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A Note on Trade Under Regime Uncertainty

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Abstract
Trade is generally good for economies. This finding permeates economics, though there are still attempts to undermine it. There are stylized game-theoretic models that may indicate strategic benefits to tariffs, but even these models do not necessarily address the secondary effects of erratic tariff policies. When tariff policies are difficult to predict, the policy uncertainty creates its own negative pressure on production. This note speaks to the concept that there are more than two players in a trade war.

JEL Codes: F13; F36; H80
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I. Introduction

Trade wars are generally not most economists' preferred mode of operating an economy. Rather, economists generally view international trade as positive for economic growth, with significant research to support this position (Krugman 1997; Bhagwati 2004; Boudreaux 2008; Furceri, et al. 2020; Griswold and Packard 2024). This note highlights further issues that may arise when trade wars are conducted erratically. The uncertainty that quick-moving and constantly shifting tariff policies create may lead to unintended consequences for the nations at war.

Trade generally increases productivity through its reliance on comparative advantage (where the lowest-opportunity-cost provider is the one who produces a good) and the division of labor (where productivity is increased by splitting the tasks between actors). The low-cost provider either uses fewer resources in production or allows the better producer of other goods to spend time producing that for which he or she is best suited, and the divided labor allows for increased efficiency in time management at the bare minimum. Overall, trade

reduces resource use and waste, allowing economies to grow wealthier than they otherwise would. These concepts have been generally understood in economics since Adam Smith[1] and David Ricardo.

There are times when government authorities see a potential opportunity to create additional value for their own country at the expense of others (as is theoretically possible in stylized models). If a country introduces tariffs on imports, less competitive producers within that country will benefit from the reduced competition. This benefit goes to the less competitive producers in the form of increased production and to the government in the form of revenue generated from the tariffs. The cost is borne by the consumers within the country that implements the tariffs, as the tax is paid by the country purchasing the tariffed items. Generally, this lowers the overall wealth of both countries: (1) Producers in the foreign country have fewer sales and less production, (2) consumers in the home country are paying more for products than they were previously, (3) the gain is split between home producers and the government, and (4) at home, the total gain is less than the total loss. This situation creates deadweight loss in the form of fewer items purchased by consumers than otherwise (consumption losses) and in the form of using additional resources to produce goods in less efficient ways (production losses).

II. Stylized Tariff Models

In very stylized examples, a home country may wield sufficient market power to force foreign producers to lower their prices to continue to sell to the home country. The country must be sufficiently large as a consumer pool, and the foreign country must be sufficiently small. If the foreign country is large enough, it will be able to withhold sales to drive the price back up rather than having to respond with lowered prices. In the case in which the large home country can flex its power against the smaller foreign country, an optimal tariff is possible. This tariff is set at a rate that generates gains for the home country at the expense of the foreign country. Home consumers would still pay higher prices for their products, but not as high as when foreign producers did not lower prices. Also, greater government revenue is generated to offset this loss to home consumers.

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[1] Though David Ricardo is credited with explicitly introducing the concept of comparative advantage to the economics profession, Adam Smith was wary of the impact that high duties and prohibitions of trade would have on productivity and wealth (see Henderson 2024; Baltzan 2025).

In an early response to the Trump administration's tariff activity,[2] Rodriguez-Clare and Costinot (2025) note that the "optimal tariff argument assumes that when foreigners face higher trade barriers in the United States, they sit idle, get poorer, and do not impose their own tariffs on US goods." The authors further note that the administration views "tariffs as a game of chicken. Provided that the United States is committed to high tariffs, they believe that foreigners will choose to maintain their own tariffs low for fear of entering a costly trade war against the United States. The game of chicken, however, is the wrong metaphor to think about trade wars. Trade wars are best viewed as a prisoners' dilemma."

To illustrate those ideas, the games are below.[3] The chicken game models two cars racing toward one another in the classic (and dangerous) game of chicken. The optimal outcome is for at least one player (A or B) to swerve at the last second. If at least one player swerves, players register a loss or a tie, but at least there was not a crash. Players who put particular value on winning increase the likelihood of a crash. The rational play in this game is to strongly signal a willingness to crash, forcing the opponent to swerve after admitting the strength of your commitment.

