The George Washington University

Ph.D. Dissertation Proposal

Fluoroscope China Syndrome at the Frontline:

Three Essays on Trade and Politics in Modern Taiwan*

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Abstract

This dissertation proposal is composed of three ongoing research papers, which all relate to the openness of China and its effects on Taiwan. The first chapter questions whether the lift of long-standing travel bans and different exposure levels to Chinese visitors affects party identification and political ideology? This paper uses the district-level presidential election results and Annual Survey Report on Visitor Expenditure and Trends (ASRVET) in Taiwan between 1996 and 2020 to test how the shock of open policy to mainland Chinese visitors changed the political ideology among the Taiwanese constituents living across the municipalities. I show that, after ECFA went into effect, the local treatment effect became more significant. The result hence demonstrates EFCA as a counter-example of the progressive economic integration theorem. The second chapter uses the time-series data from 1980 to 2015 in Taiwan, this paper aims to examine if the variation of tradedependence would impact the welfare of workers in three main categories of industry; the agriculture,manufacture, and service sectors. We gather two different sets of data, in aggregate and per capita level, to examine the trade impacts industrially and individually. The third paper would like to examine the long-run relationship between the political index and the tradevolume starting from 1972. We extract the annual data political stability indices from TheGlobalEconomy.Com. We plan to conduct the two-step Engle-Granger procedure and test the coin-tegration by combining the time series data across the industries and goods.

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Contents

Chapter 1 - Distance is the Soul of Beauty:

How Open-Border Policies Realign Ideology in Taiwan?

1 Introduction

This paper aims to identify the swerve of the political ideology across the electoral districts in Taiwan after an episode of trade policy, the Cross-strait Economic Cooperation Framework Agreement (i.e., Economic Cooperation Framework Agreement, ECFA henceforth).[1] More precisely, I use the distance to the tourist attractions in Taiwan as the proxy of tourists' exposure, then run Regression Discontinuity (RD) models to analyze how increasing exposure to Chinese tourists results from the open-boarder policies of ECFA, impact the results of presidential elections in Taiwan. I compare and document the treatment effects of low and high tourists exposure regions. And finally, run the regression to identify the potential causality of the treatment effects and the surging of the incoming Chinese tourists.

The open policy to the Chinese tourists is considered a side product of ECFA. Given the special political relationship between the People's Republic of China (P.R.C. or China, hereafter) and the Republic of China on Taiwan (R.O.C. or Taiwan, hereafter), ECFA has been a unique case among all the preferential trade agreements worldwide and created a large political and economic impact on Taiwan. ECFA lowers trade barriers in goods, boosts investment for firms trading with China as common regional trade agreements, and creates a flow of temporary migration across the strait. Because of the opening policy, more traveling groups from China arrived, revitalizing the tourism industry in Taiwan targeting the new-coming Chinese visitors. The booming commerce and all perspective interactions between the traditional geopolitical rivals had brought attention from the rest of the world. Chiang Pin-Kung, the President of Straits Exchange Foundation of Taiwan,[2] representing as the official delegate in charge of the Chinese affairs between 2008-2012, once quoted, "The journalistic, cultural, and educational interactions are more able to shorten the distance between the citizens across the strait than the economic integration."[3]

[1] Economic Cooperation Framework Agreement. A preferential trade agreement between China and Taiwan. There are more details about the P.T.A. could be found on the website of the World Trade Organization (W.T.O.), see Regional Trade Agreements Database. For the full legal document of the Economic Cooperation Framework Agreement, see http://www.ecfa.org.tw/

[2] The Straits Exchange Foundation (S.E.F.) is a semi-official organization set up by the Government of the Republic of China (Taiwan) to handle technical or business matters with the People's Republic of China (P.R.C.). Though technically a private organization, it is funded by the government and under the supervision of the Mainland Affairs Council of the Executive Yuan in Taiwan. Its role is effectively to function as the *de facto* embassy to the P.R.C., as a means of avoiding acknowledgment of the P.R.C.'s statehood status. Its counterpart in the P.R.C. is the Association for Relations Across the Taiwan Straits (ARATS).

[3] China News Service, January 30, 2010. http://news.sina.com.cn/c/2010-01-30/203717019979s.shtml

The open policy toward the Chinese market marked the first time after the Chinese Civil War that P.R.C.'s citizens were allowed to travel to the island. The sudden influx of mainland Chinese visitors boosted the traveling industry in Taiwan, which most diverted their attentions to target the growing market of Chinese visitors. Meanwhile, the Taiwanese administration then adopted a series of pro-China policies aiming to amplify the ECFA effects. For instance, the governments highly encouraged cross-strait business co-operations and commercial activities. Also, the universities based in Taiwan were encouraged to admit students from China. Those pro-China policies, such as open-border policy for Chinese tourists, in addition to the Most-favored-nation clause in ECFA, were expected to serve as a buffer for political tensions. At that time, both administrations in China and Taiwan treated those friendly trade policies as bridges to connect the daily lives of the individuals living on both sides of the strait. Theoretically, Taiwan could enjoy a more extensive market from China, while Beijing hoped ECFA could lead to deeper political coordination in the future.

However, soon it was observed that those economic incentives and the commercial interactions did not meet the their original goals on the cross-strait politics. The open policies to China that operated in Taiwan did not help "close the cultural gap" nor "shorten the distance across the strait" from the perspective of the Taiwanese. On the contrary, more news show that, after the beginning of episode to admit the Chinese tourists, the support of pro-China policies plunged. There was a broad spectrum of the causes of striking consequences, and one of them comes from the behavioral perspective. As exposed to more Chinese visitors, Taiwanese having more interactions with Chinese started to realize that there was a cultural gap and distinguish of the political views on different sides of the strait. After all, the seperation has prolonged for fifty years (1960-2010). Hence, after the policy shock, more self-identified as Taiwanese, instead of a used-to-be boarder definition of being a Chinese ethnically. The trade shock soon spurred a backlash on the approval rate of pro-China Kuomingtang administration, led by Ma Ing-joeu, since the Pro-China policies went into effect and eventually ended their eight-year tenure in office in 2016.

The open-boarder policy was initiated in 2010 to lift the long-time restrictions on Chinese visitors as part of the ECFA. We have observed that the political ideology and party recognition among the Taiwanese constituents changed dramatically since then. Before the policy shock, public opinion leaned toward the statement proposed by the pro-China politicians and parties. However, the ECFA and the incoming Chinese visitors eventually did not lead Taiwanese public opinion to favor China as expected; on the contrary, more exposure to unfamiliar Chinese visitors roused concern about the political consequence.

Nationalism and separatism grew in Taiwan afterward. The regions theoretically enjoying more significant gains from tourism trade and travel economics or more exposed to Chinese visitors are surprisingly more distant from politicians affiliated with pro-China parties. Hence, the results demonstrate a contradiction of the hypothetical idea that trade and investment agreements serve as a stepping stone for future political integration (Balassa 1994).

This consequence could be deemed a failure case in which governments attempted to utilize free trade agreements as a political tool, violating the traditional regional integration theory in economics. Economists deem Balassa (1994)'s philosophy as the convention of economic integration theory. As it advocates, the integration between the countries is a process: more complicated political integrations or policies coordination between nations follow a certain degree of successful economic cooperation since the gain from trades is relatively easier to be sensed (Gabel 1998; Balassa 1994). The evolution of the European Union (E.U.) is a success story for this paradigm, where the E.U. was initially formed as the European Coal and Steel Community (ECSC) after World War II and transcended to a supranational organization (Wiener et al. 2019).[4]

The roads to the economic integration were bumpier when the two states move toward the opposite direction on the political spectrum: Taiwan successfully transformed from an authoritarian regime to democracy in the early 90s, whereas China politics remains single-party controlled until now. Even though most Taiwanese are aware that doing business with China brings significant economic benefits, China policies envisioned by the Taiwanese politicians and candidates often trigger public debate during their political campaigns in the election cycle. Some in Taiwan advocate taking advantage of the common language and ethnicity to embrace the Chinese market, whereas others are concerned that it ultimately will jeopardize sovereignty. The peak of controversy was when discussing the service sectors part in the trade agreement. The Sunflower Movement's breakout to protest the Cross-Strait Service Trade Agreement (CSSTA, hereafter) suggested that the "starting from economic cooperation, then political coordination" style of traditional integration patterns may not apply in the cross-strait case (Rowen 2015). Lowering trade barriers and encouraging investment and trade in services do not close the gap of ideological cleavage in

[4]In 1950, Robert Schuman, then French Foreign Minister, proposed to set up ECSC to ensure coal and steel availability. It creates a common market for coal and steel for six chartered countries and brings about fair competition between European nations over natural resources, particularly in the Ruhr. The idea to establish ECSC was to prevent another world war among the nations from fighting for crude materials supporting the national defense industry. After developing for about four decades, the E.U. has transcended from the agreement of extracting rare minerals within six countries to a world-leading supranational organization including 27 member states. After introducing the common currency, the E.U. not only shows the rest of the world the highest level of economic integration but also renders a pathway for creating a new format of political coordination.

Taiwan straits. As a result, the pro-China policies aiming to boost the economy in Taiwan are no longer as attractive as they were in the early 2000s.

The open-boarder policy, which was once considered a byproduct of the ECFA, brought up a series of unforeseen backfires on the then incumbent administrations and then jeopardized the long-term cross-strait relationship. About six years after the first trade agreement came into effect, in 2014, the largest demonstration in history broke out and started a wave of anti-China movement in Taiwan. Thus, although either the magnitude or scope of the preferential trade agreement was considered significant, the political tension did not plunge but escalated after introducing the ECFA. This unprecedented outcome of the preferential trade and service agreement shook the authorities and denied the conventional wisdom of economic integration. Huang (2012) argued that the ECFA *per se* was not like the prevailing trade agreements worldwide, mostly built solely upon reciprocal economic or financial incentives. However, due to the uniqueness of the China-Taiwan relationship (cross-strait relationship, hereafter), it is well believed that it also has substantial political implications in addition to ECFA's economic rationale. Such as, China uses it as a stepping stone for potentially more profound political coordination in the future.

The impact of ECFA has been well documented and discussed in the recent literature (Hong and Yang 2011), but the political and economic effects of open border policies on Chinese visitors are left unexplored. This paper aims to identify the impact of the sudden influx of Chinese visitors on Taiwan's elections. The main contributions of this paper are two folds. First, I merge multiple data sources, including the Annual Survey Report on Visitor Expenditure and Trends from Taiwan's Tourism Bureau;[5] the district-level results from the presidential from 2000 to 2016 elections from Central Election Committee (C.E.C.); and the geographical and demographical information from the Ministry of Interior to measure the visitors' exposure across the towns in Taiwan. Then by applying the regression discontinuity design model, I estimate the treatment effects of the high- and low- tourists exposure area across the election year. Further, I test the significance of the boundaries between the high- and low-exposed regions to Chinese visitors. The results I find are primarily against the prediction of the regional integration theory, that residents living in towns that are supposedly enjoying more economic benefits from the Chinese visitors vote against the parties advocating pro-China policies in the next elections.

The followings are the structure of this paper. In Section 2, I offer an overview of the institutional

[5]The Tourism Bureau, Ministry of Transportation and Communications, Republic of China (Taiwan). Official Website: https://www.taiwan.net.tw/

background of modern politics in Taiwan by elaborating the history of the unique cross-strait relationship, the presidential electoral system, and bipartisanship in Taiwan. In Section 3, I review the related literature on the China shock and argue how existing trade literature neglected the tourism trades. Section 4, 5.1, and 5.2 introduce the data and the identification of empirical models. Section 6 lays out and interprets the results. Lastly, Section 6 concludes and provides the potential economic reasons behind the failure of this integration.

