6}$$

As (4.6) makes clear, the institution V^{BIT}_{ISDS} entails three sources of ex-post inefficiencies relative to the first best beyond the ex-ante investment inefficiency characterized above: one arising from the probability of DSB error; one arising from the cost of a dispute; and one arising from distorted choices made "in the shadow of the court." The expected loss $L(V^{BIT}_{ISDS})$ can then be written as the sum of two terms. The first term captures the first two inefficiencies summed over two sets of states: the set of states $\bar{\sigma}^{FT}_2(I^*)$, where it is the host government who acts opportunistically and exploits the incompleteness of the contract, thereby triggering a dispute; and the set of states $\bar{\sigma}^{T}_2(I^*)$, where it is the foreign investors who acts opportunistically and exploit the incompleteness of the contract, thereby triggering a dispute. The second term captures the third inefficiency summed over two sets of states: the set of states $\bar{\sigma}^{FT}_3(I^*)$, where it is the host government who acts opportunistically and exploits the incompleteness of the contract with impunity; and the set of states $\bar{\sigma}^{T}_3(I^*)$, where it is the ability of foreign investors to act opportunistically and exploit the incompleteness of the contract that induces the host government to avoid the dispute with an inefficient policy choice.

Interestingly, notice from (4.6) that the expected ex-post efficiency loss associated with the BIT ISDS institution $L(V^{BIT}_{ISDS}, I^*_{V^{BIT}_{ISDS}})$ does not depend on the *balance* between the sets $\bar{\sigma}^{T}_2(I^*)$, $\bar{\sigma}^{FT}_2(I^*)$, $\bar{\sigma}^{T}_3(I^*)$ and $\bar{\sigma}^{FT}_3(I^*)$ as do the ex ante distortions in investment levels under the BIT ISDS institution according to Proposition 3. In principal, these sets could be perfectly balanced under the BIT ISDS institution and lead to efficient levels of FDI even while the ex post efficiency losses relative to the first best were substantial. We record this in

ment who is being opportunistic. Hence, while we view the 60% win rate for defendants in BIT disputes as an interesting contrast to the 88% win rate for plaintiffs in trade agreement disputes, a reasonable takeaway may be that in the case of BIT disputes opportunism is more evenly spread between plaintiffs and defendants than in the case of trade disputes where opportunism seems (according to the model) to be strongly concentrated with importer governments.

Proposition 4. *While the ex post efficiency loss relative to the first best under the BIT ISDS institution V_{ISDS}^{BIT} hinges on the size of the sets $\bar{\sigma}_2^T(I^*)$, $\bar{\sigma}_2^{FT}(I^*)$, $\bar{\sigma}_3^T(I^*)$ and $\bar{\sigma}_3^{FT}(I^*)$, the ex ante efficiency loss hinges only on the balance between the sets $\bar{\sigma}_2^T(I^*)$ and $\bar{\sigma}_3^T(I^*)$ on the one hand, and the sets $\bar{\sigma}_2^{FT}(I^*)$ and $\bar{\sigma}_3^{FT}(I^*)$ on the other. Hence, ex ante efficiency could be achieved under V_{ISDS}^{BIT} even while the ex post efficiency losses remained substantial.*

Finally, we can ask what would happen in the absence of a BIT. Under our assumptions and given the sunk nature of FDI, it is easy to see that the Nash (i.e., in the absence of a BIT) policy for the host government given any sunk FDI level $I^* > 0$ is to select policy T in all states, implying that the Nash level of I^* is zero: there would be no FDI in the host country absent a BIT. Notice also that our small country assumption ensures that all the benefits of a BIT and all the losses associated with the V_{ISDS}^{BIT} institution relative to the first best (as measured from an ex-ante perspective) are borne by the host country. And these losses take the two forms we have outlined above: first, an inefficient level of FDI sustained under the V_{ISDS}^{BIT} institution; and second, conditional on the level of FDI, an inefficient pattern of takings as well as the dispute costs incurred.

4.2. State-to-State dispute settlement

We now evaluate the desirability of adopting an SSDS in a BIT, rather than the ISDS embodied in the V_{ISDS}^{BIT} institution considered in the previous subsection. In reality, the relevant thought experiment would be to compare a BIT institution that includes both an SSDS and an ISDS to an institution that includes only an SSDS but no ISDS. But again, as we did for our analysis of trade agreements, for simplicity we chose to proceed formally in this more parsimonious way, and then draw observations relevant to the more realistic possibility of an ISDS as an addition to (rather than a replacement for) an SSDS in a BIT.

We consider an SSDS under the assumption that the state is an *imperfect agent* for investors, in the following sense: given any FDI level I^*, the foreign government's loss from a taking is the same as that of foreign investors, that is

$$|\gamma_G^*(I^*, s)| = |\gamma_I^*(I^*, s)|, \tag{4.7}$$

but the foreign government faces a higher dispute cost

$$\text{Foreign government dispute cost} = c^* + \lambda, \qquad \text{(Assumption II)}$$

where $\lambda > 0$ reflects the shadow cost of directing public resources toward disputing a private investor claim. We have in mind that these costs could reflect both political costs borne by the foreign government and the opportunity costs of diverting public funds and resources for this purpose.[13] In light of (4.7), we will continue to represent foreign payoffs with $\gamma_I^*(I^*, s)$.

Consider first the foreign government's filing behavior under the SSDS. The foreign government files a complaint if and only if $\iota = T$ and the expected benefit to the foreign government of filing exceeds the foreign government's cost of filing, that is

$$\Pr(\text{DSB ruling is } FT \mid s) \times |\gamma_G^*(I^*, s)| > [c^* + \lambda]. \qquad \text{(FBIT SSDS)}$$

Condition (FBIT SSDS) is the "filing" condition for the foreign government to invoke the DSB under the SSDS in response to a policy choice by the host government of $\iota = T$. Next consider the host government's policy choice. This government chooses $\iota = T$ if either (FBIT SSDS) fails – because then the host government can set $\iota = T$ without triggering a dispute – or if (FBIT SSDS) holds and the expected benefit to the host government from a taking exceeds the cost to the host government of a DSB dispute:

$$\Pr(\text{DSB ruling is } T \mid s) \times \gamma_G(I^*, s) > c. \qquad \text{(T SSDS)}$$

It is now direct to derive the equilibrium (ex-post) actions of the host government and foreign government for each state. For simplicity and as noted above, in what follows we continue to assume the states where the vague contract is unambiguous are measure zero, so we can focus only on states where the court if invoked must interpret the contract.

As with our analysis of ISDS, there are two cases to consider in the case of a BIT with SSDS. If dispute costs are low relative to the dispute stakes for each disputant in the specific sense that

$$\frac{c}{\gamma_G(I^*, s)} + \frac{[c^* + \lambda]}{|\gamma_I^*(I^*, s)|} < 1, \qquad (4.8)$$

[13] For example, if the series of disputes brought by Philip Morris under the ISDS provisions of various US BITs had instead been brought by the United States government, it seems plausible in light of the public controversy surrounding these disputes to suppose that the United States government would have borne additional dispute costs that Philip Morris did not bear (e.g., the political costs of having the name of the United States government associated with litigation aimed at weakening the health regulations of other countries and dealing with various constituencies in the United States on these issues). Notice also that an offer by foreign investors to defray some of the financial dispute costs borne by the foreign government would not alter the foreign government's assessment of the cost of the dispute, because these financial costs are ultimately borne by foreign citizens in any event (through the taxes needed to generate the government revenue to pay for these costs) and whether foreign investors or foreign citizens more generally pay these financial costs is immaterial to the foreign government under our assumptions.

then

$$\frac{c}{\gamma_G(I^*,s)} < \frac{|\gamma_I^*(I^*,s)| - [c^*+\lambda]}{|\gamma_I^*(I^*,s)|}; \quad \frac{[c^*+\lambda]}{|\gamma_I^*(I^*,s)|} < \frac{\gamma_G(I^*,s)-c}{\gamma_G(I^*,s)}$$

is implied, and we have the following:

1. In states $s \in \sigma^{FT}$: if $qk(s) < \frac{c}{\gamma_G(I^*,s)}$ then $\iota = FT$ and the DSB is not invoked; if $qk(s) \in [\frac{c}{\gamma_G(I^*,s)}, \frac{|\gamma_I^*(I^*,s)|-[c^*+\lambda]}{|\gamma_I^*(I^*,s)|}]$ then $\iota = T$ and the DSB is invoked under the SSDS; if $qk(s) > \frac{|\gamma_I^*(I^*,s)|-[c^*+\lambda]}{|\gamma_I^*(I^*,s)|}$ then $\iota = T$ and the DSB is not invoked.

2. In states $s \in \sigma^T$: if $qk(s) < \frac{[c^*+\lambda]}{|\gamma_I^*(I^*,s)|}$ then $\iota = T$ and the DSB is not invoked; if $qk(s) \in [\frac{[c^*+\lambda]}{|\gamma_I^*(I^*,s)|}, \frac{\gamma_G(I^*,s)-c}{\gamma_G(I^*,s)}]$ then $\iota = T$ and the DSB is invoked under the SSDS; if $qk(s) > \frac{\gamma_G(I^*,s)-c}{\gamma_G(I^*,s)}$ then $\iota = FT$ and the DSB is not invoked.

And if dispute costs are high relative to the dispute stakes for each disputant in the specific sense that

$$\frac{c}{\gamma_G(I^*,s)} + \frac{[c^*+\lambda]}{|\gamma_I^*(I^*,s)|} \geq 1, \tag{4.9}$$

then

$$\frac{c}{\gamma_G(I^*,s)} \geq \frac{|\gamma_I^*(I^*,s)| - [c^*+\lambda]}{|\gamma_I^*(I^*,s)|}; \quad \frac{[c^*+\lambda]}{|\gamma_I^*(I^*,s)|} \geq \frac{\gamma_G(I^*,s)-c}{\gamma_G(I^*,s)}$$

is implied, and we have the following:

1. In states $s \in \sigma^{FT}$: if $qk(s) < \frac{|\gamma_I^*(I^*,s)|-[c^*+\lambda]}{|\gamma_I^*(I^*,s)|}$ then $\iota = FT$ and the DSB is not invoked; if $qk(s) > \frac{|\gamma_I^*(I^*,s)|-[c^*+\lambda]}{|\gamma_I^*(I^*,s)|}$ then $\iota = T$ and the DSB is not invoked.

2. In states $s \in \sigma^T$: if $qk(s) < \frac{\gamma_G(I^*,s)-c}{\gamma_G(I^*,s)}$ then $\iota = T$ and the DSB is not invoked; if $qk(s) > \frac{\gamma_G(I^*,s)-c}{\gamma_G(I^*,s)}$ then $\iota = FT$ and the DSB is not invoked.

An interesting difference between ISDS and SSDS in the context of BITs is how the switch impacts the occurrence of regulatory chill. Notice first that the number of states in $s \in \sigma^T$ such that $qk(s) > \frac{\gamma_G(I^*,s)-c}{\gamma_G(I^*,s)}$, which we have denoted as $\bar{\sigma}_3^T(I^*)$, does not change as we move from ISDS to SSDS: hence, the occurrence of off-equilibrium regulatory chill, wherein the host government chooses the policy FT for $s \in \sigma^T$ rather than the first-best policy T in order to avoid a costly dispute with foreign investors, is not impacted by the switch from ISDS to SSDS. This is because SSDS raises the cost of filing from c^* to $c^* + \lambda$ and hence makes filing behavior less aggressive, but it is the magnitude of the dispute cost c borne by the host country (together with the quality of the court) that matters for off-equilibrium regulatory chill.

On the other hand, to the extent that on-equilibrium regulatory chill arises under SSDS in the form of an inefficiently low expectation of takings and an inefficiently high level of FDI as a result, and maintaining our focus on ranges of I^* where (4.8) is satisfied, on-equilibrium regulatory chill will be reduced with the switch to SSDS for two reasons. First, the frequency with which opportunistic takings are challenged in court – which under ISDS occurs for $s \in \sigma^{FT}$ when $qk(s) \in [\frac{c}{\gamma_G(I^*,s)}, \frac{|\gamma_I^*(I^*,s)|-c^*}{|\gamma_I^*(I^*,s)|}]$ and which we have denoted as $\bar{\sigma}_2^{FT}(I^*)$ but which for SSDS occurs for $s \in \sigma^T$ when $qk(s) \in [\frac{c}{\gamma_G(I^*,s)}, \frac{|\gamma_I^*(I^*,s)|-[c^*+\lambda]}{|\gamma_I^*(I^*,s)|}]$ – declines under SSDS as compared to ISDS. And second, the frequency with which first-best takings are challenged in court – which under ISDS occurs for $s \in \sigma^T$ when $qk(s) \in [\frac{c^*}{|\gamma_I^*(I^*,s)|}, \frac{\gamma_G(I^*,s)-c}{\gamma_G(I^*,s)}]$ and which we have denoted as $\bar{\sigma}_2^T(I^*)$ but which for SSDS occurs for $s \in \sigma^T$ when $qk(s) \in [\frac{[c^*+\lambda]}{|\gamma_I^*(I^*,s)|}, \frac{\gamma_G(I^*,s)-c}{\gamma_G(I^*,s)}]$ – also declines under SSDS as compared to ISDS. Hence, foreign investors should expect a higher probability that they will lose their investments in a taking under SSDS than under ISDS, which by itself is efficiency enhancing if this expectation is inefficiently low under an ISDS (i.e., if on-equilibrium regulatory chill arises under ISDS).

To further investigate this last point, we next turn to the ex-ante stage, and determine the level of I^* that is supported by an SSDS in combination with the vague contract, which to differentiate from the analogous institution in the trade agreement setting we refer to as the *BIT SSDS institution* and denote by V_{SSDS}^{BIT}. Taking account of the possibility of disputes as enumerated above and continuing with our focus for simplicity on the range of I^* satisfying (4.8), the expected return earned by foreign investors who invest the level I^* in the host market in the presence of the BIT SSDS institution V_{SSDS}^{BIT} is given by

$$\begin{aligned}\rho_{V_{SSDS}^{BIT}}^*(I^*) \equiv & \sum_{s\epsilon\bar{\sigma}_1^{FT}(I^*)} p(s)\times r(I^*) + \sum_{s\epsilon\hat{\sigma}_2^{FT}(I^*)} p(s)\{[1-qk(s)]\times r(I^*) - \frac{c^*}{I^*}\} \\ & + \sum_{s\epsilon\hat{\sigma}_1^{T}(I^*)} p(s)\times 0 + \sum_{s\epsilon\hat{\sigma}_2^{T}(I^*)} p(s)\{qk(s)\times r(I^*) - \frac{c^*}{I^*}\} \\ & + \sum_{s\epsilon\hat{\sigma}_3^{FT}(I^*)} p(s)\times 0 + \sum_{s\epsilon\bar{\sigma}_3^{T}(I^*)} p(s)\times r(I^*)\end{aligned} \quad (4.10)$$

where $\bar{\sigma}_1^{FT}(I^*)$ and $\bar{\sigma}_3^T(I^*)$ are as defined in the previous subsection and where $\hat{\sigma}_2^{FT}(I^*)$ is the set of states for which FT is efficient, the importing government chooses T and foreign investors file a complaint under ISDS (i.e., s such that $s \in \sigma^{FT}$ and $qk(s) \in [\frac{c}{\gamma_G(I^*,s)}, \frac{|\gamma_I^*(I^*,s)|-[c^*+\lambda]}{|\gamma_I^*(I^*,s)|}]$), $\hat{\sigma}_1^T(I^*)$ is the set of states for which T is efficient, the importing government chooses T and the DSB is not invoked (i.e., s such that $s \in \sigma^T$ and $qk(s) < \frac{[c^*+\lambda]}{|\gamma_I^*(I^*,s)|}$), and $\hat{\sigma}_2^T(I^*)$ is the set of

states for which T is efficient, the importing government chooses T and foreign investors file a complaint under ISDS (i.e., s such that $s \in \sigma^T$ and $qk(s) \in [\frac{[c^*+\lambda]}{|\gamma_I^*(I^*,s)|}, \frac{\gamma_G(I^*,s)-c}{\gamma_G(I^*,s)}]$). And finally $\mathring{\sigma}_3^{FT}(I^*)$ is the set of states for which FT is efficient, the importing government chooses T and the DSB is not invoked (i.e., s such that $s \in \sigma^{FT}$ and $qk(s) > \frac{|\gamma_I^*(I^*,s)|-[c^*+\lambda]}{|\gamma_I^*(I^*,s)|}$). Recall that $r(I^*)$ is equal to $|\gamma_I^*(I^*,s)|/I^*$, implying that the last term in the second line of (4.10) is positive.

Comparing the first best expected return schedule to $\rho^*_{V^{BIT}_{SSDS}}(I^*)$ yields

$$\begin{aligned}\rho^*_{V^{BIT}_{SSDS}}(I^*) - p^{FT}_{FB} \times r(I^*) &= -\sum_{s\epsilon\bar{\sigma}_1^{FT}(I^*)} p(s)\{qk(s)) \times r(I^*) + \frac{c^*}{I^*}\} \\ &+ \sum_{s\epsilon\mathring{\sigma}_1^{T}(I^*)} p(s)\{qk(s) \times r(I^*) - \frac{c^*}{I^*}\} \\ &- \sum_{s\epsilon\mathring{\sigma}_3^{FT}(I^*)} p(s) \times r(I^*) + \sum_{s\epsilon\bar{\sigma}_3^{T}(I^*)} p(s) \times r(I^*).\end{aligned} \tag{4.11}$$

We can also calculate the difference in the expected return schedules on FDI under SSDS and ISDS. To facilitate this comparison, we define the sets

$$\begin{aligned}\Delta^{FT}_{BIT}(I^*) &\equiv \{s \in \sigma^{FT} \mid \frac{|\gamma_I^*(I^*,s)| - (c^*+\lambda)}{|\gamma_I^*(I^*,s)|} < qk(s) < \frac{|\gamma_I^*(I^*,s)| - c^*}{|\gamma_I^*(I^*,s)|}\} \\ \Delta^{T}_{BIT}(I^*) &\equiv \{s \in \sigma^{T} \mid \frac{c^*}{|\gamma_I^*(I^*,s)|} < qk(s) < \frac{(c^*+\lambda)}{|\gamma_I^*(I^*,s)|}\}.\end{aligned} \tag{4.12}$$

The set $\Delta^{FT}_{BIT}(I^*)$ describes those states for which, as we switch from ISDS to SSDS, an inefficient choice of T that had led to a dispute becomes an inefficient choice of T with impunity (i.e., that is not disputed). The set $\Delta^{T}_{BIT}(I^*)$ describes those states for which, as we switch from ISDS to SSDS, an efficient choice of T that had led to a dispute becomes an efficient choice of T that is not disputed. We then have

$$\begin{aligned}\rho^*_{V^{BIT}_{SSDS}}(I^*) - \rho^*_{V^{BIT}_{ISDS}}(I^*) &= -\sum_{s\epsilon\Delta^{FT}_{BIT}(I^*)} p(s)\{[1-qk(s)] \times r(I^*) - \frac{c^*}{I^*}\} \\ &- \sum_{s\epsilon\Delta^{T}_{BIT}(I^*)} p(s)\{qk(s) \times r(I^*) - \frac{c^*}{I^*}\}.\end{aligned} \tag{4.13}$$

As (4.13) demonstrates, as long as $\Delta^{FT}_{BIT}(I^*)$ and $\Delta^{T}_{BIT}(I^*)$ are not both empty, it follows that $\rho^*_{V^{BIT}_{SSDS}}(I^*) < \rho^*_{V^{BIT}_{ISDS}}(I^*)$: An SSDS shifts down the expected return schedule relative to an ISDS, because foreign investors can expect a higher probability that they will lose their investments in a taking under SSDS than under ISDS, which is efficiency enhancing if this expectation is

inefficiently low under an ISDS (i.e., if on-equilibrium regulatory chill arises under ISDS) but otherwise is efficiency worsening.

Put differently, as we observed above, absent a BIT the opportunism problem associated with commitment is all on the side of the host government, and leads to inefficiently low equilibrium investment. A BIT helps to reduce this government opportunism, but unless the court is perfectly accurate government opportunism is not eliminated. Importantly, however, under a BIT and in the presence of an imperfect court, the possibility of investor opportunism is introduced, and this raises the possibility that investment may be inefficiently high rather than inefficiently low; and depending on which of these outcomes prevails under an ISDS, the switch to an SSDS could have either beneficial or detrimental impacts on the efficiency of FDI.

Together with Proposition 3, the expression in (4.13) and the discussion surrounding it leads to the following

Proposition 5. *From an ex ante (level of FDI) efficiency perspective: (i) the BIT ISDS institution V^{BIT}_{ISDS} is preferable to the SSDS institution V^{BIT}_{SSDS} provided that c^* is sufficiently high relative to c; but (ii) if c^* is sufficiently low relative to c and if λ is not too large, the SSDS institution V^{BIT}_{SSDS} will be preferable.*[14]

Returning to the observation we made after Proposition 3, the implication of the findings of UNCTAD's 2017 *World Investment Report* on the outcomes of worldwide ISDS proceedings for 2016 suggests that case (ii) of Proposition 5 may be the more empirically relevant case, and hence raises the possibility that replacing the investor-state dispute mechanisms in existing BITs with state-to-state dispute mechanisms could be attractive from an ex ante efficiency perspective.

We summarize this discussion with the following:

Corollary 2. *As viewed through the lens of the model, the 60% win rate for host governments in BIT disputes reported by UNCTAD (2017) suggests that, empirically, c^* is relatively low and c relatively high, lending weight to the view that the SSDS institution V^{BIT}_{SSDS} may be preferable to the BIT ISDS institution V^{BIT}_{ISDS} on the basis of ex-ante efficiency.*

[14] With $\rho^*_{V_{ISDS}}(I^*) > p^{FT}_{FB} \times r(I^*)$ under the conditions on c^* and c in part (ii) of Proposition 5, the role played by the limit on the magnitude of λ is to ensure that the drop in $\rho^*_{V^{BIT}_{SSDS}}(I^*)$ below $\rho^*_{V_{ISDS}}(I^*)$ is not too large.

Next, we write down the expected ex-post efficiency loss associated with the SSDS institution conditional on a level of FDI $I^*_{V^{BIT}_{SSDS}}$ relative to the first-best outcome conditional on the same FDI level $I^*_{V^{BIT}_{SSDS}}$, again maintaining our focus for simplicity on the range of I^* satisfying (4.8). Using government payoffs, this loss is given by:

$$\begin{aligned} L(V^{BIT}_{SSDS}, I^*_{V^{BIT}_{SSDS}}) &= \sum_{s\in\mathring{\sigma}_2^{FT}(I^*)\cup\mathring{\sigma}_2^{T}(I^*)} p(s)\{qk(s)|\Gamma(I^*_{V^{BIT}_{SSDS}}, s)| + [c + c^* + \lambda]\} \\ &\quad + \sum_{s\epsilon\mathring{\sigma}_3^{FT}(I^*)\cup\bar{\sigma}_3^{T}(I^*)} p(s) \times |\Gamma(I^*_{V^{BIT}_{SSDS}}, s)|. \end{aligned} \tag{4.14}$$

As in the previous subsection, the comparison between the V^{BIT}_{SSDS} and V^{BIT}_{ISDS} institutions can be made by comparing their respective losses relative to the first best.

To facilitate this comparison, we define the set of states under which a dispute occurs in equilibrium under SSDS

$$\mathcal{D}(I^*) \equiv \{\mathring{\sigma}_2^{FT}(I^*) \cup \mathring{\sigma}_2^{T}(I^*)\}. \tag{4.15}$$

Making use of the sets defined in (4.12) and (4.15), we can now write

$$\begin{aligned} L(V^{BIT}_{SSDS}, I^*_{V^{BIT}_{SSDS}}) - L(V^{BIT}_{ISDS}, I^*_{V^{BIT}_{SSDS}}) &= \sum_{s\in\mathcal{D}(I^*)} p(s) \times \lambda \\ &\quad + \sum_{s\in\Delta^{FT}_{BIT}(I^*)} p(s)\{|\Gamma(s)| - qk(s)|\Gamma(s)| - [c + c^*]\} \\ &\quad - \sum_{s\in\Delta^{T}_{BIT}(I^*)} p(s)\{qk(s)|\Gamma(s)| + [c + c^*]\} \end{aligned}$$

or simplifying,

$$\begin{aligned} L(V^{BIT}_{SSDS}, I^*_{V^{BIT}_{SSDS}}) - L(V^{BIT}_{ISDS}, I^*_{V^{BIT}_{SSDS}}) &= \sum_{s\in\mathcal{D}(I^*)} p(s) \times \lambda \\ &\quad + \sum_{s\in\Delta^{FT}_{BIT}(I^*)} p(s)\{[1 - qk(s)]|\Gamma(s)| - [c + c^*]\} \\ &\quad - \sum_{s\in\Delta^{T}_{BIT}(I^*)} p(s)\{qk(s)|\Gamma(s)| + [c + c^*]\}. \end{aligned} \tag{4.16}$$

The right-hand-side term on the first line of (4.16) reflects the direct added dispute cost λ borne by the foreign government under an SSDS. This term is positive. The term on the second line of (4.16) can be positive or negative, and reflects the change in joint government surplus for states in which the importing government would choose the inefficient $\iota = T$ with impunity

under the V^{BIT}_{SSDS} institution but with an accompanying court filing under V^{BIT}_{ISDS}.[15] Finally, the term on the third line of (4.16) reflects the change in joint government surplus for states in which the importing government would choose the efficient $\iota = T$ and face a court filing under the V^{BIT}_{ISDS} institution but would make this choice without triggering a dispute under V^{BIT}_{SSDS}; this term is negative.

Hence, as (4.16) makes clear, in terms of ex-post inefficiencies (i.e., conditional on the level of FDI) there is a trade-off between designing a BIT with an ISDS versus an SSDS: the direct added dispute cost λ borne by the foreign government under an SSDS (the first line of (4.16)) argues for an ISDS; but the reduced frequency of disputes in equilibrium under an SSDS (the second and third lines of (4.16)) contains benefits – in terms of both DSB errors avoided and dispute costs avoided – that must be weighed against these considerations. When the added ambiguity of the ex ante investment implications of ISDS versus SSDS is also acknowledged, the choice between an SSDS and ISDS in the context of BITs is surprisingly subtle.

The expression in (4.16) suggests that ISDS would dominate SSDS in terms of ex-post (conditional on the FDI level) efficiency provided that court quality is at a level that would generate many equilibrium disputes under SSDS. We can, however, identify one set of circumstances where an SSDS dominates an ISDS in terms of ex-post efficiency according to (4.16). Suppose that under an SSDS the dispute costs for the foreign government are below the level that would ever lead it to allow an inefficient taking by the host government to go unchallenged (i.e., suppose that $\frac{1}{2}|\gamma^*_I(I^*, s)| > c^* + \lambda$);[16] this would imply that the set $\Delta^{FT}_{BIT}(I^*)$ is empty and hence that the term on the second line of (4.16) is zero. And suppose further that court quality is such that there are equilibrium disputes under an ISDS but no equilibrium disputes under an SSDS. With no equilibrium disputes under an SSDS, it follows that the set $\mathcal{D}(I^*)$ is empty and hence the right-hand-side term on the first line of (4.16) is also zero. And if there are any equilibrium disputes under ISDS, then it follows that $\Delta^{T}_{BIT}(I^*)$ must be non-empty, ensuring that $L(V^{BIT}_{SSDS}, I^*_{V^{BIT}_{SSDS}}) < L(V^{BIT}_{ISDS}, I^*_{V^{BIT}_{SSDS}})$ in this case.

More generally, if dispute costs for the foreign government under an SSDS are not too high

[15] Arguing as we did before in the context of our analysis of trade agreements, it is possible to show that

$$\sum_{s \in \Delta^{FT}_{BIT}(I^*)} p(s)[(1 - qk(s))|\Gamma(s)| - (c + c^* + \lambda)] < 0.$$

However this is not enough to sign the term in the second line of (4.16).

[16] This is analogous to the first of the two conditions in (1) imposed by Maggi and Staiger (2011).

and if the quality of the court makes equilibrium disputes under an SSDS sufficiently infrequent, the level of ex-post (conditional on FDI) inefficiency will be lower under an SSDS than under an ISDS. We summarize this last point with

Proposition 6. *If dispute costs for the foreign government under an SSDS are not so high that it would ever allow an inefficient taking by the host government to go unchallenged, and if the quality of the court makes equilibrium disputes under an SSDS sufficiently infrequent, the SSDS institution V^{BIT}_{SSDS} will out perform the BIT ISDS institution V^{BIT}_{ISDS} in terms of the level of ex-post (conditional on FDI) efficiency.*

And together Propositions 5 and 6 imply the following

Corollary 3. *On the grounds of overall ex ante (level of FDI) and ex post (conditional on the level of FDI) efficiency, and provided that λ is not too large: (i) the BIT ISDS institution V^{BIT}_{ISDS} is preferable to the SSDS institution V^{BIT}_{SSDS} provided that c^* is sufficiently high and c sufficiently low and provided also that the quality of the court makes equilibrium disputes under an SSDS sufficiently frequent; but (ii) if c^* is sufficiently low and c sufficiently high and if the quality of the court makes equilibrium disputes under an SSDS sufficiently infrequent, the SSDS institution V^{BIT}_{SSDS} will be preferable.*

Finally, as we noted at the outset of this subsection, we have proceeded with our formal analysis by considering the choice of either an ISDS or an SSDS to be included in a BIT. In reality, the relevant design choice is more aptly described as whether to include an ISDS in a BIT in addition to an SSDS. Suppose we assume that when both are included, an ISDS filing trumps an SSDS filing whenever both are incentivized to file. Then the comparison in (4.16) applies equally well to this design choice.

We summarize with

Proposition 7. *Whether investors, in addition to their governments, should have standing to bring disputes in an optimally designed BIT depends on the outcome of weighing subtle trade-offs. That is, whether an optimally designed BIT should include both an SSDS and an ISDS or rather just an SSDS depends on features of the underlying environment.*

4.3. Standing for disputes over commitments to investors more generally

In the previous subsection we have analyzed commitment issues with respect to foreign investors within the context of BITs. Arguably, similar issues may arise in the context of trade agreements: indeed, Yarbrough and Yarbrough (1992) argue that a central role for trade agreements is to allow importing governments to make policy commitments to foreign exporters who must make sunk investments in order to export to their markets.[17] In principle, the analysis of the previous subsection (where the interpretation now excludes the possibility of explicit expropriation) could be applied directly to trade agreements wherever these agreements are designed to address such commitment issues, with an Exporter-State dispute settlement (ESDS) mechanism playing the role in trade agreements that is played by ISDS mechanisms in BITs.

However, it may be plausible to view such commitment issues as less important in the context of trade agreements than they are in the context of BITs, for the simple reason that the issue of sunk investments may be more important in the context of FDI than in the context of exporting. This would seem to be true especially in a multi-country world, where exporter investments would arguably have alternative uses in other markets whereas FDI would continue to be highly susceptible to hold-up by the host country. And it would reflect as well the lack of any direct expropriation threat to the investments of exporters.

