Harmonization...What Else? The Role for International Regulatory Agreements

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DEEP INTEGRATION

Trade agreements





DEEP INTEGRATION



Controversy



"This is why harmonisation risks lowering our standards to the lowest common denominator. Again, harmonisation was a demand of big business that European trade negotiators included with little changes into the regulatory cooperation chapters of CETA and TTIP."

Corporate Europe Observatory (2017)

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Benefits versus costs of regulatory diversity



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Benefits versus costs of regulatory diversity



► How does this tradeoff affect Nash vs. cooperative eq?

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Benefits versus costs of regulatory diversity



- ► How does this tradeoff affect Nash vs. cooperative eq?
- Costs of regulatory diversity:

"... usually a *fixed cost*. You pay for this certification once from time to time, and this cost is not related to the volume traded." (Lamy, 2015)

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Main questions

What is the role of international regulatory agreements?

Does non-cooperative behavior lead to diversity when harmony is efficient, or vice-versa? And if so, why?

MAIN QUESTIONS

- What is the role of international regulatory agreements?
 - Does non-cooperative behavior lead to diversity when harmony is efficient, or vice-versa? And if so, why?
- Political economy: how does lobbying affect the regulatory regime in the non-cooperative and cooperative scenarios?
 - Pop Critique: big firms push for harmonization because it serves their interests, at the expense of general welfare

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MAIN TAKEAWAYS

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MAIN TAKEAWAYS

- ► (Inefficient) Harmony may arise non-cooperatively
 - ...and agreement may serve to diversify

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- With intra-industry trade, agreements may have a pure "coordination" role
 - ...and might help govs coordinate on diversity regime

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Main takeaways

- (Inefficient) Harmony may arise non-cooperatively
 ...and agreement may serve to diversify
- With intra-industry trade, agreements may have a pure "coordination" role
 - ...and might help govs coordinate on diversity regime
- Lobbying makes harmonization more likely
 - In this case harmonization may decrease welfare
 - But agreements per se are not the problem

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Related literature

- "Old" vs "new" trade agreements: Grossman, McCalman and Staiger (2021)
 - Semi-fixed costs (product specification costs)
 - Free entry, no political economy
- Protectionist role of standards in a noncooperative scenario: Fischer and Serra (2000), Suwa-Eisenmann and Verdier (2002)
- Regulatory cooperation without fixed costs of regulatory diversity: Costinot (2008), Maggi and Ossa (2021), Parenti and Vannoorenberghe (2022)
- Quantification of welfare effects of "National Treatment" rule for standards: Mei (2021)
- ▶ Network effects: e.g. Farrell and Klemperer (2007)

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► Two countries, Home and Foreign (*)

symmetric in size and consumer preferences

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- ▶ Local consumption externality, worse if *e* is higher

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- Zero trade costs

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Two scenarios

- A single firm at Home \rightarrow *one-way trade*
- ► Cournot duopoly with symmetric firms → *intra-industry trade* à la Brander-Krugman

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Regulatio	DN			

Home and Foreign govs set *exact* product standards for the good sold in the local market (*e* and *e** respectively)

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 - If e = e*, firm incurs F whether it serves one or both markets
 - If $e \neq e^*$, the firm incurs *F* for each market served
- Possible interpretation:
 - Certification/conformity assessment costs
 - Information costs, specification costs

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$$\tilde{W}(e, e^*) = CS(e) - \alpha E(e) + \pi(e) + \pi(e^*) - n(e, e^*)F$$

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► *CS*: consumer surplus (in reduced form)

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• e.g. an increasing function of total pollution $e \cdot d(p(e))$

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Home welfare

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- *n* is the number of supplied varieties
 - If $e = e^*$ then n = 1

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Home welfare

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- *α* captures the weight that Home attaches to this externality
- π(e) and π(e*) are the profits made in the Home and Foreign markets respectively
- *n* is the number of supplied varieties
 - If $e = e^*$ then n = 1
 - If $e \neq e^*$ then n = 2

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Home's preferred standard

$$\tilde{W}(e,e^*) = \underbrace{CS(e) - \alpha E(e) + \pi(e) + \pi(e^*)}_{W(e,e^*)} - n(e,e^*)F$$

- W: Home welfare gross of fixed costs
 - Assume W is single-peaked in e
 - Home's "preferred" standard is $e_W = \arg \max W$

