

## Utilizing Binary Coding to Determine the Impact of Prior Relations on Free Trade Agreement Benefits with China

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### ABSTRACT

This study aims to uncover the impact of prior relationships (e.g., economic, militaristic) with other countries on China's approach toward various free trade agreements (FTAs) and their efficacy. While previous literature has examined the efficiency of certain trade agreements on their own or comparatively, they fail to address the effect of prior strained, neutral, or positive relationships on their outcome. Through the linkage of countries' prior relations and the efficacy of current existing trade agreements, this study identifies the degree to which China values their international partners and enemies (specifically Peru, Costa Rica, Switzerland, Iceland, Australia, and Korea), and whether they purposefully take advantage of non-allied countries in FTAs. In examining GDP growth, political stability, mutual benefit before and after establishing FTAs from the 2010-2015 timeframe, and other indicators, this article determines the efficiency of these FTAs, and draws parallels to China's prior and current relations with these countries. The results appear to positively correlate levels of past relations and benefit to China and may provide valuable insight into current FTAs in the making, such as the China-Norway FTA and China-Japan-Korea FTA. As China grows stronger, more research must be conducted into its FTA practices to ensure fairness in the international sphere.

### **Introduction**

As China's power in the modern world grows, many countries are becoming wary of reliance on Chinese trade to boost their economic output and meet cheap consumption demands (Tan). While China's extensive list of Free Trade Agreements (FTAs) has built strong relationships and improved the economies of both itself and cooperating countries, it has grown apparent that not all FTAs are made equally or with mutual benefit in mind.

For example, Indian geostrategist and academic Brahma Chellaney first coined the phrase "debt-trap diplomacy" in 2017 when referencing China's usage of sovereign debt to gain political control over developing countries. In 2020, Johns Hopkins professor Deborah Brautigam pioneered research into China's utilization of its Belt and Road Initiative as a "debt-trap," where she analyzed Sri Lanka defaulting on its debt, consequently resulting in them handing over a strategic port to China. Other extensions of Chinese power include military aggression in the South China Sea, the Taiwan Strait, and the recent "weather balloon," which was likely spyware (Barnes, Wong, Cooper, and Buckley 2023).

It is safe to assume that the bounds of this malicious diplomacy may extend far past debt-trapping loans, and potentially into treaties and trade agreements as well. Taking a

comparative approach to analyzing China's trade agenda, I aim to determine the degree to which prior economic, militaristic, social, etc. ties have influenced China's FTA approach and benefits, specifically answering the following question: do relationships between countries impact the benefits of free trade agreements? More narrowly, I look at whether China has disproportionately benefited from its free trade agreements. The final aim of this research is to assess the level to which China values its economic partners and past relationships, which will be measured by looking at disparities in economic net-gains and losses five years after FTA implementation.

While previous literature has examined the efficiency of certain trade agreements on their own or comparatively, they fail to address prior strained, neutral, or positive relationships on their outcome. Upon looking at trade volume, GDP, and other economic indicators before and after the implementation of various trade agreements over a singular time frame, I determine the efficacy of trade agreements; and upon looking at the number of defense agreements, treaties, and governmental similarities (e.g., democracy vs. autocracy), and other indicators of past relationship, I determine the level of interconnectedness and friendliness between two countries.

My research shows that countries friendlier with China, such as Switzerland and Australia, may reap larger benefits from FTAs than enemies. Furthermore, it seems as if more developed countries benefit more from an FTA versus developing countries. As such, understanding China's approach and methodology to forming various trade agreements is essential for policy leaders to understand when negotiating FTAs with China. This article may provide insight into current FTAs in the making, such as the China-Norway FTA and China-Japan-Korea FTA. As China grows stronger, more research must be conducted into its FTA practices to ensure fairness in the international sphere.

## **Literature Review**

On June 3, 2005, four countries (Brunei, Chile, New Zealand, and Singapore) signed the Trans-Pacific Partnership (TPP), a multilateral FTA. This agreement aimed to liberalize the economies of the Asia-Pacific region, promote innovation, and increase the retention of jobs amongst the dynamic Asia-Pacific economies. China initially paid no attention to the TPP when the agreement was first signed in 2005. However, when the U.S. decided to join the negotiations in 2009, China took notice of the TPP's effect on East-Asian economies and their own economic development.

