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PONDARA on Reciprocal Tariffs
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Noncooperative game theory (NCGT) can be employed to seek cooperation in a noncooperative setting. A workgroup (WG) has been tasked with using the PONDARA system to identify goals, strategies and risks associated with America's Reciprocal Tariffs Policy (RTP) announced on April 2, 2025. There is concern that the RTP may provoke a major conflict, trade war or other adverse outcomes.

This Note shares the WG's finding that there exists a Nash Equilibrium (NE) strategy profile that may lead to a peaceful resolution and significant benefits to all players identified in the analysis.

Favourable NE Strategy Profile and Payoffs

- America: Reposition = +2
- China: Diversify = +2
- Rest of the World: Negotiate = +1

In this equilibrium, America repositions its RTP, China diversifies its export markets and enhances domestic consumption, and the Rest of the World negotiates exemptions or reductions in tariffs. This strategy profile results in the highest combined payoffs for all players, indicating a stable and mutually beneficial outcome as opportunities presented by America's Reciprocal Tariffs Policy.

Given the respective definition of the strategies, this strategy profile (R, D, N) implies necessary negotiations and resultant adjustments.

Workings

The following workings presents the WG's inputs and analysis of the system.

Structure of the RTP Situation per NCGT

Players:

- America (A),
- China (C),
- Rest of the World (W)

Rules – Sequence of Events and Actions:

1. C's Beijing government led by the CCP began governing Mainland China in 1949.
2. C's pre-1949 government led by KMT retreated to Taiwan in 1949.
3. A and C were geopolitical rivals up to 1978, but normalized their relationship since.
4. A and C reached an accord on a one-China policy.
5. A further normalized its trade relation with C in 2000.
6. C joined WTO in 2001, seeing current account surplus rising from 17.4B in 2001 to 252.99B in 2023 in current USD.
7. A's current account deficit during the period rose from 11.61B to 905.38B.
8. W's current account surplus during the period rose from 376.68B to 652.39B.
9. A's trade deficit means corresponding capital inflow into A for buying its financial assets.
10. A's current administration considers such capital inflow amounts to depletion of American ownership and dominance.
11. A announced its RTP on April 2, 2025 to rectify perceived imbalances, trade or otherwise.
12. A seeks to impose reciprocal tariffs at various rates on all trading partners with effect from April 9, 2025.
13. A determines the reciprocal tariff rate applicable to a country is one-half of the quotient of A's deficit with that country from trade in goods divided by import of goods from that country. The rates thus computed are subject to a minimum of 10%.
14. A imposes on C said reciprocal tariff at 34%, resulting in tariffs on all its imports into A at rates well above 54% considering previously imposed tariffs.
15. C retaliates by announcing a reciprocal tariff at 34% on all imports from A.
16. W's response to A's RTP have been mixed. Some countries are expected to retaliate while some may concede.

Actions Available to Each Player

America (A):

1. Increase domestic production.
2. Seek new trade partners to diversify trade relationships.
3. Provide subsidies to mitigate impact on consumers and businesses.

China (C):

1. Diversify export markets to reduce dependency on the American market.
2. Enhance domestic consumption to offset the impact of reduced exports.
3. Implement retaliatory measures to pressure America to reconsider the RTP.

Rest of the World (W):

1. Form alliances to collectively respond to America's RTP.
2. Negotiate exemptions or reductions in tariffs through diplomatic negotiations.
3. Enhance regional trade to reduce dependency on American markets.

Possible Outcomes and Payoffs

1. Reduction in trade and investment, global recession, and supply chain disruptions.
2. Increase risks of inflation and stagflation (rising inflation and unemployment).
3. Realignment of capital and trade routes.
4. Diversification of supply chains and formation of new trade alliances.

America (A)

1. Increased domestic production and job creation.
2. Reduced trade deficit and capital inflow as operation of the balance of payment.
3. Higher consumer prices due to higher prices on imported goods.
4. Retaliation from other countries, leading to reduced exports.

China (C)

1. Diversified markets and reduced dependency on the American market.
2. Strengthened domestic market, increase in domestic consumption and production.
3. Reduced exports to America, impacting economic growth.
4. Uncertainty due to trade and geopolitical tensions.