2 Institutional Background

2.1 Bipartisanship: DPP v.s. KMT

Like most of the democratic nations in the world, the modern politics in Taiwan is built upon bipartisanship. Democratic Progressive Party (DPP) and Kuomingtang (KMT, also known as the Chinese Nationalist Party) are considered two major political parties in Taiwan in the modern democratization era.[6] Two parties have nominated the presidential candidates since the first direct presidential election held in 1996. Moreover, both also endorsed the candidates, held campaign activities, and participated in the most local elections for public officials.

Given the historical path that the two parties have taken, KMT and DPP hold very different views on the Cross-strait relationship and national identification. The KMT is more policies-friendly to China, whereas DPP seeks more independencies. The dispute of the national identification is uncommon to see in other countries, but in Taiwan, any topics relating to China will become controversial. The debate of the national identification boils down to the official name of the nations. While KMT insists on being called the "Republic of China (R.O.C.)," DPP prefers to use "Taiwan" as the promotion name in the international community. And this bipartisanship gradually forms the political ideology in current Taiwan.

There have been two generations of Chiang's family ruling since Chiang Kai-shek retreated to Taiwan. The Chiangs, both represented KMT, held power from 1949 to 1988. However, the political goal of the then KMT-led government adjusted with time as well. From 1949 to the 1970s, the Chiang Kai-shek and KMT-led government made the island a military base to reconquer mainland China. However, after the 1970s, due to the change of international politics, the KMT realized it was unlikely to reclaim the mainland

[6]Here, we denote the democratization era began around the 1990s after the Martial Law ended. Since the modern democratization in Taiwan in the 1990s, DPP and KMT have been the only two parties that nominated the candidate across seven general presidential elections during 1996-2020.

and switched its focuses to building up the infrastructure in Taiwan. Chiang Ching-kuo, the eldest son of Chiang Kai-shek took over the president seat in 1978 shifted his attention to build up the infrastructure on the island. And since then, the political ideology of the KMT leans to inherit the "real China" legacy even without the support of other countries, and seek the opportunity in the future to unify the mainland. [7]

In contrast, DPP started as a group of anti-authoritarian activists extradited by the KMT government and was the only voice to demand democratization and political reform during the authorization regime. Hence, there is a substantial ideological cleavage between the two parties. The KMT inherited their Chinese roots to deem the current Taiwanese government legal representative of "real China." Also, KMT holds a more conservative stance on claiming Taiwan's independence and focuses more on economic cooperation with China. For example, KMT under the Ma administration (2008-2016) proposed maintaining the status quo on the cross-strait, building a peaceful relationship, and targeting the enormous Chinese market.

On the contrary, DPP was considered an illegal party during the KMT-Chiang family ruling period. The DPP chartered members were against the Chiang-KMT administration and wanted to disconnect with China. Members and politicians affiliated with DPP advocate the self-identification of Taiwan and claim to normalize Taiwan as an independent sovereignty country. DPP's stands to China are more progressive, resistant, and not lean toward solely relying on the market of China, whose ultimate goal was to transform Taiwan into a normal country.

Also, the two parties have been fighting for their political beliefs since the democratization era. And the Cross-strait and national identity topics have played important roles in every presidential election. Although domestic politics in Taiwan look reasonably stable nowadays as the elections of public officials are held regularly, and the transition of power is relatively peaceful, bipartisanship is still relatively young compared with other democratic countries worldwide.[8]

2.2 Ideology

Kuomingtang (KMT) is considered the right-wing, meritocratic, and conservative political party in modern Taiwan, whose political stands on national identification generally following the ideology recognizing "The

[7] Since retreating to Taiwan, the Republic of China government *de facto* only controls several areas, including Penghu, Kinmen, and Mastu, in addition to Taiwan.

[8] Taiwan's period of martial law in Taiwan (1949-1989) had been the most prolonged period of martial law in the world. The long-existing martial law was not lifted until 1990, and the president's first general direct elections occurred in 1996.

Republic of China on Taiwan."[9] The Chiang Kai-shek and the KMT retreated to Taiwan in 1949, which opened the Chiang-family ruled era under the most extended martial law in the history of the world. The KMT remained the sole legal ruling party in Taiwan under the "Dang Guo" system until democratization were enacted in the 1990s.[10]

Unlike the KMT representing the traditional and conservative power, as they still consider themselves the legal delegate of the Republic of China, Democratic Progressive Party (DPP) was the hub of non-Kuomingtang supporters under the Chiang-family-Kuomingtang authoritarian regime. Undergrounded for about decades, DPP was officially formed in 1986, under the proclamation of pursuing the nationality of Taiwan and cutting ties with the old relationship with PRC under the control of the Chinese Communist Party. After the democratization starting in 1989, DPP then became the major opposition party. Traditionally, DPP represented the mainstream "non-Kuomingtang" voice in the Chiang-family-Kuomingtang period and was deemed to be lining to the left on the political spectrum. One of the charted goals of DDP was to ultimately declare the independence of Taiwan and make the island officially becomes an actual sovereign state.

To sum up, the DPP is the leading party with the anti-China ideology. In contrast, KMT deems pro-China, given it embraces the image of the true inheritance of the Chinese legacy and would like to use the "Republic of China" or "ROC" as the nation's official name. This paper defines the pro-China margin as the winning votes and shares of the KMT candidates in each election, as specified in Equation 1. The t will represent the year of the elections, and the pro-China margin will be the primary dependent variable capturing the political ideology in the following analysis in this paper.

$$\text{Pro-China Margin}\_t = \text{Vote to KMT}\_t - \text{Vote to DPP}\_t \tag{1}$$

2.3 Presidential Elections in Taiwan

The election of the president and vice president of Taiwan is a universal direct election through secret votes by the Taiwanese citizens. After the democratization starting from the 1990s, the single-district two-vote

[9] KMT was the organization that Dr. Sun Yat-sen initially founded in 1984 to overthrow the Qing Dynasty during imperial China, whose main goal was to build a modern republican based on the new democratic system. Since KMT's early establishment in 1919, it became the dominant ruling party of the Republic of China on the mainland. From 1928 to 1949, the Kuomingtang-run China, led by Chiang Kai-shek, represented the "China" to engage in the political activities of the international community, such as World War I and II. However, after losing the Chinese Civil War to the Chinese Communist Party (CCP).

[10] "Dang Guo" in Chinese means to use a single-party to run the country, which is the system that KMT used during Chiang's administration in Taiwan.

system was introduced to Taiwanese society. The legal constituent has two ballots when it comes to the general elections for the presidents. One ballot is for the presidential candidate, and another is for the political party.[11]

The is no early vote nor absentee vote in Taiwanese elections. The president and vice president are nominated on a joint ticket. Political parties that have gained at least 5% of the last presidential or legislative election votes may directly appoint a set of candidates. For example, during the 2012 elections, only the KMT and DPP were qualified to nominate candidates through this rule. Alternatively, candidates may be nominated by a petition signed by eligible voters numbering no less than 1.5% of the electors in the last legislative election.[12]

2.4 Cross-strait Relationship

Cross-strait relationship between Taiwan and China has been complicated, thanks to long-term historical and political disputes. Despite being largely ethnic Chinese societies, Taiwan and China are very different due to their differentiated histories, which have been influenced by multiple factors including foreign colonial rule, their separate independent governments, and experiences with democratization (Kwan 2016). As China started to bring in foreign investment in the 1980s and soon became the world's factory, the economic power of Chinese firms and consumers, in addition, plays another important role regarding cross-strait politics. Meanwhile, while the China was embracing the world market, Taiwan encountered the the process of democratization and tried to find a path to cut tie with the name of China (Rigger 2003).

The tension across the Taiwanese strait has also been fluctuating due to globalization and modern democratization in Taiwan after the Chiang family's authorization stepped down. The political uncertainty in China is also highly correlated with the political cycle in Taiwan. In general, since the KMTs and their supporters are leaning to consider themselves as the Chinese's inherent, at the period of the KMT being the incumbent (1996-2000, Lee; 2008-2016 Ma), the cross-strait relationship was usually more peaceful, and the communication between Taipei and Beijing are smoother. On the other hand, since DPP was chartered with the consensus of normalizing Taiwan as a real country, the relationship with China was usually colder when the DPP's presidents were in office. There have been four different presidents who the

[11] The most recent election occurred on January 11, 2020. The Presidential and Vice Presidential Election and Recall Act of R.O.C. states that a candidate for President or Vice President must be a citizen of the Republic of China, at least 40 years old, and a resident of Taiwan for no less than 15 years with a physical presence of no less than six consecutive months.

[12] This equals 252,848 signatures for the 2012 election.

people in Taiwan elected. They are Lee Tang-Hui (KMT) in 1996-2000, Chen Shui-bian (DPP) in 2000-2008, Ma Ying-jeou (KMT) in 2008-2016, and Tsai Ing-wen from 2016 to the present.

From a historical perspective, although without the recognition of most countries in the international community, Taiwan has been *de facto* self-ruled as a sovereign state since 1949.[13] In Taiwan, it is well believed that the growing economic power of China has cultivated her political ambitions to carry out the ultimate plan to reclaim the autonomy of the island and officially annex it as an part of territory. The pending hostile relationship and ambiguous definition of national identification hence created physical and psychological trade barriers among the citizens living on the different sides of the straits. The international community's representative rights' prolonged diplomatic war consolidated as the world split on the political ideology. The consequence of this impact lasts until recently, halting the trade across the Taiwanese straits for nearly forty years.

The recent hostility to China culminated at the point of Sunflower Student Movement broke out in March 2014, which was originally coming from the distrust of the government on dealing with the service trade agreement with China. The rise of civic nationalism in Taiwan indicates the prominence of an ethnonational Chinese identity imposed by Beijing (Kwan 2016). The surge of nationalism and the higher volume of seeking the official declaration of independence in Taiwan had puzzled many in the Chinese administration, who once believed that cultural interactions and economic benefit sharing on the island might bring in higher public support of the idea of reunification, which happens to be consistent with what the conventional economic integration theory advocated.

[13] This dispute of sovereignty is the so-called "*Undetermined Status of Taiwan*." The origin could date to the unended Chinese Civil war since 1949, when the Chinese Communist Party led by Mao Zedong took over mainland China's control, while the Kuomintang lost to the civil war and fled to Taiwan under the leadership of Chiang Kai-shek. Although there was never an official fire-ceasing agreement between the two political identities, the main battlefield transformed into a diplomatic format as the Cold War Era began. Both sides started to fight for the legitimacy to represent the real "China" and seek official recognition and allegiance from the rest of the world. For example, the Republic of China (ROC) government in Taiwan led by Chiang Kai-Shek of Kuomintang (KMT) was the representative of China and a chartered member of the United Nations until People's Republic of China (PRC) replaced her seat in 1979.

2.5 Open Border to Chinese Visitors

As Ma claimed the victory of the general election in 2008, and ended Chen Shui-bian's eight-year tenure,[14] he did not take too much time after taking the office to explore the various opportunities to cooperate with Beijing and adjust the previous policies to take advantage of the vast markets of the Chinese consumers. At that time, it was well believed that Ma and KMT's victory in the 2008 election was resulted from the sluggish economic performance in Taiwan, and the Taiwanese constituents are eager to seek a more friendly environment with doing business with mainland China.

The episodes of the policy shocks began in 2008, led by the newly elected President, Ma Ying-jeou of Koumingtong (KMT), who proposed to sign a preferential trade agreement with China to take advantage of the lower trade barriers in both goods and service sectors. Besides, as part of the economic cooperation agreements, the long-time separated citizens are allowed to travel. Ma advocated the policy change toward tourists coming from mainland China. Unlike his predecessor, the Chen administration of the DDP, Ma took a more China-friendly stance and gradually imposed a series of policies that make commerce across the straits more available. The tourism industry is the one that got the most media exposure. Ma opened up the Taiwanese borders to welcome long-time banned Chinese tourists. Even though the process only started in a few cities with higher development, the impact has gradually prolonged. Table 1 documents the timeline of open-border policies, as permission to travel to Taiwan became applicable. Within less than four years, the Chinese cities on the list are eligible to travel to Taiwan, which has grown from three to forty-seven. Moreover, Ma also amended the education bill to loosen Chinese students' restrictions to apply for university or graduate schools in Taiwan.