If one accepts this distinction, then it follows that the ex ante investment problem is more important in the context of BITs than it is in the context of trade agreements, and hence ex post efficiency considerations should dominate the choice between an SSDS and an ESDS in the context of trade agreements in a way that would not be true in the context of BITs. From this observation we have a simple corollary to Proposition 6:

Corollary 4. *When it comes to the issues of commitment to foreign exporters that arise in the context of a trade agreement, and provided the issue of sunk investments is more important in the context of FDI than in the context of exporting, if dispute costs for the foreign government under an SSDS are not so high that it would ever allow an inefficient taking by the host government to go unchallenged and if the quality of the court makes equilibrium disputes under an SSDS sufficiently infrequent, an SSDS will be preferred to an ESDS.*

Together, Corollaries 3 and 4 suggest that, provided the issue of sunk investments is more

[17] See also McLaren (1997) whose analysis of a trade agreement between a large and a small coutnry turns this argument for trade agreements on its head.

important in the context of FDI than in the context of exporting, it may be optimal to handle disputes over commitment issues differently across BITs and trade agreements, with SSDS the optimal choice for the latter under reasonable conditions while the choice between SSDS and ISDS for BITs is more nuanced. This stands in contrast to the findings of Corollary 1, which provides robust support for an SSDS over an ESDS in the context of disputes over market access issues whether these disputes arise in trade agreements or in BITs.

5. Retrospective versus Prospective Damages

Thus far we have abstracted from an important feature of real-world trade and investment disputes: the court proceedings can take many months to reach a conclusion, during which time there will typically be ongoing benefits from the disputed policy choice enjoyed by the home/host country and ongoing injury suffered by the foreign plaintiff. This raises an important design question for the agreement: Should retrospective damages be part of a court ruling?[18] For BITs such retrospective payments are part of the typical calculation of damages; for trade agreements there is no role for such payments.

Can this design difference be understood as an optimal response to the distinct mix of problems being addressed by BITs and trade agreements? That is, is it possible to understand the presence of retrospective damages in BITs and the lack of retrospective damages in trade agreements as reflecting the optimality of retrospective damages when dealing with the explicit or regulatory expropriation issues that dominate BITs but no such optimality when dealing with the market access issues that dominate trade agreements? This is the question we ask in this section. We begin in the next subsection with a consideration of the issue of retrospective damages in trade agreements, and then turn in the following subsection to consider the same question in the context of BITs.

5.1. Retrospective versus prospective damages in trade agreements

We continue to work in a one-period model, but we now let ν denote the fraction of the period that it takes for the court to complete the judicial process and issue a ruling. Any ruling issued

[18] This question is distinct from the question of whether the remedy for damages should take the form of cash compensation or rather non-cash forms such as changes in policy. On this dimension there is also a stark distinction between trade agreements and BITs, with court rulings in the latter routinely specifying cash payments and the former almost never. This question, while interesting and important, is beyond the scope of our paper (see Schwartz, 1979, on the trade-offs between compensation and specific performance as remedies).

by the court is then in place for the fraction $(1-\nu)$ of the period. To simplify further, we now also assume that the foreign government's loss from protection can take one of only two values, $High$ or Low, which we denote by γ_G^{*H} and γ_G^{*L} respectively. And we assume that states of the world for which the foreign government's loss from protection is $High$ correspond to states in σ^{FT} (that is, we assume that in states of the world where the foreign government's loss from protection is $High$ we have $\Gamma(s) \equiv \gamma_G(s) + \gamma_G^{*H} < 0$); and similarly we assume that states of the world for which the foreign government's loss from protection is Low correspond to states in σ^P (that is, we assume that in states of the world where the foreign government's loss from protection is Low we have $\Gamma(s) \equiv \gamma_G(s) + \gamma_G^{*L} > 0$).[19]

Hence, a court ruling on whether the current state is in σ^{FT} or σ^P is both a ruling on whether protection or rather free trade is efficient (with the interpretive discussion in note 7 still applying) and simultaneously a ruling on the level of damages, if any, that must be paid by the importer government when it chooses to protect. That is, if the importer government chooses $\tau = P$ and the court rules for FT (i.e., rules that the current state s is in σ^{FT}), then the court is also ruling that any damages to be paid must be calculated according to γ_G^{*H}. Finally, we proceed with our analysis in this subsection under the assumption that the trade agreement takes the form of a vague contract and an SSDS.

We begin our analysis under the assumption that retrospective damages are to be paid, and then evaluate the alternative where compensation is limited to prospective damages.

Retrospective damages in trade agreements Consider first the exporter government's filing behavior under the SSDS with retrospective damages. This government files a complaint if and only if $\tau = P$ and the expected benefit to the exporter government of filing exceeds the exporter government's cost of filing, that is

$$\Pr(\text{DSB ruling is } FT \mid s) \times \{(1-\nu) \times |\gamma_G^*(s)| + [\nu \times |\gamma_G^{*H}|]\} > c^*. \qquad \text{(F SSDS RETRO)}$$

Condition (F SSDS RETRO) is the "filing" condition for the exporter government to invoke the DSB under the SSDS with retrospective damages in response to a policy choice by the importer government of $\tau = P$. Notice that the exporter government receives the true benefit of the removal of protection for state s, $|\gamma_G^*(s)|$, once the ruling has occurred and the importing

[19] With these assumptions we are effectively mirroring the set of assumptions described in note 11 under which we argued that our section-4 model of BITs could be mapped over to the case of explicit expropriation where damages are paramount.

government has removed protection under the court ruling (i.e., for the fraction $(1-\nu)$ of the period); but any retrospective damages received by the exporting government are calculated based on the court's (possibly incorrect) *assessment* of the harm done to the exporting government from this protection, which if the court ruled for FT is given by the $High$ level of damages γ_G^{*H}.

Next consider the importer government's policy choice. This government chooses $\tau = P$ if either (F SSDS RETRO) fails – because then the importer government can set $\tau = P$ without triggering a dispute – or if (F SSDS RETRO) holds and the expected benefit to the importer government from trade protection exceeds the cost to the importer government of a DSB dispute:

$$\Pr(\text{DSB ruling is } P \mid s) \times \gamma_G(s) + \Pr(\text{DSB ruling is } FT \mid s) \times \{\nu \times [\gamma_G(s) - |\gamma_G^{*H}|]\} > c. \quad \text{(P SSDS RETRO)}$$

Notice that now, and in contrast to the analogous condition (P SSDS) for the model of section 3, even when the court rules for FT there are possible payoff consequences to the importer government from having chosen $\tau = P$: the importer government enjoys the benefits from protection for the fraction of the period during which the court is deliberating $(\nu \times \gamma_G(s))$, but the importer government will also be liable for retrospective damages in the amount $\nu \times |\gamma_G^{*H}|$ which could be either bigger or smaller than these benefits.

When $\nu = 0$ and a filing generates an instantaneous ruling, the conditions in (F SSDS RETRO) and (P SSDS RETRO) that will determine the behavior of governments in the augmented model of this section collapse to the respective conditions (F SSDS) and (P SSDS) that determined the behavior of governments in the model of section 3. When $\nu > 0$ the question of a role for retrospective damages arises. And it is this role that we now evaluate, by comparing outcomes with retrospective damages (which we now derive) to outcomes without retrospective damages and instead only prospective damages (which we derive subsequently).

We proceed as before and derive the equilibrium actions of the governments for each state. For simplicity we continue as before to assume the states where the vague contract is unambiguous are measure zero, so we can focus only on states where the court if invoked must interpret the contract.

There are now four cases to consider. If dispute costs are low relative to the dispute stakes

for each disputant in the specific sense that

$$\frac{c}{\gamma_G(s)-\nu\times[\gamma_G(s)-|\gamma_G^{*H}|]}+\frac{c^*}{|\gamma_G^{*H}|}<\frac{\gamma_G(s)}{\gamma_G(s)-\nu\times[\gamma_G(s)-|\gamma_G^{*H}|]}\quad\text{for } s\in\sigma^{FT} \tag{5.1}$$

$$\frac{c}{\gamma_G(s)-\nu\times[\gamma_G(s)-|\gamma_G^{*H}|]}+\frac{c^*}{|\gamma_G^{*L}|+\nu\times[|\gamma_G^{*H}|-|\gamma_G^{*L}|]}<\frac{\gamma_G(s)}{\gamma_G(s)-\nu\times[\gamma_G(s)-|\gamma_G^{*H}|]}\quad\text{for } s\in\sigma^{P}$$

then

$$\begin{aligned}\frac{c-\nu\times[\gamma_G(s)-|\gamma_G^{*H}|]}{\gamma_G(s)-\nu\times[\gamma_G(s)-|\gamma_G^{*}(s)|]} &< \frac{|\gamma_G^{*H}|-c^*}{|\gamma_G^{*H}|}\quad\text{and}\\ \frac{c^*}{|\gamma_G^{*L}|+\nu\times[|\gamma_G^{*H}|-|\gamma_G^{*L}|]} &< \frac{\gamma_G(s)-c}{\gamma_G(s)-\nu\times[\gamma_G(s)-|\gamma_G^{*H}|]}\end{aligned}$$

are implied, and we have the following:

1. In states $s\in\sigma^{FT}$: if $qk(s)<\frac{c-\nu\times[\gamma_G(s)-|\gamma_G^{*H}|]}{\gamma_G(s)-\nu\times[\gamma_G(s)-|\gamma_G^{*H}|]}$ then $\tau=FT$ and the DSB is not invoked; if $qk(s)\in[\frac{c-\nu\times[\gamma_G(s)-|\gamma_G^{*H}|]}{\gamma_G(s)-\nu\times[\gamma_G(s)-|\gamma_G^{*H}|]},\frac{|\gamma_G^{*H}|-c^*}{|\gamma_G^{*H}|}]$ then $\tau=P$ and the DSB is invoked under the SSDS; if $qk(s)>\frac{|\gamma_G^{*H}|-c^*}{|\gamma_G^{*H}|}$ then $\tau=P$ and the DSB is not invoked.

2. In states $s\in\sigma^{P}$: if $qk(s)<\frac{c^*}{|\gamma_G^{*L}|+\nu\times[|\gamma_G^{*H}|-|\gamma_G^{*L}|]}$ then $\tau=P$ and the DSB is not invoked; if $qk(s)\in[\frac{c^*}{|\gamma_G^{*L}|+\nu\times[|\gamma_G^{*H}|-|\gamma_G^{*L}|]},\frac{\gamma_G(s)-c}{\gamma_G(s)-\nu\times[\gamma_G(s)-|\gamma_G^{*H}|]}]$ then $\tau=P$ and the DSB is invoked under the SSDS; if $qk(s)>\frac{\gamma_G(s)-c}{\gamma_G(s)-\nu\times[\gamma_G(s)-|\gamma_G^{*H}|]}$ then $\tau=FT$ and the DSB is not invoked.

Alternatively, if dispute costs are high relative to the dispute stakes for each disputant in the specific sense that

$$\frac{c}{\gamma_G(s)-\nu\times[\gamma_G(s)-|\gamma_G^{*H}|]}+\frac{c^*}{|\gamma_G^{*H}|}>\frac{\gamma_G(s)}{\gamma_G(s)-\nu\times[\gamma_G(s)-|\gamma_G^{*H}|]}\quad\text{for } s\in\sigma^{FT} \tag{5.2}$$

$$\frac{c}{\gamma_G(s)-\nu\times[\gamma_G(s)-|\gamma_G^{*H}|]}+\frac{c^*}{|\gamma_G^{*L}|+\nu\times[|\gamma_G^{*H}|-|\gamma_G^{*L}|]}>\frac{\gamma_G(s)}{\gamma_G(s)-\nu\times[\gamma_G(s)-|\gamma_G^{*H}|]}\quad\text{for } s\in\sigma^{P}$$

then

$$\begin{aligned}\frac{c-\nu\times[\gamma_G(s)-|\gamma_G^{*H}|]}{\gamma_G(s)-\nu\times[\gamma_G(s)-|\gamma_G^{*}(s)|]} &\geq \frac{|\gamma_G^{*H}|-c^*}{|\gamma_G^{*H}|}\quad\text{and}\\ \frac{c^*}{|\gamma_G^{*L}|+\nu\times[|\gamma_G^{*H}|-|\gamma_G^{*L}|]} &\geq \frac{\gamma_G(s)-c}{\gamma_G(s)-\nu\times[\gamma_G(s)-|\gamma_G^{*H}|]}\end{aligned}$$

is implied, and we have the following:

1. In states $s \in \sigma^{FT}$: if $qk(s) < \frac{|\gamma_G^{*H}|-c^*}{|\gamma_G^{*H}|}$ then $\tau = FT$ and the DSB is not invoked; if $qk(s) > \frac{|\gamma_G^{*H}|-c^*}{|\gamma_G^{*H}|}$ then $\tau = P$ and the DSB is not invoked.

2. In states $s \in \sigma^{P}$: if $qk(s) < \frac{\gamma_G(s)-c}{\gamma_G(s)-\nu\times[\gamma_G(s)-|\gamma_G^{*H}|]}$ then $\tau = P$ and the DSB is not invoked; if $qk(s) > \frac{\gamma_G(s)-c}{\gamma_G(s)-\nu\times[\gamma_G(s)-|\gamma_G^{*H}|]}$ then $\tau = FT$ and the DSB is not invoked.

Finally, two additional cases can arise, corresponding to low dispute costs in σ^{FT} and high dispute costs in σ^{P} or by high dispute costs in σ^{FT} and low dispute costs in σ^{P}, as defined by the relevant conditions in (5.1) and (5.2). These two additional cases are characterized by equilibrium behavior corresponding to the relevant conditions laid out under the first two cases.

Notice that, as before, for the low-relative-dispute-cost case defined by (5.1), there will be disputes in equilibrium for a middle range of DSB accuracy, while there are no equilibrium disputes for the high-relative-dispute-cost case defined by (5.2). For this reason, we will focus henceforth on the low-relative-dispute-cost case defined by (5.1), and simply note here that the qualitative nature of our results hold also in the remaining high-relative-dispute-cost case.

We can write down the expected efficiency loss associated with the SSDS in combination with the vague contract and retrospective damages, which we refer to as the *SSDS institution with retrospective damages* and denote by V_{SSDS}^{RETRO}, relative to the first-best outcome. For the low-relative-dispute-cost case defined by ((5.1), this loss is given by:

$$\begin{aligned} L(V_{SSDS}^{RETRO}) \;=\; & \sum_{s\in\breve{\sigma}_2^{FT}} p(s)\{[\nu+(1-\nu)\times qk(s)]|\Gamma(s)|+[c+c^*]\} \\ & + \sum_{s\in\breve{\sigma}_2^{P}} p(s)\{[(1-\nu)\times qk(s)]|\Gamma(s)|+[c+c^*]\} \\ & + \sum_{s\in\breve{\sigma}_3^{FT}\cup\breve{\sigma}_3^{P}} p(s)|\Gamma(s)|. \end{aligned} \tag{5.3}$$

Here, $\breve{\sigma}_2^{FT}$ denotes the set of states for which FT is efficient, the importing government chooses P, and the exporting government files a complaint (i.e., s such that $s \in \sigma^{FT}$ and $qk(s) \in [\frac{c-\nu\times[\gamma_G(s)-|\gamma_G^{*H}|]}{\gamma_G(s)-\nu\times[\gamma_G(s)-|\gamma_G^{*H}|]}, \frac{|\gamma_G^{*H}|-c^*}{|\gamma_G^{*H}|}]$). Similarly, $\breve{\sigma}_2^{P}$ denotes the set of states for which P is efficient, the importing government chooses P, and the exporting government files a complaint (i.e., s such that $s \in \sigma^{P}$ and $qk(s) \in [\frac{c^*}{|\gamma_G^{*L}|+\nu\times[|\gamma_G^{*H}|-|\gamma_G^{*L}|]}, \frac{\gamma_G(s)-c}{\gamma_G(s)-\nu\times[\gamma_G(s)-|\gamma_G^{*H}|]}]$). And finally, $\breve{\sigma}_3^{FT}$ denotes the set of states for which FT is efficient, the importing government chooses P, and the exporting government does not file a complaint (i.e., s such that $s \in \sigma^{FT}$ and $qk(s) > \frac{|\gamma_G^{*H}|-c^*}{|\gamma_G^{*H}|}$), while $\breve{\sigma}_3^{P}$ denotes the set of states for which P is efficient, the importing government chooses

FT, and the exporting government does not file a complaint (i.e., s such that $s \in \sigma^P$ and $qk(s) > \frac{\gamma_G(s)-c}{\gamma_G(s)-\nu\times[\gamma_G(s)-|\gamma_G^{*H}|]}$).

As (5.3) makes clear, the institution V_{SSDS}^{RETRO} entails three sources of inefficiencies relative to the first best: one arising from the probability of DSB error; one arising from the cost of a dispute; and one arising from distorted choices made "in the shadow of the court." The expected loss $L(V_{SSDS}^{RETRO})$ can then be written as the sum of three terms. The first two terms capture respectively the first two inefficiencies summed over two sets of states: the set of states $\breve{\sigma}_2^{FT}$, where it is the importing government who acts opportunistically and exploits the incompleteness of the contract, thereby triggering a dispute; and the set of states $\breve{\sigma}_2^{P}$, where it is the exporting government who acts opportunistically and exploits the incompleteness of the contract, thereby triggering a dispute. The third term captures the third inefficiency summed over two sets of states: the set of states $\breve{\sigma}_3^{FT}$, where it is the importing government who acts opportunistically and exploits the incompleteness of the contract with impunity; and the set of states $\breve{\sigma}_3^{P}$, where it is the ability of the exporting government to act opportunistically and exploit the incompleteness of the contract that induces the importing government to avoid a dispute with an inefficient policy choice.

Prospective damages in trade agreements We next suppose that retrospective damages are not provided for in the SSDS institution, and only prospective damages are allowed. Consider first the exporter government's filing behavior under the SSDS with prospective damages. This government files a complaint if and only if $\tau = P$ and the expected benefit to the exporter government of filing exceeds the exporter government's cost of filing, that is

$$\Pr(\text{DSB ruling is } FT \mid s) \times \{(1-\nu) \times |\gamma_G^*(s)|\} > c^*. \qquad \text{(F SSDS PRO)}$$

Condition (F SSDS PRO) is the "filing" condition for the exporter government to invoke the DSB under the SSDS with prospective damages in response to a policy choice by the importer government of $\tau = P$. Next consider the importer government's policy choice. This government chooses $\tau = P$ if either (F SSDS PRO) fails – because then the importer government can set $\tau = P$ without triggering a dispute – or if (F SSDS PRO) holds and the expected benefit to the importer government from trade protection exceeds the cost to the importer government of a DSB dispute:

$$\Pr(\text{DSB ruling is } P \mid s) \times \gamma_G(s) + \Pr(\text{DSB ruling is } FT \mid s) \times [\nu \times \gamma_G(s)] > c. \quad \text{(P SSDS PRO)}$$

We proceed as before and derive the equilibrium actions of the governments for each state. For simplicity we continue as before to assume the states where the vague contract is unambiguous are measure zero, so we can focus only on states where the court if invoked must interpret the contract.

As before there are four cases to consider. If dispute costs are low relative to the dispute stakes for each disputant in the specific sense that

$$\begin{aligned} \frac{c}{(1-\nu)\times\gamma_G(s)} + \frac{c^*}{(1-\nu)\times|\gamma_G^{*H}|} < \frac{\gamma_G(s)}{(1-\nu)\times\gamma_G(s)} \quad \text{for } s\in\sigma^{FT} \\ \frac{c}{(1-\nu)\times\gamma_G(s)} + \frac{c^*}{(1-\nu)\times|\gamma_G^{*L}|} < \frac{\gamma_G(s)}{(1-\nu)\times\gamma_G(s)} \quad \text{for } s\in\sigma^{P} \end{aligned} \tag{5.4}$$

then

$$\begin{aligned} \frac{c-\nu\times\gamma_G(s)}{(1-\nu)\times\gamma_G(s)} &< \frac{(1-\nu)\times|\gamma_G^{*H}|-c^*}{(1-\nu)\times|\gamma_G^{*H}|}; \text{ and} \\ \frac{c^*}{(1-\nu)\times|\gamma_G^{*L}|} &< \frac{\gamma_G(s)-c}{(1-\nu)\times\gamma_G(s)} \end{aligned}$$

is implied, and we have the following:

1. In states $s\in\sigma^{FT}$: if $qk(s) < \frac{c-\nu\times\gamma_G(s)}{(1-\nu)\times\gamma_G(s)}$ then $\tau = FT$ and the DSB is not invoked; if $qk(s)\in[\frac{c-\nu\times\gamma_G(s)}{(1-\nu)\times\gamma_G(s)}, \frac{(1-\nu)\times|\gamma_G^{*H}|-c^*}{(1-\nu)\times|\gamma_G^{*H}|}]$ then $\tau = P$ and the DSB is invoked under the SSDS; if $qk(s) > \frac{(1-\nu)\times|\gamma_G^{*H}|-c^*}{(1-\nu)\times|\gamma_G^{*H}|}$ then $\tau = P$ and the DSB is not invoked.

2. In states $s\in\sigma^{P}$: if $qk(s) < \frac{c^*}{(1-\nu)\times|\gamma_G^{*L}|}$ then $\tau = P$ and the DSB is not invoked; if $qk(s)\in[\frac{c^*}{(1-\nu)\times|\gamma_G^{*L}|}, \frac{\gamma_G(s)-c}{(1-\nu)\times\gamma_G(s)}]$ then $\tau = P$ and the DSB is invoked under the SSDS; if $qk(s) > \frac{\gamma_G(s)-c}{(1-\nu)\times\gamma_G(s)}$ then $\tau = FT$ and the DSB is not invoked.

Alternatively, if dispute costs are high relative to the dispute stakes for each disputant in the specific sense that

$$\begin{aligned} \frac{c}{(1-\nu)\times\gamma_G(s)} + \frac{c^*}{(1-\nu)\times|\gamma_G^{*H}|} \geq \frac{\gamma_G(s)}{(1-\nu)\times\gamma_G(s)} \quad \text{for } s\in\sigma^{FT} \\ \frac{c}{(1-\nu)\times\gamma_G(s)} + \frac{c^*}{(1-\nu)\times|\gamma_G^{*L}|} \geq \frac{\gamma_G(s)}{(1-\nu)\times\gamma_G(s)} \quad \text{for } s\in\sigma^{P} \end{aligned} \tag{5.5}$$

then

$$\begin{aligned} \frac{c-\nu\times\gamma_G(s)}{(1-\nu)\times\gamma_G(s)} &\geq \frac{(1-\nu)\times|\gamma_G^{*H}|-c^*}{(1-\nu)\times|\gamma_G^{*H}|}; \text{ and} \\ \frac{c^*}{(1-\nu)\times|\gamma_G^{*L}|} &\geq \frac{\gamma_G(s)-c}{(1-\nu)\times\gamma_G(s)} \end{aligned}$$

is implied, and we have the following:

1. In states $s \in \sigma^{FT}$: if $qk(s) < \frac{(1-\nu)\times|\gamma_G^{*H}|-c^*}{(1-\nu)\times|\gamma_G^{*H}|}$ then $\tau = FT$ and the DSB is not invoked; if $qk(s) > \frac{(1-\nu)\times|\gamma_G^{*H}|-c^*}{(1-\nu)\times|\gamma_G^{*H}|}$ then $\tau = P$ and the DSB is not invoked.
2. In states $s \in \sigma^{P}$: if $qk(s) < \frac{\gamma_G(s)-c}{(1-\nu)\times\gamma_G(s)}$ then $\tau = P$ and the DSB is not invoked; if $qk(s) > \frac{\gamma_G(s)-c}{(1-\nu)\times\gamma_G(s)}$ then $\tau = FT$ and the DSB is not invoked.

Finally, two additional cases can arise, corresponding to low dispute costs in σ^{FT} and high dispute costs in σ^{P} or by high dispute costs in σ^{FT} and low dispute costs in σ^{P}, as defined by the relevant conditions in (5.4) and (5.5). These two additional cases are characterized by equilibrium behavior corresponding to the relevant conditions laid out under the first two cases.

Notice that, as before, for the low-relative-dispute-cost case defined by (5.4), there will be disputes in equilibrium for a middle range of DSB accuracy, while there are no equilibrium disputes for the high-relative-dispute-cost case defined by (5.5). For this reason, we will focus henceforth on the low-relative-dispute-cost case defined by (5.4), and simply note here that the qualitative nature of our results hold also in the remaining high-relative-dispute-cost case.

We can write down the expected efficiency loss associated with the SSDS in combination with the vague contract and prospective damages, which we refer to as the *SSDS institution with prospective damages* and denote by V_{SSDS}^{PRO}, relative to the first-best outcome. For the low-relative-dispute-cost case defined by (5.4), this loss is given by:

$$\begin{aligned} L(V_{SSDS}^{PRO}) &= \sum_{s\in\ddot{\sigma}_2^{FT}} p(s)\{[\nu+(1-\nu)\times qk(s)]|\Gamma(s)|+[c+c^*]\} \\ &\quad + \sum_{s\in\ddot{\sigma}_2^{P}} p(s)\{[(1-\nu)\times qk(s)]|\Gamma(s)|+[c+c^*]\} \\ &\quad \sum_{s\in\ddot{\sigma}_3^{FT}\cup\ddot{\sigma}_3^{P}} p(s)|\Gamma(s)|. \end{aligned} \tag{5.6}$$

Here, $\ddot{\sigma}_2^{FT}$ denotes the set of states for which FT is efficient, the importing government chooses P, and the exporting government files a complaint (i.e., s such that $s \in \sigma^{FT}$ and $qk(s) \in$

$[\frac{c-\nu\times\gamma_G(s)}{(1-\nu)\times\gamma_G(s)}, \frac{(1-\nu)\times|\gamma_G^{*H}|-c^*}{(1-\nu)\times|\gamma_G^{*H}|}])$. Similarly, $\ddot{\sigma}_2^P$ denotes the set of states for which P is efficient, the importing government chooses P, and the exporting government files a complaint (i.e., s such that $s \in \sigma^P$ and $qk(s) \in [\frac{c^*}{(1-\nu)\times|\gamma_G^{*L}|}, \frac{\gamma_G(s)-c}{(1-\nu)\times\gamma_G(s)}])$. And finally, $\ddot{\sigma}_3^{FT}$ denotes the set of states for which FT is efficient, the importing government chooses P, and the exporting government does not file a complaint (i.e., s such that $s \in \sigma^{FT}$ and $qk(s) > \frac{(1-\nu)\times|\gamma_G^{*H}|-c^*}{(1-\nu)\times|\gamma_G^{*H}|}$), while $\ddot{\sigma}_3^P$ denotes the set of states for which P is efficient, the importing government chooses FT, and the exporting government does not file a complaint (i.e., s such that $s \in \sigma^P$ and $qk(s) > \frac{\gamma_G(s)-c}{(1-\nu)\times\gamma_G(s)}$).

Notice that, relative to (5.6), the right-hand side of (5.3) reflects four differences associated with the introduction of retrospective damages. First, for some states in σ^{FT} the requirement to pay retrospective damages will induce the importer government to select FT rather than selecting P and facing a court filing; this is because for these states the introduction of retrospective damages eliminates the ability of the importer government to "get away with protection, at least for a while, without any consequences." Second, for some states in σ^{FT} the addition of retrospective damage payments helps induce the exporter government to file against P when in the absence of such damage payments the exporter government would not find filing worth the cost. And the analogous differences can occur in σ^P. That is, for some states in σ^P the addition of retrospective damage payments induces the exporter government to file against P when in the absence of such damage payments the exporter government would not find filing worth the cost; and for some states in σ^P the requirement to pay retrospective damages will induce the importer government to select FT rather than selecting P and facing a court filing.

The comparison between the V_{SSDS}^{RETRO} and V_{SSDS}^{PRO} institutions can be made by comparing their respective losses relative to the first best. To facilitate this comparison, we define the sets

$$\begin{aligned}
\breve{\Delta}_A^{FT} &\equiv \{s \in \sigma^{FT} \mid \frac{c-\nu\times\gamma_G(s)}{(1-\nu)\times\gamma_G(s)} < qk(s) < \frac{[c-\nu\times\gamma_G(s)]+\nu\times|\gamma_G^{*H}|}{[(1-\nu)\times\gamma_G(s)]+\nu\times|\gamma_G^{*H}|}\} \qquad (5.7)\\
\breve{\Delta}_B^{FT} &\equiv \{s \in \sigma^{FT} \mid \frac{[|\gamma_G^{*H}|-c^*]-\nu\times|\gamma_G^{*H}|}{|\gamma_G^{*H}|-\nu\times|\gamma_G^{*H}|} < qk(s) < \frac{|\gamma_G^{*H}|-c^*}{|\gamma_G^{*H}|}\}\\
\breve{\Delta}_A^{P} &\equiv \{s \in \sigma^{P} \mid \frac{c^*}{[(1-\nu)\times|\gamma_G^{*L}|]+\nu\times|\gamma_G^{*H}|} < qk(s) < \frac{c^*}{(1-\nu)|\gamma_G^{*L}|}\}\\
\breve{\Delta}_B^{P} &\equiv \{s \in \sigma^{P} \mid \frac{\gamma_G(s)-c}{[(1-\nu)\times\gamma_G(s)]+\nu\times|\gamma_G^{*H}|} < qk(s) < \frac{\gamma_G(s)-c}{(1-\nu)\times\gamma_G(s)}\}.
\end{aligned}$$

These sets embody the four changes in the switch from prospective to retrospective damages as highlighted just above. Making use of the sets defined in (5.7), we can now write

$$
\begin{aligned}
L(V_{SSDS}^{RETRO}) - L(V_{SSDS}^{PRO}) \;=\; & -\sum_{s\in\breve{\Delta}_A^{FT}} p(s)\{[\nu+(1-\nu)\times qk(s)]\times|\Gamma(s)|+[c+c^*]\}+ \quad (5.8)\\
& \sum_{s\in\breve{\Delta}_B^{FT}} p(s)\{[\nu+(1-\nu)\times qk(s)]\times|\Gamma(s)|+[c+c^*]-|\Gamma(s)|\}\\
& \sum_{s\in\breve{\Delta}_A^{P}} p(s)\{[(1-\nu)\times qk(s)]\times|\Gamma(s)|+[c+c^*]\}+\\
& \sum_{s\in\breve{\Delta}_B^{P}} p(s)\{|\Gamma(s)|-([(1-\nu)\times qk(s)]\times|\Gamma(s)|+[c+c^*])\}.
\end{aligned}
$$

The first term on the right-hand side of (5.8) is negative, reflecting the gain in joint government surplus that occurs as we switch from V_{SSDS}^{PRO} to V_{SSDS}^{RETRO} due to the states in σ^{FT} where the choice $\tau = P$ was made and led to a filing under the V_{SSDS}^{PRO} institution, but where the threat of a filing under retrospective damages leads to the choice of $\tau = FT$ under V_{SSDS}^{RETRO}. This term argues for retrospective damages. The second term reflects the change in joint government surplus that occurs as we switch from V_{SSDS}^{PRO} to V_{SSDS}^{RETRO} due to the states in σ^{FT} where the choice $\tau = P$ was unchallenged under the V_{SSDS}^{PRO} institution but leads to a court filing under V_{SSDS}^{RETRO}; this term is positive provided that $qk(s) > \frac{(1-\nu)\times|\gamma_G^{*H}|-c^*}{(1-\nu)\times|\gamma_G^{*H}|}$, which is guaranteed in the set $\breve{\Delta}_B^{FT}$. This second term therefore argues for prospective damages. The third term is also positive, and reflects the loss in joint government surplus that occurs as we switch from V_{SSDS}^{PRO} to V_{SSDS}^{RETRO} due to the states in σ^{P} where the choice $\tau = P$ was unchallenged under the V_{SSDS}^{PRO} institution but leads to a court filing under V_{SSDS}^{RETRO}. Like the second term on the right-hand side of (5.8), this third term argues for prospective damages. And the fourth term reflects the change in joint government surplus that occurs as we switch from V_{SSDS}^{PRO} to V_{SSDS}^{RETRO} due to the states in σ^{P} where the choice $\tau = P$ led to a court filing under the V_{SSDS}^{PRO} institution, but where the threat of a court filing under retrospective damages leads to a choice of $\tau = FT$; this term can be of either sign, but must be negative if court quality is sufficiently low and under this condition would then argue for retrospective damages.[20]

Hence, according to (5.8), whether retrospective or rather prospective damages are warranted in a trade agreement comes down to which of the terms on the right-hand side of (5.8)

[20]Intuitively, for a given state s if court quality is sufficiently low in the specific sense that $qk(s)$ approaches $\frac{\gamma_G(s)-c}{(1-\nu)\times\gamma_G(s)}$ from below and hence the upper boundary of the set $\breve{\Delta}_B^P$, then the importer government will verge on indifference between (a) selecting P and facing a court filing and (b) selecting FT and avoiding a court filing, while the exporter government strictly prefers (b), which retrospective damages will induce.

dominates. In this regard, if we appeal to the observation made by Maggi and Staiger (2011) that in the context of trade agreements the plaintiffs normally win (88% of the time in WTO disputes), then this in turn implies through the lens of our model (and theirs) that most disputes in the context of trade agreements occur in σ^{FT} as a result of opportunistic behavior on the part of the importer government; and it then follows that the dominant terms on the right-hand side of (5.8) will be the first and second terms (associated with the sets $\breve{\Delta}_A^{FT}$ and $\breve{\Delta}_B^{FT}$ respectively) in the empirically relevant case. And as Maggi and Staiger observe and as is also true in our model here, a relatively high dispute cost for the foreign exporter government as compared to the home importer government will generate this empirically relevant dispute pattern for trade agreement disputes in the model. But note also that between the first two terms in (5.8), the first term will become more important (the set $\breve{\Delta}_A^{FT}$ will expand) and the second term less important (the set $\breve{\Delta}_B^{FT}$ will contract) as court quality improves (as $qk(s)$ gets smaller beginning from $qk(s) > \frac{(1-\nu)\times|\gamma_G^{*H}|-c^*}{(1-\nu)\times|\gamma_G^{*H}|}$, and more states move into the range for $s \in \sigma^{FT}$ satisfying $qk(s) \in [\frac{c-\nu\times\gamma_G(s)}{(1-\nu)\times\gamma_G(s)}, \frac{(1-\nu)\times|\gamma_G^{*H}|-c^*}{(1-\nu)\times|\gamma_G^{*H}|}]$). We may therefore conclude that if dispute costs for the foreign exporter government are relatively high as compared to dispute costs for the home importer government, and if court quality is high enough, then the first term of (5.8) dominates and retrospective damages are called for, while if court quality does not reach this threshold then the second term dominates and prospective damages will maximize joint surplus.[21]

We summarize with:

Proposition 8. *Provided that court costs for the exporter government c^* are high relative to court costs for the importer government c so that plaintiffs mostly win trade disputes as is the case empirically for trade disputes, an optimal trade agreement will include retrospective damages if court quality is sufficiently high but should include only prospective damages if court quality does not reach this threshold.*

As this proposition indicates, our model suggests that introducing retrospective damages into trade agreements would only be a good thing for the joint surplus of member governments if

[21] Interestingly, if mostly it is the exporter government who acts opportunistically, which would be the case in the model if c is high relative to c^* and which would imply a low success rate for the plaintiff counter to empirical evidence on WTO disputes, then the role of court quality in the case for retrospective damages is reversed: prospective damages would be best for joint surplus if court quality is high enough, and retrospective damages would be called for if court quality does not rise to this level. In Proposition 8, we emphasize only the empirically relevant case for trade agreements.

court quality is sufficiently high.