Table 1. Chicken game

	B: Swerve	B: Straight
A: Swerve	Tie, Tie	Lose, Win
A: Straight	Win, Lose	Crash, Crash

We can view this strategy in terms of tariff payoffs also. If both countries collect tariffs, both sides bear continuing and significant losses. If the home country can signal a commitment to continued punishment, it can induce the foreign country to remove its tariffs in order to minimize the damage. If the foreign country does so, the home country can gain at the expense of the foreign country.

[2] In early formulations of the administration's tariff policy, the 20 percent optimal tariff was referenced. In a 2024 publication, future economic adviser Stephen Miran (2024, p. 25) cited Rodriguez-Clare and Costinot as the source for that number. This number was derived from a previous model in Costinot and Rodriguez-Clare (2014, pp. 227–28), and its use in the policy discussions led the authors to respond in their 2025 piece to clarify the very stylized models used to reach 20 percent.

[3] All numerical valuations are intended to be illustrative rather than derived from a formula.

Table 2. Tariff chicken game

	Foreign: Don't tariff	Foreign: Tariff
Home: Don't tariff	\$3, \$3	\$0, \$4
Home: Tariff	\$4, \$0	-\$1, -\$1

As Davila et al. (2025, pp. 9–10) illustrate,[4] the ability to do this depends entirely on the market power of the home country. If the foreign country has alternative locations to send its goods to, the chicken strategy is less likely to work, as the foreign country will also have a strong commitment to maintaining its tariffs. It is also likely the case that a country has market power in producing one set of goods but not another (again because of comparative advantage). If both countries have a comparative advantage in different areas of production, retaliatory tariffs can potentially alter the payoff matrix. In either case, the game may be better understood as a prisoners' dilemma.

The prisoners' dilemma stems from the scenario in which two prisoners are held in different cells. They are asked to testify against one another in return for a reduced sentence. This game is modeled in table 3, where each box indicates years in prison resulting from the prisoners' actions.

Table 3. Prisoners' dilemma

	B: Silent	B: Testify
A: Silent	1 year, 1 year	5 years, 0 years
A: Testify	0 years, 5 years	3 years, 3 years

The payoffs of the prisoners' dilemma illustrate the incentive to testify. If Prisoner A testifies, he will be released in a plea deal. This deal will reduce the sentence from one year to zero years, creating an incentive for A to testify. Prisoner B has the same payoffs and will likely come to the same conclusion. If A knows that B is likely to testify, then A's testimony will reduce his own time from five years to three years. Whether B testifies or not, it remains in A's interest to testify. In this example, it is mostly likely that both prisoners will testify and serve three years each.

[4] Rodriguez-Clare and Costinot (2025) also stress this in their response to being cited in Miran (2024) as reasons for the current administration's tariff policy.

Table 4. Tariff prisoners' dilemma

	Foreign: Don't tariff	Foreign: Tariff
Home: Don't tariff	\$2, \$2	\$0, \$4
Home: Tariff	\$4, \$0	\$1, \$1

As before, we can put this scenario into tariff terms. If the home country can only inflict some damage on the foreign country, then the foreign country may find it preferable to tariff items with which it can also inflict some concessions than to not respond. In this payoff matrix, both countries find it preferable to institute tariffs. If A does and B does not, A will receive a higher payoff. If B does, then A is also better off instituting a tariff. However, both countries would be better off without a tariff if there were a credible commitment to not having tariffs. In this case, the optimal way out is to sign a trade agreement recognizing that it is better for neither to have tariffs than both. Under this payoff matrix, negotiation is key.

Importantly, commitment is also key. Partly, the commitment between the two countries must be credible for this agreement to be stable. The international trade literature generally refer to signed trade agreements, such as the United States-Mexico-Canada Agreement, or USMCA. These agreements are a central part of the economic literature on the pros and cons of trade wars.

III. Stylized Tariffs Models Under Uncertainty

However, governments are not the only players in trade wars. Businesses within the home country must also consider how the trade war may play out. Producers who generally operate with a mix of home and foreign production, bringing intermediate goods back and forth over the international boundary, may be susceptible to large disruptions in the trade flows from tariffs.