Song and Yuan (2012) point out that U.S. interest in the TPP has acted as a catalyst for China's aggressive and fast-moving FTA agenda and that opening its domestic markets would be necessary to counteract growing U.S. influence within the region. Since then, China has signed 14 FTAs with sovereign countries and its two special administrative regions. At the time of

writing, nine new FTAs are underway, and two more are going through second or upgrade phases.

While the aim of Chinese FTA ‘blitzing’ may be to counteract U.S. influence, the aims are still largely economic and philanthropic. Jiang (2010) finds that Chinese policy elites have claimed Chinese exceptionality for its ‘big country morality,’ seeking to provide agreements that particularly benefit neighboring and smaller countries. However, this may not be the case; Schott, Jung, and Cimino-Issacs (2015) from the Peterson Institute for International Economics find that the FTAs like the Korea-China FTA has failed to meet standards, and that “the negotiated outcome cut too many corners to achieve such a comprehensive result” (1). Schott specifically attributes the cutting of corners to ineffective bilateral negotiations and China’s desire to match tariffs with that of the U.S., resulting in limited room for Korea’s benefit.

Supporting the above narrative, other scholarship suggests that Chinese FTAs may be pure extensions of hard power, one-sided, or inefficient. Various arguments have been presented that may be indicative of China’s oversights and preferences during and following FTA negotiation:

- China’s decision to pursue FTAs are less economic, rather political. Fostering and rewarding strategic allies with FTAs may harm international stability, especially with increasing hostility towards Taiwan (Gao 2009).
- Dispute settlement is important to the implementation of trade agreements, yet China’s FTAs do not contain rigid dispute settlement mechanisms (Wang 2011).
- China’s preferences for FTA partners are influenced by exporters of primary commodities and those who have little leverage of trade restrictions, since China already has many trade agreements with third countries (Müller and Seabra 2019).
- There is minimal evidence to support that China’s FTAs are designed to enhance market access abroad or secure supplies of raw materials, implying other motivations are at play (Zeng 2016).
- China has been looking for ways to exploit “domestic and international fissures” with an alliance network in recent years (Ford and Goldgeier 2021).

However, scholars approaching the Korea-China FTA from a more analytical, one-sided perspective have found the China-Korea FTA to be productive. Choi (2012) analyzes the FTA from the Korean perspective, looking at trade volume, GDP, and foreign direct investment (FDI). Scholarship has also deemed the ASEAN-China FTA (ACFTA), Australia-China FTA, and other FTAs a great success. For example, Alleyne, Zhang, and Mu (2020) find that ACFTA resulted in more sustainable trade from ASEAN members towards China, in addition to improved export efficiency. Historical trends suggest that most FTAs with China are not impacted by current and past political tensions.

While most literature appears to agree that Chinese FTAs are productive, experts are still divided on the mutual benefit countries obtain from these FTAs. This article defines mutually beneficial as substantial and relatively equal economic benefits to both countries.

Regardless of whether scholarship supports or opposes free trade relations with China, previous literature fails to consider the impact prior relations between two countries may have on the outcome of FTAs. Instead, other factors of FTA productivity, such as distance and development, have been analyzed thoroughly over the years. Therefore, looking at prior relations will provide valuable policy insight on China's exact motivators for FTAs and whether countries should form FTAs with China.

## Methodology

### Determining Cases

To determine whether FTAs were, in fact, beneficial to both countries, test cases were selected based on a singular time frame of 2010 to 2015, inclusive. Test cases were chosen based on when the FTA went into effect, not when the FTA was signed. Consequently, the following cases were chosen for analysis, with the year in parentheses indicating effective implementation: Peru (2010), Costa Rica (2011), Switzerland (2014), Iceland (2014), Australia (2015), and Korea (2015). All FTAs from 2010 to 2015 were selected.