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W: Home welfare gross of fixed costs
Assume W is single-peaked in e
Home's "preferred" standard is e_W = arg max W

Total surplus (gross of fixed costs) arising in Home:

- $\blacktriangleright S(e) = CS(e) \alpha E(e) + \pi(e)$
- Surplus maximizing standard: $e_S = \arg \max S$

• Note:
$$e_W = e_S$$
 in this setting

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$$\tilde{W}^{*}(e^{*}) = W^{*}(e^{*}) = CS(e^{*}) - \alpha^{*}E(e^{*})$$

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$$\tilde{W}^{*}(e^{*}) = W^{*}(e^{*}) = CS(e^{*}) - \alpha^{*}E(e^{*})$$

 α* captures the weight that Foreign attaches to the externality

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$$\tilde{W}^{*}(e^{*}) = W^{*}(e^{*}) = CS(e^{*}) - \alpha^{*}E(e^{*})$$

- α* captures the weight that Foreign attaches to the externality
- Foreign's "preferred" standard: $e_W^* = \arg \max_{a^*} W^*$

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$$\tilde{W}^{*}(e^{*}) = W^{*}(e^{*}) = CS(e^{*}) - \alpha^{*}E(e^{*})$$

- *α*^{*} captures the weight that Foreign attaches to the externality
- ► Foreign's "preferred" standard: $e_W^* = \arg \max_{e^*} W^*$

- ► Total surplus (gross of fixed costs) arising in Foreign:
 - $S^*(e^*) = CS(e^*) \alpha^* E(e^*) + \pi(e^*)$
 - Surplus maximizing standard: $e_S^* = \arg \max S^*$
 - Foreign does not care about Home firm's profits: $e_W^* < e_S^*$

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PRODUCT-STANDARD-SETTING GAME

- Simultaneous move game:
 - Home chooses e to maximize \tilde{W}
 - Foreign chooses e^* to maximize \tilde{W}^*

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Product-standard-setting game

- Simultaneous move game:
 - Home chooses *e* to maximize \tilde{W}
 - ▶ Foreign chooses e^{*} to maximize W̃^{*}
- ► How does the equilibrium outcome depend on:
 - *F*: cost of regulatory diversity
 - |α α*|: heterogeneity of "fundamental" preferences



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► Int'l externalities exerted by Foreign's choice of standard:

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- ► Int'l externalities exerted by Foreign's choice of standard:
 - ▶ Baseline externality: tighter *e*^{*} reduces Home profits

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 - Positive "matching externality": given *e*, if Foreign chooses a matching *e** it reduces the Home firm's fixed cost

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 - ▶ Baseline externality: tighter *e*^{*} reduces Home profits
 - Positive "matching externality": given *e*, if Foreign chooses a matching *e*^{*} it reduces the Home firm's fixed cost
- Home's choice of standard does not affect Foreign in this setting
- The matching externality might suggest that an agreement should encourage harmonization. But this intuition is not quite correct...

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Home government reaction function

$$\max_{e} \tilde{W}(e, e^{*}) = W(e, e^{*}) - n(e, e^{*})F$$

$$e_W = rg\max_e W(e, e^*)$$



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Foreign reaction function

$$\max_{e^*} \tilde{W}^*(e^*) = \max_{e^*} W^*(e^*) \qquad e^*_W = \arg\max_{e^*} W^*(e^*)$$



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Nash equilibrium



 $\hat{\alpha}$: value of α^* such that *regulatory* preferences are the same: $e_W = e_W^*$

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California/Brussels effect

- Do we observe spontaneous harmony in reality?
- Several studies have found evidence of the so-called "California" or "Brussels" effect: a tendency of product standards to ratchet upwards towards levels found in high-regulating countries
 - See for ex. Vogel (1995), Bradford (2019)

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COOPERATIVE STANDARDS

Home and Foreign choose *e* and *e*^{*} to maximize joint welfare

$$\max_{e,e^*} [\tilde{W}(e,e^*) + \tilde{W}^*(e^*)] = \max_{e,e^*} [S(e) + S^*(e^*) - n(e,e^*)F]$$

Implicitly assumes international transfers available

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Implicitly assumes international transfers available