The swerve of the political attitude from the previous administration to the long-time foe made Taiwanese concerned, and the public opinion has highly diverged. Some believe that this is an excellent opportunity for mid-level exporting firms, tourism, and educational sectors in Taiwan to grab the fruits of China's enormous market. In contrast, many believed Beijing sugar-coated the trade agreement policies and tried to use their economic influence to achieve their ultimate political goal: to reunify the island.

I translate and organize the whole series of the policies relating to the trade and economic integration

[14] Chen Shui-bian, 2000-2008 the President of Taiwan in office, was once considered the "Son of Taiwan" and praised by the majority of the constituents. He is the one ending the KMT fifty-five years authoritarian regime, who held salient position to keep China in the distance and paving a path for the Taiwanese nationalism identification. For example, Chen had tried to push the movement to rejoin the United Nations by using the name of Taiwan and justify the state-own companies' brand names from the Republic of China or R.O.C. to Taiwan.

between Taiwan and China in Table 1, from the website of the Tourism Bureau. Table 1 documents the policies relating to the Chinese tourists from the mainland, which also shows a political climate at that time. Ma administration cashed in their commitment to exploring the China market after the KMT victory in the 2008 presidential election. And table 2 documented the cities that are open to tourism to Taiwan chronologically. As indicated in the 2, the open-border policies to allow the mainland Chinese to visit Taiwan started from three metropolises in China in 2011, which were Beijing, Shanghai, and Xiamen. However, it only took two years for these policies to extend to the other twenty-six cities in mainland China.

On the other hand, Figure 1 and Figure 2 show the series of incoming visitors to Taiwan categorized by their residences. As we can tell from the two graphs, both the absolute number and the proportion of Chinese visitors increased rapidly after the EFCA went into effect in 2008.

Date	Regulations Governing the Permission for Mainland Personnel to Come to Taiwan for Tourism Activities
2006.8.27	The Taiwan Strait Tourism Association was established.
2008.6.13	Signed the "Agreement on Mainland Residents Traveling to Taiwan on Both Sides of the Taiwan Straits."
2008.7.4	The first cross-strait voyage, the first tour group of mainland tourists arrived in Taiwan.
2008.7.18	Mianland visitors to Taiwan are officially opened for sightseeing, with a daily quota of 3,000 visitors to Taiwan.
2009.7.18	The Taiwan Travel Association and the Association For Tourism Exchange Across The Taiwan Straits
	(hereinafter referred to as the Two Little Associations) jointly established a regular cross-strait tourism consultation.
	The two sides jointly held the first cross-strait tourism exchange roundtable in Beijing.
2010.8.14	For the second anniversary of the opening of cross-strait tourism, a cross-strait tourism round table was held at the Ambassador Hotel Hsinchu.
2011.1.1	The daily quota for the tourists to Taiwan was increased to 4,000.
2011.6.28	The first batch of mainland tourists who travelled freely came to Taiwan, with a daily quota of 500 people.
2012.4.28	The quota limit for free traveling to Taiwan of the mainlanders was adjusted to 1,000 per day.
2013.4.1	The daily quota for Mainland Chinese Tourism Group was adjusted to 5,000, and the quota for free travel was adjusted to 2,000.
2013.5.1	The Tourism Bureau of the Ministry of Communications implements high-quality tour groups for land passengers and is subject to a daily quota of group guests.
2013.10.1	China implemented a new travel law, strictly regulated shopping itineraries and banned commissions.
2013.12.1	The daily quota for free travel by Mainland travelers to Taiwan was adjusted to 3,000.
2014.4.16	The daily quota for free travel by Mainland travelers to Taiwan was adjusted to 4,000.
2014.11.28	The "In-depth Tour of Indigenous Tribes" was opened without daily quota restrictions.
2015.5.1	Opened the "Mainland Chinese Tourists High-end Quality Tour" without daily quota restrictions.
2015.9.21	The daily quota for free travel by land travelers to Taiwan was adjusted to 5,000.

Table 1: Timetable of Policy Relating to Mainland Chinese Tourists. Resource: Webpage of Tourism Bureau, Ministry of Transportation and Communication. https://admin.taiwan.net.tw/timetable

Date	Phase	Cities Residents Allowed Travel to Taiwan	Count	Total
2011 / 6 / 28	Phase 1	Beijing, Shanghai, Xiamen	3	3
2011 / 7 / 29	Mini-Three Links[15]	Xiamen, Fuzhou (Fujian), Putian, Quanzhou, Zhangzhou, Longyan, Sanming, Nanping, Ninde	(9)	(9)
2012 / 4 / 28	Phase 2 - Stage 1	Tianjin, Chongqing, Nanjing, Hangzhou, Guangzhou, Chengdu	6	9
2012 / 8 / 28	Phase 2 - Stage 2	Jinan, Xian, Fuzhou (Jiangxi), Shenzhen	4	13
2012 / 8 / 28	Mini-Three Links[15]	Wenzhou, Quzhou, Lishui, Ganzhou, Fuzhou, Shangrao, Yingtan, Meizhou, Chaozhou, Shantou, Jieyang	(11)	(20)
2013 / 6 / 28	Phase 3 - Stage 1	Shenyang, Zhengzhou, Wuhan, Suzhou, Ningbo, Qingdao	6	19
2013 / 6 / 28	Phase 3 - Stage 2	Shijiazhuang, Changchun, Hefei, Changsha, Nanning, Kunming, Quanzhou	7	26
2014 / 7 / 18	Phase 4	Harbin, Taiyuan, Nanchang, Guiyang, Dalian, Wuxi, Wenzhou, Zhongshan, Yantai, Zhangzhou	10	36
2015 / 3 / 18	Phase 5	Haikou, Hohhot, Lanzhou, Yinchuan, Changzhou, Zhoushan, Huizhou, Weihai, Longyan, Guilin, Xuzhou	11	47
2019 / 7 / 31	Tourism to Taiwan was Suspended		-	0
2019 / 9 / 20	The policy of “Mini-Three Links” reinstated		(20)	(20)

Table 2: Timetable of Open Up Tourism to Taiwan for the Residences in Mainland Cities
Source: Mianland Affairs Council, Republic of China (Taiwan). Table is oragnanized by the auther.

[15] Mini-Three Link: The citizens residing in these cities in then were allowed to do tourism only in Jingmen, Mazhu, and Penghu, the remote island of Taiwan.