This specific time frame was chosen for relevancy and diversity. Results of the FTA were analyzed up to five years into the future, up to 2020, before the pandemic had tangible effects on most economies. Thus, the most optimal time frame that would be reflective of modern-day globalization would be 2010 to 2015. Despite the higher number of FTAs implemented in the 2000s, the cases chosen for analysis still exhibit regional diversity, with two FTAs being made with Latin American countries, two from European countries, one from an Oceanic country, and one with another East-Asian country. Differing geographical locations may serve to provide insight into how farther distances impact relations or FTA outcomes.

### Binary Coding Scheme

I utilize a binary coding scheme to analyze the relationship between prior relations stretching back fifty years and the mutual benefit observed in the FTAs. The primary goal of the binary coding scheme is to relate past relations to economic impact, which would then be considered in the context of percentage increases in trade volume. Criteria regarding country friendliness included defense agreements, past conflicts, economic treaties, conferences, level of allyship with the U.S., and democracy levels. Indicators that showed positive relationships were given a 1, while demonstrations of negative relationships were given a 0.

Specific percentages and time frames for coding were assigned criteria based on data averages (the sum of all values in a row, divided by the number of countries), logical reasoning, and previous literature. Two different schemes were utilized to assess two variables: prior relations and economic impact. A third table was utilized to display trade volume changes.

First, regarding country friendliness, if any test case was currently in a defense relationship with China, those values were assigned a 1, and a 0 otherwise. Kinne (2012) argues that *ceteris paribus*, states that participate in large numbers of defense agreements indicate diffuse trustworthiness. This would suggest that any existing defense agreements would indicate positive mutuality amongst member parties, for militaries are a leading, if not the largest, indicator of state dominance.

Recent conflicts were determined by if the United Nations Security Council (UNSC) ever voted on an issue concerning China and test case countries, with a time period stretching up to 70 years prior. With the UNSC making decisions on determining the existence of and aiming to resolve a threat to peace, two countries being involved in a UNSC vote may indicate aggression that could exist between the two. Past aggression could extend into present-day relations. For example, Russia's 2014 invasion of Ukraine demonstrated levels of hostility that have led to the recent 2022 invasion. A 1 was given to countries that were not involved with China in a UNSC vote within the specified time frame, and a 0 otherwise.

Any economic treaties signed would indicate a level of coupling between two nations, with a larger number of treaties signed showing larger economic ties. Economic treaties were looked at up to twenty years in the past (roughly the beginning of 21st century technologization), with most being bilateral investment treaties (BITs). Replacements to past BITs were also counted, in addition to larger trade agreements, such as the Regional Comprehensive Economic Partnership. Test cases were awarded a 1 if they had three or more treaties signed with China within the specified timeframe of 2010 to 2015, and a 0 otherwise. The threshold of three or more treaties signed resulting in a 1 was decided within the context of all the data, as the average amount of treaties signed amongst the six test cases was 2.6, which I rounded to three.

Both inbound and outbound conferences or meetings countries had with China were also looked at within the last twenty years. Conferences, according to the United Nations and Council on Foreign Relations, are necessary to discuss economic, social, and political matters. Thus, a greater number of conferences would suggest a stronger, or at least, a more involved relationship between two countries. Furthermore, meetings between presidents or other officials are capable of reaffirming relationships founded upon friendship or mutuality. Countries that held five or more conferences with China over the specified timeframe were awarded a 1, and a 0 otherwise. Data was taken from William & Mary's China's Global Public Diplomacy Dashboard Dataset.

Levels of democracy were also analyzed as a means to relate China's autocracy to other countries' governmental systems. Any country classified in the same democratic index level as China at the time of writing (provided by Freedom House) was awarded a 1 and a 0 otherwise. More similar government structures would evidently lead to more mutual understanding, and thus friendlier relations.

Criteria regarding economic impact included GDP/capita growth as a percentage, GNI/capita growth as a percentage, unemployment rates, and political stability. Indicators that showed positive economic impact were given a 1, while demonstrations of negative economic impact were given a 0. Economic indicators (GDP and GNI) were considered using percentages to account for differences in country size. I utilized data from Macrotrends, which sources the World Bank, for these indicators.