When the changes happen rapidly and unpredictably, businesses must address the costs of such uncertainty. While there are many important issues to cover regarding optimal tariffs—epistemological issues, conflicting incentives, and general political-economic problems that arise with any state actions[5]—the focus of the current paper is to review the impact of this level of uncertainty. For the sake

[5] For a fuller explanation of robust political economy and the issues of policy making by human actors rather than omniscient and benevolent rulers, see Levy (2002); Leeson and Subrick (2006); Pennington (2011.

of argument, let us assume that universal tariff authority is vested in a single individual. This individual may or may not view economic machinations in the traditional manner. Through their choices, this individual may either strengthen or weaken the usual channels for influencing policy under standard political economy theories. Seemingly erratic decisions on trade policy may make political negotiations riskier, as the chances for stable, successful outcomes are lowered. Unexpected decisions made by this authority figure can produce regime uncertainty, increasing market instability. Regime uncertainty can have deleterious consequences for economic growth (Higgs 1997; Boudreaux 2024). The effects of this uncertainty can also be modeled as a game. Unlike the two-player games of chicken or the prisoners' dilemma, this game is a one-player game of best response. In such a game, the player must decide what the best response is in the face of external factors decided without his input.

The game is presented in table 5. In this payoff matrix, the business that maintains its existing supply lines across international lines can take advantage of its comparative advantage in production to earn the highest rate of return for that production ($4). If the government is credible in its trade negotiations, no tariff is implemented suddenly. However, if the government reneges on agreements and a tariff is instituted at random, the player will find it difficult to adjust those supply lines in the short run. The higher cost of inputs to production at that moment will yield a severe reduction in production (−$2).

Table 5. Business One-Player Game

	Government: credible	Government: reneges
Firm: Don't prepare for tariff	$4	-$2
Firm: Prepare for tariff	$2	$0

A forward-looking business will prefer not to remain in such a state of uncertainty. Rather, firms may attempt to minimize losses by converting supply lines from international to domestic where possible.

In doing so, firms are choosing to switch to less productive processes in the hopes of minimizing the uncertainty regarding their business operations. The restructuring from more efficient to less efficient means of production is well known in the trade-diversion literature: Favorable tariffs induce producers to move to the lower-tariff country (Griswold and Packard 2024). In this case, it would be a move

based not necessarily on the specific tariff but on the more general pattern of less stable and more randomized tariff threats. The result is still that standard production processes would be operating at lower productivity ($2 instead of $4), so the firm can preemptively minimize losses should an actual tariff arise. When the tariff does arrive, the cost-minimizing production process will let the firm feel less of a direct impact ($0 instead of −$2).

This shift in industry behavior would result in changes to the trade game, whether played as a chicken game or a prisoners' dilemma game. In either case, the gain from the tariffs would be lowered. The government does not collect tariff revenue when industries are voluntarily reducing imports, as such revenue is only collected on items that cross the border. No tariff is collected when the goods are simply produced inefficiently. However, consumers would already be suffering from consumption losses prior to the tariff because of the higher production costs, and producers would already be incurring a loss through inefficient resource uses. This implies that even in the state of play in which both countries avoid using tariffs, the payoffs would be lowered.

Should a tariff be applied by one country but not the other, the payoffs would also be lowered. As noted, the voluntary shift of supply lines would have already mitigated the extent of the change in response to a tariff. Since the shift is less dramatic, the government revenue gains would also be less substantial. Similarly, the pain inflicted upon the foreign nation would be less severe. As the home industries have already shifted toward domestic inputs, fewer inputs would be flowing across international lines. This reduction in flows would insulate the foreign industries from more significant price swings due to international demand, making them much less sensitive to the tariff-induced changes. In this scenario, the gain to the home country from a tariff is lessened as is the cost to the foreign country. If a tariff was applied by both countries, the factors would also change the payoffs for this option. As firms have already moved toward domestic production, there would be less sensitivity on each side to the application of additional tariffs.