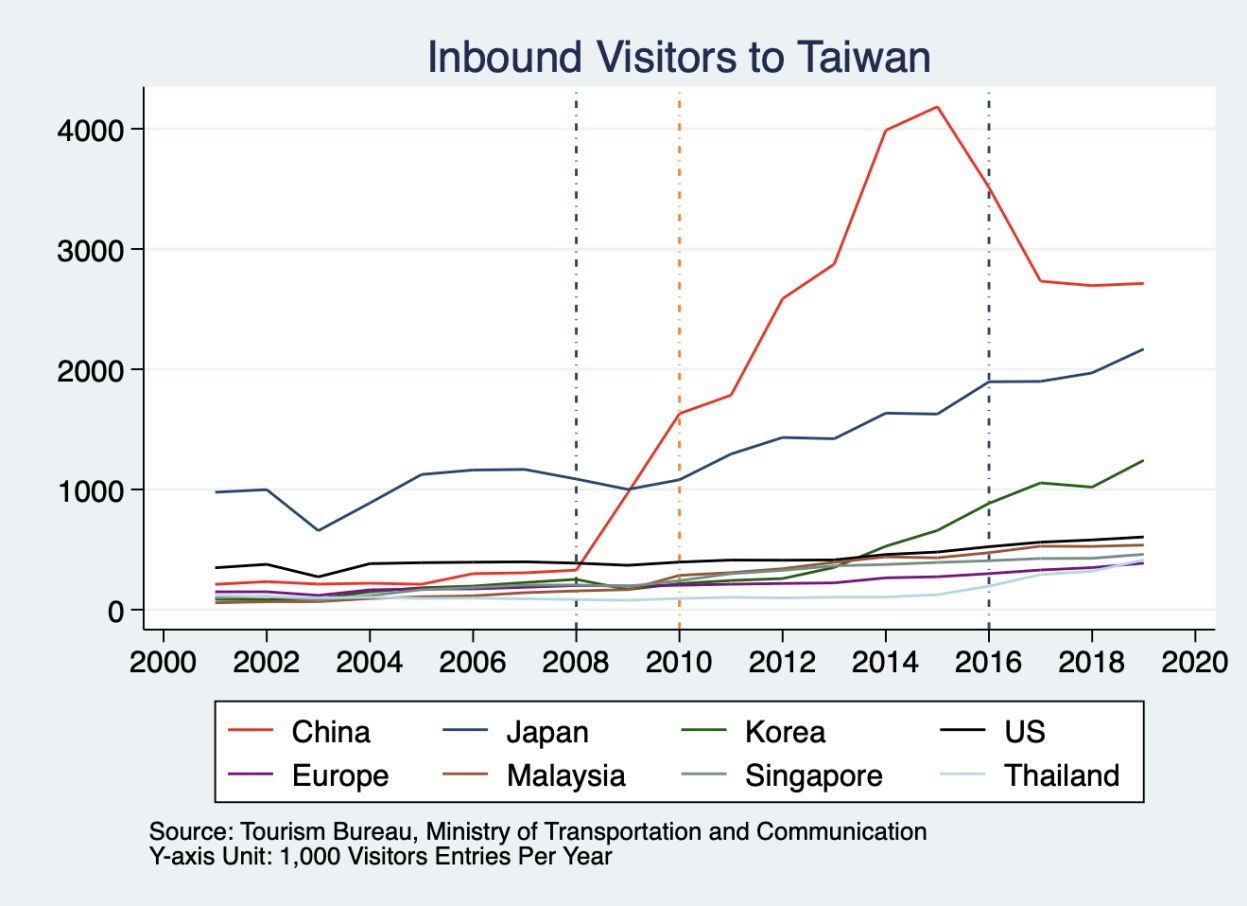

Figure 1: Inbound Visitors to Taiwan, 2001-2020

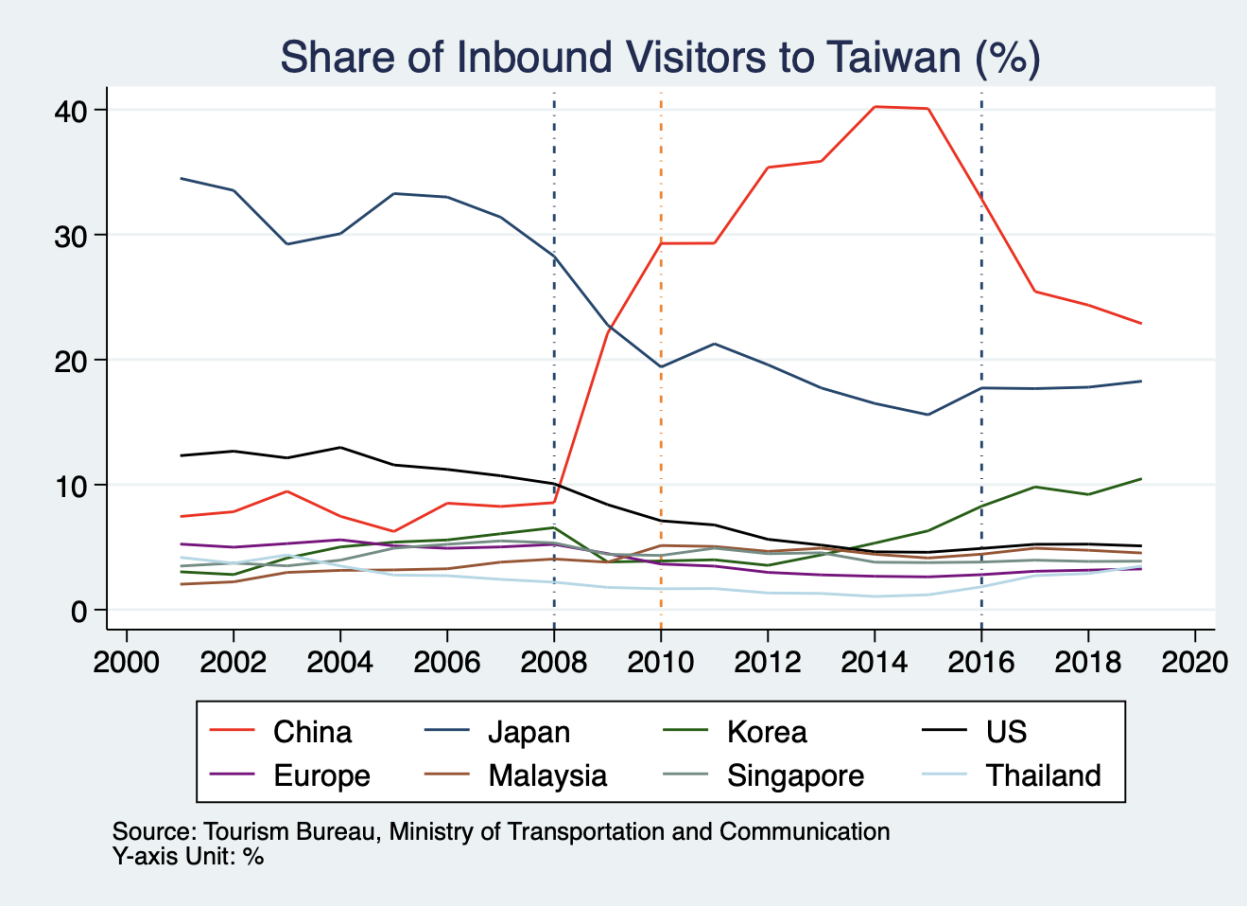

Figure 2: Share of Inbound Visitors to Taiwan, 2001-2020

3 Literature Review

3.1 Trade and China Shock

Discussions about the dynamics of the trade policies and the politics in a country are not new in the trade and political economy literature. Irwin (1994) examines voting patterns in the 1906 general election in the United Kingdom to explore the support for and opposition to free trade with the British electorate. Irwin (1994) also tests the hypothesis that support and opposition in each parliamentary district are closely related to the economic interests of the district's constituents, which in turn hinges on the international trade performance of the sectors in which the constituents are employed. Although the British voting and political system are unique globally and different from the Taiwanese political system, the result of Irwin (1994) still provides a broad picture of how trade policies affect the decision of the vote and it consequent political outcomes.

Young and Magee (1986) utilizes a simultaneous game model to delineate the strategic behavior by two contending coalitions of factor owners and also political competition between two rival parties contending to the political office. A Heckscher-Ohlin style of the trade model is assumed in this paper. Each political party pre-associates itself with the interests of one of the production factors and proposes policy intervention which benefits the factor owners support. In short, Young and Magee (1986) considers a Heckscher-Ohlin-Samuelson trade model with two lobbies, representing the interests of factor owners, and two political parties. The lobbies contribute resources to politics, equating their returns to political and economic activity at the margin, while the parties maximize their probability of election, trading off general voter dissatisfaction with protection against the electioneering resources that favorable policies attract from the lobbies.

On the other hand, since we focus on the Chinese tourists coming to Taiwan in this paper, we should not ingore the string of the literature that capture the growing power of the China in global trade. Since China became a member of the World Trade Organization, the large market power has fundamentally change the global economy. There have already been many papers trying to evaluate China's impact on the U.S. labor market, mainly regarding the penetration of Chinese importing goods. For example, Autor et al. (2013a) exploiting the rising import competition of Chinese goods on US labor markets and concluded that the increasing import competition from the Chinese importing goods explains one-quarter of the aggregate decline in the employment of the US labor market (Autor et al. 2020). And most of the empirical literature

regarding the China symdrone on the local market focus on the manufacturing sectors and the trade in goods. (Autor et al. 2013a,b, 2014, 2019). This string of literature regarding the China shock mostly focuses on the manufacturing sectors and seldom touch on the impact of trade shock on the service sector. This paper aims to identify that the municipalities in Taiwan have encountered a larger swerve of the political ideology, which fills in the current literature gap.

Guo and Jiang (2021) focuses on the political effects on the open border policies, in which they defined it as cross-border tourism of Chinese tourists to Taiwan. However, instead of using the data of historical presidential elections in Taiwan, they run the regression discontinuity by using the time series survey data of the Taiwanese national identification and the tourists' numbers. Guo and Jiang (2021) has also shown that cross-border tourism did not help achieve Beijing's original political goal. The empirical results in Guo and Jiang (2021) are different from this study. They show that the independence–unification views that the arrival of Chinese tourists has not influenced the majority of Taiwanese hold. The increase in the number of Chinese tourists does not significantly affect the proportion of Taiwanese who support independence and support maintaining the status quo. By contrast, the number of Taiwanese who support unification reduces. It implies that cross-border tourism may not be an effective means to achieve political goals.

3.2 Trade in Tourism

Recently, the literature analyzing the relationship between international trade and tourism has been growing. But little does these papers touch on the political effects and barely look at the particular shock of the open-broader policy for the Chinese tourists. For example, Kulendran and Wilson (2000) tests a connection between international trade and international travel flows using time series econometric techniques by using data for Australia and four important travel and trading partners, the U.S.A., the U.K., New Zealand, and Japan.

Also, there is no consensus in the literature on how to estimate the exposure of the tourist. However, in the literature, we could find that travel distance and time play important roles in the spread of tourists. There have been many papers discussing the measurement of tourist exposure. One area's exposure to the incoming tourists was highly dependent on tourist dispersion. Becken et al. (2008) identifies the itinerary prototypes based on the characteristics of the tourists and examines the tourist behavior across space and time. They found that the spatial distribution of the tourist itinerary is shaped by a wide range of factors, including country of origin, port of arrival, travel style, repeat visitation, the purpose of travel, and the

presence of children under fifteen years old.

Allen et al. (2021) is the latest paper that touches on tourism in trade and its effects on the labor markets. The authors develop a new strategy to capture the region's tourism effect and ask, "Is tourism good for locals?" This paper also focuses on the political tensions regions- the Catalonia region in Spain, even though they did not test the political outcomes of the Catalonia region. Allen et al. (2021) uses detailed spatial data on expenditure and income patterns of residents in Barcelona. The result shows that plausibly exogenous shifts in tourist expenditure due to compositional differences in their country of origin across time and over space in the city crowd out local expenditure by increasing prices but partially compensating through increases in wages. However, the incidence of the tourism shock is highly heterogeneous across the city, with inner-city residents bearing the most significant welfare losses and peripheral residents enjoying the most lavish welfare gains.

4 Data and Variables

Since this study focuses on exploring the open-border tourism policies and their political effects on the presidential elections in Taiwan, there is no database. We have to merge different data resources published by four governmental agencies in Taiwan. I extract the data published by three Taiwanese government agencies: first, the Central Election Committee for the historical electoral data, the boundaries and the geographical shape data from the Ministry of Interior, and finally the Annual Survey Report on Visitors Expenditure and Transportation (ASRVET) from the Tourism Bureau of Ministry of Transportation and Communication. I detail them in the following subsection, starting from the historical electoral data.

4.1 Presidential Election Data

First, I pulled the historical presidential elections' voting data from Taiwan's Central Election Commission (CEC) database.[16] All historical electoral data are recorded and downloadable from the online database of CEC, the highest government agency in charge of government officials' elections, and conducted and supervised elections that occurred in twenty-two second-level municipalities in Taiwan.[17] CEC also governs the local election commissions who administrate the logistics of the all-level elections. All elections in Taiwan's democratized period are operated according to "Public Officers Election and Recall Law" and "Presidential and Vice Presidential Election and Recall Law." In addition, CEC has been granted its political independence and ensures the fairness of elections and campaigns. The commissioners of local and central election commissions serve a four-year term, who are not subject to party affiliation and given independent discretion.

In this paper, I focused on the presidential election results of the third-level governmental administration, where there are three hundred and sixty-eight municipalities, including those governed by the cities located in the outer islands of Taiwan. The names of these third-level municipalities are different depending on which their upper-level government is. It is called "district" in Chinese if the area is under "special municipality," whereas "town," "village," or "county-administered city" are the names of the municipality is under the county. There are one hundred and sixty-four districts, six aboriginal mountain districts,

[16] The English version of the official website of the Central Election Commission in Taiwan, https://web.cec.gov.tw/english/

[17] The second-level refers to the special-municipality, city, and county. In 2021, there are twenty-two second-level administrations. There are six special-municipalities, Taipei, New Taipei, Taoyuan, Taichung, Tainan, Kaohsiung; three cities, Keelung, Hsinchu, and Chiayi; and thirteen other counties.

fourteen county-administrated cities, thirty-eight towns, one hundred and twenty-two villages, and twelve aboriginal mountain villages.[18]

The third-level municipality provides sufficient variation on the vote results to explore the causal effects in the empirical model, which has also been the traditional administrative division since the Kuomingtang retreated to Taiwan. In addition, the third level is the finest level that avoids the problem of gerrymandering. Even with that CEC database providing further detailed fourth-level electoral results, I am afraid that the consistent realignment in history will hinder the results we would like to explore.

4.2 Chinese Visitor Statistics

Secondly, I extract the annual statistics of the incoming visitors worldwide from the Annual Report Survey of Visitors Expenditure and Transportation (ARSVER). This survey was constructed by the Tourism Bureau under the Ministry of Transportation and Communication (MOTC) in Taiwan at the tourist attractions or the airports in Taiwan.[19] This yearly published report includes the ranking of the relative visits of the tourist's interests, as well as the numbers of tourists coming to Taiwan and what are their purposes of the stay. While this report provides the data of how many tourists stay in the different counties or cities annually, there are no more exemplary statistics on the county or city level of the tourism, let alone the district levels that I explore. Hence, to estimate the potential tourists' exposure, we used the driving distance and time from the districts to a particular tourist attraction as a proxy of tourist exposure, a convention documented in the tourism literature. In other words, I assume the possibility distribution of exposure to the tourists follows the uniform distribution. If the district is closer to the particular tourist attraction or the major airport, the residents living in the neighborhoods are supposed to have a better chance to interact with the tourists. The assumption hidden from our RD model is that the tourist exposure is proportional to the inverse of the travel distance or time. To represent them mathematically in the following Equation 2 and 3. For every district i to tourist attraction j,

[18] There are 368 third level municipalities, include 164 districts, 6 mountain districts, 14 county administrated cities, 38 towns, 122 villiages, 24 mountain villages. 368 = 164 + 6 + 14 + 38 + 122 + 24

[19] The official homepage of the Tourism Bureau, Ministry of Transportation and Communication in Taiwan. https://admin.taiwan.net.tw/English/index.aspx

$$\text{Tourist Exposure of District}_i \text{ from Attraction}_j \propto \frac{1}{\text{Driving Distance}_{ij}} \tag{2}$$

$$\text{Tourist Exposure of District}_i \text{ from Attraction}_j \propto \frac{1}{\text{Driving Time}_{ij}} \tag{3}$$

4.3 Geographical Data: Travel Distance and Time

As mentioned in the subsection, we proxy the distance to estimate the exposure of Chinese tourists across the towns in Taiwan. However, by using the geographic data, we can create an index that approximates the degree of exposure of tourists in every district.