Regarding GDP/capita percent growth, previous literature observes that the average GDP/capita growth of countries five years after completing an FTA is about five percent (Hur and Park 2012). The same percentages were mapped onto GNI/capita: countries demonstrating GDP and GNI per capita growth above five percent five years after the FTA's initial implementation were awarded a 1, and a 0 otherwise.

Unemployment rates and political stability were also addressed to analyze economic impacts. According to Oner (2010) from the International Monetary Fund, unemployment is highly dependent on economic activity, Okun's Law supports that a decline in unemployment by 1 percentage point corresponds to a 3 percent rise in real output. This would suggest that decreasing unemployment rates positively affect real GDP, another indicator of economic growth. As such, any decrease in the unemployment rate five years after the FTA's implementation was awarded a 1, and a 0 otherwise. Unemployment data was also gathered from Macrotrends, which sources the World Bank.

Likewise, political stability was also measured to account for economic impact, albeit less directly. Hurwitz (1972) identified five distinct approaches to stability, which correlated political stability to the absence of violence amongst states, government longevity, constitutional order, absence of structural change, and social attributes. With the prosperity of countries' economies highly reliant on their respective governments, stable governments more capable of making long-term decisions for the nation are likely to support growth. Consequently, any increase in political stability five years after the FTA's implementation was awarded a 1, and a 0 otherwise. Political stability was measured through The World Bank's political stability index. All binary values for both prior relations and economic impact were eventually totaled, with a higher number equating to stronger presumed relations and economic impact.

The binary values for measures of past relations and economic impact were aggregated and related to a pure measure of mutual benefits stemming from FTAs—percent changes in trade

volume. Mutual benefit was measured with trade volume growth alone. Looking at trade volume growth five years after the FTA's implementation in terms of percentages, a mutual benefit was determined by comparing these two percentages. Trade volume growth from test country to China and China to test country as a percentage were eventually subtracted. In other words, a lower percentage differential would indicate mutuality. Data was taken from the Observatory of Economic Complexity.

**Table 1.** Binary Coding Scheme for Prior Relations, with “YES” indicating a score of 1, and a 0 otherwise.

Frame	Sub-Frame	Peru 2010	Costa Rica 2011	Switzerland 2014	Iceland 2014	Australia 2015	Korea 2015
<b>Prior Relations</b>	Defense Agreement  If at least one defense agreement with China, YES	0	0	0	0	0	0
	Recent Conflict (last 70 years)  If UN Security Council did not vote on issue, YES	1	1	1	1	1	0



	Economic Treaties Signed (last 50 years)	1	1	4	1	5	4
	If 3+ treaties signed in last 20 years with China (not including FTA), YES	0	0	1	0	1	1
		China - Peru BIT (1994)	China - Costa Rica BIT (2007)	China - Switzerland BIT (2009)  Hong Kong, China SAR - Switzerland BIT (1994)  China - Switzerland BIT (1986)  EFTA - Hong Kong FTA (2011)	China - Iceland BIT (1994)	Australia - Hong Kong Investment Agreement (2019)  Australia - China Framework Agreement (2003)  Australia - China BIT (1988)  Australia - Hong Kong, China SAR BIT (1993)  RCEP (2020)	China - Japan - Korea, Republic of Trilateral Investment Agreement (2012)  China - Korea, Republic of BIT (2007)  Hong Kong, China SAR - Korea, Republic of BIT (1997)  RCEP (2020)





	Outbound and Inbound Conferenc es/Meeting s with each other (last 20 years)	4	3	6	3	10	16
	If 5+ meetings in last 20 years with China, YES	0	0	1	0	1	1
	Democracy Levels	0	0	0	0	0	0
	If democracy status is same as China, YES						
<b>Totals</b>		1	1	3	1	3	2