5.2. Retrospective versus prospective damages in BITs

We next consider the issue of retrospective versus prospective damages in BITs, assuming for simplicity as before that BITs are only concerned with the host government making policy commitments to foreign investors (i.e., we abstract from any market access issues associated with foreign investors). We continue to let ν denote the fraction of the period that it takes for the court to complete the judicial process and issue a ruling, and in analogy with our approach to the analysis of retrospective versus prospective damages in trade agreements, we now also assume that the foreign investor's loss from a taking, conditional on investment level I^*, can take one of only two values, $High$ or Low, which we denote by $\gamma_I^{*H}(I^*)$ and $\gamma_I^{*L}(I^*)$ respectively. And we assume that states of the world for which the foreign investor's loss from a taking is $High$ correspond to states in σ^{FT} (that is, we assume that in states of the world where the foreign investor's loss from a taking is $High$ we have $\Gamma(I^*, s) \equiv \gamma_G(I^*, s) + \gamma_I^{*H}(I^*) < 0$); and similarly we assume that states of the world for which the foreign investor's loss from a taking is Low correspond to states in σ^T (that is, we assume that in states of the world where the foreign government's loss from a taking is Low we have $\Gamma(I^*, s) \equiv \gamma_G(I^*, s) + \gamma_I^{*L}(I^*) > 0$). Hence, a court ruling on whether the current state is in σ^{FT} or σ^T is both a ruling on whether a taking or rather free trade is efficient (with the interpretive discussion in notes 7 and 11 still applying) and simultaneously a ruling on the level of damages, if any, that must be paid by the importer government when it chooses to protect. And similar to above, we proceed with our analysis in this subsection under the assumption that the BIT takes the form of a vague contract and an ISDS.

As above, we begin our analysis under the assumption that retrospective damages are to be paid, and then evaluate the alternative where compensation is limited to prospective damages.

Retrospective damages in BITs We start with the ex-post stage, when the FDI level I^* is already sunk. Consider first the foreign investor's filing behavior under the ISDS.[22] The foreign investor files a complaint if and only if $\iota = T$ and the expected benefit to the foreign investor

[22] As before, we assume the existence of a single foreign investor for simplicity, abstracting from any free-rider issues with filing decisions that might arise with multiple investors on the grounds that the free-rider problem should be second-order given the investor-specific remedies provided under ISDS clauses.

of filing exceeds the foreign investor's cost of filing, that is

$$\Pr(\text{DSB ruling is } FT \mid s) \times \{(1-\nu) \times |\gamma_I^*(I^*, s)| + [\nu \times |\gamma_I^{*H}(I^*)|]\} > c^*. \quad \text{(F ISDS RETRO)}$$

Condition (F ISDS RETRO) is the "filing" condition for the foreign investor to invoke the DSB under the ISDS with retrospective damages in response to a policy choice by the host government of $\iota = T$.

Next consider the host government's policy choice. The host government chooses $\iota = T$ if either (F ISDS RETRO) fails – because then the host government can set $\iota = T$ without triggering a dispute – or if (F ISDS RETRO) holds and the expected benefit to the host government from a taking exceeds the cost to the host government of a DSB dispute:

$$\Pr(\text{DSB ruling is } T \mid s) \times \gamma_G(I^*, s) + \Pr(\text{DSB ruling is } FT \mid s) \times \{\nu \times [\gamma_G(I^*, s) - |\gamma_I^{*H}(I^*)|]\} > c. \quad \text{(T ISDS RETRO)}$$

As we noted in the previous subsection, when $\nu = 0$ and a filing generates an instantaneous ruling, the conditions in (F ISDS RETRO) and (T ISDS RETRO) that will determine the behavior of governments in the augmented model of this section collapse to the respective conditions (F ISDS) and (T ISDS) that determined the behavior of governments in the model of section 3. When $\nu > 0$ the question of a role for retrospective damages arises. And it is this role that we now evaluate, by comparing outcomes with retrospective damages (which we now derive) to outcomes without retrospective damages and instead only prospective damages (which we derive subsequently).

Proceeding as before, it is direct to derive the equilibrium (ex-post) actions of the host government and foreign investors for each state. For simplicity and as noted above, in what follows we assume the states where the vague contract is unambiguous are measure zero, so we can focus only on states where the court if invoked must interpret the contract.

There are four cases to consider. If dispute costs are low relative to the dispute stakes for each disputant in the specific sense that

$$\frac{c}{\gamma_G(s) - \nu \times [\gamma_G(s) - |\gamma_I^{*H}(I^*)|]} + \frac{c^*}{|\gamma_I^{*H}(I^*)|} < \frac{\gamma_G(s)}{\gamma_G(s) - \nu \times [\gamma_G(s) - |\gamma_I^{*H}(I^*)|]} \quad \text{for } s \in \sigma^{FT} \tag{5.9}$$

$$\frac{c}{\gamma_G(s) - \nu \times [\gamma_G(s) - |\gamma_I^{*H}(I^*)|]} + \frac{c^*}{|\gamma_I^{*L}(I^*)| + \nu \times [|\gamma_I^{*H}(I^*)| - |\gamma_I^{*L}(I^*)|]} < \frac{\gamma_G(s)}{\gamma_G(s) - \nu \times [\gamma_G(s) - |\gamma_I^{*H}(I^*)|]} \quad \text{for } s \in \sigma^{T}$$

then

$$\begin{aligned} \frac{c-\nu\times[\gamma_G(s)-|\gamma_I^{*H}(I^*)|]}{\gamma_G(s)-\nu\times[\gamma_G(s)-|\gamma_I^{*H}(I^*)|]} &< \frac{|\gamma_I^{*H}(I^*)|-c^*}{|\gamma_I^{*H}(I^*)|} \text{ and} \\ \frac{c^*}{|\gamma_I^{*L}(I^*)|+\nu\times[|\gamma_I^{*H}(I^*)|-|\gamma_I^{*L}(I^*)|]} &< \frac{\gamma_G(s)-c}{\gamma_G(s)-\nu\times[\gamma_G(s)-|\gamma_I^{*H}(I^*)|]} \end{aligned}$$

are implied, and we have the following:

1. In states $s \in \sigma^{FT}$: if $qk(s) < \frac{c-\nu\times[\gamma_G(s)-|\gamma_I^{*H}(I^*)|]}{\gamma_G(s)-\nu\times[\gamma_G(s)-|\gamma_I^{*H}(I^*)|]}$ then $\iota = FT$ and the DSB is not invoked; if $qk(s) \in [\frac{c-\nu\times[\gamma_G(s)-|\gamma_I^{*H}(I^*)|]}{\gamma_G(s)-\nu\times[\gamma_G(s)-|\gamma_I^{*H}(I^*)|]}, \frac{|\gamma_I^{*H}(I^*)|-c^*}{|\gamma_I^{*H}(I^*)|}]$ then $\iota = T$ and the DSB is invoked under the ISDS; if $qk(s) > \frac{|\gamma_I^{*H}(I^*)|-c^*}{|\gamma_I^{*H}(I^*)|}$ then $\iota = T$ and the DSB is not invoked.
2. In states $s \in \sigma^{T}$: if $qk(s) < \frac{c^*}{|\gamma_I^{*L}(I^*)|+\nu\times[|\gamma_I^{*H}(I^*)|-|\gamma_I^{*L}(I^*)|]}$ then $\iota = T$ and the DSB is not invoked; if $qk(s) \in [\frac{c^*}{|\gamma_I^{*L}(I^*)|+\nu\times[|\gamma_I^{*H}(I^*)|-|\gamma_I^{*L}(I^*)|]}, \frac{\gamma_G(s)-c}{\gamma_G(s)-\nu\times[\gamma_G(s)-|\gamma_I^{*H}(I^*)|]}]$ then $\iota = T$ and the DSB is invoked under the SSDS; if $qk(s) > \frac{\gamma_G(s)-c}{\gamma_G(s)-\nu\times[\gamma_G(s)-|\gamma_I^{*H}(I^*)|]}$ then $\iota = FT$ and the DSB is not invoked.

Alternatively, if dispute costs are high relative to the dispute stakes for each disputant in the specific sense that

$$\frac{c}{\gamma_G(s)-\nu\times[\gamma_G(s)-|\gamma_I^{*H}(I^*)|]} + \frac{c^*}{|\gamma_I^{*H}(I^*)|} > \frac{\gamma_G(s)}{\gamma_G(s)-\nu\times[\gamma_G(s)-|\gamma_I^{*H}(I^*)|]} \text{ for } s \in \sigma^{FT} \tag{5.10}$$

$$\frac{c}{\gamma_G(s)-\nu\times[\gamma_G(s)-|\gamma_I^{*H}(I^*)|]} + \frac{c^*}{|\gamma_I^{*L}(I^*)|+\nu\times[|\gamma_I^{*H}(I^*)|-|\gamma_I^{*L}(I^*)|]} > \frac{\gamma_G(s)}{\gamma_G(s)-\nu\times[\gamma_G(s)-|\gamma_I^{*H}(I^*)|]} \text{ for } s \in \sigma^{T}$$

then

$$\begin{aligned} \frac{c-\nu\times[\gamma_G(s)-|\gamma_I^{*H}(I^*)|]}{\gamma_G(s)-\nu\times[\gamma_G(s)-|\gamma_I^{*H}(I^*)|]} &\geq \frac{|\gamma_I^{*H}(I^*)|-c^*}{|\gamma_I^{*H}(I^*)|} \text{ and} \\ \frac{c^*}{|\gamma_I^{*L}(I^*)|+\nu\times[|\gamma_I^{*H}(I^*)|-|\gamma_I^{*L}(I^*)|]} &\geq \frac{\gamma_G(s)-c}{\gamma_G(s)-\nu\times[\gamma_G(s)-|\gamma_I^{*H}(I^*)|]} \end{aligned}$$

is implied, and we have the following:

1. In states $s \in \sigma^{FT}$: if $qk(s) < \frac{|\gamma_I^{*H}(I^*)|-c^*}{|\gamma_I^{*H}(I^*)|}$ then $\tau = FT$ and the DSB is not invoked; if $qk(s) > \frac{|\gamma_I^{*H}(I^*)|-c^*}{|\gamma_I^{*H}(I^*)|}$ then $\tau = P$ and the DSB is not invoked.

2. In states $s \in \sigma^P$: if $qk(s) < \frac{\gamma_G(s)-c}{\gamma_G(s)-\nu\times[\gamma_G(s)-|\gamma_I^{*H}(I^*)|]}$ then $\iota = T$ and the DSB is not invoked; if $qk(s) > \frac{\gamma_G(s)-c}{\gamma_G(s)-\nu\times[\gamma_G(s)-|\gamma_I^{*H}(I^*)|]}$ then $\iota = FT$ and the DSB is not invoked.

Finally, two additional cases can arise, corresponding to low dispute costs in σ^{FT} and high dispute costs in σ^T or by high dispute costs in σ^{FT} and low dispute costs in σ^T, as defined by the relevant conditions in (5.9) and (5.10). These two additional cases are characterized by equilibrium behavior corresponding to the relevant conditions laid out under the first two cases.

Notice that, as before, for the low-relative-dispute-cost case defined by (5.9), there will be disputes in equilibrium for a middle range of DSB accuracy, while there are no equilibrium disputes for the high-relative-dispute-cost case defined by (5.10). For this reason, we will focus henceforth on the low-relative-dispute-cost case defined by (5.9), and simply note here that the qualitative nature of our results hold also in the remaining high-relative-dispute-cost case.

We can write down the expected ex-post efficiency loss associated with the ISDS in combination with the vague contract and retrospective damages, which we refer to as the *ISDS institution with retrospective damages* and denote by V_{ISDS}^{RETRO}, relative to the first-best outcome. For the low-relative-dispute-cost case defined by (5.9), this loss is given by:

$$\begin{aligned} L(V_{ISDS}^{RETRO}, I^*) &= \sum_{s\in\check{\sigma}_2^{FT}} p(s)\{[\nu + (1-\nu)\times qk(s)]|\Gamma(I^*,s)| + [c+c^*]\} \\ &\quad + \sum_{s\in\check{\sigma}_2^{T}} p(s)\{[(1-\nu)\times qk(s)]|\Gamma(I^*,s)| + [c+c^*]\} \\ &\quad + \sum_{s\in\check{\sigma}_3^{FT}\cup\check{\sigma}_3^{T}} p(s)|\Gamma(I^*,s)|. \end{aligned} \tag{5.11}$$

Here, $\check{\sigma}_2^{FT}$ denotes the set of states for which FT is efficient, the host government chooses T, and the foreign investor files a complaint. Similarly, $\check{\sigma}_2^{T}$ denotes the set of states for which T is efficient, the host government chooses T, and the foreign investor files a complaint. And finally, $\check{\sigma}_3^{FT}$ denotes the set of states for which FT is efficient, the host government chooses T, and the foreign investor does not file a complaint, while $\check{\sigma}_3^{T}$ denotes the set of states for which T is efficient, the host government chooses FT, and the foreign investor does not file a complaint.

As (5.11) makes clear, the institution V_{ISDS}^{RETRO} entails three sources of ex-post inefficiencies conditional on I^* relative to the first best: one arising from the probability of DSB error; one arising from the cost of a dispute; and one arising from distorted choices made "in the shadow of the court." The expected ex-post efficiency loss $L(V_{ISDS}^{RETRO}, I^*)$ can then be written as the

sum of three terms. The first two terms capture respectively the first two inefficiencies summed over two sets of states: the set of states $\check{\sigma}_2^{FT}$, where it is the importing government who acts opportunistically and exploits the incompleteness of the contract, thereby triggering a dispute; and the set of states $\check{\sigma}_2^{P}$, where it is the exporting government who acts opportunistically and exploits the incompleteness of the contract, thereby triggering a dispute. The third term captures the third inefficiency summed over two sets of states: the set of states $\check{\sigma}_3^{FT}$, where it is the importing government who acts opportunistically and exploits the incompleteness of the contract with impunity; and the set of states $\check{\sigma}_3^{P}$, where it is the ability of the exporting government to act opportunistically and exploit the incompleteness of the contract that induces the importing government to avoid a dispute with an inefficient policy choice.

We now turn to the ex-ante stage, and determine the level of I^* that is supported by by V_{ISDS}^{RETRO}. Denoting the world interest rate by r^*, we assume as before that foreign investors receive return $r(I^*, s)$ under domestic policy FT in state s, where, due to a fixed factor in the host country (e.g., land), $r(0, s) = \bar{r}(s)$ for some finite $\bar{r}(s) > r^*$, $r(\bar{I}^*(s), s) = 0$ for some finite and positive $\bar{I}^*(s)$, and $r^{/}(I^*, s) < 0$; and we assume that foreign investors receive nothing under domestic policy T. Owing to our assumption in this section that the state-dependence of returns on FDI is binary in nature, we can also denote

$$r(I^*, s) = \begin{cases} r^H(I^*) & \text{if } s \in \sigma^{FT} \\ r^L(I^*) & \text{if } s \in \sigma^{T} \end{cases}$$

Taking account of the possibility of disputes and retrospective damages as enumerated above, and focusing on the range of I^* satisfying (5.9), the expected return earned by foreign investors who invest the level I^* in the host market in the presence of the ISDS institution with retrospective damages V_{ISDS}^{RETRO} is given by

$$\begin{aligned} \rho^*_{V_{ISDS}^{RETRO}}(I^*) \equiv & \sum_{s \epsilon \check{\sigma}_1^{FT}(I^*)} p(s) \times r^H(I^*) + \sum_{s \epsilon \check{\sigma}_2^{FT}(I^*)} p(s)\{[1 - qk(s)] \times r^H(I^*) - \frac{c^*}{I^*}\} \qquad (5.12) \\ & + \sum_{s \epsilon \check{\sigma}_1^{T}(I^*)} p(s) \times 0 + \sum_{s \epsilon \check{\sigma}_2^{T}(I^*)} p(s)\{qk(s) \times [(1-v) r^L(I^*) + \nu r^H(I^*)] - \frac{c^*}{I^*}\} \\ & + \sum_{s \epsilon \check{\sigma}_3^{FT}(I^*)} p(s) \times 0 + \sum_{s \epsilon \check{\sigma}_3^{T}(I^*)} p(s) \times r^L(I^*) \end{aligned}$$

where $\check{\sigma}_1^{FT}(I^*)$ is the set of states for which FT is efficient, the importing government chooses FT and the DSB is not invoked, $\check{\sigma}_1^{T}(I^*)$ is the set of states for which T is efficient, the importing government chooses T and the DSB is not invoked (i.e., s such that $s \in \sigma^T$ and $qk(s) < \frac{c^*}{|\gamma_I^*(I^*,s)|}$),

and where $\check{\sigma}_2^{FT}(I^*)$, $\check{\sigma}_2^{T}(I^*)$, $\check{\sigma}_3^{FT}(I^*)$ and $\check{\sigma}_3^{T}(I^*)$ are as defined just above. Recall that $r(I^*, s)$ is equal to $|\gamma_I^*(I^*, s)|/I^*$, implying that the last term in the second line of (5.12) is positive.

Comparing the first best expected return schedule $\rho_{FB}^*(I^*)$ defined in (4.4) to $\rho_{V_{ISDS}^{RETRO}}^*(I^*)$ yields

$$\begin{aligned}\rho_{V_{ISDS}^{RETRO}}^*(I^*) - \rho_{FB}^*(I^*) \;=\; & -\sum_{s\epsilon\check{\sigma}_2^{FT}(I^*)} p(s)\{qk(s)) \times r^H(I^*) + \frac{c^*}{I^*}\} \\ & + \sum_{s\epsilon\check{\sigma}_2^{T}(I^*)} p(s)\{qk(s) \times [(1-v)r^L(I^*) + \nu r^H(I^*)] - \frac{c^*}{I^*}\} \\ & - \sum_{s\epsilon\check{\sigma}_3^{FT}(I^*)} p(s) \times r^H(I^*) + \sum_{s\epsilon\check{\sigma}_3^{T}(I^*)} p(s) \times r^L(I^*).\end{aligned} \tag{5.13}$$

As (5.13) demonstrates, returns to FDI under the ISDS institution V_{ISDS}^{RETRO} can be either too low or too high relative to the first best depending on whether the right-hand side of (5.13) is dominated by the first and third terms or rather the second and fourth terms (recall that the second term on the right-hand side of (5.13) is positive); that is, depending on whether the host country or rather foreign investors are most able to exploit the incompleteness of the contract and act opportunistically within the limits allowed by this incompleteness.

Prospective damages in BITs We next suppose that retrospective damages are not provided for in the ISDS institution, and only prospective damages are allowed. Again we start with the ex-post stage, when the FDI level I^* is already sunk.

Consider first the foreign investor's filing behavior under the ISDS. The foreign investor files a complaint if and only if $\iota = T$ and the expected benefit to the foreign investor of filing exceeds the foreign investor's cost of filing, that is

$$\Pr(\text{DSB ruling is } FT \mid s) \times \{(1-\nu) \times |\gamma_I^*(I^*, s)|]\} > c^*. \tag{F ISDS PRO}$$

Condition (F ISDS PRO) is the "filing" condition for the foreign investor to invoke the DSB under the ISDS with prospective damages in response to a policy choice by the host government of $\iota = T$.

Next consider the host government's policy choice. The host government chooses $\iota = T$ if either (F ISDS PRO) fails – because then the host government can set $\iota = T$ without triggering a dispute – or if (F ISDS PRO) holds and the expected benefit to the host government from a

taking exceeds the cost to the host government of a DSB dispute:

$$\Pr(\text{DSB ruling is } T \mid s) \times \gamma_G(I^*, s) + \Pr(\text{DSB ruling is } FT \mid s) \times [\nu \times \gamma_G(I^*, s)] > c. \tag{T ISDS PRO}$$

Proceeding as before, it is direct to derive the equilibrium (ex-post) actions of the host government and foreign investors for each state. For simplicity and as noted above, in what follows we assume the states where the vague contract is unambiguous are measure zero, so we can focus only on states where the court if invoked must interpret the contract.

As before, there are four cases to consider. If dispute costs are low relative to the dispute stakes for each disputant in the specific sense that

$$\begin{aligned} \frac{c}{(1-\nu)\times\gamma_G(s)} + \frac{c^*}{(1-\nu)\times|\gamma_I^{*H}(I^*)|} &< \frac{\gamma_G(s)}{(1-\nu)\times\gamma_G(s)} \quad \text{for } s \in \sigma^{FT} \\ \frac{c}{(1-\nu)\times\gamma_G(s)} + \frac{c^*}{(1-\nu)\times|\gamma_I^{*L}(I^*)|} &< \frac{\gamma_G(s)}{(1-\nu)\times\gamma_G(s)} \quad \text{for } s \in \sigma^{T} \end{aligned} \tag{5.14}$$

then

$$\begin{aligned} \frac{c-\nu\times\gamma_G(s)}{(1-\nu)\times\gamma_G(s)} &< \frac{(1-\nu)\times|\gamma_I^{*H}(I^*)|-c^*}{(1-\nu)\times|\gamma_I^{*H}(I^*)|} \quad \text{and} \\ \frac{c^*}{(1-\nu)\times|\gamma_I^{*L}(I^*)|} &< \frac{\gamma_G(s)-c}{(1-\nu)\times\gamma_G(s)} \end{aligned}$$

are implied, and we have the following:

1. In states $s \in \sigma^{FT}$: if $qk(s) < \frac{c-\nu\times\gamma_G(s)}{(1-\nu)\times\gamma_G(s)}$ then $\iota = FT$ and the DSB is not invoked; if $qk(s) \in [\frac{c-\nu\times\gamma_G(s)}{(1-\nu)\times\gamma_G(s)}, \frac{(1-\nu)\times|\gamma_I^{*H}(I^*)|-c^*}{(1-\nu)\times|\gamma_I^{*H}(I^*)|}]$ then $\iota = T$ and the DSB is invoked under the ISDS; if $qk(s) > \frac{(1-\nu)\times|\gamma_I^{*H}(I^*)|-c^*}{(1-\nu)\times|\gamma_I^{*H}(I^*)|}$ then $\iota = T$ and the DSB is not invoked.

2. In states $s \in \sigma^{T}$: if $qk(s) < \frac{c^*}{(1-\nu)\times|\gamma_I^{*L}(I^*)|}$ then $\iota = T$ and the DSB is not invoked; if $qk(s) \in [\frac{c^*}{(1-\nu)\times|\gamma_I^{*L}(I^*)|}, \frac{\gamma_G(s)-c}{(1-\nu)\times\gamma_G(s)}]$ then $\iota = T$ and the DSB is invoked under the SSDS; if $qk(s) > \frac{\gamma_G(s)-c}{(1-\nu)\times\gamma_G(s)}$ then $\iota = FT$ and the DSB is not invoked.

Alternatively, if dispute costs are high relative to the dispute stakes for each disputant in the specific sense that

$$\frac{c}{(1-\nu)\times\gamma_G(s)} + \frac{c^*}{(1-\nu)\times|\gamma_I^{*H}(I^*)|} > \frac{\gamma_G(s)}{(1-\nu)\times\gamma_G(s)} \quad \text{for } s \in \sigma^{FT}$$

(5.15)

$$\frac{c}{(1-\nu)\times\gamma_G(s)}+\frac{c^*}{(1-\nu)\times|\gamma_I^{*L}(I^*)|}>\frac{\gamma_G(s)}{(1-\nu)\times\gamma_G(s)} \quad \text{for } s\in\sigma^T$$

then

$$\begin{aligned}\frac{c-\nu\times\gamma_G(s)}{(1-\nu)\times\gamma_G(s)} &\geq \frac{(1-\nu)\times|\gamma_I^{*H}(I^*)|-c^*}{(1-\nu)\times|\gamma_I^{*H}(I^*)|} \quad \text{and}\\ \frac{c^*}{(1-\nu)\times|\gamma_I^{*L}(I^*)|} &\geq \frac{\gamma_G(s)-c}{(1-\nu)\times\gamma_G(s)}\end{aligned}$$

is implied, and we have the following:

1. In states $s\in\sigma^{FT}$: if $qk(s)<\frac{(1-\nu)\times|\gamma_I^{*H}(I^*)|-c^*}{(1-\nu)\times|\gamma_I^{*H}(I^*)|}$ then $\iota=FT$ and the DSB is not invoked; if $qk(s)>\frac{(1-\nu)\times|\gamma_I^{*H}(I^*)|-c^*}{(1-\nu)\times|\gamma_I^{*H}(I^*)|}$ then $\iota=T$ and the DSB is not invoked.
2. In states $s\in\sigma^P$: if $qk(s)<\frac{\gamma_G(s)-c}{(1-\nu)\times\gamma_G(s)}$ then $\iota=T$ and the DSB is not invoked; if $qk(s)>\frac{\gamma_G(s)-c}{(1-\nu)\times\gamma_G(s)}$ then $\iota=FT$ and the DSB is not invoked.

Finally, two additional cases can arise, corresponding to low dispute costs in σ^{FT} and high dispute costs in σ^T or by high dispute costs in σ^{FT} and low dispute costs in σ^T, as defined by the relevant conditions in (5.14) and (5.15). These two additional cases are characterized by equilibrium behavior corresponding to the relevant conditions laid out under the first two cases.

Notice that, as before, for the low-relative-dispute-cost case defined by (5.14), there will be disputes in equilibrium for a middle range of DSB accuracy, while there are no equilibrium disputes for the high-relative-dispute-cost case defined by (5.15). For this reason, we will focus henceforth on the low-relative-dispute-cost case defined by (5.14), and simply note here that the qualitative nature of our results hold also in the remaining high-relative-dispute-cost case.

We can write down the expected ex-post efficiency loss associated with the ISDS in combination with the vague contract and prospective damages, which we refer to as the *ISDS institution with prospective damages* and denote by V_{ISDS}^{PRO}, relative to the first-best outcome. For the low-relative-dispute-cost case defined by (5.14), this loss is given by:

$$\begin{aligned}L(V_{ISDS}^{PRO},I^*) &= \sum_{s\in\acute{\sigma}_2^{FT}}p(s)\{[\nu+(1-\nu)\times qk(s)]|\Gamma(I^*,s)|+[c+c^*]\} \\ &\quad+\sum_{s\in\acute{\sigma}_2^{T}}p(s)\{[(1-\nu)\times qk(s)]|\Gamma(I^*,s)|+[c+c^*]\} \\ &\quad+\sum_{s\in\acute{\sigma}_3^{FT}\cup\acute{\sigma}_3^{T}}p(s)|\Gamma(I^*,s)|.\end{aligned} \tag{5.16}$$

Here, $\acute{\sigma}_2^{FT}$ denotes the set of states for which FT is efficient, the host government chooses T, and the foreign investor files a complaint. Similarly, $\acute{\sigma}_2^{T}$ denotes the set of states for which T is efficient, the host government chooses T, and the foreign investor files a complaint. And finally, $\acute{\sigma}_3^{FT}$ denotes the set of states for which FT is efficient, the host government chooses T, and the foreign investor does not file a complaint, while $\breve{\sigma}_3^{T}$ denotes the set of states for which T is efficient, the host government chooses FT, and the foreign investor does not file a complaint.

Notice that, relative to (5.16), the right-hand side of (5.11) reflects four differences associated with the introduction of retrospective damages. First, for some states in σ^{FT} the requirement to pay retrospective damages will induce the host government to select FT rather than selecting T and facing a court filing; this is because for these states the introduction of retrospective damages eliminates the ability of the importer government to "get away with a taking, at least for a while, without any consequences." Second, for some states in σ^{FT} the addition of retrospective damage payments helps induce the foreign investors to file against T when in the absence of such damage payments the foreign investors would not find filing worth the cost. And the analogous differences can occur in σ^{T}. That is, for some states in σ^{T} the addition of retrospective damage payments induces the foreign investors to file against T when in the absence of such damage payments the foreign investors would not find filing worth the cost; and for some states in σ^{T} the requirement to pay retrospective damages will induce the host government to select FT rather than selecting T and facing a court filing.