Efficient diversified standards:

$$e_S = rg\max_e S(e) = e_W$$
 and $e_S^* = rg\max_{e^*} S^*(e^*) > e_W^*$

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COOPERATIVE STANDARDS

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Implicitly assumes international transfers available

Efficient diversified standards:

$$e_S = \operatorname*{arg\,max}_e S(e) = e_W$$
 and $e_S^* = \operatorname*{arg\,max}_{e^*} S^*(e^*) > e_W^*$

▶ Harmonization is efficient iff there exists *e*_{*H*} such that:

$$S(e_S) + S^*(e_S^*) - F \le S(e_H) + S^*(e_H)$$

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Cooperative equilibrium



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Cooperative equilibrium



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Cooperative equilibrium



• $\frac{|\alpha^* - \alpha|}{F}$ small \Rightarrow *Harmony*

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How cooperation affects the regulatory regime



► Harmonization (*H*) if

$$\begin{cases} \frac{|\alpha^* - \alpha|}{F} \\ \frac{|\alpha^* - \hat{\alpha}|}{F} \end{cases}$$

sufficiently small sufficiently large

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How cooperation affects the regulatory regime



Harmonization (H) if

 $\begin{cases} \frac{|\alpha^* - \alpha|}{F} & \text{sufficiently small} \\ \frac{|\alpha^* - \hat{\alpha}|}{F} & \text{sufficiently large} \end{cases}$

Diversification (D) if



 $\begin{cases} \frac{|\alpha^* - \alpha|}{F} & \text{sufficiently large} \\ \frac{|\alpha^* - \hat{\alpha}|}{F} & \text{sufficiently small} \end{cases}$

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How cooperation affects the regulatory regime



► Harmonization (*H*) if

 $\begin{cases} \frac{|\alpha^* - \alpha|}{F} & \text{sufficiently small} \\ \frac{|\alpha^* - \hat{\alpha}|}{F} & \text{sufficiently large} \end{cases}$

▶ Diversification (*D*) if

 $\begin{cases} \frac{|\alpha^* - \alpha|}{F} & \text{sufficiently large} \\ \frac{|\alpha^* - \hat{\alpha}|}{F} & \text{sufficiently small} \end{cases}$

 Otherwise cooperation maintains regime (*M_D*, *M_H*) and only changes standards *levels*



Political Economy: Non-cooperative equilibrium





Political Economy: Non-cooperative equilibrium



 $\hat{\alpha}_{\gamma=1}$ $\hat{\alpha}_{\gamma>1}$

- Home gov's objective under lobbying: $\tilde{W} + (\gamma - 1)(\pi + \pi^* - nF)$
- Foreign gov's objective as before
- Lobbying shifts down the spontaneous harmony region
 - Intuition: Home preferred standard gets looser, so â ↓

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Political Economy: Cooperative equilibrium

The agreement maximizes



Political Economy: Cooperative equilibrium



The agreement maximizes

 $\tilde{W}^w + (\gamma - 1)(\pi + \pi^* - nF)$

- Lobbying increases likelihood of cooperative harmony (under conditions)
 - Intuition: firm cares about *F*, not about the environment

The Pop Critique



• Intermediate $\frac{|\alpha - \alpha^*|}{F}$: the politically-pressured agreement does Harmony, while efficiency requires Diversity

The Pop Critique



- Intermediate $\frac{|\alpha \alpha^*|}{F}$: the politically-pressured agreement does Harmony, while efficiency requires Diversity
- In Brown, the agreement inefficiently harmonizes standards with γ > 1
 - The agreement can never inefficiently diversify
- Pop Critique may be right?
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The problem may not lie in the agreement:



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 - Lobbying may lead to inefficient spontaneous harmony



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 - Lobbying may lead to inefficient spontaneous harmony
 - Lobbying reduces overlap between spontaneous harmony and efficient harmony regions
 - ...so lobbying reduces the likelihood of efficient spontaneous harmony



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Same setting as above, but different market structure

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Same setting as above, but different market structure

Cournot duopoly with symmetric firms

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Same setting as above, but different market structure

Cournot duopoly with symmetric firms

Firms make symmetric profits π(e) in the Home market and π(e*) in the Foreign market

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- Same setting as above, but different market structure
 - Cournot duopoly with symmetric firms
- Firms make symmetric profits π(e) in the Home market and π(e*) in the Foreign market
- ► Home and Foreign reaction functions are similar, but shifted because $\alpha \neq \alpha^*$

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The agreement doesn't tinker much with regulatory *regime*, unlike the monopoly case

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- The agreement doesn't tinker much with regulatory *regime*, unlike the monopoly case
- For intermediate $|\alpha \alpha^*|/F$, the agreement *weakly* harmonizes (*H*) or diversifies (*D*)

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- The agreement doesn't tinker much with regulatory *regime*, unlike the monopoly case
- For intermediate $|\alpha \alpha^*|/F$, the agreement *weakly* harmonizes (*H*) or diversifies (*D*)
- The agreement corrects standards *levels*, but...