**Table 2.** Binary Coding Scheme for Economic Impact, with “YES” indicating a score of 1, and a 0 otherwise.

Frame	Sub-Frame	Peru 2010	Costa Rica 2011	Switzerland 2014	Iceland 2014	Australia 2015	Korea 2015
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<b>Econ Impact</b>	Real GDP/Capita  If real GDP/C has increased by at least 5 percent within 5 years of the FTA, YES	+22.449%  1	+30.228%  1	-5.188%  0	+26.15%  1	-8.799%  0	10.403%  1
	<b>Real GNI/Capita</b>  If real GNI/C has increase by at least 5 percent within 5 years of the FTA, YES	+43.607%  1	+37.157%  1	-4.272%  0	+51.6%  1	+101.13%  1	+14.90%  1
	<b>Unemployment Rates</b>  If unemployment rate decreases at all within 5 years, YES	3.58% <sup>1</sup> 3.27%  1	10.14% 8.6%  1	4.83% 4.39%  1	4.90% 3.51%  1	6.05% 6.46%  0	3.55% 3.93%  0

	Political Stability	-1 <sup>1</sup> -0.4	0.51 0.66	1.4 1.32	1.25 1.64	0.88 0.85	0.16 0.57
	If political stability according to the World Bank increases in any way within 5 years, YES	1	1	0	1	0	1
<b>Totals</b>		4	4	1	4	1	3

<sup>1</sup>For unemployment rates and political stability, values in the upper row indicate the initial value at the time of FTA signing, while values in the lower row indicate values five years after signing.

**Table 3.** Mutual benefit measured with changes in total trade volume during and five years after FTA signing.

Mutual Benefit	Sub-Frame	Peru 2010	Costa Rica 2011	Switzerland 2014	Iceland 2014	Australia 2015	Korea 2015
	Partner country's exports to China	5.47B <sup>1</sup> 7.43B +35%	339M 471M +39%	18.4B 21.4B +16.3%	45.9M 136M +196%	69.4B 103B +48%	131B 131B +0%
	China's exports to partner country	4.92B <sup>1</sup> 8.25B +67%	1.37B 1.99B +45%	11.1B 12.6B +13%	346M 374M +8%	44B 57.3B +30%	94.2B 109B +16%
	Difference in benefit	China benefits by 32%	China benefits by 4%	Switzerland benefits by 2.8%	Iceland benefits by 188%	Australia benefits by 18.2%	China benefits by 15.7%

<sup>1</sup>For country to country exports, values in the upper row indicate the initial value at the time of FTA signing, while values in the lower row indicate values five years after signing. Both upper and lower values were used to find percentage change, which is shown.

## Results

The final data appears to support a correlation between the strength of prior relations and level of mutual benefit, although long-term economic impacts appear to be uncorrelated. Specifically, countries that were measured to be more friendly with China before signing the FTA, as shown in Table 1, benefitted more in terms of trade volume growth, shown in Table 3, whereas countries defined as less friendly found China benefitting more overall. In this case, having a relationship defined as “more friendly” required a score of 3 in the prior relations coding scheme.

Looking at prior relations, Switzerland and Australia scored the highest with a value of 3, Korea next with a value of 2, and Peru, Costa Rica, and Iceland with a value of 1. Regarding economic impact, Peru, Costa Rica, and Iceland scored the highest with a score of 4, Korea next with a score of 3, and Switzerland and Australia at the lowest with a score of 1. Finally, mutual benefit was measured, with the following data listed with respect to Peru, Costa Rica, Switzerland, Iceland, Australia, and Korea: China benefitted by 32%, China benefitted by 4%, Switzerland benefitted by 2.8%, Iceland benefitted by 188%, Australia benefitted by 18.2%, and China benefitted by 15.7%.

Of the cases, five of six support my hypothesis that friendlier relations yield larger benefits to the other country by pure trade volume growth as a percentage when signing an FTA with China. This conclusion is supported by Switzerland and Australia, both of which held the highest value for friendliness (3) and benefitted more than China did. In other words, countries with poorer relations with China saw China gaining more from the FTA. While benefit was established earlier to be mutual, little mutuality is displayed, aside from Costa Rica and Switzerland, which saw a trade volume growth percentage of less than five. Other countries saw a trade growth volume differential of at least 15 percentage points.