The ex-post-efficiency comparison between the V_{ISDS}^{RETRO} and V_{ISDS}^{PRO} institutions can be made by comparing their respective losses relative to the first best. To facilitate this comparison, we define the sets

$$
\begin{aligned}
\breve{\Delta}_A^{FT} &\equiv \{s \in \sigma^{FT} \mid \frac{c - \nu \times \gamma_G(s)}{(1-\nu) \times \gamma_G(s)} < qk(s) < \frac{c - \nu \times \gamma_G(s) + \nu \times |\gamma_I^{*H}(I^*)|}{(1-\nu) \times \gamma_G(s) + \nu \times |\gamma_I^{*H}(I^*)|}\} \qquad (5.17)\\
\breve{\Delta}_B^{FT} &\equiv \{s \in \sigma^{FT} \mid \frac{[|\gamma_I^{*H}(I^*)| - c^*] - \nu \times |\gamma_I^{*H}(I^*)|}{|\gamma_I^{*H}(I^*)| - \nu \times |\gamma_I^{*H}(I^*)|} < qk(s) < \frac{|\gamma_I^{*H}(I^*)| - c^*}{|\gamma_I^{*H}(I^*)|}\}\\
\breve{\Delta}_A^{T} &\equiv \{s \in \sigma^{T} \mid \frac{c^*}{[(1-\nu) \times |\gamma_I^{*L}(I^*)|] + \nu \times |\gamma_I^{*H}(I^*)|} < qk(s) < \frac{c^*}{(1-\nu) \times |\gamma_I^{*L}(I^*)|}\}\\
\breve{\Delta}_B^{T} &\equiv \{s \in \sigma^{T} \mid \frac{\gamma_G(s) - c}{[(1-\nu) \times \gamma_G(s)] + \nu \times |\gamma_I^{*H}(I^*)|} < qk(s) < \frac{\gamma_G(s) - c}{(1-\nu) \times \gamma_G(s)}\}.
\end{aligned}
$$

These sets embody the four changes in the switch from prospective to retrospective damages as highlighted just above. Making use of the sets defined in (5.17), we can now write

$$
\begin{aligned}
L(V_{ISDS}^{RETRO}) - L(V_{ISDS}^{PRO}) \;=\; & -\sum_{s\in\check{\Delta}_A^{FT}} p(s)\{[\nu+(1-\nu)\times qk(s)]\times|\Gamma(I^*,s)|+[c+c^*]\}+ \quad (5.18)\\
& \sum_{s\in\check{\Delta}_B^{FT}} p(s)\{[\nu+(1-\nu)\times qk(s)]\times|\Gamma(I^*,s)|+[c+c^*]-|\Gamma(I^*,s)|\}\\
& \sum_{s\in\check{\Delta}_A^{T}} p(s)\{[(1-\nu)\times qk(s)]\times|\Gamma(I^*,s)|+[c+c^*]\}+\\
& \sum_{s\in\check{\Delta}_B^{T}} p(s)\{|\Gamma(I^*,s)|-([(1-\nu)\times qk(s)]\times|\Gamma(I^*,s)|+[c+c^*])\}.
\end{aligned}
$$

In exact analogy with our analysis of trade agreements from the previous subsection, the first term on the right-hand side of (5.18) is negative, the second and third terms are positive, and the fourth term can be of either sign but must be negative if court quality is sufficiently low. Hence, according to (5.18), whether retrospective or rather prospective damages are warranted in a BIT from the perspective of ex-post efficiency comes down to which of the terms on the right-hand side of (5.18) dominates. And arguing as we did in the discussion after Proposition 5 and the lead-up to Corollary 2, we may therefore conclude that if dispute costs for the foreign investors are relatively low as compared to dispute costs for the host government as appears to be the relevant case when win rates in BIT disputes are viewed through the lens of the model, then the first two terms on the right-hand side of (5.18) are dominated by third and fourth terms; and if court quality is high enough, then the third term of (5.18) dominates and prospective damages are called for in a BIT from the perspective of ex-post efficiency, while if court quality does not reach this threshold then the fourth term is negative and dominates, and retrospective damages will be better for ex-post efficiency in this case.

We summarize with

Proposition 9. *Provided that court costs for the foreign investor c^* are low relative to court costs for the host government c so that according to the model defendants mostly win BIT investment disputes as is the case empirically, prospective damages in a BIT will minimize ex-post inefficiencies if court quality is sufficiently high, but retrospective damages will minimize ex-post inefficiencies if court quality does not reach this threshold.*

We now turn to the ex-ante stage, and determine the level of I^* that is supported by V_{ISDS}^{PRO}. Taking account of the possibility of disputes and prospective damages as enumerated above, and

focusing on the range of I^* satisfying (5.14), the expected return earned by foreign investors who invest the level I^* in the host market in the presence of the ISDS institution with prospective damages V_{ISDS}^{PRO} is given by

$$\begin{aligned}\rho^*_{V_{ISDS}^{PRO}}(I^*) \equiv & \sum_{s\epsilon\acute{\sigma}_1^{FT}(I^*)} p(s) \times r^H(I^*) \\ & + \sum_{s\epsilon\acute{\sigma}_2^{FT}(I^*)} p(s)\{[1-qk(s)] \times (1-v) \times r^H(I^*) - \frac{c^*}{I^*}\} \\ & + \sum_{s\epsilon\acute{\sigma}_1^{T}(I^*)} p(s) \times 0 + \sum_{s\epsilon\acute{\sigma}_2^{T}(I^*)} p(s)\{qk(s) \times (1-v) \times r^L(I^*) - \frac{c^*}{I^*}\} \\ & + \sum_{s\epsilon\acute{\sigma}_3^{FT}(I^*)} p(s) \times 0 + \sum_{s\epsilon\acute{\sigma}_3^{T}(I^*)} p(s) \times r^L(I^*)\end{aligned} \tag{5.19}$$

where $\acute{\sigma}_1^{FT}(I^*)$ is the set of states for which FT is efficient, the importing government chooses FT and the DSB is not invoked, $\acute{\sigma}_1^{T}(I^*)$ is the set of states for which T is efficient, the importing government chooses T and the DSB is not invoked, and where $\acute{\sigma}_2^{FT}(I^*)$, $\acute{\sigma}_2^{T}(I^*)$, $\acute{\sigma}_3^{FT}(I^*)$ and $\acute{\sigma}_3^{T}(I^*)$ are as defined just above. Recall that $r(I^*, s)$ is equal to $|\gamma_I^*(I^*, s)|/I^*$, implying that the last term in the second line of (5.19) is positive.

Comparing the first best expected return schedule $\rho^*_{FB}(I^*)$ defined in (4.4) to $\rho^*_{V_{ISDS}^{PRO}}(I^*)$ yields

$$\begin{aligned}\rho^*_{V_{ISDS}^{PRO}}(I^*) - \rho^*_{FB}(I^*) = & - \sum_{s\epsilon\acute{\sigma}_2^{FT}(I^*)} p(s)\{[qk(s) + \nu(1-qk(s))] \times r^H(I^*) + \frac{c^*}{I^*}\} \\ & + \sum_{s\epsilon\acute{\sigma}_2^{T}(I^*)} p(s)\{qk(s) \times (1-v) \times r^L(I^*) - \frac{c^*}{I^*}\} \\ & - \sum_{s\epsilon\acute{\sigma}_3^{FT}(I^*)} p(s) \times r^H(I^*) + \sum_{s\epsilon\acute{\sigma}_3^{T}(I^*)} p(s) \times r^L(I^*).\end{aligned} \tag{5.20}$$

The first and third terms on the right-hand side of (5.20) are negative, while the second and fourth terms are positive. As with the similar expression (4.5) in the previous section, it is direct to verify that the relative sizes of the host government and the foreign investor dispute costs c and c^* are key determinants of the relative sizes of these sets over which these various terms are summed. In particular, as c^* rises and c falls, the sets $\acute{\sigma}_2^{T}(I^*)$ and $\acute{\sigma}_3^{T}(I^*)$ shrink while the sets $\acute{\sigma}_2^{FT}(I^*)$ and $\acute{\sigma}_3^{FT}(I^*)$ grow. Using (5.20), this implies in turn that, all else equal, returns to FDI will be lower than efficient under the BIT ISDS institution with prospective

damages V_{ISDS}^{PRO} when c^* is sufficiently high relative to c, and will be higher than efficient under the BIT ISDS institution with prospective damages V_{ISDS}^{PRO} when c^* is sufficiently low relative to c.

But what is new in (5.20) relative to (4.5) is the role of the ν, the length of delay between filing and a court ruling. It is direct to show from (5.20) that if ν is sufficiently close to 1, we must have $\rho^*_{V_{ISDS}^{PRO}}(I^*) < \rho^*_{FB}(I^*)$ regardless of the relative sizes of c^* and c: this follows because the second term in (5.20) goes to zero and the set $\acute{\sigma}_3^T(I^*)$ vanishes so the fourth term goes to zero as well, leaving only the negative first and third terms.[23] That is, if the delay between filing and a court ruling is sufficiently long, a BIT with prospective damages must lead to under-investment.

We record this in

Proposition 10. *While the ex ante distortions in investment levels under the BIT ISDS institution with prospective damages V_{ISDS}^{PRO} can in general go in either direction, if the delay between filing and a court ruling is sufficiently long, a BIT with prospective damages must lead to under-investment. That is, if ν is sufficiently close to* 1*, we must have $\rho^*_{V_{ISDS}^{PRO}}(I^*) < \rho^*_{FB}(I^*)$.*

We can also calculate the difference in the expected return schedules on FDI under retro-

[23] That we must have $\rho^*_{V_{ISDS}^{PRO}}(I^*) < \rho^*_{FB}(I^*)$ if ν is sufficiently close to 1 can also be easily seen by noting that, under condition (F ISDS PRO) which gives the filing condition in the presence of prospective damages, the foreign investor would never file a complaint if ν is sufficiently close to one, as long as the dispute cost c^* is strictly positive; and hence the BIT would have no impact whatsoever, with the return to FDI remaining at its (inefficiently low) Nash level.

spective and prospective damages. Making use of the sets defined in (5.17), we have

$$\begin{aligned}\rho^*_{V^{RETRO}_{ISDS}}(I^*) - \rho^*_{V^{PRO}_{ISDS}}(I^*) \;=\; & \sum_{s\epsilon\{\check{\sigma}_2^{FT}(I^*)\cap\acute{\sigma}_2^{FT}(I^*)\}} p(s)[1-qk(s)]\{\nu \times r^H(I^*)\} \\ & + \sum_{s\epsilon\{\check{\sigma}_2^{T}(I^*)\cap\acute{\sigma}_2^{T}(I^*)\}} p(s)qk(s)\{\nu \times r^H(I^*)\} \\ & + \sum_{s\epsilon\check{\Delta}_A^{FT}} p(s)\{[1-[1-qk(s)]\times(1-\nu)]\times r^H(I^*) + \frac{c^*}{I^*}\} \\ & + \sum_{s\epsilon\check{\Delta}_B^{FT}} [1-qk(s)]\times r^H(I^*) - \frac{c^*}{I^*}\} \\ & + \sum_{s\epsilon\check{\Delta}_A^{T}} p(s)\{qk(s)\times[(1-\nu)r^L(I^*) + \nu r^H(I^*)] - \frac{c^*}{I^*}\} \\ & + \sum_{s\epsilon\check{\Delta}_B^{T}} p(s)\{[1-qk(s)\times(1-\nu)]\times r^L(I^*) + \frac{c^*}{I^*}\}. \end{aligned} \tag{5.21}$$

The terms on the first two lines of the right-hand side of (5.21) capture the direct impact of the retrospective damage payments in raising the expected return to foreign investors: the first line reflects the set of states in σ^{FT} for which a filing occurs under both retrospective and prospective damages, and the second line reflects the set of states in σ^T for which a filing occurs under both retrospective and prospective damages. The terms on the bottom four lines then correspond to each of the sets defined in (5.17) where, for a given state, host government and/or foreign investor behavior switches when prospective damages are replaced by retrospective damages, and reflect the associated change in expected returns to investment.

All terms on the right-hand side of (5.21) are positive, ensuring not surprisingly that a BIT with retrospective damages leads to a higher expected return on FDI and hence encourages FDI relative to a BIT with prospective damages. We may also observe that, as (5.13) demonstrates, if court quality is sufficiently high the BIT ISDS institution with retrospective damages V^{RETRO}_{ISDS} can deliver first best FDI levels, as for sufficiently high court quality the terms on the right-hand side of (5.13) all go to zero. Putting these observations together with our earlier observation in Proposition 10 that, if the delay between filing and a court ruling is sufficiently long, a BIT with prospective damages must lead to under-investment, we can state the following:

Proposition 11. *From an ex ante (level of FDI) efficiency perspective, the BIT ISDS institution V^{RETRO}_{ISDS} with retrospective damages will out-perform the BIT ISDS institution V^{PRO}_{ISDS}*

with prospective damages if the delay between filing and a court ruling is sufficiently long and court quality is sufficiently high.[24]

The following is then an immediate consequence of Propositions 9 and 11:

Corollary 5. *On the grounds of overall ex ante (level of FDI) and ex post (conditional on the level of FDI) efficiency, and provided that ex-ante FDI distortions are the main problem being addressed by a BIT, the BIT ISDS institution V_{ISDS}^{RETRO} with retrospective damages will out-perform the BIT ISDS institution V_{ISDS}^{PRO} with prospective damages if the delay between filing and a court ruling is sufficiently long and court quality is sufficiently high.*

Throughout this subsection, to evaluate the pros and cons of retrospective versus prospective damages in BITs, we have maintained the assumption that the BIT operates with an ISDS. But when viewed together with Corollary 2, Corollary 5 suggests that the combination of retrospective damages and an SSDS may be a BIT design worth considering. On the other hand, as summarized by Propositions 1 and 8 our results suggests that the current design of trade agreements may be appropriate, in that our model strongly supports state-to-state dispute settlement in trade agreements and indicates that introducing retrospective damages into trade agreements would only be a good thing for the joint surplus of member governments if court quality is sufficiently high.

6. Conclusion [TBA]

7. References [TBA]

[24] The role of the assumption on court quality in Proposition 11 is to ensure that moving from prospective to retrospective damages does not increase the ex ante return on FDI from a level which begins below the first best level to a level which is far above the first best level, similar to the role played by the limit on the magnitude of λ in Proposition 5 (see note 14).

Takeaway on Investor-State Dispute Settlement

- Trade and investment agreements can be about market access and commitment problems
- Market access problems (in either case) are best dealt with SSDS while things are more subtle for commitment problems
- Real-world trade agreements are well-suited to deal with market access problems but not commitment problems and vice versa

New Issues for Trade Agreements

CCER Mini Course Day Five

Robert W. Staiger

Dartmouth

June 2018

Introduction

- There is now an established literature on the economics of international trade agreements
  - successful in illuminated many features of real-world trade agreements
  - focused almost entirely on trade in goods
  - a focus that made sense when most services were non-traded
- But the importance of trade in services has grown rapidly over the past several decades
  - services now at the top of the trade liberalization agenda
- The need for the literature to consider trade-in-services agreements has become more pressing
- Even more obvious: the need to consider what trade agreements can do for climate accords

Introduction

- Focus on
  - *liberalizing services*: "The Economic Structure of International Trade-in-Services Agreements (with Alan Sykes), May 2017
  - *trade agreements and climate accords*: 2018 Frank D. Graham Memorial Lecture Princeton

The Economic Structure of International Trade-in-Services Agreements

Robert W. Staiger and Alan O. Sykes

Dartmouth and Stanford

July 2017

Introduction

- There is now an established literature on the economics of international trade agreements
  - successful in illuminated many features of real-world trade agreements
  - focused almost entirely on trade in goods
  - a focus that made sense when most services were non-traded
- But the importance of trade in services has grown rapidly over the past several decades
  - services now at the top of the trade liberalization agenda
- The need for the literature to consider trade-in-services agreements has become more pressing
- In this paper we take a first step in filling this lacuna

Introduction

- WTO agreements cover both goods trade (GATT) and trade in services (GATS)
- There are striking differences between GATT and GATS
- The broad structure of GATT can be understood from the perspective of the ToT theory
- We show that the broad structure of GATS can also be understood through the lens of the ToT theory
  - but only if this theory is augmented with a set of restrictions on the policies available to govs, reflecting salient features of services trade
- This is the main positive message of our paper

Introduction

- The GATT/WTO has been highly successful in liberalizing goods trade; GATS has been largely unsuccessful in liberalizing services trade
- What explains this difference in success?
- A potential reason: the distinct nature of integration that each agreement has attempted
- Both agreements seek to expand market access,
  - but GATT was designed for "shallow integration"
  - while GATS reflects an orientation towards "deep integration"
- $\Longrightarrow$ GATS raises significant challenges for negotiations seeking to expand market access that do not arise with GATT

Introduction

The pervasiveness of NTBs in the service sector means that trade liberalization in this sector is complex. ... Many trade barriers in the service sector are a side effect of domestic regulations that have legitimate purposes. ... However, these same rules can be manipulated to protect local suppliers. ... A challenge for trade-policy analysis is to isolate the protective effect of regulatory policy from the beneficial effects, and to suggest rules for liberalization that provide the benefits of increased trade while ensuring that other legitimate policy objectives are achieved. (Copeland and Mattoo, 2008).

Introduction

- Our augmented ToT model
  - can help interpret the deep-integration focus of GATS
  - and clarify the underlying problems that a trade-in-services agreement must solve
- An understanding of the underlying problems can inform the consideration of alternative design approaches to solve the problems
- We find that a shallow-integration approach more in line with that taken by GATT might be possible in a trade-in-services agreement
  - thereby sidestepping some of the most contentious issues that may have stymied negotiation progress thus far
- This is the main normative message of our paper

Institutional Background: GATT vs GATS

- *GATT* market access liberalization: tariffication & shallow integration
- $\Longrightarrow$ Concentrate protective measures in the form of tariffs by agreeing to certain across-the-board prohibitions
  - in addition to MFN obligation, which prohibits tariff discrimination across trading partners
  - use of quantitative restrictions prohibited
  - use of domestic taxation/regulation that discriminates against imported goods prohibited by national treatment (NT) obligation
  - further elaboration of NT obligations in WTO TBT/SPS Agreements
- $\Longrightarrow$ Negotiate tariff reductions
  - detailed product-by-product tariff commitments
- $\Longrightarrow$ Market access implications of agreed tariff commitments secured by MFN/NT/TBT/SPS and nonviolation (NV) clause

Institutional Background: GATT vs GATS

- *GATS* market access liberalization: deep integration
- Primarily "Mode 3" services
  - commercial presence in importing nation by a foreign service provider
- $\Longrightarrow$ No concentration of protective measures into any particular form
- $\Longrightarrow$ Other than MFN, no across-the-board prohibitions of any kind
- $\Longrightarrow$ Sector-by-sector negotiations over behind-the-border measures
  - relaxation/removal of quantitative restrictions, ownership restrictions, licensing restrictions
  - even NT obligations
- $\Longrightarrow$ Market access implications of agreed commitments secured by MFN and NV clause, and NT where NT agreed

A Benchmark Model of Services Trade

- A simple partial equilibrium model of trade between two countries
- "Mode 3" service trade
  - service must be produced where it is consumed
  - $\Longrightarrow$ Import tariff/export tax collected at the border not an option
- A market imperfection
  - consumption generates a local "eye sore" negative externality
  - $\Longrightarrow$ Efficiency role for regulatory standards
  - domestic gov imposes a regulatory standard as a condition of entry, r for domestic and ρ for foreign service providers
  - per-unit externality levels $\theta(r)$ and $\theta(\rho)$, θ decreasing and convex
- Demanded only in the domestic country
  - $D = \alpha - P$, P the consumer price of the service in the domestic market

Benchmark Model

- Domestic firms: per-unit cost of compliance/conformity-assessment to meet standard s is $\kappa(s)$ where κ increasing/convex in s

- Foreign firms: domestic gov can invest I at cost $c \cdot I$ to bring foreign-firm cost of meeting standard s down to domestic-firm level
  - per-unit cost to meet standard s is $\kappa^*(s, I) \equiv \kappa(s) + \lambda(I)$, where λ is decreasing/convex in I with $\lambda(0) > 0$ and $\lambda(\infty) \geq 0$
  - separability of $\kappa^*(s, I)$ in s and I ensures NT consistent with efficiency

- Supply of domestic and foreign service providers given respectively by

$$\begin{aligned} S_d &= q_d - \kappa(r) \quad \text{for} \quad q_d \geq \kappa(r) \\ S_f &= q_f - \kappa^*(\rho, I) \quad \text{for} \quad q_f \geq \kappa^*(\rho, I) \end{aligned}$$

  with q_d, q_f the producer prices of the service in the domestic market
  - Note: these are "like products" in the domestic market

Benchmark Model

- In Benchmark Model an expansive list of non-tariff fiscal instruments (in specific terms, tax if positive, subsidy if negative)
  - a nondiscriminatory sales tax t imposed by the domestic gov
  - a discriminatory sales tax or surcharge t_f levied on foreign service providers by the domestic gov
  - a discriminatory sales tax or surcharge t_f^* levied on foreign service providers by the foreign gov
  - later impose more realistic restrictions on instruments as a way to understand reasons for differences between GATT and GATS

- With all taxes set at non-prohibitive levels, the pricing relationships:

$$q_d + t = P = q_f + t_f^* + t + t_f$$

Benchmark Model

- Define the "world" price of the foreign service $q_w \equiv q_f + t_f^*$
- Market clearing $D = S_d + S_f$ implies

$$\tilde{q}_w = \frac{1}{3}[\alpha - 2t_f + t_f^* - t + \kappa(r) + \kappa^*(\rho, I)]$$

- Market-clearing levels of other prices $\tilde{P}$, $\tilde{q}_d$ and $\tilde{q}_f$ then follow
- Market-clearing world price of the "raw" *un*regulated service:

$$\tilde{q}_w^0 \equiv \tilde{q}_w - \kappa^*(\rho, I) = \frac{1}{3}[\alpha - 2t_f + t_f^* - t + \kappa(r) - 2\kappa^*(\rho, I)]$$

- For any ρ and I, a one-to-one correspondence between $\tilde{q}_w$ and $\tilde{q}_w^0$, but we refer to $\tilde{q}_w^0$ rather than $\tilde{q}_w$ as "the terms of trade" in services
- Similarly for the market-clearing foreign producer price of the "raw" *un*regulated service: $\tilde{q}_f^0 \equiv \tilde{q}_f - \kappa^*(\rho, I)$

Benchmark Model

- Domestic welfare (wlog abstract from political economy): CS plus PS plus TR, minus disutility from externality minus investment cost

$$\begin{aligned} W &= CS(\tilde{P}) + PS(r, \tilde{q}_d) + TR(r, \rho, I, \tilde{P}, \tilde{q}_d, \tilde{q}_w^0) \\ &\quad -Z(r, \rho, \tilde{P}, \tilde{q}_d) - c \cdot I \\ &\equiv W(r, \rho, I, \tilde{P}, \tilde{q}_d, \tilde{q}_w^0) \end{aligned}$$

- Foreign welfare: CS plus politically-weighted PS plus TR

$$W^*(\tilde{q}_f^0, \tilde{q}_w^0) = \gamma^* \cdot PS^*(\tilde{q}_f^0) + TR^*(\tilde{q}_f^0, \tilde{q}_w^0)$$

- Note: $W_{\tilde{q}_w^0} < 0$, $W^*_{\tilde{q}_w^0} > 0$ and $W_{\tilde{q}_w^0} + W^*_{\tilde{q}_w^0} = 0$
- Efficient policies maximize joint welfare
- Absent a trade-in-services agreement, Nash policies prevail

Comparing Efficient and Nash Policies

- Only discriminatory sales taxes distorted in Nash (ToT manipulation)

$$\left[\left(-\frac{\partial\theta(r^E)}{\partial r}\right)-\frac{\partial\kappa(r^E)}{\partial r}\right]=0;\quad \left[\left(-\frac{\partial\theta(\rho^E)}{\partial\rho}\right)-\frac{\partial\kappa(\rho^E)}{\partial\rho}\right]=0$$

$$\left[\left(-\frac{\partial\lambda(I^E)}{\partial I}\right)\cdot S_f^E-c\right]=0$$

$$t^E=\theta(r^E);\quad t_f^E+t_f^{*E}=-(\gamma^*-1)\cdot S_f^E$$

$$\begin{aligned}\left[\left(-\frac{\partial\theta(r^N)}{\partial r}\right)-\frac{\partial\kappa(r^N)}{\partial r}\right] &= 0;\quad \left[\left(-\frac{\partial\theta(\rho^N)}{\partial\rho}\right)-\frac{\partial\kappa(\rho^N)}{\partial\rho}\right]=0\\ \left[\left(-\frac{\partial\lambda(I^N)}{\partial I}\right)\cdot S_f^N-c\right] &= 0\\ t^N &= \theta(r^N);\quad t_f^N+t_f^{*N}=-(\gamma^*-1)\cdot S_f^N+\frac{3}{2}S_f^N\end{aligned}$$

A Benchmark Trade-in-Services Agreement

- Benchmark Model suggests a "shallow" focus on liberalizing t_f and t_f^* might have been natural for GATS
  - but as with GATT, an efficient agreement would need additional rules
- To see this, suppose agreement binds $\bar{t}_f = 0$ and $\bar{t}_f^* = -(\gamma^* - 1) \cdot S_f^E$, leaving all other policies unconstrained

$$\left[\left(-\frac{\partial\theta(r^R)}{\partial r}\right) - \frac{\partial\kappa(r^R)}{\partial r}\right] = \frac{1}{2S_d^R}[S_f^R - (\theta(r^R) - \theta(\rho^R))]\frac{\partial\kappa(r^R)}{\partial r}$$

$$\left[\left(-\frac{\partial\theta(\rho^R)}{\partial \rho}\right) - \frac{\partial\kappa(\rho^R)}{\partial \rho}\right] = -\frac{1}{2S_f^R}[S_f^R - (\theta(r^R) - \theta(\rho^R))]\frac{\partial\kappa(\rho^R)}{\partial \rho}$$

$$\left[\left(-\frac{\partial\lambda(I^R)}{\partial I}\right) \cdot S_f^R - c\right] = \frac{1}{2}[S_f^R - (\theta(r^R) - \theta(\rho^R))]\left(-\frac{\partial\lambda(I^R)}{\partial I}\right)$$

$$t^R = \frac{1}{2}[\theta(r^R) + \theta(\rho^R)] + \frac{1}{2}S_f^R$$

- $\Longrightarrow$ $r^R < r^E < \rho^R$, I^R too small, t^R too high

A Benchmark Trade-in-Services Agreement

- Now consider adding some additional across-the-board rules
- First, a *national treatment* (NT) rule applied to regulation – but *not* taxation – implying the restriction $r \geq \rho$
- Suppose agreement binds $\bar{t}_f = 0$ and $\bar{t}_f^* = -(\gamma^* - 1) \cdot S_f^E$, leaving all other policies unconstrained beyond NT

$$\left[\left(-\frac{\partial\theta(r^R)}{\partial r}\right) - \frac{\partial\kappa(r^R)}{\partial r}\right] = 0; \quad \left[\left(-\frac{\partial\theta(\rho^R)}{\partial \rho}\right) - \frac{\partial\kappa(\rho^R)}{\partial \rho}\right] = 0$$

$$\left[\left(-\frac{\partial\lambda(I^R)}{\partial I}\right) \cdot S_f^R - c\right] = \frac{1}{2} S_f^R \cdot \left(-\frac{\partial\lambda(I^R)}{\partial I}\right)$$

$$t^R = \theta(r^R) + \frac{1}{2} S_f^R$$

- $\Longrightarrow$ NT sufficient to prevent distortions of regulatory standards, *independent* of foreign service provider market share

A Benchmark Trade-in-Services Agreement

- Next, a *Technical Barriers to Trade* (TBT) rule: govs are obligated to adopt regulations that are *no more trade restrictive than necessary* to achieve their objectives
  - $\Longrightarrow \left(-\frac{\partial \lambda(I^R)}{\partial I}\right) S_f^R = c$
- Suppose agreement binds $\bar{t}_f = 0$ and $\bar{t}_f^* = -(\gamma^* - 1) \cdot S_f^E$, leaving all other policies unconstrained beyond NT and TBT rules

$$\left[\left(-\frac{\partial \theta(r^R)}{\partial r}\right) - \frac{\partial \kappa(r^R)}{\partial r}\right] = 0; \quad \left[\left(-\frac{\partial \theta(\rho^R)}{\partial \rho}\right) - \frac{\partial \kappa(\rho^R)}{\partial \rho}\right] = 0$$

$$\left[\left(-\frac{\partial \lambda(I^R)}{\partial I}\right) \cdot S_f^R - c\right] = 0$$

$$t^R = \theta(r^R) + \frac{1}{2} S_f^R$$

- $\Longrightarrow$ NT and TBT sufficient to prevent distortions of regulatory standards and investments in reducing costs of compliance and conformity assessment

A Benchmark Trade-in-Services Agreement

- Finally, a *non-violation* (NV) rule whose primary purpose is to dissuade govs from introducing new commercial measures subsequent to negotiations that undercut market access commitments
- Begin at Nash policies where $t_f^N + t_f^{*N} = -(\gamma^* - 1) \cdot S_f^N + \frac{3}{2} S_f^N$ and remaining policy choices satisfy

$$\begin{aligned}
\left[\left(-\frac{\partial\theta(r^N)}{\partial r}\right) - \frac{\partial\kappa(r^N)}{\partial r}\right] &= 0; \quad \left[\left(-\frac{\partial\theta(\rho^N)}{\partial \rho}\right) - \frac{\partial\kappa(\rho^N)}{\partial \rho}\right] = 0 \\
\left[\left(-\frac{\partial\lambda(I^N)}{\partial I}\right) \cdot S_f^N - c\right] &= 0 \\
t^N &= \theta(r^N)
\end{aligned}$$

- Suppose agreement binds $\bar{t}_f = 0$ and $\bar{t}_f^* = -(\gamma^* - 1) \cdot S_f^E$, leaving all other policies unconstrained beyond NT and TBT rules

A Benchmark Trade-in-Services Agreement

- Remaining policy choices satisfy

$$\left[\left(-\frac{\partial\theta(r^R)}{\partial r}\right)-\frac{\partial\kappa(r^R)}{\partial r}\right] = 0; \quad \left[\left(-\frac{\partial\theta(\rho^R)}{\partial \rho}\right)-\frac{\partial\kappa(\rho^R)}{\partial \rho}\right] = 0$$

$$\left[\left(-\frac{\partial\lambda(I^R)}{\partial I}\right)\cdot S_f^R - c\right] = 0$$

$$t^R = \theta(r^R)+\frac{1}{2}S_f^R$$

- NV could prevent change from $t^N=\theta(r^N)$ to $t^R=\theta(r^R)+\frac{1}{2}S_f^R$, and allow the agreement to achieve efficient policies

A Benchmark Trade-in-Services Agreement

- $\therefore$ NT, TBT and NV work in tandem to facilitate shallow integration based on negotiated market access commitments over t_f and t_f^*
  - NT addresses incentives to distort regulatory standards r and ρ that arise once market access commitments over t_f and t_f^* are made
  - TBT addresses incentives to distort compliance-cost-reducing investments I that arise once market access commitments over t_f and t_f^* are made
  - NV prevents the introduction of new "commercial measures" /fiscal instruments (t) from frustrating these market access commitments (plus secondary role wrt changes in r and ρ)
- And with only t_f and t_f^* distorted in Nash, Benchmark Model suggests that a GATT-like shallow integration approach to services trade would have been very natural for govs to pursue
- Why is GATS so different?