Hence, we started by extracting the geographic data maintained and published by the National Land Surveying and Mapping Center (NLSC), governed by the Ministry of Interior of Taiwan. First, according to the database that NLSC published, we locate the coordination of every town, airport, and yearly ranked tourist attractions based on the Annual Survey Report on Visitor Expenditure and Trends (ASRVET). We then use the Stata package `geodist` (Picard 2010) and the mapping services provided by the HERE company[20] to calculate the driving time from each Taiwanese town to the tourist attractions as a proxy of tourist exposure. We use the driving distance and time as the proxy of the tourist exposure is because driving or taking the touring bus is the main transportation for the tourists coming to Taiwan for the first time. There might be a slight difference between the driving distance and the driving times, considering the infrastructure of the West Coast of Taiwan is better than the East Coast of Taiwan.

[20]The homepage of HERE Technology, https://www.here.com/

5 Methodology and Identification

5.1 Regression Discontinuity Design

Since there is a data limitation in the for us to know the tourists stay and the traveling, we proximate the exposure of the tourist by using the driving distance and time to the tourist attractions in Taiwan. The Regression Discontinuity (RD) design is a quasi-experimental impact-evaluation method used to evaluate programs with a cutoff point determining who is eligible to participate. RD models allow researchers to compare the sample approximately the differences between the control and the treatment groups (Cattaneo et al. 2020). In other words, the discontinuity around the cutoff point (Angrist and Pischke 2008), which we set by the sample mean in each model. We expect that the treatment effect will not be statistically significant before the shock of trade policies. There are minor differences in the high- and low-Chinese tourists exposure regions. In contrast, after the trade shock, the treatment effects will become more significant.

There are considerable merits for us to run the RD model to tease out the swerve of the political ideology before and after the trade shock (Lee and Lemieux 2010). First, even though we could create an index of the exposure to the Chinese tourists, there is still much cause that might potentially confound the electoral results. For example, the demographic variables of the constituents, such as the average income, educational level, gender composition, and age composition of the citizens who resided in the regions, could potentially be factors to affect the electoral outcomes. Although we could add more controls in our traditional parametric regression models, there is always room to argue another potential variable that might endogenize the electoral outcome.

The appropriate regression discontinuity design could eliminate missing observed variables since, by definition, we focus on the areas around the imaginary cutoff of either driving distance or time. And the distance to particular tourist attractions is not supposed to have direct causality to the political ideologies. The only difference in the close and away regions from a tourist site is the traveling time. The rest of the missing variables should be very similar for those municipalities.

There are more reasons regarding the external validity of using the RD design. First, the unobserved factors that impact the results of the elections tend to be continuous—for example, the level of education, the income, or the demographic of the constituents. Secondly, the district can not directly manipulate its treatment, whether getting tourists' exposure or not. Third, we need not additionally assume the

distributions of the unknown factors.

5.2 Identification

To capture the realignment of the political ideology, I use the winning margin of the KMT as the primary outcome variable. As mentioned in Section 2.2, since many variables potentially will affect the outcomes of the elections, the Regression Discontinuity design on the proper cutoff of the driving distance and time could solve it. Using the Regression Discontinuity (RD) method, we only focus on the boundaries of the treatment and control group in the sample. Our goal in this paper is to tease out whether the various degree of tourist exposure impacts the votes before or after the shock coming from China. In other words, I compare the treatment effect of tourists' exposure across the different years of the electoral results. In the model, the confounder X_i is the real tourist exposure in the town i that we can not observe and accurately estimate. However, according to the tourism literature, we know that tourist dispersion is highly correlated with the distance and travel time to the main tourist attractions. By understanding this mechanism, we can use the driving distances as a proxy of tourist exposure.

Those towns that are distanced from tourist attractions or the airport as the low-exposed towns are the control group in our model. On the other hand, the high-exposed districts are in proximity of the tourist attractions or airports. We then calculate the sample average as the cutoff between the high and low exposure regions and estimate the treatment effects in each election. Finally, we run a regression of these treatment effects on the previous years' incoming Chinese tourists to see if the increment of the Chinese tourists impacts the treatment effects in the RD models.

The following is the RD model in each election year, which is a sharp RD design. (Lee 2008, Lee and Lemieux (2010)) where the variables: Y_i represent the Pro-China Margin, as our primary outcome variables capturing the ideology realignment. D_i is the treatment, deciding the district is high-exposed to tourists or not. X_i is the assigning variable, the driving time or driving distance to airport or tourist attractions. W_i is the unobserved endogenous variable, which could be thought of as the real tourist numbers, which is assumed to affect the result of election Y_i. c is the cutoff of driving distance or driving time, which we use as the sample mean.[21]

[21] In the first model we run, we pin c = 290 minutes as this is the average time that people spend on the highway traveling from the capital to the south. One day trip from Taipei (north region) to Kaohsiung (south area) is 4 hours and 50 minutes.

$$Y_i = D_i\tau + W_i\delta_1 + U_i \tag{4}$$

$$D_i = 1[X_i \geq c]$$

$$X_i = W_i\delta_2 + V_i$$

Since districts can not precisely control W_i via X_i, the external validity of the RD holds. On the other hand, it is not always the case that the longer travel time from the airport brings fewer tourists; the districts have no complete control to be tourism hot spots or not. Then, to robust our analysis, we calculate the treatment effect based on the different local polynomial functions in the RD model. Here, we consider the first four degrees of the power in the RD model. The RD model with the linear local polynomial function is as following, the τ_1 is the estimated variable that we are interested in.

$$Y_i = \tau_1[X_i > c] + \delta_1(X_i - c) + U_i \tag{RD1}$$

The quadratic one,

$$Y_i = \tau_1[X_i > c] + \delta_1(X_i - c) + \delta_2(X_i - c)^2 + U_i \tag{RD2}$$

The cubic one,

$$Y_i = \tau_1[X_i > c] + \delta_1(X_i - c) + \delta_2(X_i - c)^2 + \delta_3(X_i - c)^3 + U_i \tag{RD3}$$

And with the power of fourth local polynomial function, the RD model becomes

$$Y_i = \tau_1[X_i > c] + \delta_1(X_i - c) + \delta_2(X_i - c)^2 + \delta_3(X_i - c)^3 + \delta_4(X_i - c)^4 + U_i \tag{RD4}$$

And finally, after calculating the treatment effects from the different elections year, we then test the stationarity of the series of treatment effects and run a time-series regression of those treatment effects on the numbers of the incoming Chinese visitors. Such as,

$$\text{Treatment Effects}_t = \beta_0 + \beta_1 \text{Chinese Tourist}_t + \varepsilon_t \tag{5}$$

5.3 Alogorithm

To wrap up this section, I conclude this section by listing the algorithm we use in this study.

1. Calculate the distance between the municipalities and the tourists attractions.
2. Calculate the mean of distances, set the municipalities into control and treatment group.
3. Set the mean of the distance as the cutoff to the close and away regions.
4. Run the regression discontinuity using the 2004, 2008, 2012, 2016, 2020 presidential electoral data.
5. Compare the treatment effects across the different elections.
6. Regression those treatment effects on the importing number of the Chinese tourists.

6 Results: RD Figures

The following figures are the series of RD results based on the 2016 presidential elections and use the largest airport in Taiwan, Taipei International Airports, as the tourist concentration point. As indicated in the series of graphs, either kind of the local polynomial functions of the RD model shows a significant difference at the cutoff point between the high and low tourist exposed areas.

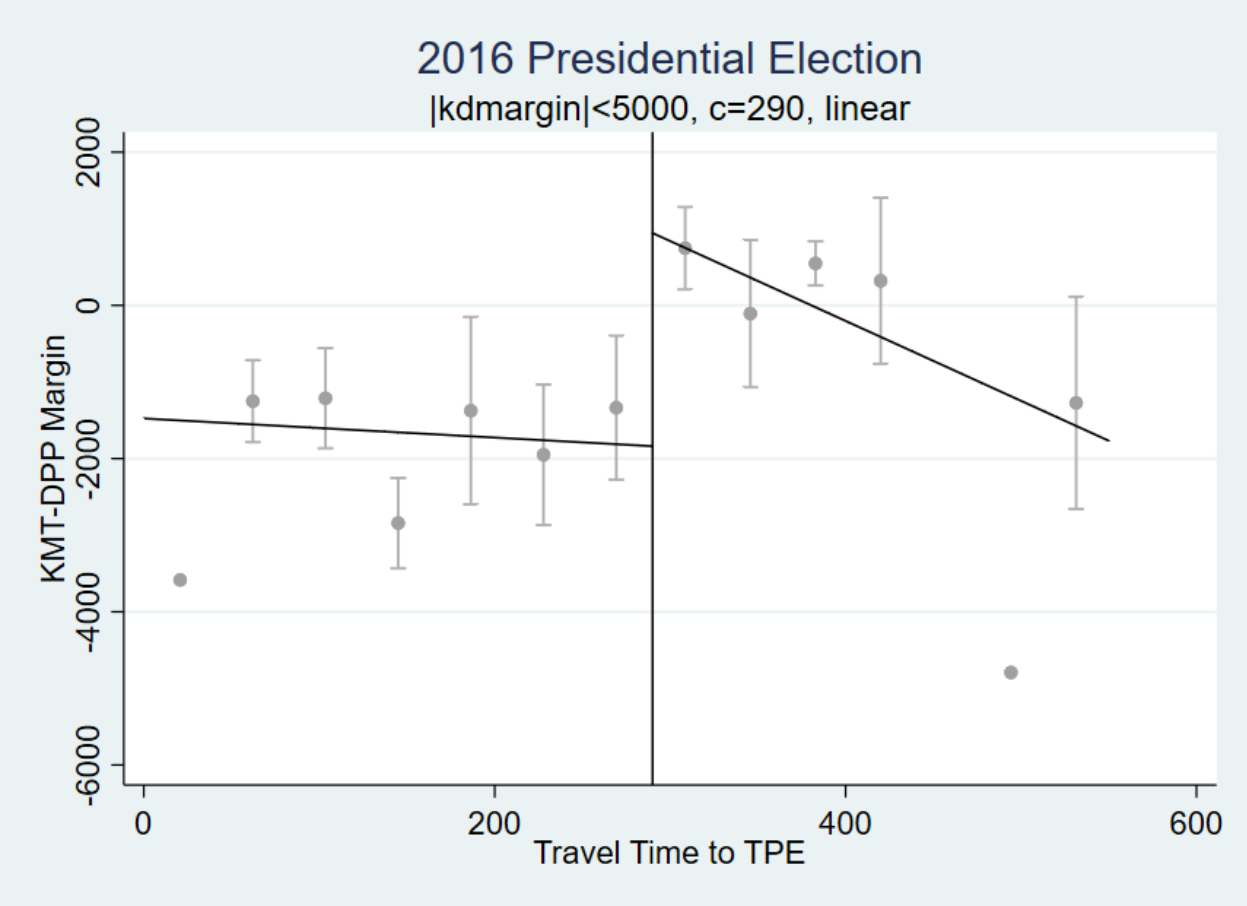

Figure 3: 2016 Election, Linear Model, Taipei Airport (t=2016, d=1, j=TPE, c=290)