## Discussion

As aforementioned, five of six test cases support the conclusion that friendlier relations yield larger benefit by pure trade volume growth as a percentage. The country that did not fit this conclusion was Iceland. Despite receiving a relations score of only 1, Iceland saw exports to China nearly double over the five-year period from 2014 to 2019. On the contrary, China’s exports to Iceland only grew by around 30 million, or an 8.1% increase. This disparity within the

data can be attributed to multiple factors, some more likely than others. One explanation could be a combination of Iceland's high ranking on the Human Development Index (0.938) and its relatively lower economic output, which would allow it to take greater advantage of the FTA over a country with already a sized economy. Another reason could be Iceland's historical reliance on domestic demand (aside from tourism), for a sudden introduction of free trade with an economic giant would spike growth.

Country distance to China does not appear to have an impact on FTA results, given Australia's capability to benefit from the FTA and Korea not benefitting as much. Furthermore, Switzerland and Iceland were also able to benefit over China, although Cuba and Costa Rica were incapable of doing so. The scattered distances, mixed with varying degrees of FTA success show distance and benefit are unlikely to be related. A more representative trend may actually be the level of development—three of the four developed countries were able to benefit from an FTA (Korea is the exception). This may be because developed countries are capable of manufacturing and trading more desirable tech products, thus taking advantage of all tariff reductions. Furthermore, more developed countries are likely to have stronger relations with China in the first place, as developed countries were more likely to have economic treaties and meetings with China. Korea's close relationship with the U.S. and geographical proximity to China is a likely reason as to why China does not want Korea to benefit (Korea's trade growth with China in percentage over five-years after the FTA's implementations was 0%).

With respect to economic impact, there are some levels of correlation between economic impact and mutual benefit (Table 2 and Table 3), but not between economic impact and prior relations (Table 2 and Table 1). Countries scoring a 3 and above in economic impact saw China benefitting more, with once again, Iceland being the exception. This may suggest that China's benefit in FTAs outweighs the goals of achieving mutual benefit; in other words, countries benefit more economically when China reaps more out of the FTA. The most likely reason as to why this may be plausible follows the basic principles of economies of scale: China benefitting over other countries as an industrial powerhouse would naturally result in greater economic flows than a smaller country benefitting over China.

On a broader note, the research does imply that China's presumed dominance approach to diplomacy is not as exploitative as it appears to be. The greatest growth deficit by China, in any case, was 32%, with Peru, and even with this in mind, Peru still benefits by growing trade a staggering 35% over a five-year timeframe. In addition to three other countries benefitting over China, this may demonstrate that China values an absolute-gains approach over a relative one, exemplifying liberalist principles.

## **Conclusion**

The findings of this research support a strong correlation between the level of prior relations and trade volume growth, whereas economic indicators are less correlated. This means that countries with positive relations prior to signing an FTA with China saw greater economic benefits over China. Meanwhile, countries with less friendly relations saw China benefitting more. Regardless of these initial findings, all countries eventually benefited from their respective FTAs substantially, aside from Korea, which saw zero growth five-years after the FTA's introduction.

While previous literature has analyzed China's FTAs comparatively, they fail to account for how prior relations impact the level of success an FTA may yield. Knowing the impact of prior relationships could provide policymakers an additional level of context when considering treaties or economic agreements, not only FTAs, with China. My understanding of the data leads me to believe that all current FTAs in consideration will yield benefits, especially for developed and less U.S.-associated countries like Norway. On the other hand, countries like Canada or South Korea may find difficulty reaping as many benefits as they are economically and politically similar and more dependent on the U.S.. Policymakers are thus encouraged to participate in all FTAs possible with China, as collaboration would bolster economic output, regardless of mutual benefit.

Still, it is difficult to conclude whether the research supports a realist or liberalist approach to China's FTA agenda. Interpreting such a blitzing of FTAs may naturally implicate a desire for interdependence (a liberalist perspective), yet simultaneously, realist interpretations claiming China's FTA agenda is purely in response to U.S. interest in Asia are also valid. Further research may be conducted into the interconnectedness of pure U.S. allyship and FTA mutuality to understand these factors better. Regarding China's fairness in the economic sphere, this article supports the claim that China is a fair, rational actor when it comes to trade agreements.

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