The Implications of Limited Service-Sector Policy Options

- Discriminatory domestic sales tax instrument t_f
  - with goods trade, absent NT a discriminatory sales tax could be imposed at the border (tariff by another name)
  - for Mode 3 services trade, a discriminatory sales tax must be imposed at the point of production/consumption of the service
- Limited evidence that imposing higher taxes on foreigners can in some circumstances be feasible in service sector (Hendrix & Zodrow, 2003):
  - "Almost all states tax rentals of tangible personal property...reflecting the popularity of taxes than may be exported to nonresidents..."
- But for the most part, such taxes probably best thought of as unavailable (perhaps for reasons of high transaction costs)
  - introduce this policy constraint into the Benchmark Model

$$t_f \equiv 0 \qquad \text{(Assumption 1)}$$

The Implications of Limited Service-Sector Policy Options

- Note: $t_f = 0$ and $t_f^* = -(\gamma^* - 1) \cdot S_f^E$ still consistent with efficiency
- But Nash now

$$\left[\left(-\frac{\partial\theta(r^N)}{\partial r}\right) - \frac{\partial\kappa(r^N)}{\partial r}\right] = \frac{1}{2S_d^N}[S_f^N - (\theta(r^N) - \theta(\rho^N))]\frac{\partial\kappa(r^N)}{\partial r}$$

$$\left[\left(-\frac{\partial\theta(\rho^N)}{\partial\rho}\right) - \frac{\partial\kappa(\rho^N)}{\partial\rho}\right] = -\frac{1}{2S_f^N}[S_f^N - (\theta(r^N) - \theta(\rho^N))]\frac{\partial\kappa(\rho^N)}{\partial\rho}$$

$$\left[\left(-\frac{\partial\lambda(I^N)}{\partial I}\right) \cdot S_f^N - c\right] = \frac{1}{2}[S_f^N - (\theta(r^N) - \theta(\rho^N))]\left(-\frac{\partial\lambda(I^N)}{\partial I}\right)$$

$$t^N = \frac{1}{2}[\theta(r^N) + \theta(\rho^N)] + \frac{1}{2}S_f^N$$

$$t_f^{*N} = -(\gamma^* - 1)S_f^N + \frac{1}{2}S_f^N$$

The Implications of Limited Service-Sector Policy Options

- Distortions widespread in Nash, shallow approach to service trade liberalization no longer obvious
- But still possible to avoid direct negotiations over standards, *if across-the-board NT, TBT and NV rules introduced first*
- Remaining policy choices satisfy

$$\left[\left(-\frac{\partial\theta(r^R)}{\partial r}\right)-\frac{\partial\kappa(r^R)}{\partial r}\right] = 0; \quad \left[\left(-\frac{\partial\theta(\rho^R)}{\partial \rho}\right)-\frac{\partial\kappa(\rho^R)}{\partial \rho}\right] = 0$$

$$\left[\left(-\frac{\partial\lambda(I^R)}{\partial I}\right)\cdot S_f^R - c\right] = 0$$

$$t^R = \theta(r^R)+\frac{1}{2}S_f^R; \quad t_f^{*N} = -(\gamma^*-1)S_f^N+\frac{1}{2}S_f^N$$

- Bind $\bar{t}=\theta(r^E)$ and $\bar{t}_f^*=-(\gamma^*-1)\cdot S_f^E$
  - NV prevents subsequent changes in r and ρ from undercutting market access commitments

The Implications of Limited Service-Sector Policy Options

- Discriminatory foreign sales tax/subsidy instrument t_f^*
  - foreign gov must be able to administer program of sales tax/subsidies to its service firms within jurisdiction of domestic gov
- Perhaps even less reason to think this policy instrument is available
  - introduce this policy constraint into the Benchmark Model

$$t_f^* \equiv 0 \qquad \text{(Assumption 2)}$$

- For simplicity, relax Assumption 1 so that original efficiency frontier still attainable with $t_f = -(\gamma^* - 1) \cdot S_f^E$ (and $t_f^* \equiv 0$)
- Nash conditions for domestic gov unchanged by Assumption 2, so still possible to avoid direct negotiations over standards
  - bind $\bar{t}_f = -(\gamma^* - 1) \cdot S_f^E$ (and $t_f^* \equiv 0$) and add NT/TBT/NV
- Note: critical role for market power as source of international inefficiency is diminished under Assumption 2

Open Questions

- Can sales taxes be as finely tuned to individual service industries as regulatory standards?
  - if not, the capacity of the NT rule applied to standards for channeling distortions into nondiscriminatory sales taxes is qualified
- Can the concept of "like product" central to the NT rule be reliably applied as a legal matter in the service sector?
  - if not, the utility of a shallow integration approach for services trade will be undermined
- Can govs measure and monitor with reasonable accuracy the changes in import volumes and prices that would be required for the reliable application of the NV rule in the service sector?
  - the fragmentary data on Mode 3 service trade currently available could pose a roadblock to shallow integration for services trade
- Are world prices determined by bargaining between Mode 3 service providers and purchasers rather than market clearing conditions?

Conclusion

- There are striking differences between GATT and GATS
- We show that the broad structure of GATS can be understood through the lens of the ToT theory
  - but only if this theory is augmented with a set of restrictions on the policies available to govs, reflecting salient features of services trade
- The GATT/WTO has been highly successful in liberalizing goods trade; GATS has been largely unsuccessful in liberalizing services trade
- A potential reason: the distinct nature of integration that each agreement has attempted
- We find that a shallow-integration approach more in line with that taken by GATT might be possible in a trade-in-services agreement
  - thereby sidestepping some of the most contentious issues that may have stymied negotiation progress thus far

The Economics of Trade Agreements & the design of Global Climate Accords

Frank D. Graham Memorial Lecture
Princeton University

Robert W. Staiger

Dartmouth

April 19 2018

Introduction

- According to the ToT theory of international trade agreements
  - countries use trade agreements to internalize the international pecuniary (ToT) externalities imposed by their trade policies
  - and thereby escape from a ToT driven Prisoners' Dilemma (Johnson, 1953-54, Grossman and Helpman, 1995, Bagwell and Staiger,1999)

Introduction

- According to the ToT theory of international trade agreements
  - countries use trade agreements to internalize the international pecuniary (ToT) externalities imposed by their trade policies
  - and thereby escape from a ToT driven Prisoners' Dilemma (Johnson, 1953-54, Grossman and Helpman, 1995, Bagwell and Staiger,1999)
- According to the Commitment theory
  - countries use trade agreements to help their govs make policy commitments to their own private sectors (eg, limits to state aid)
  - and thereby solve a domestic commitment problem (Staiger and Tabellini, 1987, Maggi and Rodriguez-Clare, 1998)

Introduction

- For global climate accords, a non-pecuniary international externality is the central problem to address (Barrett, 2003, Nordhaus, 2015)

Introduction

- For global climate accords, a non-pecuniary international externality is the central problem to address (Barrett, 2003, Nordhaus, 2015)
- But there may also be elements of pecuniary (ToT) externalities
  - associated with competitiveness/carbon leakage impacts of unilateral policy intervention (Mattoo and Subramanian, 2013)

Introduction

- For global climate accords, a non-pecuniary international externality is the central problem to address (Barrett, 2003, Nordhaus, 2015)
- But there may also be elements of pecuniary (ToT) externalities
  - associated with competitiveness/carbon leakage impacts of unilateral policy intervention (Mattoo and Subramanian, 2013)
- Plus elements of commitment issues
  - as in the hold-up problem emphasized by Battaglini and Harstad (2016)

Introduction

- For global climate accords, a non-pecuniary international externality is the central problem to address (Barrett, 2003, Nordhaus, 2015)
- But there may also be elements of pecuniary (ToT) externalities
  - associated with competitiveness/carbon leakage impacts of unilateral policy intervention (Mattoo and Subramanian, 2013)
- Plus elements of commitment issues
  - as in the hold-up problem emphasized by Battaglini and Harstad (2016)
- And there may be opportunities for linkage across trade and climate issues (Maggi, 2016)

Introduction

- For global climate accords, a non-pecuniary international externality is the central problem to address (Barrett, 2003, Nordhaus, 2015)
- But there may also be elements of pecuniary (ToT) externalities
  - associated with competitiveness/carbon leakage impacts of unilateral policy intervention (Mattoo and Subramanian, 2013)
- Plus elements of commitment issues
  - as in the hold-up problem emphasized by Battaglini and Harstad (2016)
- And there may be opportunities for linkage across trade and climate issues (Maggi, 2016)
- I will focus here on the problems caused by international externalities
  - and how agreements can be designed to address them

Introduction

- What can the Economics of Trade Agreements teach us about the design of Climate Accords?

Introduction

- What can the Economics of Trade Agreements teach us about the design of Climate Accords?
- In answering this question, I will touch on the following issues:
  - participation
  - workable externality mitigating strategies
  - border tax adjustments
  - enforcement linkage
  - participation linkage
  - negotiation linkage

Designing an international agreement

- An international agreement must generate Pareto gains for the member governments relative to Nash

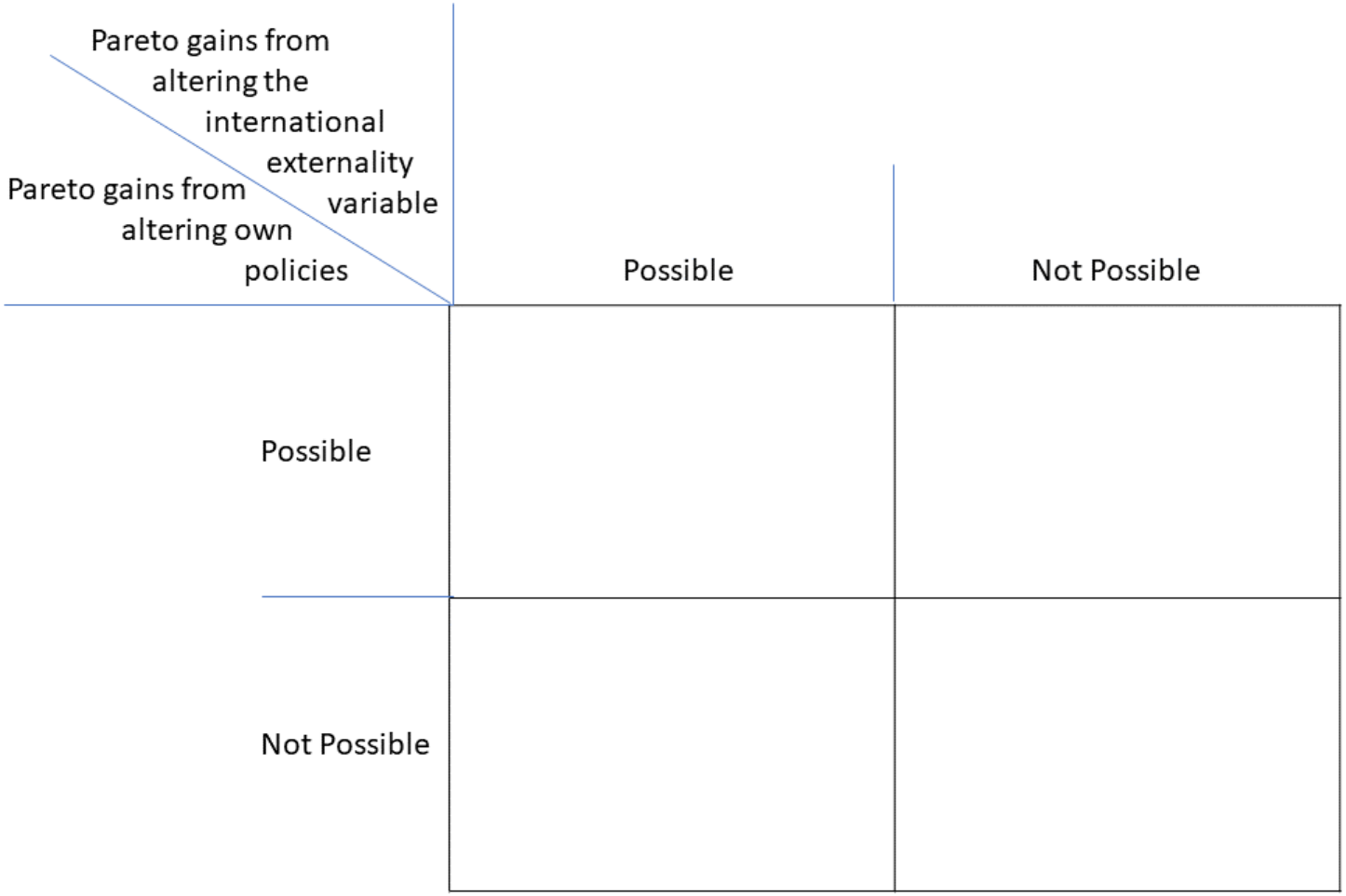
Designing an international agreement

- An international agreement must generate Pareto gains for the member governments relative to Nash
- To inform the design of the agreement, identify the source of the Pareto gains

Designing an international agreement

- An international agreement must generate Pareto gains for the member governments relative to Nash
- To inform the design of the agreement, identify the source of the Pareto gains
- In the case of agreements to address an international externality
  - Pareto gains could come from altering the level of the international externality variable
  - Pareto gains could come from altering own policies away from unilateral best-response

A taxonomy


Pareto gains from altering the international externality variable
Pareto gains from altering own policies
Possible
Not Possible
Possible
Not Possible

The source of gains from a trade agreement

- ToT theory provides simple framework within which to interpret the source of gains from a trade agreement
- Two-good two-country competitive general equilibrium trade model
- Govs use tariffs τ and τ^* to serve objectives

$$W(p(\tau, \widetilde{p}^w), \widetilde{p}^w) \quad \text{and} \quad W^*(p^*(\tau^*, \widetilde{p}^w), \widetilde{p}^w)$$

  - satisfying $W_{\widetilde{p}^w} < 0 < W^*_{\widetilde{p}^w}$
  - $\Longrightarrow$ govs would like to move the international externality variable in opposite directions

The source of gains from a trade agreement

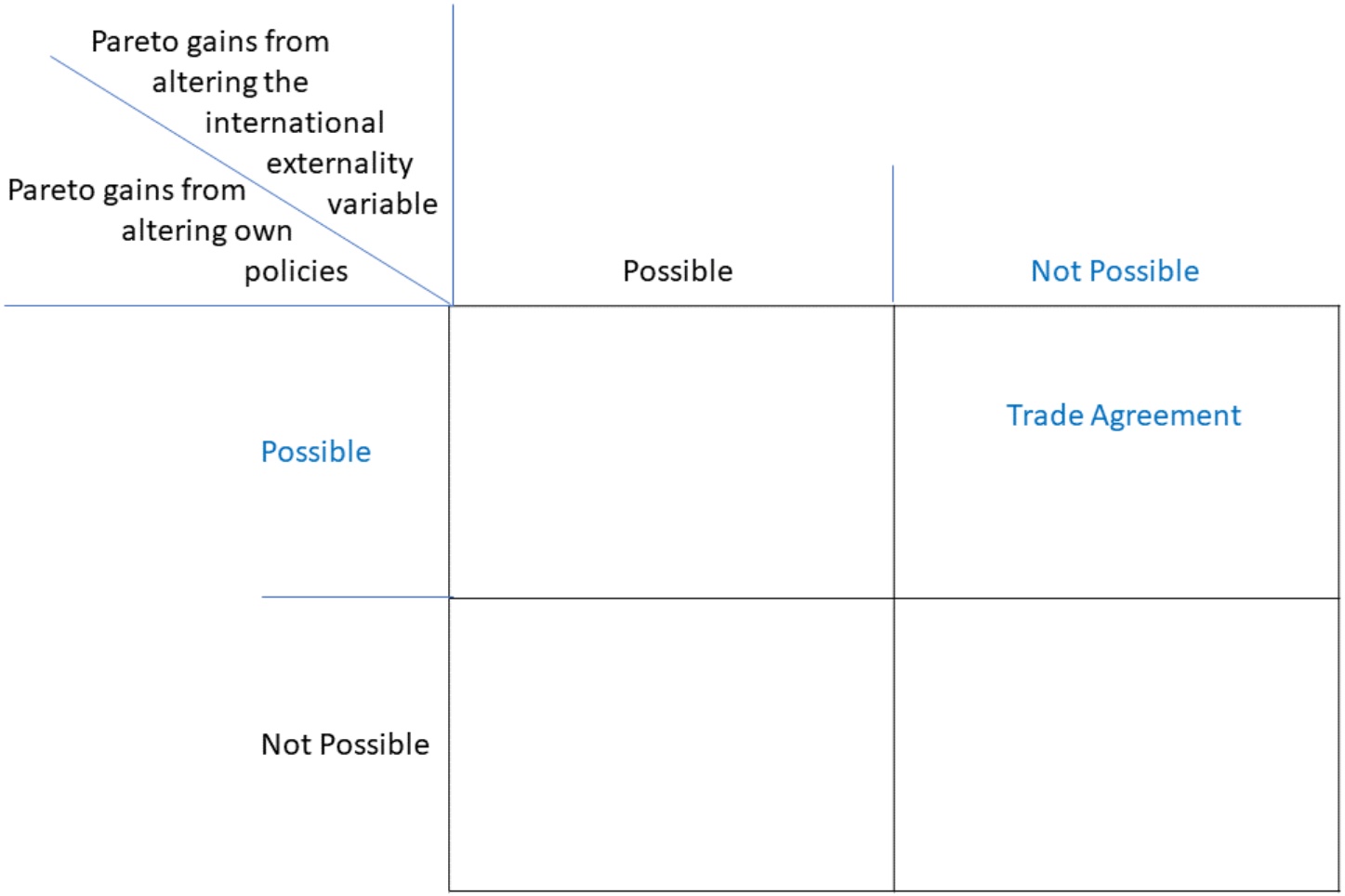
- Nash tariffs satisfy

$$W_p \overset{(+)}{\frac{dp}{d\tau}} + W_{\widetilde{p}^w} \overset{(-)}{\frac{\partial \widetilde{p}^w}{d\tau}} = 0; \qquad W^*_{p^*} \overset{(-)}{\frac{dp^*}{d\tau^*}} + W^*_{\widetilde{p}^w} \overset{(+)}{\frac{\partial \widetilde{p}^w}{d\tau^*}} = 0$$

$$\Longrightarrow \quad W_p < 0 < W^*_{p^*} \text{ at Nash tariff choices}$$

- Pareto gains can be achieved by *freezing* the level of the international externality variable
  - with $\widetilde{p}^w(\overset{(-)}{\tau}, \overset{(+)}{\tau^*})$, gains then come from the reduction in domestic distortions that result from own liberalization
- Changes in the level of the international externality variable cannot generate Pareto gains
  - reflects the international redistribution associated with $\widetilde{p}^w$ movements

The structure of Trade Agreements



The source of gains from a climate accord

- A pair of two-good competitive general equilibrium closed economies
- Govs use taxes t and t^* to serve objectives

$$W(q(t), p(t), C(t) + C^*(t^*)) \text{ and } W^*(q^*(t^*), p^*(t^*), C(t) + C^*(t^*))$$

  - satisfying $W_{[C+C^*]} < 0$ and $W^*_{[C+C^*]} < 0$; $\frac{dC}{dt} < 0$ and $\frac{dC^*}{dt^*} < 0$
  - $\Longrightarrow$ govs would like to move the international externality variable in the same direction

The source of gains from a climate accord

- Nash taxes satisfy $\frac{dW}{dt} = 0$ and $\frac{dW^*}{dt^*} = 0 \implies$

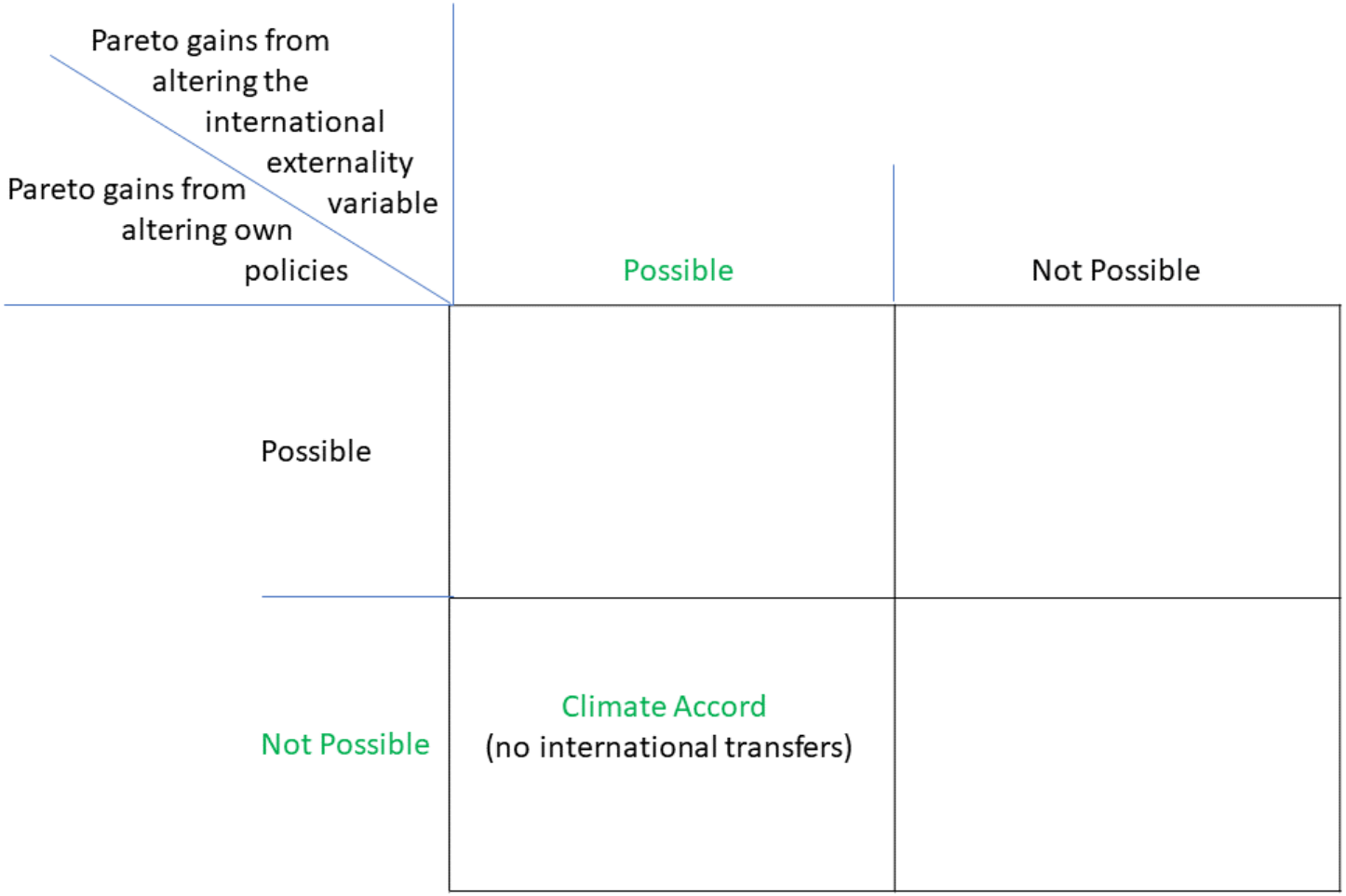
$$\frac{d[W + W^*]}{dt} = \frac{dW^*}{dt} = W^*_{[C+C^*]} \frac{dC}{dt} > 0$$

$$\frac{d[W + W^*]}{dt^*} = \frac{dW}{dt^*} = W_{[C+C^*]} \frac{dC^*}{dt^*} > 0$$

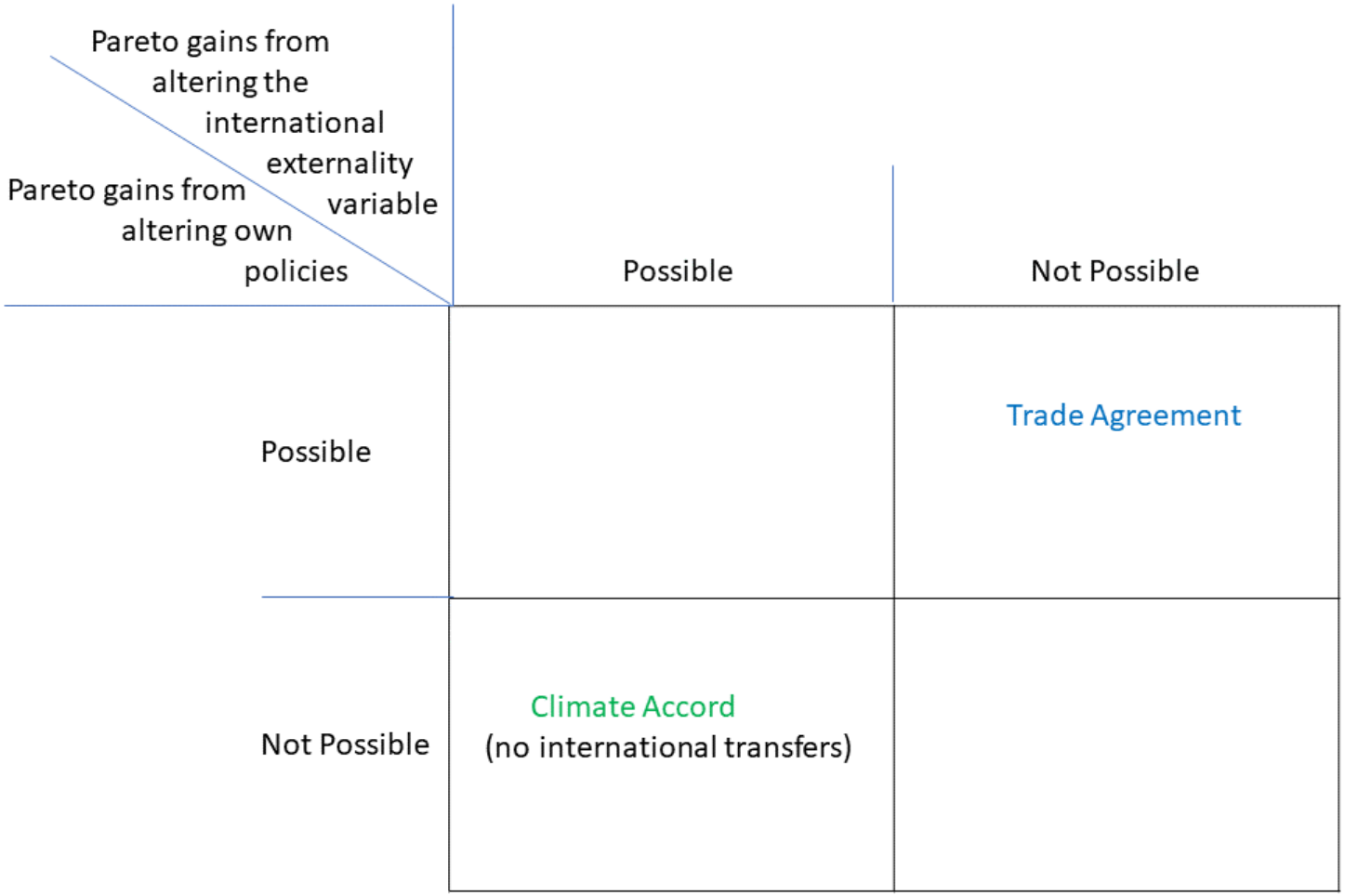
  at Nash tax choices

- Pareto gains come from *altering* the level of the international externality variable
  - reducing global carbon output $C + C^*$
- In the absence of international transfers, no Pareto gains possible from determining which countries alter their policies
  - who undertakes the costly carbon mitigation to reduce $C(t) + C^*(t^*)$

The structure of Climate Accords



The structure of Trade Agreements and Climate Accords



The source of Pareto gains from a trade agreement: changes in own policies

The source of Pareto gains from a climate accord: changes in the level of the international externality variable

Implication

- The goal of a trade agreement
  - *eliminate the influence* of movements in the international externality variable on policy choices
  - an environment that freezes the level of the international externality variable when a country makes its policy choices can achieve this goal

Implication

- The goal of a trade agreement
  - *eliminate the influence* of movements in the international externality variable on policy choices
  - an environment that freezes the level of the international externality variable when a country makes its policy choices can achieve this goal
- The goal of a climate accord
  - policy choices that *internalize the full impact* of movements in the international externality variable
  - an environment that freezes the international externality variable when a country makes its policy choices cannot achieve this goal

Participation

- Why is securing participation a key challenge in global climate accords but less so for trade agreements?

Participation

- Why is securing participation a key challenge in global climate accords but less so for trade agreements?
- Often observed that this is so because tariff discrimination allows non-members to be excluded from the trade liberalization of members
  - hence trade liberalization is not a public good

Participation

- Why is securing participation a key challenge in global climate accords but less so for trade agreements?
- Often observed that this is so because tariff discrimination allows non-members to be excluded from the trade liberalization of members
  - hence trade liberalization is not a public good
- But even in the absence of tariff discrimination, non-members can at most enjoy only *incidental* benefits from a trade agreement

$$W^{**}(p^{**}(\tau^{**}, \widetilde{p}^{w}), \widetilde{p}^{w})$$

versus

$$W^{**}(q^{**}(t^{**}), p^{**}(t^{**}), C(t) + C^{*}(t^{*}) + C^{**}(t^{**}))$$

Remaining questions

- How does the GATT/WTO architecture work to eliminate the influence of movements in $\tilde{p}^w$ on policy choices?
- How does the GATT/WTO architecture work when there is both a trade and a climate problem to solve?

The GATT/WTO architecture

- The two pillars of the GATT/WTO architecture
  - Non-discrimination (MFN)
  - Reciprocity
- How does the GATT/WTO architecture work to eliminate the influence of movements in $\tilde{p}^w$ on policy choices?