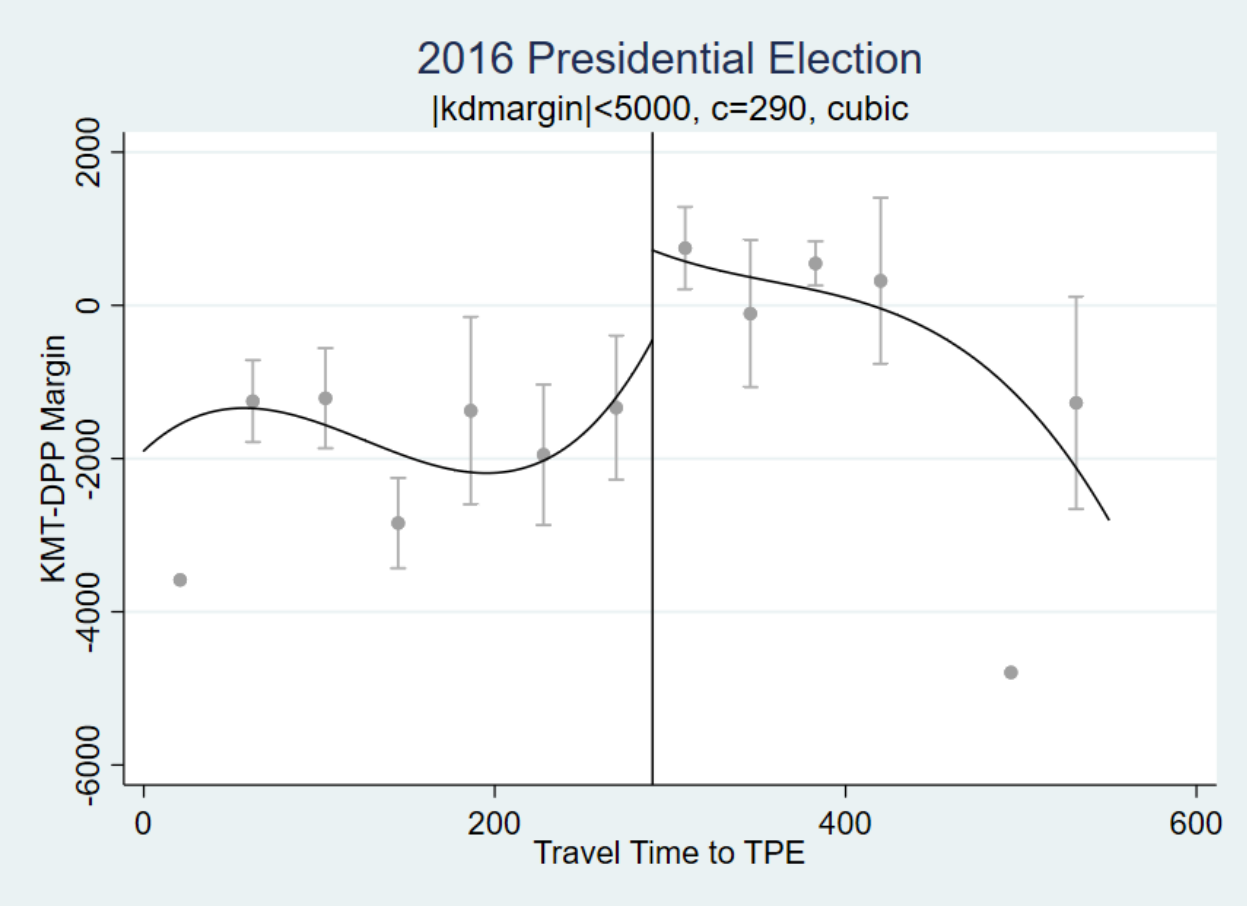

Figure 4: 2016 Election, Quadratic Model, Taipei Airport (t=2016, d=2, j=TPE)

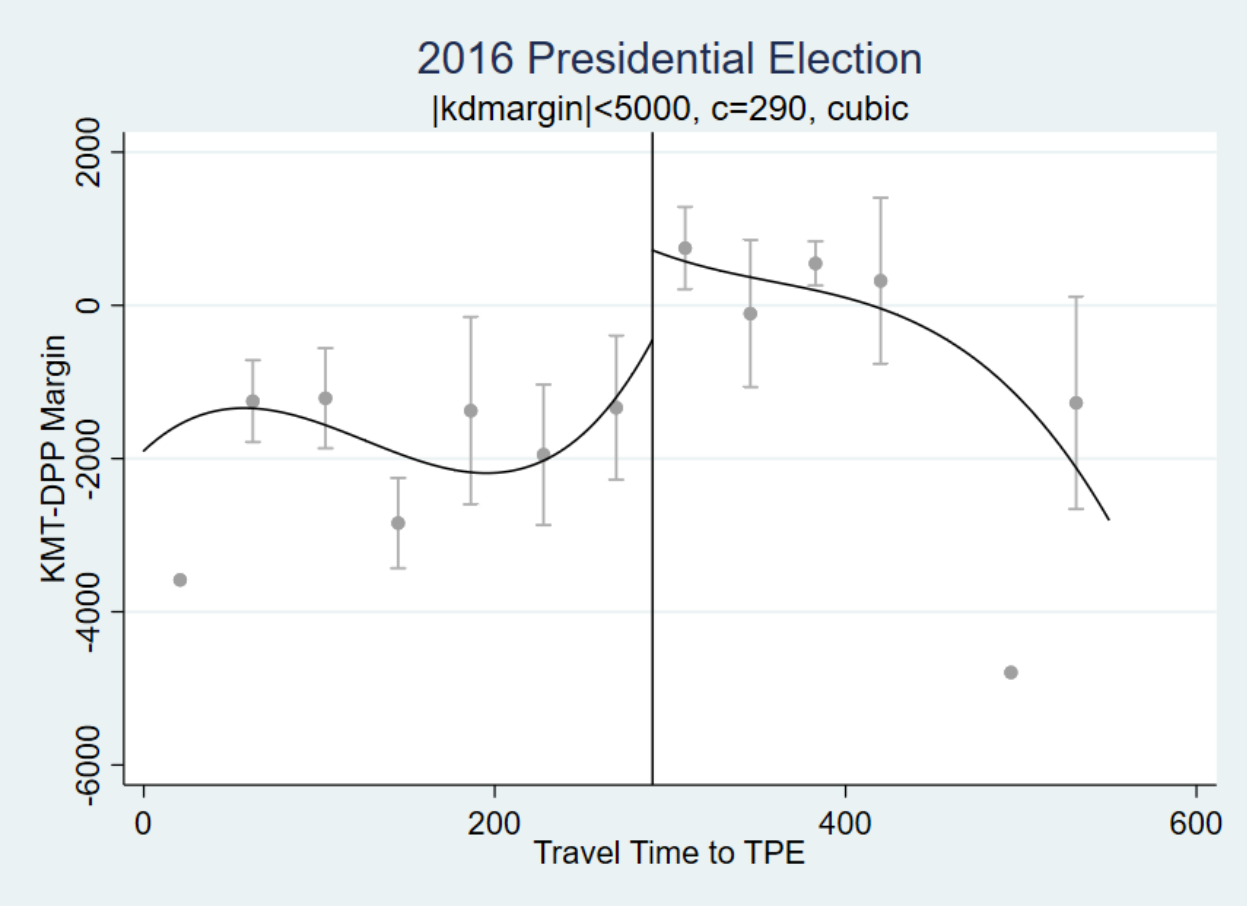

Figure 5: 2016 Election, Cubic Model, Taipei Airport (t=2016, d=3, j=TPE)

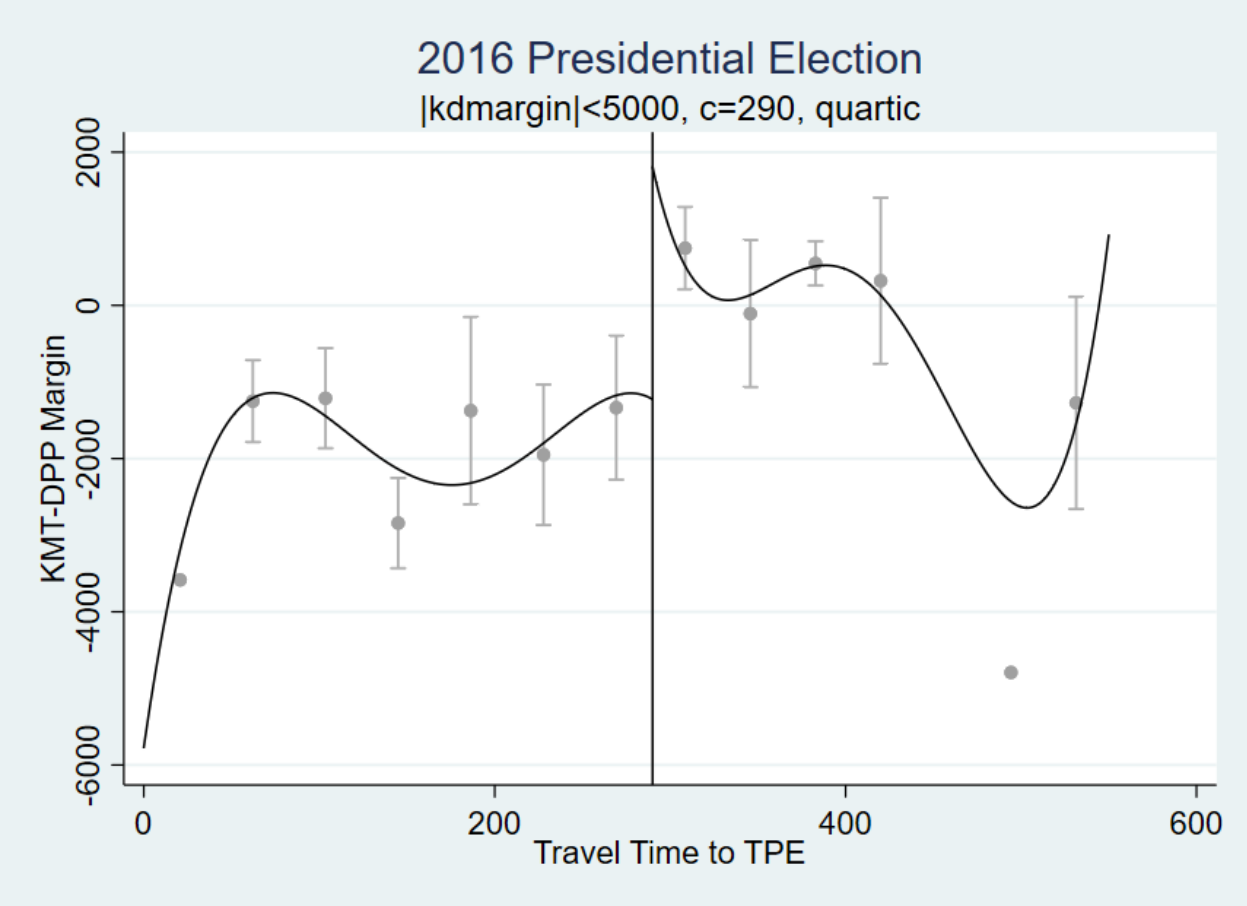

Figure 6: 2016 Election, Quartic Model, Taipei Airport (t=2016, d=4, j=TPE)

7 Conclusion

"Distance is the Soul of Beauty" was quoted by Simone Weil. The French scholar, philosopher, and political activist uses her words to describe humans' social interactions and behaviors. This witty quote appreciates the merits of the distance between individuals; that is, one might be easier to get along with others should they be unfamiliar, whereas familiarity often leads to more friction. It is not feeling out of place if we put this quote into the context of global politics and economics in modern history. Countries are prone to have tensions and conflicts with their neighbors. Asian countries are no exception. Besides the prolonged cross-straits tensions between China and Taiwan, the 2020–2021 China–India skirmishes with boarders resulted from long-time Sino-Indian disputes on the proclaimed territories. The consistent political tensions on the Korean Peninsula are due to the ideological distinctions between the two political identities.[22] Not to mention another well-known case in the Middle East, Israel continues to have military clashes with her neighbor Arabic states, which causes the image of instability in its neighboring regions for decades. As noted above, although there are various reasons to cause countries to engage in conflicts and tensions, a shouting distance between counterparts seems to be a common trait shared.[23]

The tangled relationship between China and Taiwan is another case in point. Either physically or psychologically, China and Taiwan are not far from each other. The island of Taiwan is geographically separated from China's southeast coast by the short stretch of Taiwan Strait, which ranges from 220 km at its widest point to 130 km at its narrowest. Meanwhile, ethnically, both China and Taiwan shared the primary composition of Han ethnicity and the inheritance of the Chinese culture. Follow the previous argument, the political tensions sustained since the day that two China were built.[24]

The political gridlock resulting from the unended Chinese Civil War and the spillover of Cold War had shut down the communications and commercial cooperation at both ends during the post-war era. Although there has been no physical military engagement across the straits since the end of the Second Taiwan Strait Crisis in 1979, neither side could solve this political gridlock unilaterally. Until now, each side, either side still claims their legitimacy of China's representation in the international community and

[22] Of course, the potential risks of North Korea using nuclear weapons contribute to the current tension, but it is probably hard to argue that other nations did not play a role in this context.