Introduction	Basic model	One-way trade	Intra-industry trade	Conclusion
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 ... if *F* relatively large and α close to α*, efficient standards are a Nash equilibrium, so agreement has a pure coordination role



Political economy



 Under lobbying, agreement may entail inefficient harmony



Political economy



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Political economy



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Introduction 000000	Basic model 000	One-way trade 000000000000000	Intra-industry trade 00000	Conclusion

Conclusion

- The role of regulatory agreements depends crucially on whether trade is one-way or two-way in a given industry
- ► If trade is one-way:
 - Cooperation may promote harmony or diversity, and it always corrects standards levels
 - Under some conditions there is "spontaneous harmony" but the agreement encourages diversity
 - Under lobbying a harmonization agreement is more likely, and can reduce welfare (Pop Critique)
- ► If trade is intra-industry:
 - Agreements weakly change the regulatory regime
 - Under some conditions they play a *pure* coordination role
 - Lobbying can lead to inefficient harmonization, but it is not agreements *per se* that cause the problem.

Cost of regulatory diversity

"... is usually a *fixed cost*. You pay for this certification once from time to time, and this cost is not related to the volume traded." (Lamy, 2015)

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Two types of fixed costs:



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Two types of fixed costs:



▶ OECD (2017):

- 1. Information costs \rightarrow fixed or semi-fixed
- 2. Specification costs \rightarrow fixed or semi-fixed
- 3. Conformity assessment costs \rightarrow fixed



Product standard



Product standard

Conformity assessment procedure



Product standard

Conformity assessment procedure

Conformity assessment agency



Product standard

Conformity assessment procedure

Conformity assessment agency



Product standard

Conformity assessment procedure

Conformity assessment agency





Extensions 0000

Lobbying and Spontaneous Harmony

Harmony and Div are equally efficient iff

$$\gamma F = \underbrace{W(e_W) - W(e_W^*)}_L$$

- $\gamma \uparrow$ tilts the balance towards Harmony iff $\varepsilon_{L,\gamma} < 1$.
- Differentiating L with respect to γ and applying the envelope theorem yields:

$$\varepsilon_{L,\gamma} < 1 \Leftrightarrow \tilde{CS}(e_W) - \tilde{CS}(e_W^*) > 0$$
 where $\tilde{CS} = CS - \alpha E$

Lobbying and Cooperative Harmony

Harmony and Div are equally efficient if

$$\gamma F = max_{e,e^*}S^w - max_{e=e^*}S^w \equiv L$$
, where $S^w \equiv \tilde{CS}^w + \gamma \pi^w$

- $\gamma \uparrow$ tilts the balance towards Harmony iff $\varepsilon_{L,\gamma} < 1$
- Applying envelope thm and simplifying: $\varepsilon_{L,\gamma} < 1$ iff $\tilde{CS}_{Div}^{w} > \tilde{CS}_{Harm}^{w}$ (world consumers better off under Div)

FOCs:
$$\tilde{CS}'(e_s) + \gamma \pi'(e_s) = 0$$
 and $\tilde{CS}^{*'}(e_s^*) + \gamma \pi'(e_s^*) = 0$

► If $\pi'(e)$ is diminishing and e_H not too far from $\frac{e_S + e_S^*}{2}$, the higher-*e* country has lower marginal consumer loss, hence moving standards toward each other reduces \tilde{CS}^w , and therefore $\varepsilon_{L,\gamma} < 1$