The GATT/WTO architecture

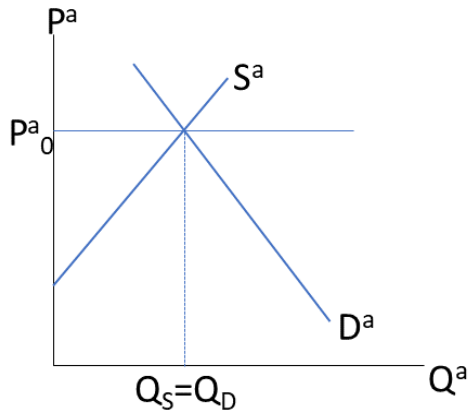
- The two pillars of the GATT/WTO architecture
  - Non-discrimination (MFN)
  - Reciprocity
- How does the GATT/WTO architecture work to eliminate the influence of movements in $\tilde{p}^w$ on policy choices?
- MFN
  - in a multi-country world, MFN keeps the trade policy externality running through $\tilde{p}^w$, as simple as in a 2-country world

The GATT/WTO architecture

- The two pillars of the GATT/WTO architecture
  - Non-discrimination (MFN)
  - Reciprocity
- How does the GATT/WTO architecture work to eliminate the influence of movements in $\tilde{p}^w$ on policy choices?
- MFN
  - in a multi-country world, MFN keeps the trade policy externality running through $\tilde{p}^w$, as simple as in a 2-country world
- Reciprocity
  - defines a measured, *proportionate response* to a country's trade policy changes by its trading partners; can be interpreted as freezing $\tilde{p}^w$
  - a change in trade policies from (τ^0, τ^{*0}) to (τ^1, τ^{*1}) satisfies the principle of reciprocity iff it offers a balance of concessions in that $\tilde{p}^w(0)[M(1) - M(0)] = E(1) - E(0)$

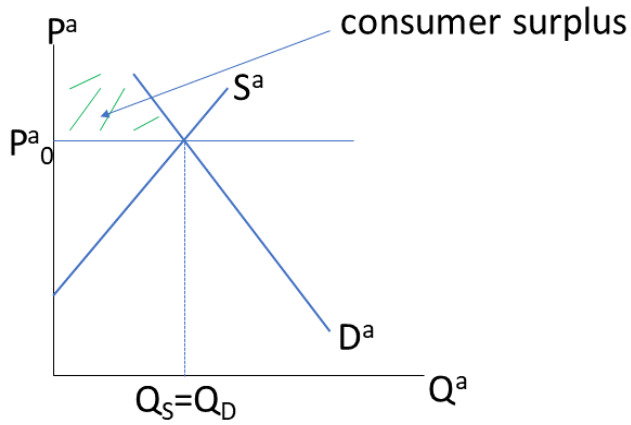
The GATT/WTO solution to the trade agreement problem

- A closed economy



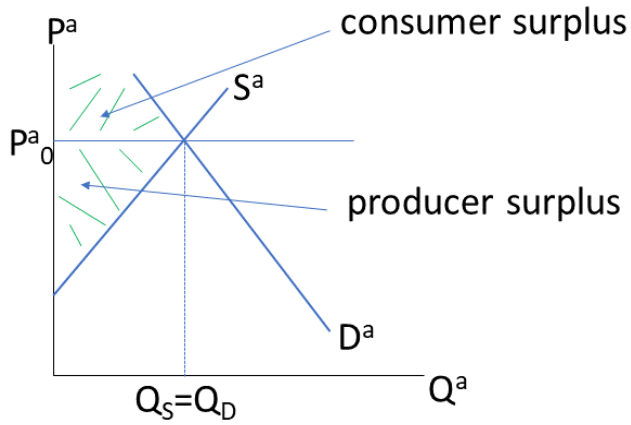
The GATT/WTO solution to the trade agreement problem

- A closed economy



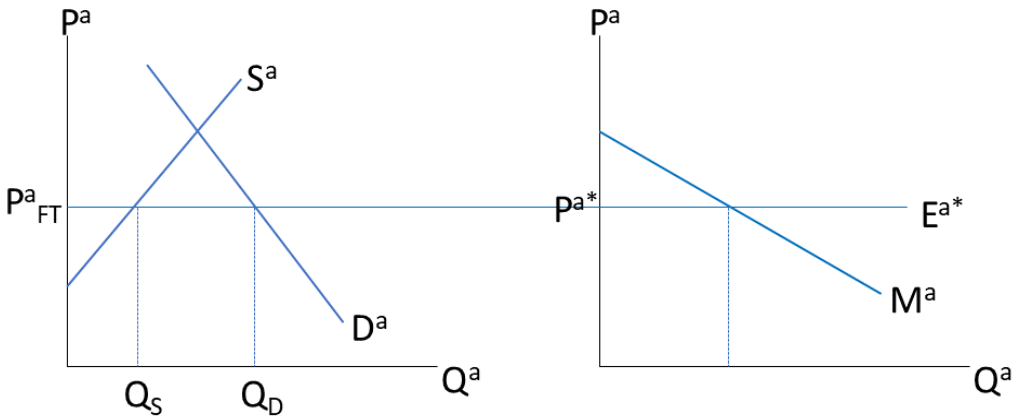
The GATT/WTO solution to the trade agreement problem

- A closed economy



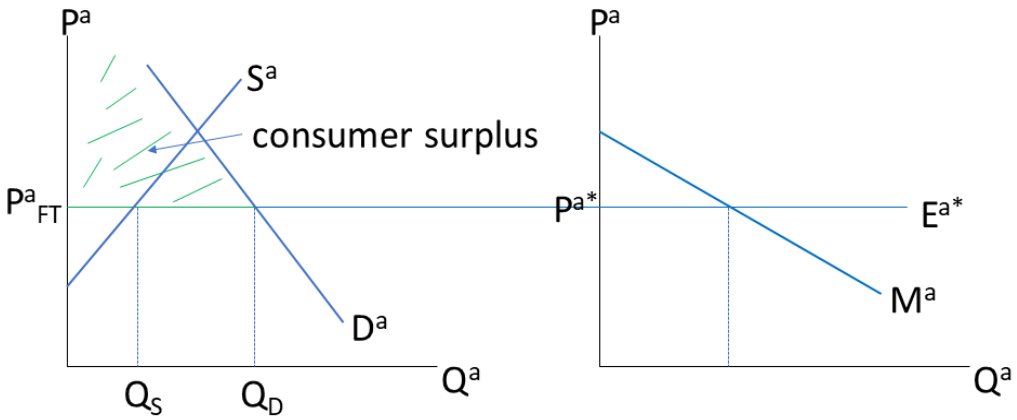
A small open economy

- A small open economy



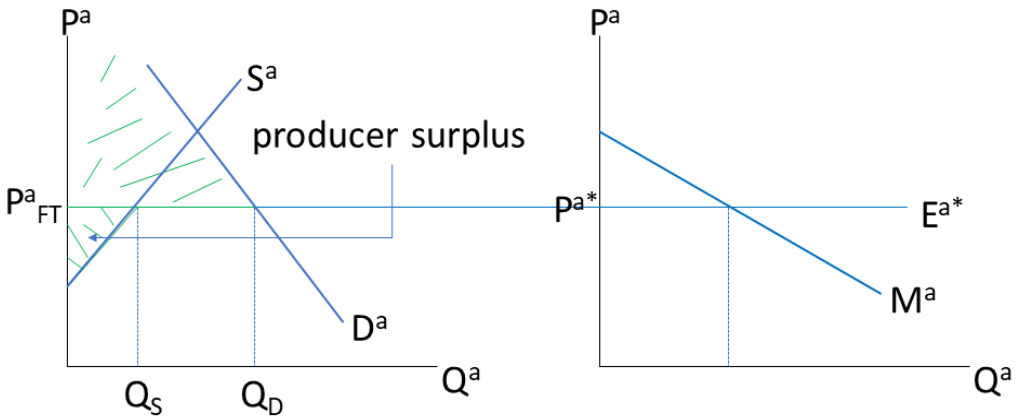
A small open economy

- A small open economy



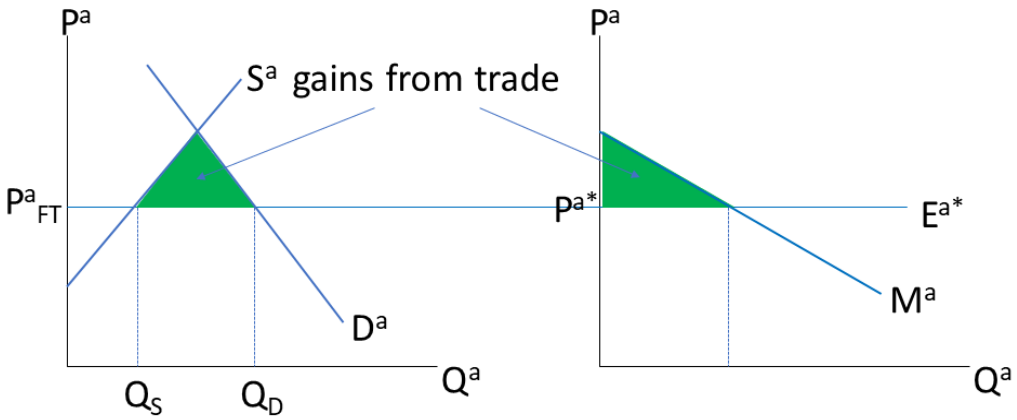
A small open economy

- A small open economy



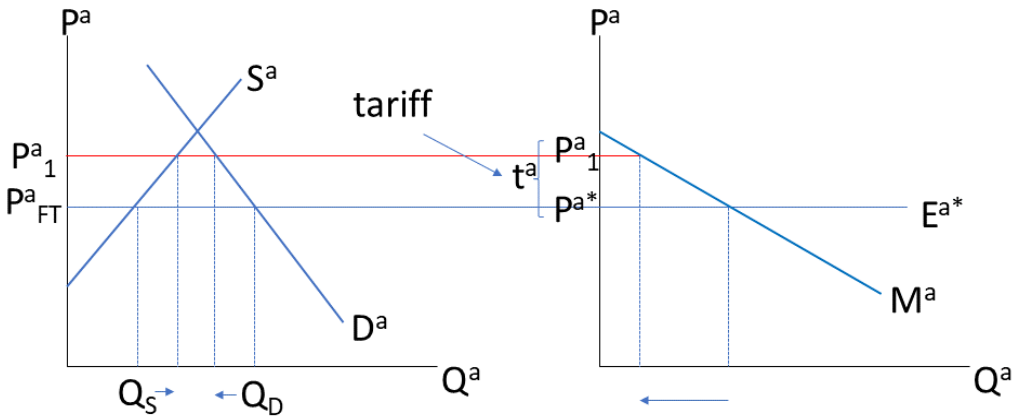
A small open economy

- A small open economy



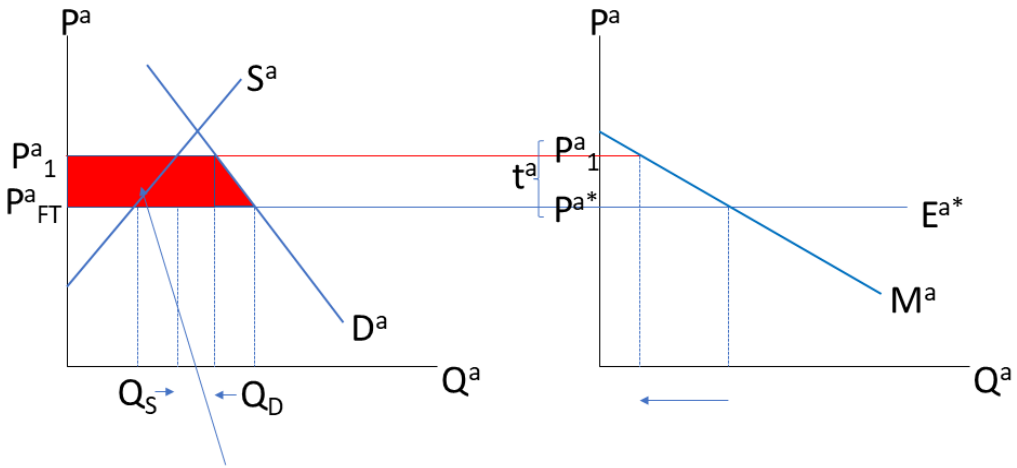
A small country's unilateral tariff choice

- A *small country's* unilateral tariff choice



A small country's unilateral tariff choice

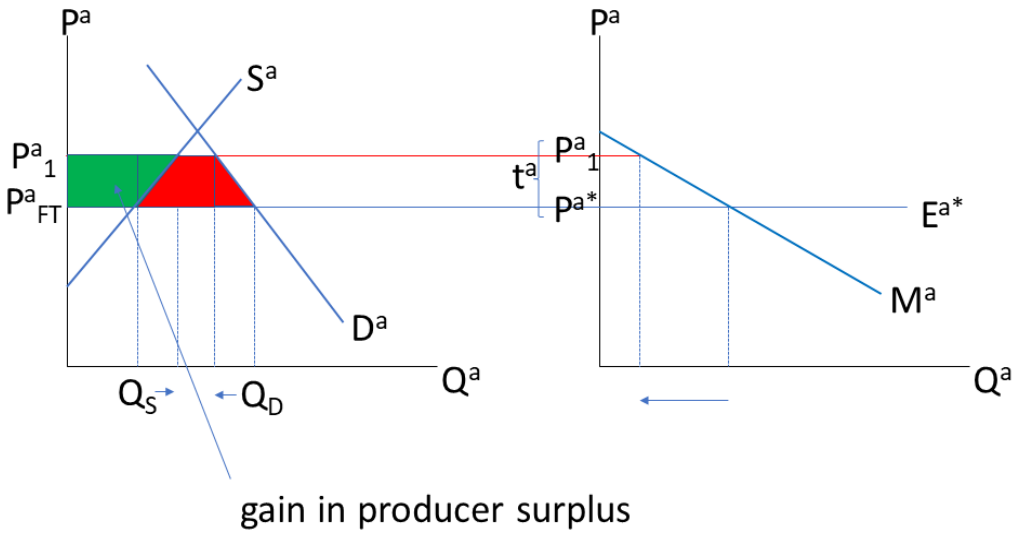
- A *small country's* unilateral tariff choice



Loss of consumer surplus

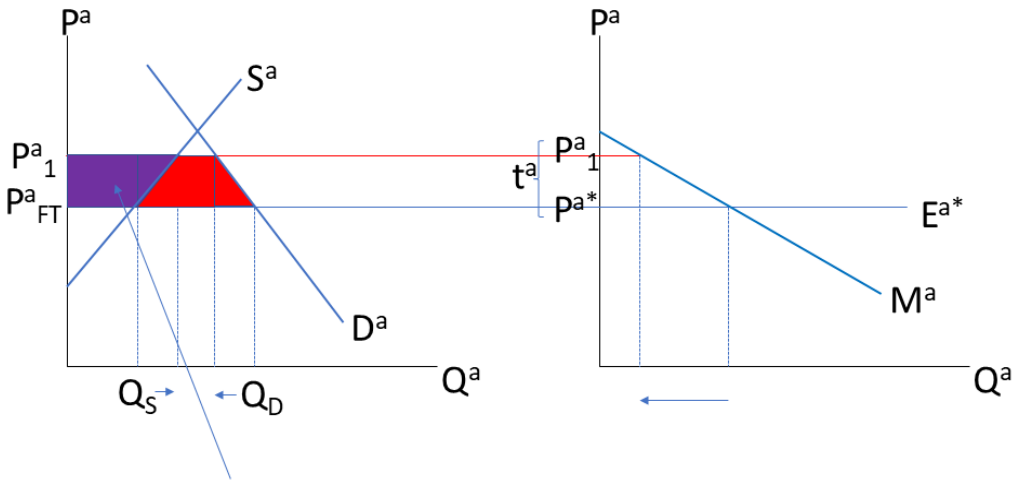
A small country's unilateral tariff choice

- A *small country's* unilateral tariff choice



A small country's unilateral tariff choice

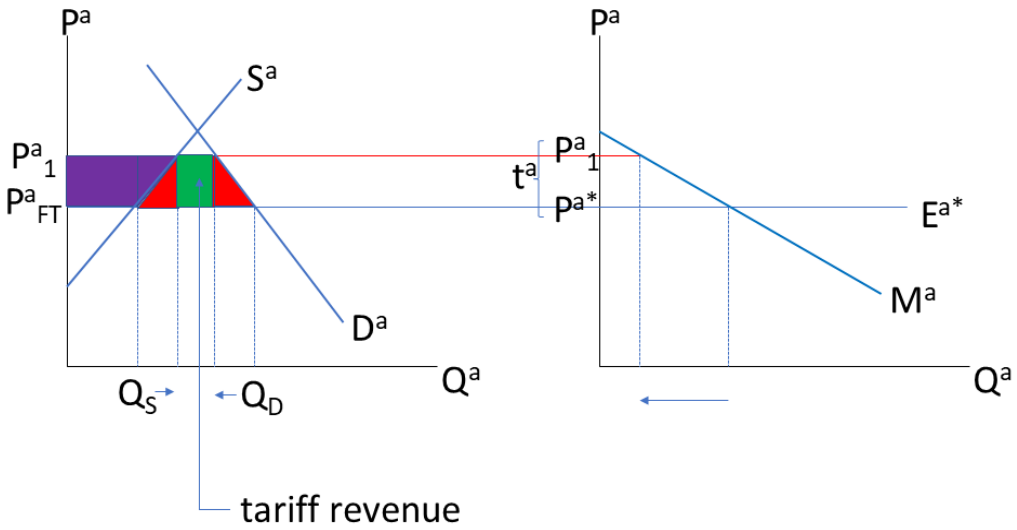
- A *small country's* unilateral tariff choice



gov's valuation of shifting surplus from consumers to producers

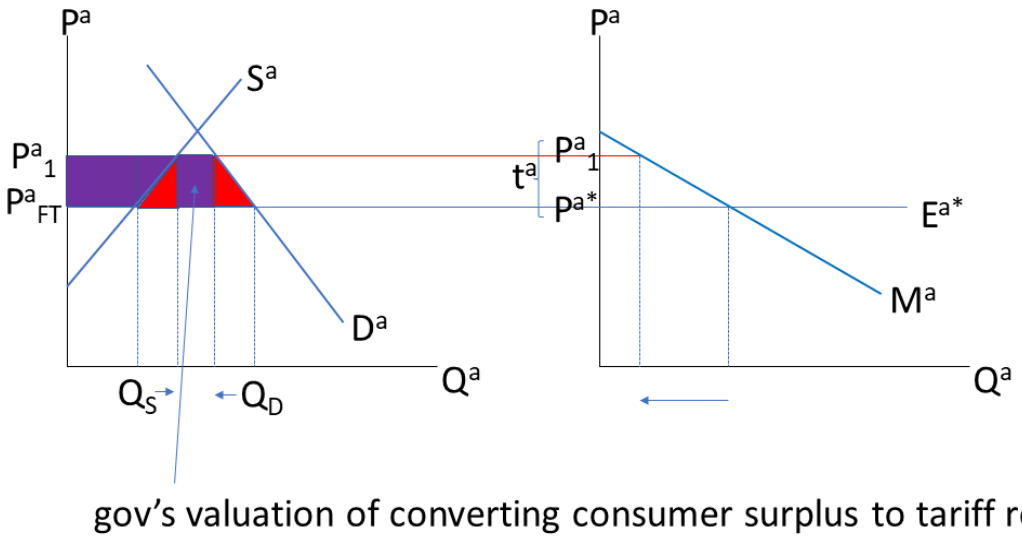
A small country's unilateral tariff choice

- A *small country's* unilateral tariff choice



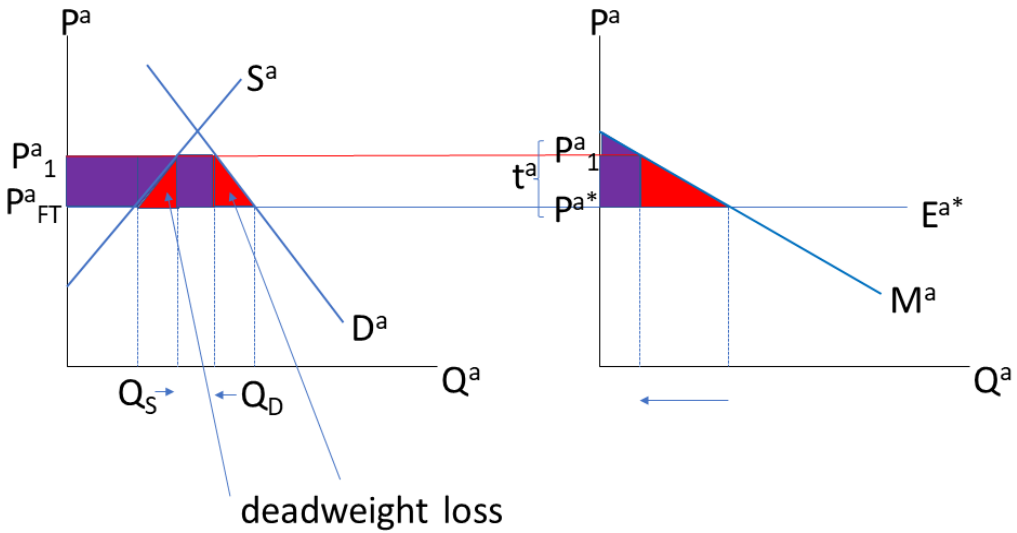
A small country's unilateral tariff choice

- A *small country's* unilateral tariff choice



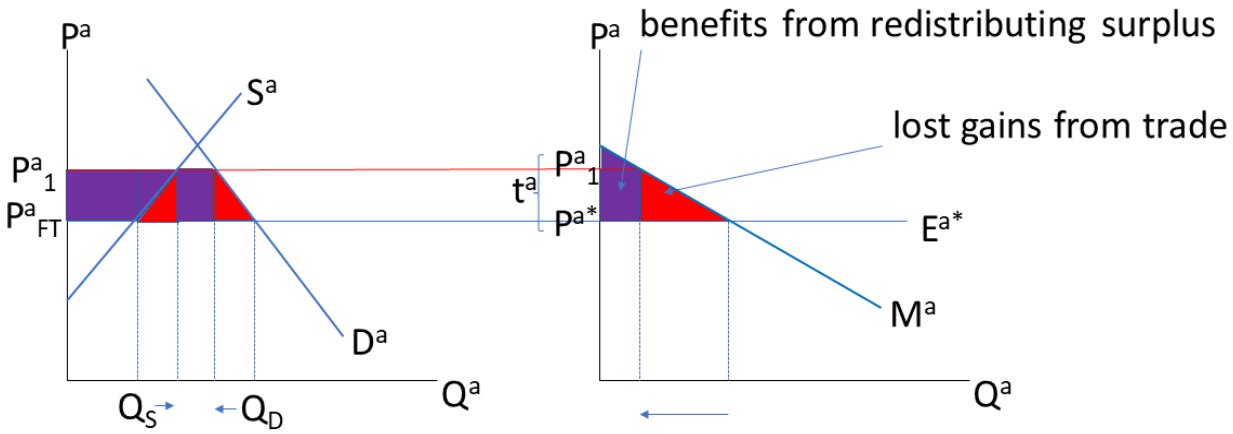
A small country's unilateral tariff choice

- A *small country's* unilateral tariff choice



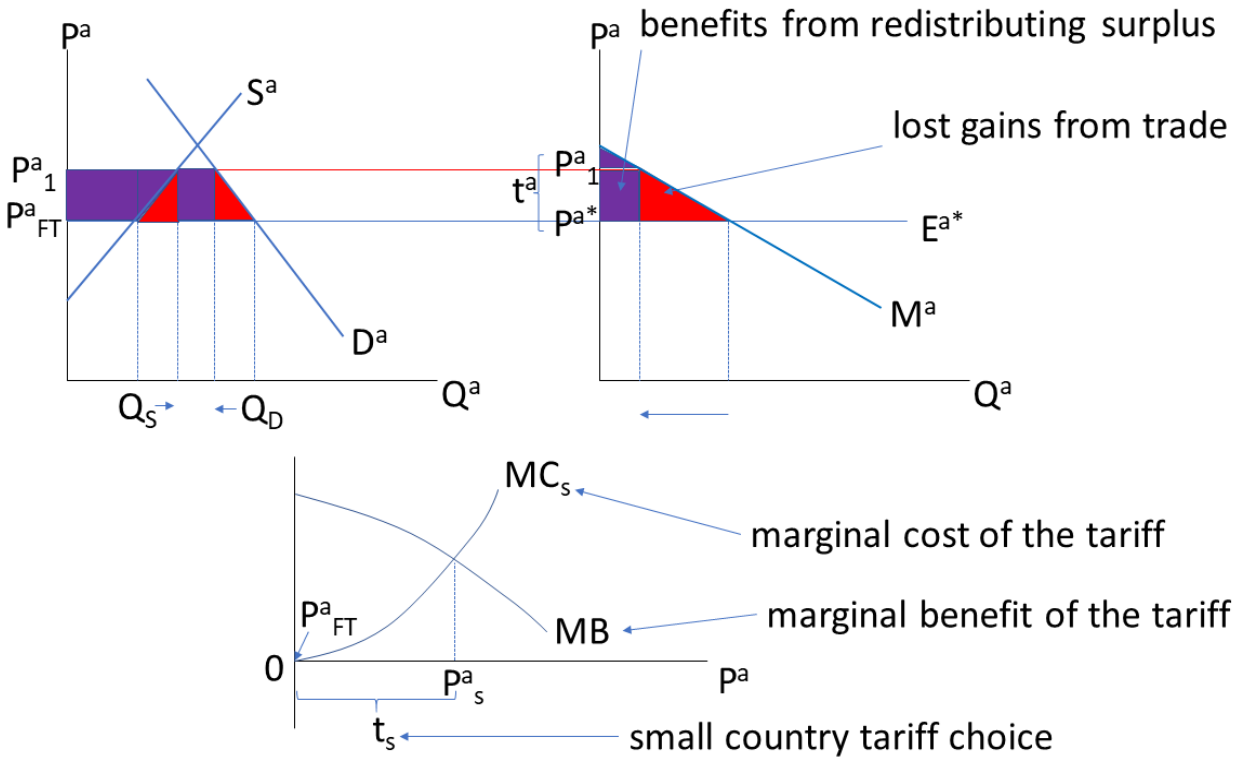
A small country's unilateral tariff choice

- A *small country's* unilateral tariff choice



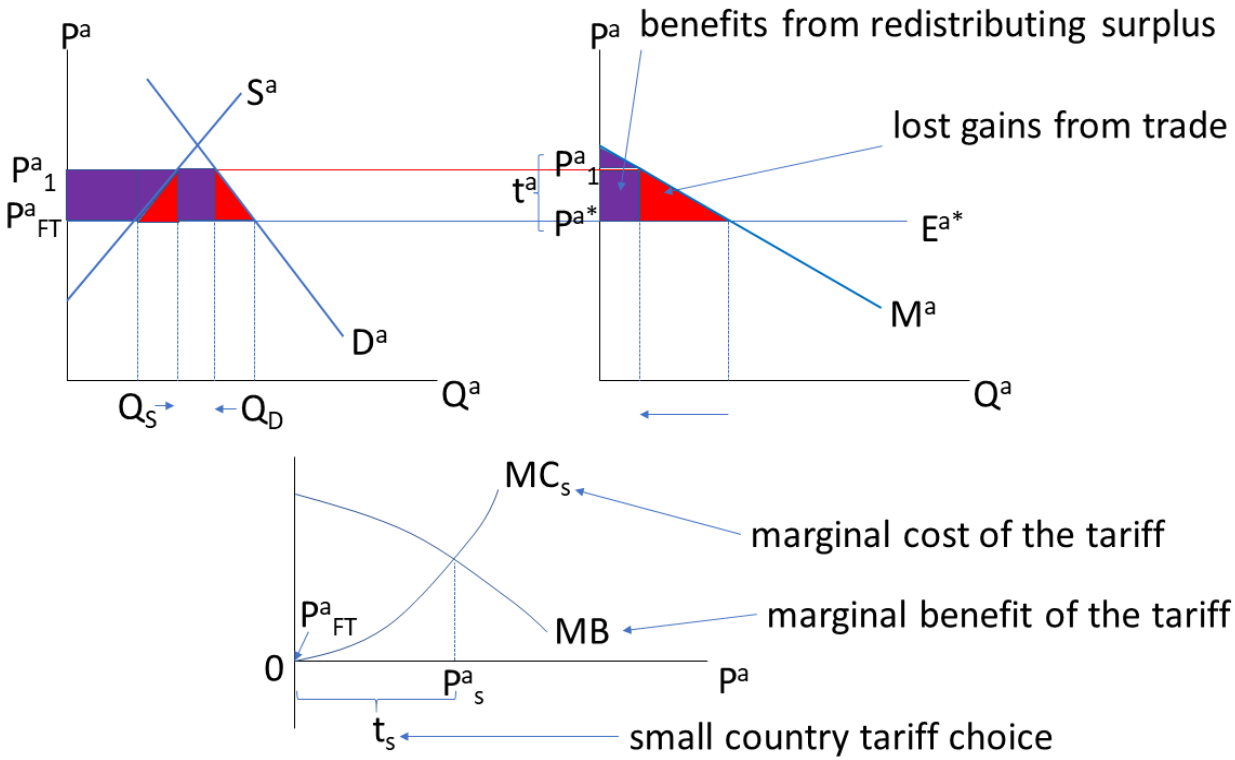
A small country's unilateral tariff choice

- A *small country's* unilateral tariff choice



A small country's unilateral tariff choice

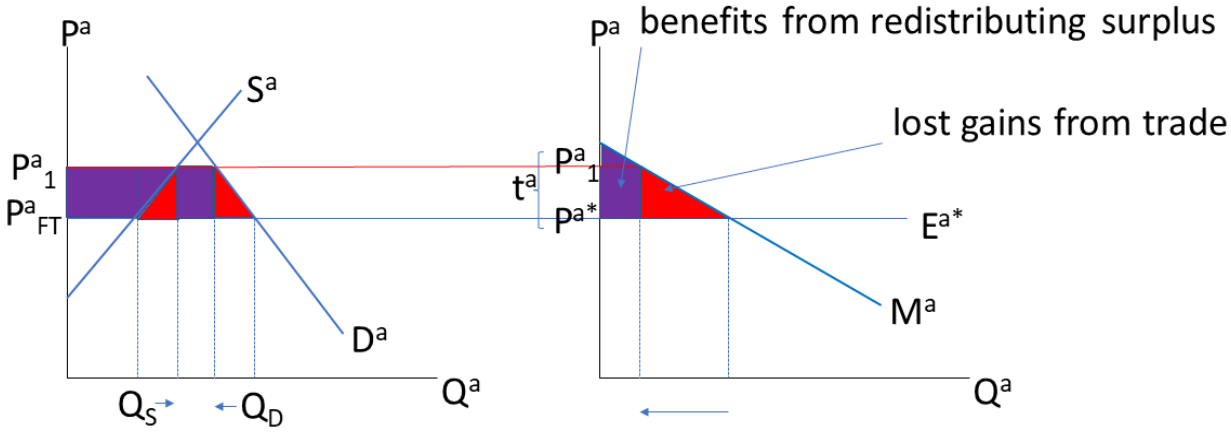
- A *small country's* unilateral tariff choice



- A *small* country's policy choices impose no externalities on the world
- $\Rightarrow$ Policy choices are *internationally efficient* in a world of small countries, given national government objectives
- No international inefficiency, nothing for a trade agreement to do!