When modeled as a chicken game, the implication is that it is more difficult to inflict pain upon each other. Neither country remains as sensitive to the swings. If the home country wishes to inflict pain upon the other nation until it reverses the tariff, the continued use of tariff threats and the industry response to this uncertainty mean that the home country must commit to an even costlier tariff game before any such

reversal will occur. Simply put, the foreign country cares significantly less after a specific number of threats.

Table 6. Tariff chicken game under uncertainty

	Foreign: Don't tariff	Foreign: Tariff
Home: Don't tariff	$2, $2	$1, $3
Home: Tariff	$3, $1	$0, $0

When modeled as a prisoners' dilemma, the game may be played similarly but feature fewer gains. The payoffs in table 7 suggest that a detrimental Nash equilibrium could exist and that a trade deal is still the better option to not end up in the tariff-tariff box. However, the gains from doing so are also smaller. The gains from having a domestic tariff and not a foreign one are likewise smaller.

Table 7. Tariff prisoners' dilemma under uncertainty

	Foreign: Don't tariff	Foreign: Tariff
Home: Don't tariff	$2, $2	$1, $3
Home: Tariff	$3, $1	$1.5, $1.5

In either model, the payoffs in every box are lowered relative to the payoffs without uncertainty, suggesting that the tariff threats themselves are detrimental to economic growth. Ridrigue, Shi, and Tan (2024) find that there was less resource misallocation in Chinese firms when trade uncertainty was reduced after China joined the World Trade Organization. This reduction indicates an increase in underallocated or misallocated productive resources while the uncertainty persists. This finding is in line with the results of the stylized payoff models.

Caldara et al. (2020, pp. 54–55) similarly find that a rise in trade tensions—modeled based on news and uncertainty about higher tariffs—leads "to a sizeable decline in investment, consumption, GDP, and exports." They find this decline[6] in economic activity

[6] Boer and Rieth (2024, pp. 12–13) find that there is a brief rise in output before it declines. They acknowledge this is at odds with Caldara et al. (2020), as Boer and Rieth use a non-retaliation model with differing effects on the exchange rate.

across several models during periods when US administrations acknowledge they are considering renegotiating trade agreements, which suggests that rapid changes across a wider contingent of trading partners would have an increased effect from the expectation of slower-moving negotiations.

The payoffs shown in this section and section 2 are for illustrative purposes only. In practice, tariffs may be imposed for non-economic reasons, such as retaliation, political leverage, or even spite.[7] Also, only producer impacts are considered above. Consumers may respond to tariff threats by boycotting goods from the initiating country.[8] These added issues make it difficult to describe payoffs succinctly and further complicate the analysis.

Regardless of what the economic payoffs might be, achieving any intended policy goal requires that all parties understand what those goals actually are. Negotiations stall, and the likelihood of a successful agreement being reached diminishes when the goals of one or more trade partners are unclear or in doubt. A credible commitment to negotiate requires a mutual understanding of objectives and values; otherwise, common ground cannot be reached and uncertainty for businesses persists.

IV. Conclusion

Reduced and inefficient production can result from the uncertainty of the regime rather than just from the actual tariff. The continuing whipsawing makes international planning difficult, and firms in both countries are likely to find more reliable production processes even if it comes at a cost to the firm. Having done so, it does make tariffs easier to sustain in either game. The cost of having them has been lowered because of industry precautions, but the theoretical gains from the tariffs are lowered because of the same precautions. Rather

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However, the decline does materialize, with the uncertainty itself driving more of the economic shift than the tariff implementation (Boer and Rieth 2024, p. 26).

[7] For further discussion of these issues and the particular instances in which retaliation may be successful, see Bayard and Elliott (1994). Pape (1997, p. 96) notes that trade wars and sanctions should not be evaluated on a similar scale as they serve very different purposes with dramatically different scopes. He also acknowledges that even the narrower view of tariffs as sanctions rarely achieves the desired result for the sanctioning country.

[8] This consumer retaliation has been notable in 2025 with Canada reducing purchases as a response to the US threat to impose 35 percent tariffs. This retaliation impacted the export and tourism sectors of the US economy (Thornton 2025).

than counting concessions received as a victory, we should consider such a game as simply reducing overall wealth.

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