[23] Visit the website of Peace Insight for more detailed statistics and graphs of the conflicted regions around the world. Peace Insight is powered by Peace Direct, an Non-government Organization (NGO) supporting local people in the most challenging conflict environments worldwide.

[24] i.e., the People's Republic of China (P.R.C.) controlled and established in mainland China, and the Republic of China (R.O.C.) relocated and settled to Taiwan.

denies another.

However, although there was never an official tie built by the authorities, the underground capital investments, technological transfer, and stratigical cooperation across the straight were increasing as the wave of globalization began. Since China's post-1978 reform period, Taiwanese entrepreneurs and capital, along with outsourcing by Taiwanese firms, have played an important role in seeding coastal China with manufacturing capabilities. Those early investments in China created global production chains stretching from Taiwan's Hsinchu Techonology Park to Chinese factories in southeastern provinces to the retail electronics stores of North America and Europe (Rosen and Wang 2011). Being aware of the investment and joint venture across the straits, both governments started to take a new route by appreciating the value of business cooperation and specialization of the trade. The logic behind this follows the belief that trade gains would ease the political tension and ultimately solve the political problems (Pelzman 2016). The more the economies dependent upon each other, the more inseparable their citizens' lives become, hence plummeting the possibility of getting into military conflict. In short, a gradual economic integration could serve as a stepping stone for more advanced political coalitions in the future.

I interpret my results from two main perspectives. First, from the behavioral and microeconomic perspective, my results challenge the contact hypothesis advocated by sociologists (Allport 1954; Katz 1991) and experimental economists (Bertrand and Duflo 2017). According to my results, more intensive interactions between members of the conflict groups neither alleviate the stereotype nor form a new sense of belongingness. Instead, they reinforce the bias, perhaps due to the visitors' self-selection or existing cultural distinctions. Secondly, from the lens of macroeconomics, my results demonstrate a higher degree of economic integration, such as the policy of opening to never-met visitors, does not necessarily lead to a higher degree of political convergence. On the contrary, I find the districts with higher exposure to Chinese visitors encountered a more significant ideological realignment after the policy shock. Residents living in the towns in the northern part of Taiwan, surrounded by the main tourist attractions, gradually swung their votes to favor the party distancing themselves from China.

Chapter 2 - Anatomy of China Syndrome:

How China and WTO Impact Labor Welfare across Industries in Taiwan?

1 Introduction

Using the time-series data from 1980 to 2015 in Taiwan, this paper aims to examine if the variation of trade dependence would impact the welfare of workers in three main categories of industry; the agriculture, manufacture, and service sectors. We gather two different sets of data, in aggregate and per capita level, to examine the trade impacts industrially and individually. Net trade volume is a composition of the calculation of GDP. Hence, it is reasonable to relate the trade dependence to a country's strategy of resources allocation, as well as the production activities of the firms in different industries. More so, based on the model of labor economics, the equilibrium wage fluctuates partially because of the shocks from labor demand. However, this argument might lead to an endogenous problem when it comes to exploring the relationship between trade and labor welfare, i.e., there might be some hidden factors that simultaneously drive the trade volume and the compensation of the labor. Hence, choosing appropriate instrumental variables becomes inevitable. Here, I use the annual emission of carbon dioxide as an instrument variable and apply multiple 2SLS regressions in our model. In this paper, I will compare numerous empirical models to the benchmark OLS model and try to answer the fundamental causalities of labor welfare with the trade.

"Build a Wall" might be the most well-known quote from the last few years during the Trump administration.[25] The abnormal political slogan sounds exaggerated and dramatic at the beginning of his campaign. Still, the election result favored the proponent of building the wall to deter the immigrants. But why is a country that was created by the immigrant suddenly lean-to protectionism? The post-election polls showed the concerns that the occurring jobs outflows during globalization had enormously impacted the voting behavior of the constituency. The voters representing middle-class laborers in the inland U.S. states, who suffered from the stagnation over the last decade, played vital roles in the Trump's and protectionists' victories. In some sense, the triumph of protectionism denies the merit of specialization, which improves production efficiency and productivity, creating a higher welfare level for each side of the trade. However, if I look back in the post-war era, anti-globalism and protectionism were never news.

[25] Or "Build a Wall," during the unofficial campaign slogan that usually chanted in the Trump's rally. "The Wall" indicates the potential plan of building an artificial wall between borders of the U.S. and Mexico. *The Washington Post*, Robert J. Samuelson, October 10, 2017, DOI: https://goo.gl/kK7yDY

Globalization is a double-edged sword. It reduces the trade barriers and helps the firms utilize their comparative advantages, so those firms in the country as members of trade agreements could enjoy the gains because of a bigger market. On the other hand, a redistribution problem showed up at the same time. Those firms without comparative advantages will suffer from opening up the borders due to the additional competition coming from overseas. As it was reflected in the *Fundamental Theorem of the Welfare Economics*, there always exists a trade-off between efficiency and equality. Hence, balancing trade liberalization and redistribution of the gains becomes imperative when I value the effects of trade policies.

But is a gain or a loss from trade predetermined? Or what are the factors in deciding which industry will wind down and which industry will expand? In the U.S., I could refer to the car-manufacturing sector as an example that suffered from trade liberalization. In 2009, GM, Chrysler, and Ford had asked for the government's bailouts. Due to the competition with foreign brands, the downward of the assembly lines and auto-part factories in Midwestern states had caused the jobs outflows, and hence downgraded the welfare of laborers. Another example might be the industry of home electronic appliances. Under the wave of globalization, the automobile firms in the U.S. move overseas and build their assembly lines in developing markets, such as China and Mexico, to lower production costs to take advantage of the lower labor cost. However, this, in turn, reduces the labor demand domestically in the U.S., the workers who used to work in the car manufacturing sectors lose their jobs. There is one common characteristic in both industries mentioned above, and they are relatively labor-intensive industries.

But if I consider other countries, the situation that the U.S. manufacturing industry encounters in the waves of globalization might not occur. For example, in Taiwan, the industries that suffered the most due to the World Trade Organization (WTO) participation will neither be the automobile nor home appliance industry, but the agricultural, natural resources, and energy. The distinguish between the countries should result from the different demographic characteristics and endowments across the nations. The international trade theory has tried to capture the reasons behind deriving the models to examine them empirically.

We have to be cautious when starting a regression model to examine trade impact on the welfare of laborers. Following Simon Kuznets' idea of the national accounting, the volume of net export contributes to total national income; that is, there will be a *perfect collinearity* problem if I directly apply the regression model of the GDP to trade volume. Also, since the labor wage and trade volume simultaneously correlated with the GDP, which implies they might be endogenous. To have a consistent empirical analysis, applying

the instrumental variables becomes inevitable. Econometric theory indicates that a valid instrument should induce changes in the explanatory variable with an independent effect on the explained variable. Hence, to use one variable correlated with the country's openness but does not correlate with the labor welfare, I might be able to track out the trade effects across the industries.

Section 3 introduces the database and the reason to choose the periods between 1981 to 2015. Section 4 plots out the model to explore the questions. For example, how does the openness of the country affect the laborers in the different sectors? We use the econometric method includes the OLS with the dummy variables, difference-in-difference, and instrumental variables with two-stage least squares. Section 5 reports the regression results via the tables. Finally, section 6 concludes and discusses the future improvement of the paper.

2 Literature and Theory

There are large volumes of literature in international economics discussing the relationship between trade activities and the return of production inputs (Feenstra 2015). Since this is an empirical paper focusing on the analysis of Taiwan due to the impact of China and join of the WTO. I omit the derivations of the theoretical model and list some classical theories relating to trade effects and the return of input factors.

Considering labor is the only input I need in production, the Ricardian model concluded the technological difference among the countries causes the existence of the trade. One should specialize in the most-productive industry and deal with others. The model provides a good explanation of the incentives to the origin of trade transactions. Still, practically, it is not convincing to assume the production only relies on a single input. On the other hand, the Ricardian model can not explain the mobility of the factors nor the relationship between the resources endowment and trade activities. More so, the model ignores the demand side of the economy.

The other trade theory that could answer this is the Heckscher-Ohlin model, which considers a two-good, two-factor, and two-country model. Under this setting, I treat all the variables involved as a relative term. In the Hecksher-Ohlin model, I focus on the relative price of the goods, the ratio of the factor prices, or the terms of trade. In the following, I summarize five well-known theories to discuss the relationship between international trade and the return of the production inputs.

(Theorem 1) Heckscher-Ohlin Theorem, 1924, 1991 [26]

Each country will export good that uses abundant factors intensively.

(Theorem 2) Stolper-Samuelson Theorem, 1941

An increase in the relative price of the good will increase the real return to the factor used intensively in that good and reduce the real return to the other factor.

(Lemma 1) Factor Insensitivity Reversal

So long as both goods are produced, and factor intensity reversals (FIRs) do not occur, then each price vector (p_1, p_2) corresponds to unique factor prices (w,r).

(Theorem 3) Factor Price Equalization Theorem

Suppose that two countries are engaged in free trade, having identical technologies but different factors endowments. If both countries produce goods and FIRs do not occur, then the factor prices(w,r) are equalized.

(Theorem 4) Rybczynski Theorem, 1955

An increase in a factor endowment will increase the industry's output using it intensively and decrease the output of the other industry.

Stopler-Samuelson Theorem initiates the idea that trade activities will stimulate the return of production inputs. For example, the return of the capital in the capital-intensive country increases as the trade begins. Vice versa, the average wage of laborers, will increase in the labor-intensive country. No-Factor-Insensitivity-Reversal condition tells us the price vector of the production inputs will be uniquely mapped toward the volume of the information. And the Factor Price Equalization Theorem tells us the price difference between the input factors across the countries will be closer as the trade begins. Heckscher-Ohlin and Rybczynski Theorem indicate the country with the larger endowment of the production factors will increase their productions in the corresponding industry. Hence, trade benefits the industries with higher endowments of production inputs. If I apply the theoretical logic, in the 1980s, Taiwan had become an economic power with a substantial foreign exchange reserve. Then, the workers in that industry could be relatively easier to access the gains from trade. And the companies were able to internationalize their

[26] The original theory was articled by Heckscher and Ohlin in 1924 in Swedish, was translated and edited to English in 1991.

production.

Taiwan had been a relatively capital-intensive economy at that time. The increasing trade with China and the world should hurt the labor-intensive agriculture sector and benefit the capital-intensive manufacturing industries. How the welfare of the labor and firms effect by the openness of China and the join of WTO be the primary assumption, I would like to examine in this paper.

3 Data

3.1 Source and Sample

I extract the time-series data of the production and trade from the "Report on Industry, Commerce, and Service Census." The database was created by the Directorate-General of Budget, Statistics, and Accounting (DGBSA) in Taiwan.[27] DGBSA is a governmental institution in charge of collecting the macroeconomic data for the national budget and a variety of economic statistics. It serves as a primary consultation institute for the congress and incumbent administration, whose role in the Taiwanese government parallels the U.S. Census Bureau. The first national-wide census conducted by the authorization in Taiwan dates back to 1930. However, the digital version of the database was not created until 1980, so the furthest data I could find was truncated. The latest one starts from 1981.

Nevertheless, this period (1981-2015) in Taiwan is an excellent sample to compare the trade effects under different economic environments. The economy had been through two exogenous shocks within this period, i.e., the political transformations and the participation in WTO.