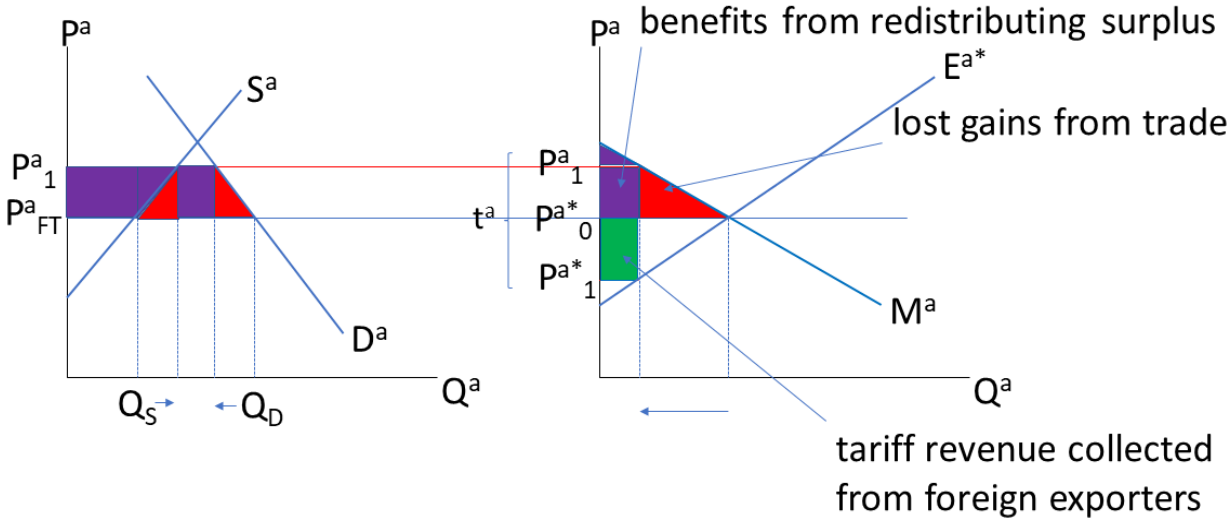
A large country's unilateral tariff choice

- A *large country's* unilateral tariff choice (recall small country)



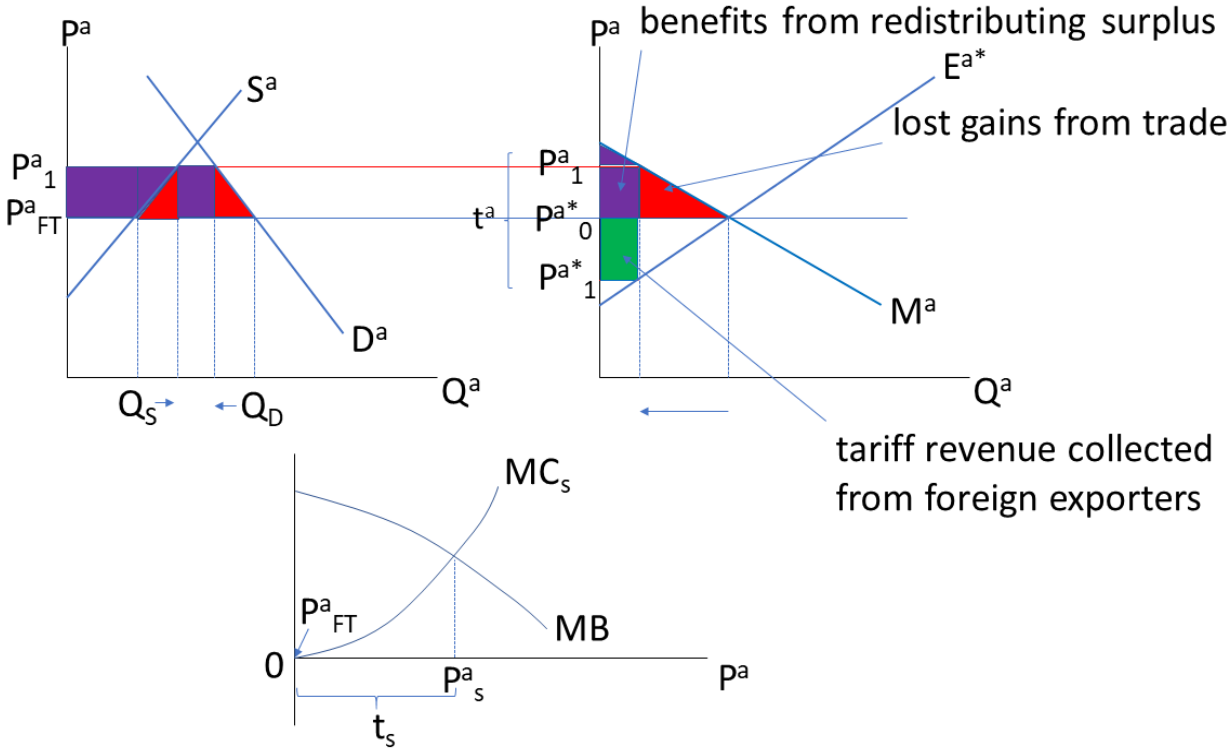
A large country's unilateral tariff choice

- A *large country's* unilateral tariff choice



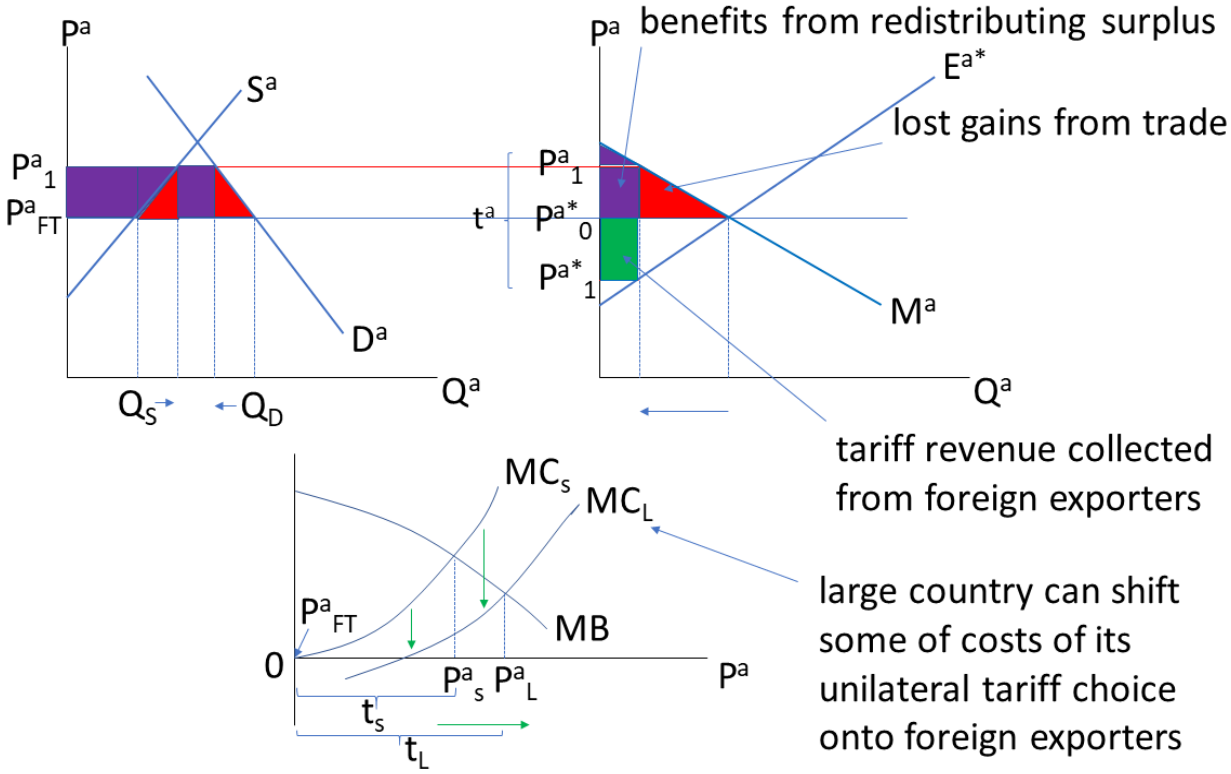
A large country's unilateral tariff choice

- A *large country's* unilateral tariff choice



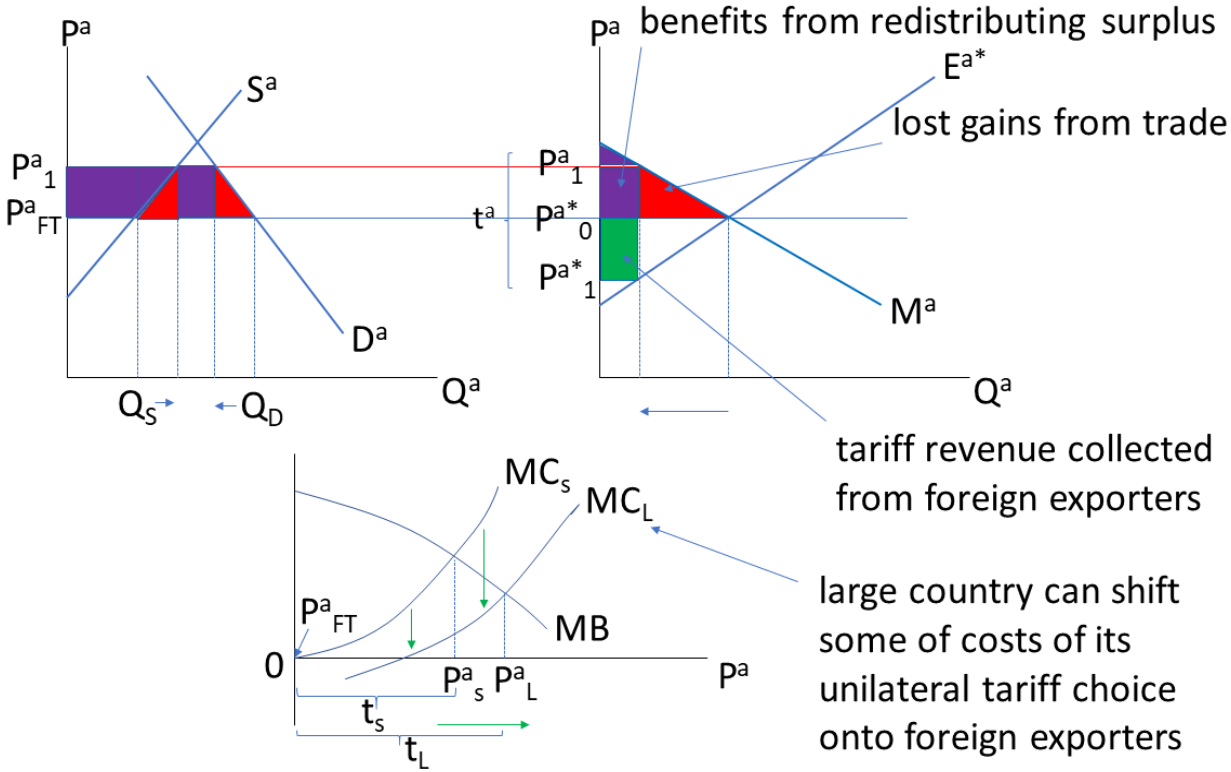
A large country's unilateral tariff choice

- A *large country's* unilateral tariff choice



A large country's unilateral tariff choice

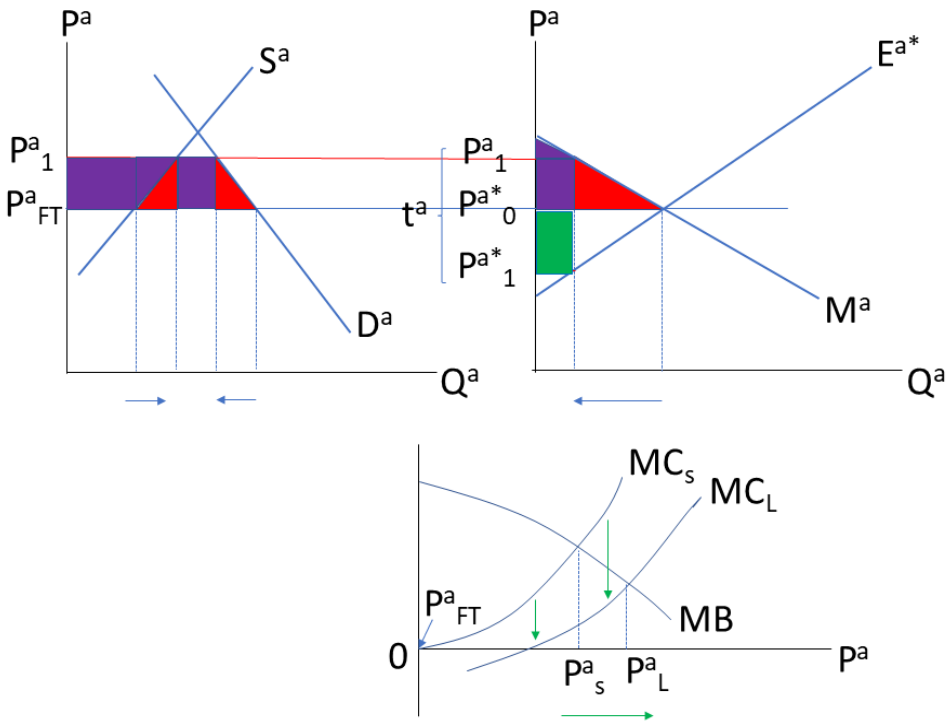
- A *large country's* unilateral tariff choice



- A large country's tariffs impose negative externalities on the world
- $\Rightarrow$ Tariff choices are *internationally inefficient* (too high) in a world with large countries, given national government objectives
- Address the inefficiency, and a mutually beneficial agreement possible!

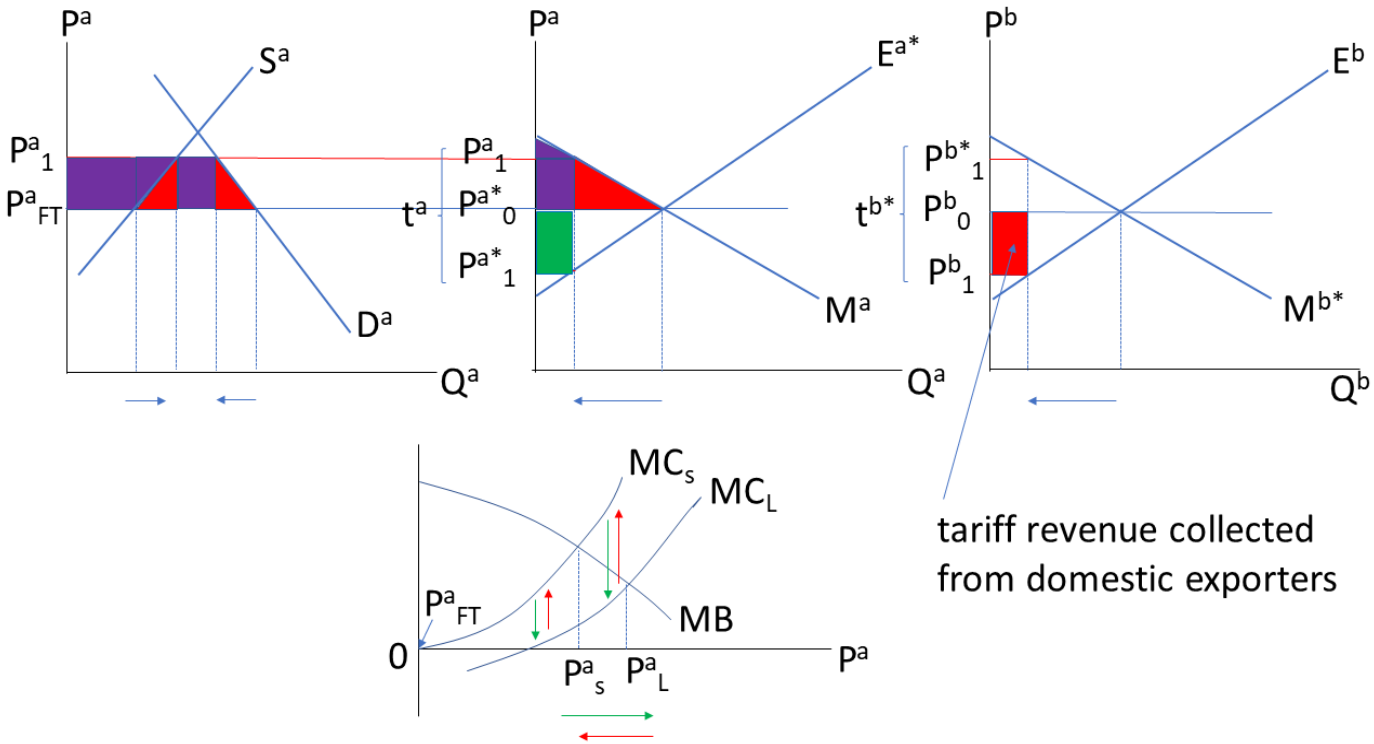
Reciprocity

- Recall a large country's unilateral tariff choice



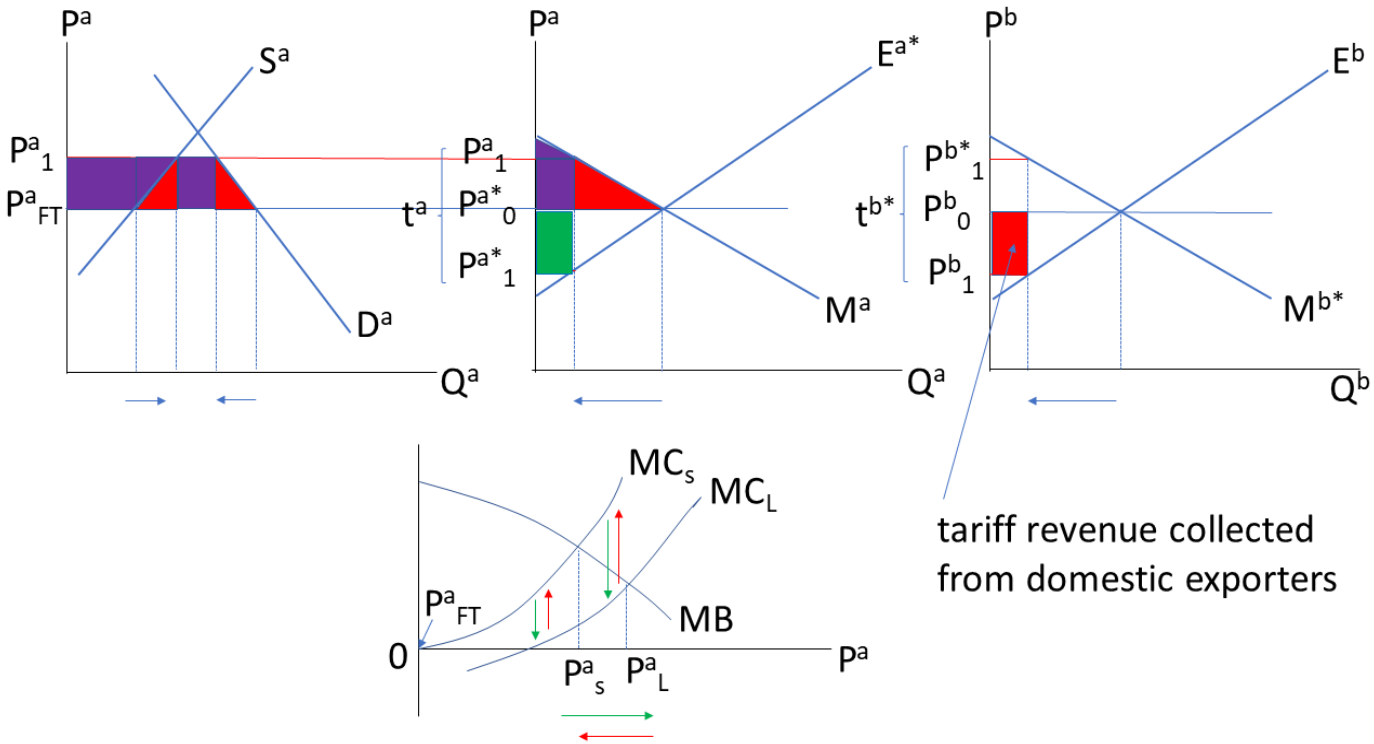
Unilateral tariff choice in the presence of reciprocity

- A measured, *proportionate response* by its trading partner



Unilateral tariff choice in the presence of reciprocity

- A measured, *proportionate response* by its trading partner



- The large country faces the trade-offs of a small country
- $\Rightarrow$ Legitimacy: A multilateral trade institution built on the pillars of MFN and reciprocity should work well to help governments solve the fundamental trade agreement problem

Reciprocity in action: reciprocal retaliation

NYTimes March 2 2018

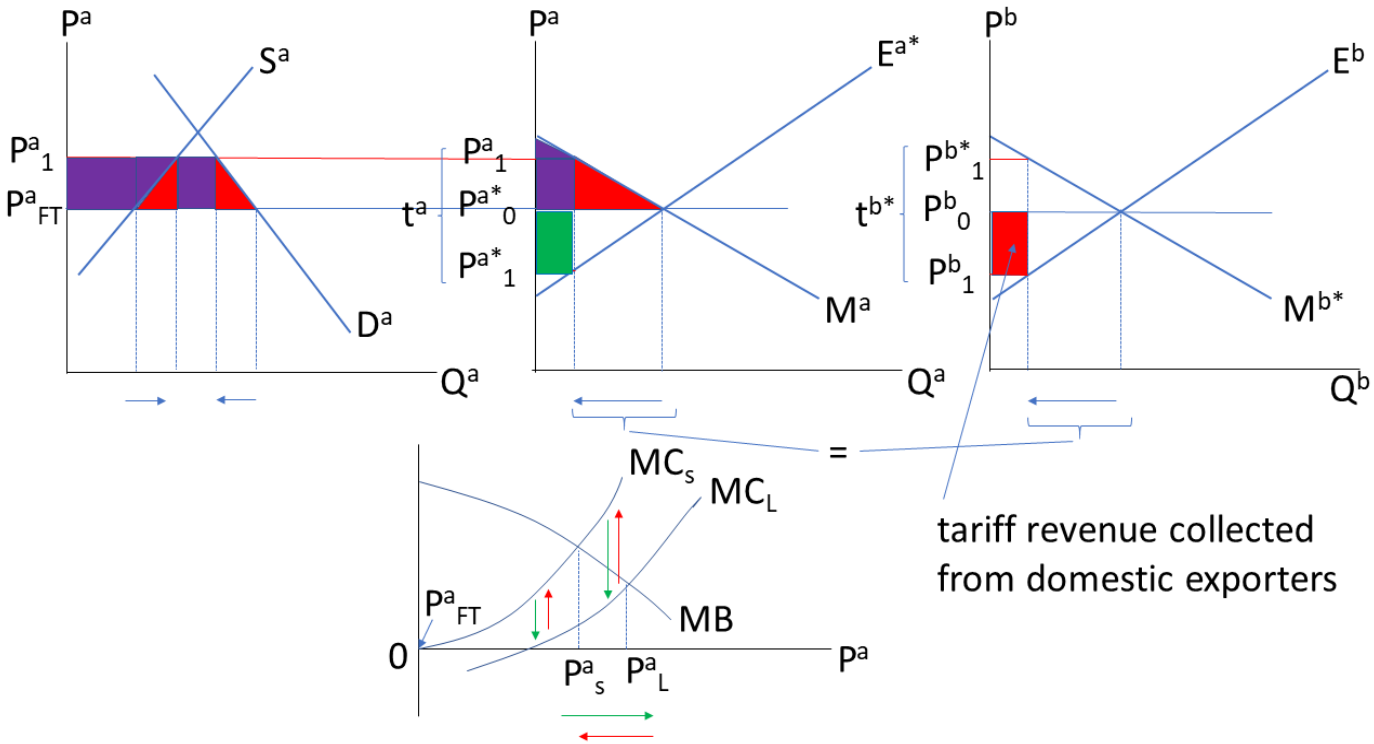
Trump's Tariffs Prompt Global Threats of Retaliation

... The European Union detailed a three-step plan to penalize $3.5 billion of American trade — the same amount of European steel and aluminum the bloc estimates would be harmed by the planned tariffs. It proposed taxing American exports including bourbon, bluejeans, orange juice, cranberries, rice and motorcycles. The European Union could then ... bring a case against the United States at the World Trade Organization.

A European Union official said that the bloc had been preparing for the announcement for months and that everything was in place for a swift, proportionate response. ...

Unilateral tariff choice in the presence of reciprocity

- A *proportionate response* by its trading partners



- The large country faces the trade-offs of a small country
- $\Rightarrow$ Like a small country, it cannot reduce the costs to its citizens of its tariff choice by shifting some of those costs onto foreign companies
  - nothing left for a trade agreement to do!

This is not a trade war

- This is how the GATT/WTO system works to *avoid* a trade war

> *The Organization's control over countermeasures of this kind enables it to keep such measures within reasonable limits: to allow countermeasures commensurate with the action which occasions them; and to hold in check emotional reactions which might result in punitive measures by countries injured against the country responsible for the injury. The control over countermeasures is a check on the development of trade wars. (US Council of the ICC, 1955)*

Enforcement

- What keeps countries operating within this rules-based system?
  - the off-equilibrium threat of an all-out trade war

Enforcement

- What keeps countries operating within this rules-based system?
  - the off-equilibrium threat of an all-out trade war
- What might the beginning of a trade war look like?

Escalating Trade Fight, Trump Threatens Higher Taxes on European Cars

By EMILY COCHRANE New York Times MARCH 3, 2018

WASHINGTON — President Trump warned on Saturday that he would apply higher taxes on imported European cars if the European Union carried through on its threat to retaliate against his proposed stiff new tariffs on steel and aluminum.

"If the E.U. wants to further increase their already massive tariffs and barriers on U.S. companies doing business there, we will simply apply a Tax on their Cars which freely pour into the U.S.," Mr. Trump wrote on Twitter from Florida, where he was spending part of the weekend. "They make it impossible for our cars (and more) to sell there. Big trade imbalance!"

The GATT/WTO in a world of trade and climate problems

- How does the GATT/WTO architecture work when there is both a trade and a climate problem to solve?

The GATT/WTO in a world of trade and climate problems

- How does the GATT/WTO architecture work when there is both a trade and a climate problem to solve?
- A partial equilibrium model of trade in aluminum, the production of which is carbon-intensive
- N the population of importing country H, H gov policies τ and t
- N^* the population of exporting country F, F gov policies τ^* and t^*

The GATT/WTO in a world of trade and climate problems

- How does the GATT/WTO architecture work when there is both a trade and a climate problem to solve?
- A partial equilibrium model of trade in aluminum, the production of which is carbon-intensive
- N the population of importing country H, H gov policies τ and t
- N^* the population of exporting country F, F gov policies τ^* and t^*
- Welfare

$$W = CS + \lambda \cdot PS + REV - \theta N \cdot [s(q) + s^*(q^*)]$$

$$W^* = CS^* + \lambda^* \cdot PS^* + REV^* - \theta N^* \cdot [s(q) + s^*(q^*)]$$

  - political economy weights λ for the H gov, λ^* for the F gov
  - θ the damage to per-capita welfare from another unit of carbon output

Trade problem but no climate problem

- No climate problem: $\theta = 0$

Trade problem but no climate problem

- No climate problem: $\theta = 0$
- Efficient policies

$$\begin{aligned} \bar{\tau}^E &\equiv \tau^E + \tau^{*E} = 0 \\ t^E &= -(\lambda - 1)\frac{1}{\eta_s}; \quad t^{*E} = -(\lambda^* - 1)\frac{1}{\eta_{s^*}} \end{aligned}$$

Trade problem but no climate problem

- No climate problem: $\theta = 0$
- Efficient policies

$$\begin{aligned} \bar{\tau}^E &\equiv \tau^E + \tau^{*E} = 0 \\ t^E &= -(\lambda - 1)\frac{1}{\eta_s}; \quad t^{*E} = -(\lambda^* - 1)\frac{1}{\eta_{s^*}} \end{aligned}$$

- Nash policies

$$\begin{aligned} \tau^N &= \frac{1}{\eta_{e^*}}; \qquad \tau^{*N} = \frac{1}{\eta_m} \\ t^N &= -(\lambda - 1)\frac{1}{\eta_s}; \quad t^{*N} = -(\lambda^* - 1)\frac{1}{\eta_{s^*}} \end{aligned}$$

Trade problem but no climate problem

- No climate problem: $\theta = 0$
- Efficient policies

$$\begin{aligned} \bar{\tau}^E &\equiv \tau^E + \tau^{*E} = 0 \\ t^E &= -(\lambda - 1)\frac{1}{\eta_s}; \quad t^{*E} = -(\lambda^* - 1)\frac{1}{\eta_{s^*}} \end{aligned}$$

- Nash policies

$$\begin{aligned} \tau^N &= \frac{1}{\eta_{e^*}}; \qquad \tau^{*N} = \frac{1}{\eta_m} \\ t^N &= -(\lambda - 1)\frac{1}{\eta_s}; \quad t^{*N} = -(\lambda^* - 1)\frac{1}{\eta_{s^*}} \end{aligned}$$

- The nature of Nash inefficiencies when $\theta = 0$

$$\text{Tariffs too high} \quad : \quad \tau^N + \tau^{*N} = \frac{1}{\eta_{e^*}} + \frac{1}{\eta_m} > 0 = \bar{\tau}^E$$

$$\text{Taxes set efficiently} \quad : \quad t^N = t^E; \quad t^{*N} = t^{*E}$$

Efficient tariffs & taxes with shallow-integration reciprocity

- Position tariffs at the efficient levels

$$\tau^E = 0; \quad \tau^{*E} = 0$$

Efficient tariffs & taxes with shallow-integration reciprocity

- Position tariffs at the efficient levels

$$\tau^E = 0; \quad \tau^{*E} = 0$$

- No other preferred tariff with reciprocal response of trading partner
  - evaluated at τ^E and t^E

$$\frac{dW}{d\tau} + \frac{dW}{d\tau^*}\frac{d\tau^*}{d\tau}|_{d\widetilde{p}^w=0} = 0$$

Efficient tariffs & taxes with shallow-integration reciprocity

- Position tariffs at the efficient levels

$$\tau^E = 0; \quad \tau^{*E} = 0$$

- No other preferred tariff with reciprocal response of trading partner
  - evaluated at τ^E and t^E

$$\frac{dW}{d\tau} + \frac{dW}{d\tau^*}\frac{d\tau^*}{d\tau}|_{d\widetilde{p}^w=0} = 0$$

- Will taxes remain at Nash=efficient levels?

$$t^E = -(\lambda - 1)\frac{1}{\eta_s}; \quad t^{*E} = -(\lambda^* - 1)\frac{1}{\eta_{s^*}}$$

Efficient tariffs & taxes with shallow-integration reciprocity

- Position tariffs at the efficient levels

$$\tau^E = 0; \quad \tau^{*E} = 0$$

- No other preferred tariff with reciprocal response of trading partner
  - evaluated at τ^E and t^E

$$\frac{dW}{d\tau} + \frac{dW}{d\tau^*}\frac{d\tau^*}{d\tau}|_{d\widetilde{p}^w=0} = 0$$

- Will taxes remain at Nash=efficient levels?

$$t^E = -(\lambda - 1)\frac{1}{\eta_s}; \quad t^{*E} = -(\lambda^* - 1)\frac{1}{\eta_{s^*}}$$

- No other preferred tax with reciprocal response of trading partner
  - evaluated at τ^E and t^E

$$\frac{dW}{dt} + \frac{dW}{d\tau^*}\frac{d\tau^*}{dt}|_{d\widetilde{p}^w=0} = 0$$

Trade problem and climate problem

- Climate problem: $\theta > 0$

Trade problem and climate problem

- Climate problem: $\theta > 0$
- Efficient policies

$$\begin{aligned} \bar{\tau}^E &\equiv \tau^E + \tau^{*E} = 0 \\ t^E &= -(\lambda - 1)\frac{1}{\eta_s} + (N + N^*)\frac{\theta}{q} \\ t^{*E} &= -(\lambda^* - 1)\frac{1}{\eta_{s^*}} + (N + N^*)\frac{\theta}{q^*} \end{aligned}$$

Trade problem and climate problem

- Climate problem: $\theta > 0$
- Efficient policies

$$\begin{aligned}
\bar{\tau}^E &\equiv \tau^E + \tau^{*E} = 0 \\
t^E &= -(\lambda - 1)\frac{1}{\eta_s} + (N + N^*)\frac{\theta}{q} \\
t^{*E} &= -(\lambda^* - 1)\frac{1}{\eta_{s^*}} + (N + N^*)\frac{\theta}{q^*}
\end{aligned}$$