DUOPOLY

- ► Cournot duopoly with symmetric firms → intra-industry trade à la Brander-Krugman
- Firms make symmetric profits π(e) in the Home market and π(e*) in the Foreign market

$$\tilde{W} = \underbrace{CS(e) - \alpha E(e) + \pi(e) + \pi(e^*)}_{W(e,e^*)} - n(e,e^*)F$$

$$\tilde{W}^* = \underbrace{CS(e^*) - \alpha^* E(e^*) + \pi(e^*) + \pi(e)}_{W^*(e^*, e)} - n(e, e^*)F$$

GOVERNMENT REACTION FUNCTIONS

► Home and Foreign reaction functions are similar, but shifted because $\alpha \neq \alpha^*$












COOPERATIVE EQUILIBRIUM



Qualitatively similar as in monopoly case

- International policy externalities: foreign-profit and matching externalities
 - Similar to monopoly case, but foreign-profit externality is two-ways, and "matching externality" is more symmetric
- Again, cursory intuition might suggest regulatory harmony is "under-provided" in non-cooperative scenario, but in general this is not the case.
- Overlay Nash and cooperative parabolas using numerical approach: assume constant-elasticity *c*(*e*); consider both linear and constant-elasticity *d*(*p*).
 - Analytical work still in progress



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 ...if *F* relatively large and α close to α*, efficient standards are a Nash equilibrium, so agreement has at best a pure coordination role

Political economy: Cooperative equilibrium



Political economy: Cooperative equilibrium

- --- A: $\gamma = 1 ---- A : \gamma > 1$ α^* DivHarmony 0 Div.....
- Lobbying expands the cooperative harmony region

Political economy: Cooperative equilibrium



- Lobbying expands the cooperative harmony region
 - Intuition: as in monopoly case, plus, as γ ↑ govs' objectives become more aligned with profits and with each other

Political economy: Non-cooperative equilibrium



Political economy: Non-cooperative equilibrium

— N: $\gamma = 1$ ----- N: $\gamma > 1$



 Unlike the monopoly case, lobbying also makes spontaneous harmony more likely

The Pop Critique



 Under lobbying, agreement may entail inefficient harmony

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Complete policy instruments

- Suppose there are transfers between both governments and the Home firm
 - Nash equilibrium will be efficient
 - If the Foreign government can write a perfect contract with the Home firm, this is a perfect substitute for an international contract between Home and Foreign governments
 - Reminiscent of the efficiency of first-degree price discrimination
- There is a role for international regulatory cooperation only in a second-best world where governments do not have a complete set of policy instruments

Firm will serve a given market if it can break even

Firm will serve a given market if it can break even

- ► If $e \neq e^*$,
 - Firm serves Home market iff $e \ge \hat{e}(F)$
 - Firm serves Foreign market iff $e^* \ge \hat{e}(F)$

Firm will serve a given market if it can break even

- ▶ If e ≠ e*,
 ▶ Firm serves Home market iff e ≥ ê(F)
 ▶ Firm serves Foreign market iff e* ≥ ê(F)
- If $e = e^*$, firm serves both markets iff $e = e^* \ge \hat{e}(\frac{F}{2})$

Firm will serve a given market if it can break even

- ▶ If e ≠ e*,
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- If $e = e^*$, firm serves both markets iff $e = e^* \ge \hat{e}(\frac{F}{2})$
- ► In what follows, assume α and F such that Firm always serves Home market $(e_W(\alpha) \ge \hat{e}(F))$

 $\max_{e^*} W^*(e^*) \quad s.t. \quad (PC)$

$$\max_{e^*} W^*(e^*) \quad s.t. \quad (PC) \qquad \qquad e^*_W = \arg\max_{e^*} W^*(e^*)$$

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▶ *PC* binding iff $e_W^*(\alpha^*) < \hat{e}(F) \to F > \hat{F}(\alpha^*)$, where $\hat{F}'(\cdot) < 0$

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▶ *PC* binding iff $e_W^*(\alpha^*) < \hat{e}(F) \to F > \hat{F}(\alpha^*)$, where $\hat{F}'(\cdot) < 0$



Implications of firm's break-even constraint

Multiple harmony equilibria may arise even with one-way trade

Implications of firm's break-even constraint

- Multiple harmony equilibria may arise even with one-way trade
- Cooperative harmony may create trade at the extensive margin

Implications of firm's break-even constraint

- Multiple harmony equilibria may arise even with one-way trade
- Cooperative harmony may create trade at the extensive margin
- Under lobbying, agreement may inefficiently harmonize and create welfare reducing trade