Rest of the World (W)

1. New trade opportunities with countries affected by America's RTP.
2. Strengthened regional trade, enhanced trade agreements and cooperation.
3. Economic disruption in global trade and investment flows.
4. Increased prices for goods and services due to higher tariffs.

Potential Nash Equilibrium Strategies

A Nash Equilibrium occurs when no player can improve their payoff by unilaterally changing their strategy, given the strategies of the other players.

Strategies:

1. America (A)

- Impose RTP (IR): Implement Reciprocal Tariffs as announced.
- Negotiate (N): Seek to negotiate new trade agreements or exemptions.
- Reposition (R): Revoke or reduce the RTP.

2. China (C)
  - Retaliate (RT): Impose reciprocal tariffs on American imports.
  - Negotiate (N): Seek to negotiate with America to reduce tariffs.
  - Diversify (D): Focus on diversifying export markets and enhancing domestic consumption.

3. Rest of the World (W)
  - Retaliate (RT): Impose tariffs on American imports.
  - Negotiate (N): Seek to negotiate exemptions or reductions in tariffs.
  - Form Alliances (FA): Form alliances to collectively respond to America's RTP.

Payoff Matrix

To simplify the analysis, we will consider a 3x3x3 payoff matrix where each cell represents the payoffs for A, C, and W based on their chosen strategies. The payoffs represent the relative benefits or costs to each player as identified in the analysis.

America (A)	China (C)	Rest of the World (W)	Payoffs (A, C, W)
IR	RT	RT	(-3, -3, -3)
		N	(-2, -3, -1)
		FA	(-3, -3, -2)
	N	RT	(-1, -2, -2)
		N	(0, -1, 0)
		FA	(-1, -1, -1)
	D	RT	(-1, -1, -2)
		N	(0, 0, 0)
		FA	(-1, 0, -1)
N	RT	RT	(-2, -2, -2)
		N	(-1, -2, -1)
		FA	(-2, -2, -2)
	N	RT	(0, -1, -1)
		N	(1, 0, 1)
		FA	(0, 0, 0)
	D	RT	(0, 0, -1)
		N	(1, 1, 1)
		FA	(0, 1, 0)
R	RT	RT	(-1, -1, -1)
		N	(0, -1, 0)
		FA	(-1, -1, -1)
	N	RT	(1, 0, -1)
		N	(2, 1, 1)
		FA	(1, 1, 0)
	D	RT	(1, 1, -1)
		N	(2, 2, 1)
		FA	(1, 2, 0)

Identifying Nash Equilibrium

To find the Nash Equilibrium, we need to identify the strategy profiles where no player can improve their payoff by unilaterally changing their strategy.

1. America (A)

  - If A chooses IR, the best responses for C and W are D and N, respectively, leading to payoffs (0, 0, 0).
  - If A chooses N, the best responses for C and W are D and N, respectively, leading to payoffs (1, 1, 1).
  - If A chooses R, the best responses for C and W are D and N, respectively, leading to payoffs (2, 2, 1).

2. China (C)

  - If C chooses RT, the best responses for A and W are N and N, respectively, leading to payoffs (-1, -2, -1).
  - If C chooses N, the best responses for A and W are N and N, respectively, leading to payoffs (1, 0, 1).
  - If C chooses D, the best responses for A and W are N and N, respectively, leading to payoffs (2, 2, 1).

3. Rest of the World (W):

  - If W chooses RT, the best responses for A and C are R and D, respectively, leading to payoffs (1, 1, -1).
  - If W chooses N, the best responses for A and C are R and D, respectively, leading to payoffs (2, 2, 1).
  - If W chooses FA, the best responses for A and C are R and D, respectively, leading to payoffs (1, 2, 0).

Nash Equilibrium Strategy Profile

The Nash Equilibrium strategy profile is where no player can improve their payoff by unilaterally changing their strategy. Based on the analysis, the Nash Equilibrium strategy profile is:

- America (A): Reposition (R)
- China (C): Diversify (D)
- Rest of the World (W): Negotiate (N)

Payoffs: (2, 2, 1)

Given the respective definition of the strategies, this strategy profile (R, D, N) implies necessary negotiations and resultant adjustments.