- Nash policies

$$\tau^N = \left[\frac{s^* \times \eta_{s^*}}{e^* \times \eta_{e^*}}\right] \times N\frac{\theta}{q^*} + \frac{1}{\eta_{e^*}}; \quad \tau^{*N} = -\left[\frac{s \times \eta_s}{m \times \eta_m}\right] \times N^*\frac{\theta}{q} + \frac{1}{\eta_m}$$

$$t^N = -(\lambda - 1)\frac{1}{\eta_s} + N\frac{\theta}{q}; \qquad t^{*N} = -(\lambda^* - 1)\frac{1}{\eta_{s^*}} + N^*\frac{\theta}{q^*}$$

Trade problem and climate problem

- The nature of Nash inefficiencies when $\theta > 0$

Trade problem and climate problem

- The nature of Nash inefficiencies when $\theta > 0$
- Carbon taxes too low, reflecting international non-pecuniary externality (climate problem)

$$t^N - t^E = -N^* \frac{\theta}{q}$$

$$t^{*N} - t^{*E} = N \frac{\theta}{q^*}$$

Trade problem and climate problem

- The nature of Nash inefficiencies when $\theta > 0$
- Carbon taxes too low, reflecting international non-pecuniary externality (climate problem)

$$t^N - t^E = -N^* \frac{\theta}{q}$$

$$t^{*N} - t^{*E} = N \frac{\theta}{q^*}$$

- Conditional on Nash carbon taxes, tariffs too high, reflecting international pecuniary externality (trade problem)

$$\bar{\tau}^N - \bar{\tau}^E(t^N, t^{*N}) = \frac{1}{\eta_{e^*}} + \frac{1}{\eta_m}$$

Efficient tariffs with shallow-integration reciprocity

- Nash carbon taxes and efficient tariffs conditional on Nash carbon taxes can be implemented with shallow-integration reciprocity

Efficient tariffs with shallow-integration reciprocity

- Nash carbon taxes and efficient tariffs conditional on Nash carbon taxes can be implemented with shallow-integration reciprocity

- Position tariffs at the efficient levels given Nash carbon taxes

$$\tau^E(t^N) = \left[\frac{s^* \times \eta_{s^*}}{e^* \times \eta_{e^*}}\right] \times N\frac{\theta}{q^*};\ \tau^{*E}(t^{*N}) = -\left[\frac{s \times \eta_s}{m \times \eta_m}\right] \times N^*\frac{\theta}{q}$$

Efficient tariffs with shallow-integration reciprocity

- Nash carbon taxes and efficient tariffs conditional on Nash carbon taxes can be implemented with shallow-integration reciprocity

- Position tariffs at the efficient levels given Nash carbon taxes

$$\tau^E(t^N) = \left[\frac{s^* \times \eta_{s^*}}{e^* \times \eta_{e^*}}\right] \times N\frac{\theta}{q^*};\ \tau^{*E}(t^{*N}) = -\left[\frac{s \times \eta_s}{m \times \eta_m}\right] \times N^*\frac{\theta}{q}$$

- No other preferred tariff with reciprocal response of trading partner
  - evaluated at $\tau^E(t^N)$ and t^N

$$\frac{dW}{d\tau} + \frac{dW}{d\tau^*}\frac{d\tau^*}{d\tau}|_{d\widetilde{p}^w=0} = 0$$

Efficient tariffs with shallow-integration reciprocity

- Will carbon taxes remain at Nash levels?

$$t^N = -(\lambda - 1)\frac{1}{\eta_s} + N\frac{\theta}{q};\ t^{*N} = -(\lambda^* - 1)\frac{1}{\eta_{s^*}} + N^*\frac{\theta}{q^*}$$

Efficient tariffs with shallow-integration reciprocity

- Will carbon taxes remain at Nash levels?

$$t^N = -(\lambda - 1)\frac{1}{\eta_s} + N\frac{\theta}{q};\ t^{*N} = -(\lambda^* - 1)\frac{1}{\eta_{s^*}} + N^*\frac{\theta}{q^*}$$

- No other preferred tax with reciprocal response of trading partner
  - evaluated at $\tau^E(t^N)$ and t^N

$$\frac{dW}{dt} + \frac{dW}{d\tau^*}\frac{d\tau^*}{dt}|_{d\widetilde{p}^w=0} = 0$$

Efficient tariffs with shallow-integration reciprocity

- Will carbon taxes remain at Nash levels?

$$t^N = -(\lambda - 1)\frac{1}{\eta_s} + N\frac{\theta}{q};\ t^{*N} = -(\lambda^* - 1)\frac{1}{\eta_{s^*}} + N^*\frac{\theta}{q^*}$$

- No other preferred tax with reciprocal response of trading partner
  - evaluated at $\tau^E(t^N)$ and t^N

$$\frac{dW}{dt} + \frac{dW}{d\tau^*}\frac{d\tau^*}{dt}|_{d\widetilde{p}^w=0} = 0$$

- $\Rightarrow$ Nature of remaining inefficiencies under GATT/WTO when $\theta > 0$
  - carbon taxes inefficient, but only due to international non-pecuniary externality

$$t^N - t^E = -N^*\frac{\theta}{q};\quad t^{*N} - t^{*E} = N\frac{\theta}{q^*}$$

Border tax adjustments

- When $\theta > 0$, the GATT/WTO shallow-integration reciprocity approach leaves carbon taxes at inefficiently low levels

Border tax adjustments

- When $\theta > 0$, the GATT/WTO shallow-integration reciprocity approach leaves carbon taxes at inefficiently low levels

- Suppose an enforceable climate accord raises carbon taxes to their efficient levels

$$t^E = -(\lambda - 1)\frac{1}{\eta_s} + (N + N^*)\frac{\theta}{q}; \quad t^{*E} = -(\lambda^* - 1)\frac{1}{\eta_{s^*}} + (N + N^*)\frac{\theta}{q^*}$$

Border tax adjustments

- When $\theta > 0$, the GATT/WTO shallow-integration reciprocity approach leaves carbon taxes at inefficiently low levels
- Suppose an enforceable climate accord raises carbon taxes to their efficient levels

$$t^E = -(\lambda - 1)\frac{1}{\eta_s} + (N + N^*)\frac{\theta}{q}; \quad t^{*E} = -(\lambda^* - 1)\frac{1}{\eta_{s^*}} + (N + N^*)\frac{\theta}{q^*}$$

- Could the GATT/WTO approach deliver efficient tariffs (conditional on the efficient carbon taxes)?

Border tax adjustments

- Yes, but only if H's import tariff rises with its higher carbon tax (BTA)

$$\text{from} \quad \tau^E(t^N) = \left[\frac{s^* \times \eta_{s^*}}{e^* \times \eta_{e^*}}\right] \times N\frac{\theta}{q^*}$$

$$\text{to} \quad \tau^E(t^E) = \left[\frac{s^* \times \eta_{s^*}}{e^* \times \eta_{e^*}}\right] \times N\frac{\theta}{q^*} + \left[\frac{s \times \eta_s}{m \times \eta_m}\right] \times N^*\frac{\theta}{q}$$

Border tax adjustments

- Yes, but only if H's import tariff rises with its higher carbon tax (BTA)

$$\text{from} \quad \tau^E(t^N) = \left[\frac{s^* \times \eta_{s^*}}{e^* \times \eta_{e^*}}\right] \times N\frac{\theta}{q^*}$$

$$\text{to} \quad \tau^E(t^E) = \left[\frac{s^* \times \eta_{s^*}}{e^* \times \eta_{e^*}}\right] \times N\frac{\theta}{q^*} + \left[\frac{s \times \eta_s}{m \times \eta_m}\right] \times N^*\frac{\theta}{q}$$

- and F's export subsidy rises with its higher carbon tax (BTA)

$$\text{from} \quad \tau^{*E}(t^{*N}) = -\left[\frac{s \times \eta_s}{m \times \eta_m}\right] \times N^*\frac{\theta}{q}$$

$$\text{to} \quad \tau^{*E}(t^{*E}) = -\left[\frac{s \times \eta_s}{m \times \eta_m}\right] \times N^*\frac{\theta}{q} - \left[\frac{s^* \times \eta_{s^*}}{e^* \times \eta_{e^*}}\right] \times N\frac{\theta}{q^*}$$

Border tax adjustments

- With the climate accord implementing efficient carbon taxes t^E and t^{*E}, position tariffs at the efficient levels

$$\tau^E(t^E) = \left[\frac{s^* \times \eta_{s^*}}{e^* \times \eta_{e^*}}\right] \times N\frac{\theta}{q^*} + \left[\frac{s \times \eta_s}{m \times \eta_m}\right] \times N^*\frac{\theta}{q}$$

$$\tau^{*E}(t^{*E}) = -\left[\frac{s \times \eta_s}{m \times \eta_m}\right] \times N^*\frac{\theta}{q} - \left[\frac{s^* \times \eta_{s^*}}{e^* \times \eta_{e^*}}\right] \times N\frac{\theta}{q^*}$$

Border tax adjustments

- With the climate accord implementing efficient carbon taxes t^E and t^{*E}, position tariffs at the efficient levels

$$\tau^E(t^E) = \left[\frac{s^* \times \eta_{s^*}}{e^* \times \eta_{e^*}}\right] \times N\frac{\theta}{q^*} + \left[\frac{s \times \eta_s}{m \times \eta_m}\right] \times N^*\frac{\theta}{q}$$

$$\tau^{*E}(t^{*E}) = -\left[\frac{s \times \eta_s}{m \times \eta_m}\right] \times N^*\frac{\theta}{q} - \left[\frac{s^* \times \eta_{s^*}}{e^* \times \eta_{e^*}}\right] \times N\frac{\theta}{q^*}$$

- No other preferred tariff with reciprocal response of trading partner
  - evaluated at τ^E and t^E

$$\frac{dW}{d\tau} + \frac{dW}{d\tau^*}\frac{d\tau^*}{d\tau}|_{d\widetilde{p}^w=0} = 0$$

Border tax adjustments

- With the climate accord implementing efficient carbon taxes t^E and t^{*E}, position tariffs at the efficient levels

$$\tau^E(t^E) = \left[\frac{s^* \times \eta_{s^*}}{e^* \times \eta_{e^*}}\right] \times N\frac{\theta}{q^*} + \left[\frac{s \times \eta_s}{m \times \eta_m}\right] \times N^*\frac{\theta}{q}$$

$$\tau^{*E}(t^{*E}) = -\left[\frac{s \times \eta_s}{m \times \eta_m}\right] \times N^*\frac{\theta}{q} - \left[\frac{s^* \times \eta_{s^*}}{e^* \times \eta_{e^*}}\right] \times N\frac{\theta}{q^*}$$

- No other preferred tariff with reciprocal response of trading partner
  - evaluated at τ^E and t^E

$$\frac{dW}{d\tau} + \frac{dW}{d\tau^*}\frac{d\tau^*}{d\tau}|_{d\widetilde{p}^w=0} = 0$$

- $\Rightarrow$ The implied BTA is *not* based on carbon content of imports
  - "market access" preserving: each country adjusts its tariff to neutralize the competitive effect of its higher carbon tax and leave $\widetilde{p}^w$ unchanged

Enforcement linkage

- Suppose a climate accord raises carbon taxes to their efficient levels

$$t^E = -(\lambda - 1)\frac{1}{\eta_s} + (N + N^*)\frac{\theta}{q}; \quad t^{*E} = -(\lambda^* - 1)\frac{1}{\eta_{s^*}} + (N + N^*)\frac{\theta}{q^*}$$

  - but enforcement is left to the WTO

Enforcement linkage

- Suppose a climate accord raises carbon taxes to their efficient levels

$$t^E = -(\lambda - 1)\frac{1}{\eta_s} + (N + N^*)\frac{\theta}{q}; \quad t^{*E} = -(\lambda^* - 1)\frac{1}{\eta_{s^*}} + (N + N^*)\frac{\theta}{q^*}$$

  - but enforcement is left to the WTO

- Could efficient carbon taxes be secured under the GATT/WTO reciprocity norm?

Enforcement linkage

- Suppose a climate accord raises carbon taxes to their efficient levels

$$t^E = -(\lambda - 1)\frac{1}{\eta_s} + (N + N^*)\frac{\theta}{q}; \quad t^{*E} = -(\lambda^* - 1)\frac{1}{\eta_{s^*}} + (N + N^*)\frac{\theta}{q^*}$$

  - but enforcement is left to the WTO

- Could efficient carbon taxes be secured under the GATT/WTO reciprocity norm?
- No: evaluated at τ^E and t^E

$$\frac{dW}{dt} + \frac{dW}{d\tau^*}\frac{d\tau^*}{dt}\Big|_{d\widetilde{p}^w = 0} < 0$$

  - H would prefer to reduce its carbon tax below the efficient level and accept reciprocal tariff retaliation from F

Enforcement linkage

- Suppose a climate accord raises carbon taxes to their efficient levels

$$t^E = -(\lambda - 1)\frac{1}{\eta_s} + (N + N^*)\frac{\theta}{q}; \quad t^{*E} = -(\lambda^* - 1)\frac{1}{\eta_{s^*}} + (N + N^*)\frac{\theta}{q^*}$$

  - but enforcement is left to the WTO

- Could efficient carbon taxes be secured under the GATT/WTO reciprocity norm?
- No: evaluated at τ^E and t^E

$$\frac{dW}{dt} + \frac{dW}{d\tau^*}\frac{d\tau^*}{dt}\Big|_{d\widetilde{p}^w = 0} < 0$$

  - H would prefer to reduce its carbon tax below the efficient level and accept reciprocal tariff retaliation from F

- $\Rightarrow$ WTO enforcement of efficient carbon taxes requires more severe tariff retaliation than implied by the GATT/WTO reciprocity norm

Participation linkage

- To address free-riding on the carbon taxes of others, the Climate Club proposal of Nordhaus (2015) envisions adding a set of "climate amendments" to the WTO that would

> ...*"explicitly allow uniform tariffs on nonparticipants within the confines of a climate treaty; it would also prohibit retaliation against countries who invoke the mechanism."*

Participation linkage

- To address free-riding on the carbon taxes of others, the Climate Club proposal of Nordhaus (2015) envisions adding a set of "climate amendments" to the WTO that would

  ...*"explicitly allow uniform tariffs on nonparticipants within the confines of a climate treaty; it would also prohibit retaliation against countries who invoke the mechanism."*

- Obviously not all current WTO members would see these amendments to be in their interest
  - but not all GATT members saw it in their interest to create the WTO

Participation linkage

- To address free-riding on the carbon taxes of others, the Climate Club proposal of Nordhaus (2015) envisions adding a set of "climate amendments" to the WTO that would

  ...*"explicitly allow uniform tariffs on nonparticipants within the confines of a climate treaty; it would also prohibit retaliation against countries who invoke the mechanism."*

- Obviously not all current WTO members would see these amendments to be in their interest
  - but not all GATT members saw it in their interest to create the WTO
- To implement the Climate Club proposal, could mimic the strategy used in creating the WTO
  - the major players could formally withdraw from the WTO and enter a new treaty creating the Green WTO

Participation and enforcement linkage

- Suppose the Green WTO were created with
  - no change to the WTO beyond the climate amendments envisioned by Nordhaus
  - no external enforcement mechanism for carbon tax commitments beyond that implied under the GATT/WTO reciprocity norm
  - universal participation

Participation and enforcement linkage

- Suppose the Green WTO were created with
  - no change to the WTO beyond the climate amendments envisioned by Nordhaus
  - no external enforcement mechanism for carbon tax commitments beyond that implied under the GATT/WTO reciprocity norm
  - universal participation
- What would this accomplish?

Participation and enforcement linkage

- Within the Green WTO
  - H solves

$$\frac{dW}{d\tau} + \frac{dW}{d\tau^*}\frac{d\tau^*}{d\tau}|_{d\widetilde{p}^w=0} = 0; \quad \frac{dW}{dt} + \frac{dW}{d\tau^*}\frac{d\tau^*}{dt}|_{d\widetilde{p}^w=0} = 0$$

    implementing t^N and $\tau^E(t^N)$

  - F solves

$$\frac{dW^*}{d\tau^*} + \frac{dW^*}{d\tau}\frac{d\tau}{d\tau^*}|_{d\widetilde{p}^w=0} = 0; \quad \frac{dW^*}{dt^*} + \frac{dW^*}{d\tau}\frac{d\tau}{dt^*}|_{d\widetilde{p}^w=0} = 0$$

    implementing t^{*N} and $\tau^{*E}(t^{*N})$

Participation and enforcement linkage

- Within the Green WTO
  - H solves

$$\frac{dW}{d\tau} + \frac{dW}{d\tau^*}\frac{d\tau^*}{d\tau}|_{d\widetilde{p}^w=0} = 0; \quad \frac{dW}{dt} + \frac{dW}{d\tau^*}\frac{d\tau^*}{dt}|_{d\widetilde{p}^w=0} = 0$$

    implementing t^N and $\tau^E(t^N)$

  - F solves

$$\frac{dW^*}{d\tau^*} + \frac{dW^*}{d\tau}\frac{d\tau}{d\tau^*}|_{d\widetilde{p}^w=0} = 0; \quad \frac{dW^*}{dt^*} + \frac{dW^*}{d\tau}\frac{d\tau}{dt^*}|_{d\widetilde{p}^w=0} = 0$$

    implementing t^{*N} and $\tau^{*E}(t^{*N})$

- Same as with GATT/WTO shallow-integration reciprocity and no climate accord

Participation and enforcement linkage

- Within the Green WTO
  - H solves

$$\frac{dW}{d\tau} + \frac{dW}{d\tau^*}\frac{d\tau^*}{d\tau}|_{d\widetilde{p}^w=0} = 0; \quad \frac{dW}{dt} + \frac{dW}{d\tau^*}\frac{d\tau^*}{dt}|_{d\widetilde{p}^w=0} = 0$$

    implementing t^N and $\tau^E(t^N)$

  - F solves

$$\frac{dW^*}{d\tau^*} + \frac{dW^*}{d\tau}\frac{d\tau}{d\tau^*}|_{d\widetilde{p}^w=0} = 0; \quad \frac{dW^*}{dt^*} + \frac{dW^*}{d\tau}\frac{d\tau}{dt^*}|_{d\widetilde{p}^w=0} = 0$$

    implementing t^{*N} and $\tau^{*E}(t^{*N})$

- Same as with GATT/WTO shallow-integration reciprocity and no climate accord
- $\Rightarrow$ Even universal participation in climate accord won't accomplish much unless enforcement of climate commitments goes beyond GATT/WTO reciprocity norms

Negotiation linkage

- Sticking point in the WTO Doha Round: a basic asymmetry
  - BRICS willing to cut tariffs in exchange for reciprocal tariff cuts from industrialized countries, but industrialized countries have few tariffs left to cut and want BRICS to do this non-reciprocally

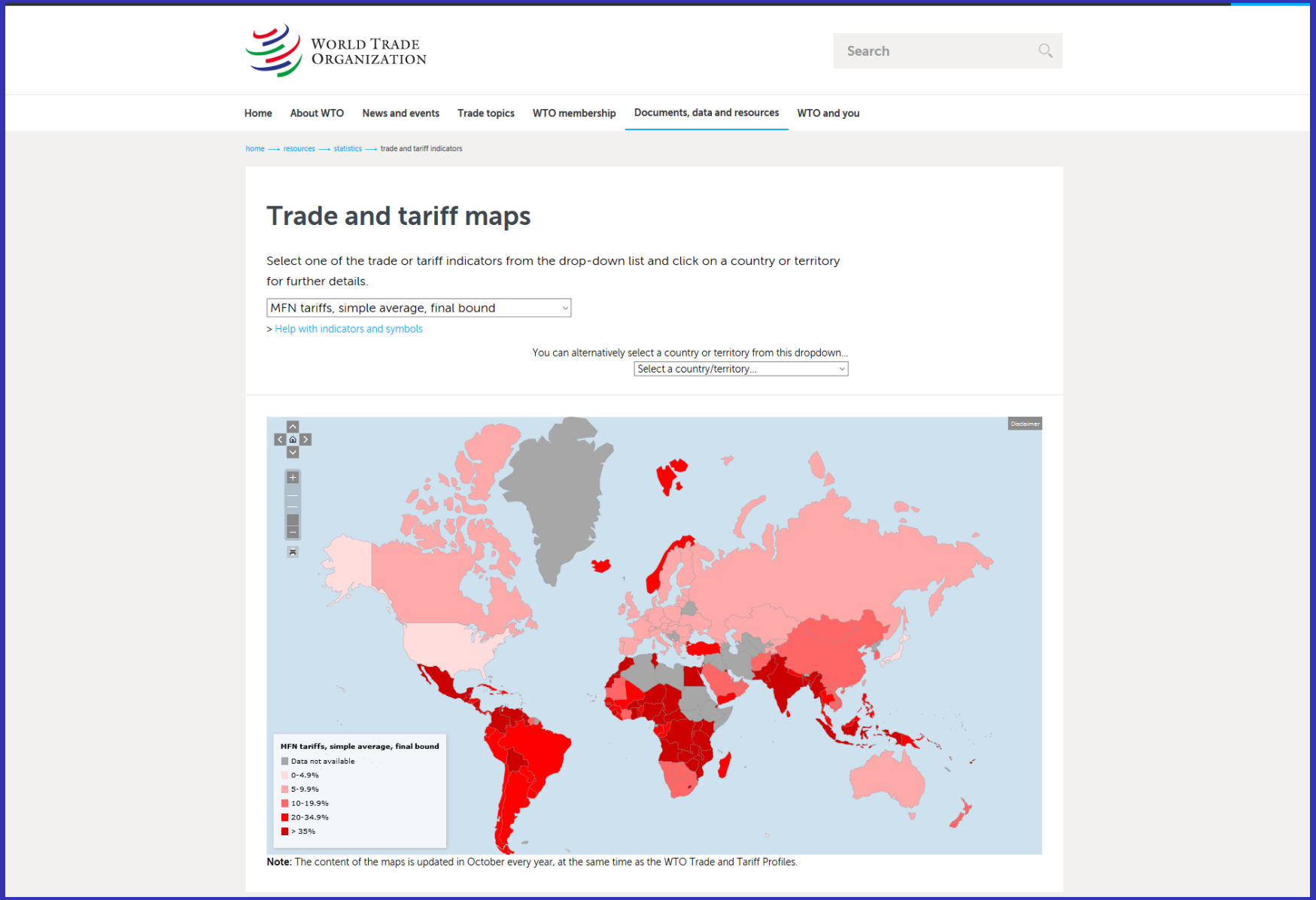
Negotiation linkage

- Sticking point in the WTO Doha Round: a basic asymmetry
  - BRICS willing to cut tariffs in exchange for reciprocal tariff cuts from industrialized countries, but industrialized countries have few tariffs left to cut and want BRICS to do this non-reciprocally
- Sticking point in climate talks: a basic asymmetry
  - industrialized countries willing to adopt high carbon taxes if BRICS also do so, but BRICS view carbon taxes as a threat to development and want industrialized countries to do this non-reciprocally

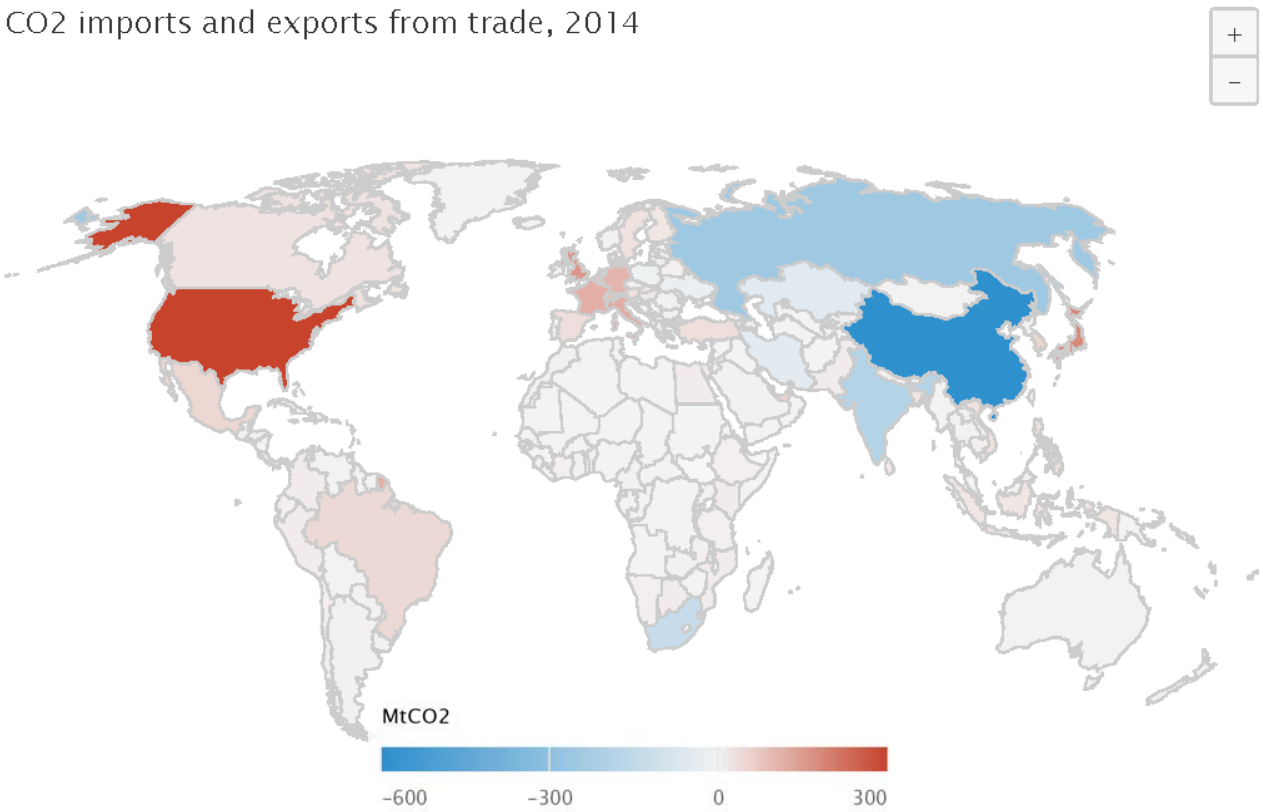
Negotiation linkage

- Sticking point in the WTO Doha Round: a basic asymmetry
  - BRICS willing to cut tariffs in exchange for reciprocal tariff cuts from industrialized countries, but industrialized countries have few tariffs left to cut and want BRICS to do this non-reciprocally
- Sticking point in climate talks: a basic asymmetry
  - industrialized countries willing to adopt high carbon taxes if BRICS also do so, but BRICS view carbon taxes as a threat to development and want industrialized countries to do this non-reciprocally
- An opportunity for negotiation linkage?

BRICS tariff cuts ...



... in exchange for US/EU carbon tax commitments



Global CO2 imports and exports from trade in 2014. Based on data from the Global Carbon Project (http://www.globalcarbonproject.org/carbonbudget/16/data.htm). Note that 2014 is the latest year where CO2 import/export data is available. Also note that the scale goes from -600 to 300MtCO2. Chart by Carbon Brief using Highcharts (https://www.highcharts.com/).

Negotiation linkage

- Would industrialized countries sign on to this if GATT/WTO reciprocity norm was followed in the negotiations?

Negotiation linkage

- Would industrialized countries sign on to this if GATT/WTO reciprocity norm was followed in the negotiations?
  - No, because H has implemented t^N and $\tau^E(t^N)$ by solving

$$\frac{dW}{d\tau} + \frac{dW}{d\tau^*}\frac{d\tau^*}{d\tau}|_{d\widetilde{p}^w=0} = 0; \quad \frac{dW}{dt} + \frac{dW}{d\tau^*}\frac{d\tau^*}{dt}|_{d\widetilde{p}^w=0} = 0$$

  - so H has nothing to gain from a negotiation in which it raises t and F lowers τ^* reciprocally to ensure $d\widetilde{p}^w = 0$

Negotiation linkage

- Would industrialized countries sign on to this if GATT/WTO reciprocity norm was followed in the negotiations?
  - No, because H has implemented t^N and $\tau^E(t^N)$ by solving

$$\frac{dW}{d\tau} + \frac{dW}{d\tau^*}\frac{d\tau^*}{d\tau}|_{d\widetilde{p}^w=0} = 0; \quad \frac{dW}{dt} + \frac{dW}{d\tau^*}\frac{d\tau^*}{dt}|_{d\widetilde{p}^w=0} = 0$$

  - so H has nothing to gain from a negotiation in which it raises t and F lowers τ^* reciprocally to ensure $d\widetilde{p}^w = 0$

- $\Rightarrow$ BRICS must give more than reciprocal tariff cuts in exchange for industrialized country carbon taxes to make this work

Takeaway on Climate Accords

- The success of the GATT/WTO in addressing trade problems makes it an attractive model for other international agreements

Takeaway on Climate Accords

- The success of the GATT/WTO in addressing trade problems makes it an attractive model for other international agreements

- But the structure of the trade problem may be special and not transferable to other problems such as global climate concerns
  - the differences in the nature of the international externality on which I have focused
  - the heightened importance of dynamic considerations/threshold effects associated with global climate concerns
  - other differences?

Takeaway on Climate Accords

- The success of the GATT/WTO in addressing trade problems makes it an attractive model for other international agreements

- But the structure of the trade problem may be special and not transferable to other problems such as global climate concerns
  - the differences in the nature of the international externality on which I have focused
  - the heightened importance of dynamic considerations/threshold effects associated with global climate concerns
  - other differences?

- What is needed is careful analysis to identify and understand the differences and commonalities across problems
  - and what these imply for effective institutional design

Takeaway on Climate Accords

- Moreover, GATT was the result of decades of trial and error
  - built on lessons learned from 19th and early 20th century European experience and the 1934 US RTAA

Takeaway on Climate Accords

- Moreover, GATT was the result of decades of trial and error
  - built on lessons learned from 19th and early 20th century European experience and the 1934 US RTAA
- With climate problems, can't wait decades to get it right, elevating the value of lessons from successful institutional design in other areas

Takeaway on Climate Accords

- Moreover, GATT was the result of decades of trial and error
  - built on lessons learned from 19th and early 20th century European experience and the 1934 US RTAA
- With climate problems, can't wait decades to get it right, elevating the value of lessons from successful institutional design in other areas
- What can the Economics of Trade Agreements teach us about the design of Climate Accords?

Takeaway on Climate Accords

- Moreover, GATT was the result of decades of trial and error
  - built on lessons learned from 19th and early 20th century European experience and the 1934 US RTAA
- With climate problems, can't wait decades to get it right, elevating the value of lessons from successful institutional design in other areas
- What can the Economics of Trade Agreements teach us about the design of Climate Accords?
- No silver bullet, but with careful analysis, potentially useful insights may emerge

Final Thoughts

- It is important to understand
  - why GATT worked
  - the economic environment it is best suited for
  - whether changes in the economic environment imply the need for changes in design of trade agreements
- At stake is
  - the future path of globalization
  - which international institutions will set the rules of globalization
  - what trade-offs we will face in our globalized world
- Twenty five years ago Paul Krugman coined the phrase 'GATT-think':

  ...a simple set of principles that is entirely consistent, explains most of what goes on in the negotiations, but makes no sense in terms of economics.

- Many open questions remain, but from this starting point the economic analysis of trade agreements has made important progress