Figure 7 shows the monthly Trade Openness Index (TOI) within this period.[28] This figure was made by combining the quarterly GDP data and monthly total trade volume from the same census and database. The monthly TOI fluctuates sensitively with the outside shocks during this period.[29]

[27] DGBSA Taiwan, English Website http://eng.dgbas.gov.tw/mp.asp

[28] Trade Openness Index is also called Trade Openness Ratio, Dependence Degree on the Trade, or Trade-to-GDP ratio. One could refer to OECDiLibrary for the definition. https://tinyurl.com/yc9rpst5 within this period. We find a similar trend diagram in the database of Federal Reserve Economic Data (FRED). For Federal Reserve Economic Data, see https://fred.stlouisfed.org/ However, the diagram I plotted here in Figure 7 has finer and more accurate time grids.

[29] The World Bank has the same annual time series data with different countries, however, the data for Taiwan is missing. See the link, https://data.worldbank.org/indicator/NE.TRD.GNFS.ZS

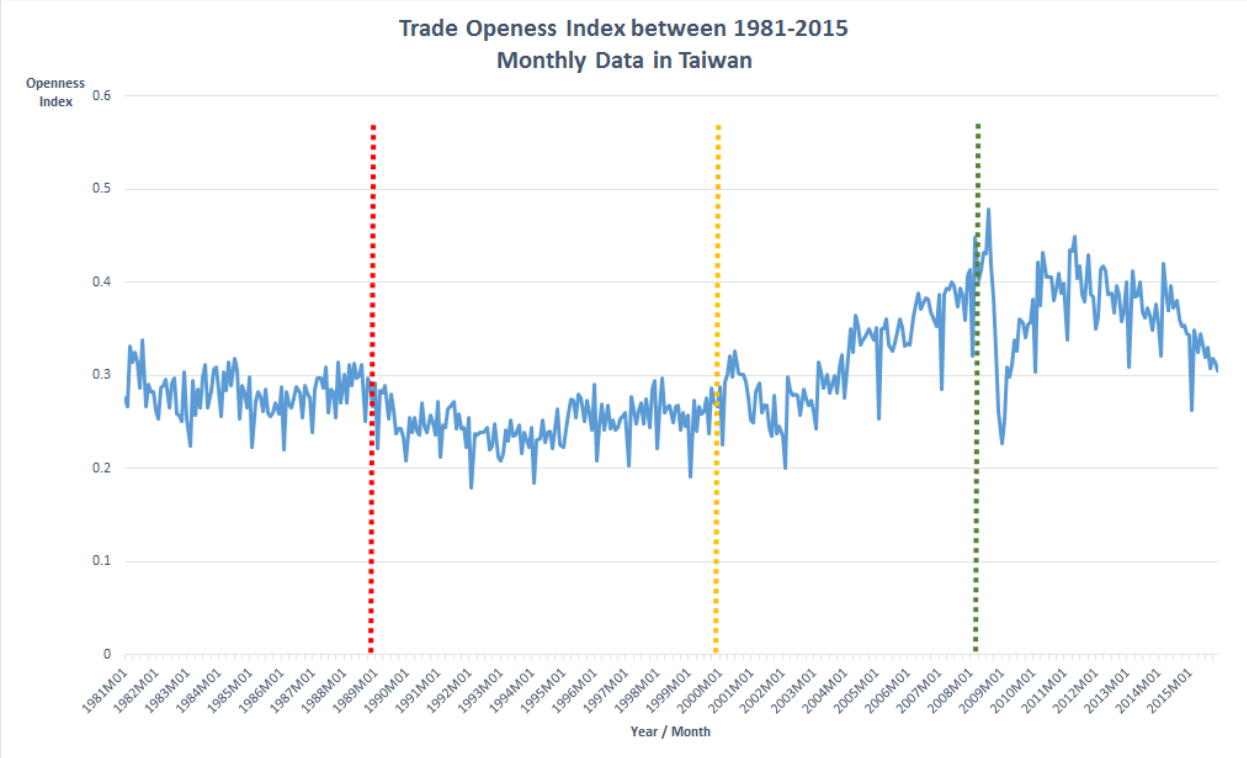

Figure 7: Trade Openness Index, Between 1981-2015 in Taiwan

The year 2002 serves as another turning point for the Taiwanese international business. Ever since the World Trade Organization was formed after the Uruguay Round in 1995, the Taiwanese government had tried to make a bid to become a member of the most significant multilateral international organization, eventually permitted in 2001, and the agreement treaty came into effect January 1st, 2002. Due to the preamble of the General Agreement on Tariffs and Trade (GATT), each signing member has to lower the tariffs and reduce trade barriers and give other members the "Most-Favor-Nation" treatment. As I could predict, the trade-to-GDP ratio (TOI) would hence increase significantly. Figure 7 captures this shock too, in which the yellow dot vertical line represents the date of being introduced to WTO. Since these two shocks happened only in Taiwan, I take them as the control factors for the trade patterns; that is, those two shocks will be indicated by two different dummy variables in our regression model. The green line indicates the existence of the subprime mortgage crisis in 2008. Still, since it is a global and systematical shock, I don't put it as another dummy variable in the model. Still, the impact of trade on the workers during the financial crisis is an excellent future topic to explore.

In the regression model, I consider two perspectives of the trade effects by using the aggregate and per capita data. We refer to the first macro model, applying the OLS, 2SLS, and FD models with all aggregate

variables. For example, total trade volume, total profits of the industry, and the total return of labor. Secondly, I use the Trade Openness Index (TOI) as our main explanatory variable to capture the country's trade activities at the micro-level. Before I move on, it is worthwhile to look at this common index in the trade. Trade Openness Index (TOI) is a micro indicator of percentage to measure a country's exposure to the international economy. The higher the index is, the more important is the trade to the country. The formula is calculated as dividing the aggregate value of imports and exports by the gross domestic product for the same period.[30]

$$\text{Trade Openness Index (TOI)} = \frac{\text{Export} + \text{Import}}{\text{Gross Domestic Product}} \tag{6}$$

3.2 Industry and Labor Data

In the DGBSA database, there is an annual report on each industry's laborers' total profits and compensations. The industries are classified into three sectors, agriculture, manufacture, and service, under the *International Standard Industrial Classification in All Economic Activities*, a system introduced by United Nations. The government calculates the operational profits in each industry from the firms' annual tax forms, which I could reasonably believe the statistics documented in the database might be underestimated. Moreover, I could also find the yearly values of the export and import. To combine with the monthly real GDP data, I could calculate the Trade Openness Index accordingly.[31]

Up to this point, I have the data of aggregate operational profits for each three aggregate sectors and the data of total returns of the production inputs. However, there are only annual data of the total profits and total returns of the production factors in the database. Hence, I mainly focus on the yearly series data in our following analysis, although it represents a relatively small sample size.

However, if I only consider the aggregate level of data, I might oversee the redistribution of the gains from trade. As I have mentioned in the introduction part, I are interested in the trade effects on the aggregate profits of the firms and the total returns of the laborers in each sector and concern the individual laborers' welfare accordingly. We assume the labor markets of each sector are competitive with no barriers to entry and exit, and the laborers could move across sectors. Then, the number of laborers varies, and the industry's population becomes another factor affecting the gain from trade per capita. If I want to explore

[30] Hence, this value of TOI need not be between 0 and 1. And TOI is supposed to be a better indicator for measuring the dependence on trade than the net trade volume per capita. (This is a reply to the first referee's comment.)

[31] Figure 7 plotted out by the monthly data, the monthly data is also accessible.

the effects of different degrees of openness on individual labor, I have to consider the total number of laborers hired. Fortunately, I can find the annual data of the total number the labors employed in different industries via *Population Census* from the Taiwanese Ministry of Economics. Combining the labor data with the aggregate returns and profits I already had could transform all aggregate variables into per capita terms. The following equation shows how I adjust the data from the aggregate level to per capita unit.

$$\text{Returns Per Capita}_{i,t} = \frac{\text{Total Returns}_{i,t}}{\text{Total Labors}_{i,t}} \tag{7}$$

$$\text{Profits Per Capita}_{i,t} = \frac{\text{Total Profits}_{i,t}}{\text{Total Labors}_{i,t}}$$

$$\text{i = Agriculture(A), Manufacture(M), Servie(S);} \quad \text{t = 1981-2015} \quad \text{(T = 35)}$$

Table 3 provides a list of the shorthand of the variables throughout the paper. And then, I conclude this part with the Pearson correlation matrices for both categories of the data. Table 4 reports the correlation of the macro (aggregate) variables. Table 5 reports the correlation coefficient of micro (per capita) variables.

Table 3: Notations of Variables

Macro Model	
Trade	Total Trade Volume (Export + Import Volume)
R_A	Total Returns of Production Input in Agriculture Industry
P_A	Total Profits of Agriculture Industry
R_M	Total Returns of Production Input in Manufacture Industry
P_M	Total Profits of Manufacture Industry
R_S	Total Returns of Production Input in Service Industry
P_S	Total Profits of Service Industry
Micro Model	
TOI	Trade Open Index (Total Trade Volume / GDP)
r_A	Returns Per Capita in Agricultural Industry
π_A	Profits Per Capita in Agricultural Industry
r_M	Returns Per Capita in Manufacture Industry
π_M	Profits Per Capita in Manufacture Industry
r_S	Returns Per Capita in Service Industry
π_S	Profits Per Capita in Service Industry

Table 4: Pearson Correlation, Aggregate Data

	Trade	R_A	P_A	R_M	P_M	R_S	P_S
Trade	1.0000						
R_A	0.4340	1.0000					
P_A	0.8019	0.7480	1.0000				
R_M	0.7695	0.5605	0.8455	1.0000			
P_M	0.9221	0.4895	0.8001	0.8852	1.0000		
R_S	0.7379	0.3316	0.5082	0.2455	0.5481	1.0000	
P_S	0.9588	0.4824	0.8094	0.7712	0.9133	0.7953	1.0000

Table 5: Pearson Correlation, Per Capita Variables

	TOI	r_A	π_A	r_M	π_M	r_S	π_S
TOI	1.0000						
r_A	0.9391	1.0000					
π_A	0.8848	0.9699	1.0000				
r_M	0.6418	0.7877	0.8404	1.0000			
π_M	0.8505	0.9065	0.8901	0.8587	1.0000		
r_S	0.6753	0.6279	0.4988	0.1208	0.4347	1.0000	
π_S	0.8988	0.9410	0.8840	0.7372	0.8778	0.7475	1.0000

3.3 Carbon Dioxide Emission

In this subsection, I will explain intuitively why the annual emission of Carbon Dioxide (CO_2) is a good instrument of the trade volume (value).

We download the carbon dioxide emission data from the Carbon Dioxide Information Analysis Center (CDIAC). We turn the aggregate CO_2 emission as the instrumental variable of the total trade volume, and the CO_2 emission per capita as the instrumental of trade openness index (TOI). According to the CDIAC, the raw data are estimated from thousand tons of carbon consumed. To convert these estimates to units of Carbon Dioxide (CO_2), multiply these numbers estimated by 3.667.[32] We know the linear transformation of the data does not affect the regression result, so there is no need to be concerned about the emission unit's conversion. The raw data is good enough to set Carbon Dioxide as an exogenous variable.

Carbon dioxide is a significant greenhouse gas on the Earth. Since the Industrial Revolution, the concentration of CO_2 has rapidly grown in the atmosphere. The emission of CO_2 primarily results from

[32]U.S. Energy Information Administration, *1 pound of carbon combines with 2.667 pounds of oxygen to produce 3.667 pounds of carbon dioxide*. For details, please refer to the link, https://www.eia.gov/coal/production/quarterly/co2_article/co2.html

the usage of fossil fuels, which could be related to an index of economic activities and economic growth. To serve as a good instrument variable, I think that there is a correlation between trade volume and CO_2 emission. Still, the emission of CO_2 might be independent of the individual welfare of laborers as well as the total profits of the firms. Here, I report the correlation coefficient for the CO_2 with other variables in our data set as a conclusion in this subsection. As mentioned in the previous parts, I will use the total trade volume and trade openness index (TOI) as our main explanatory variables.

Table 6: Correlation Coefficient Between CO_2 with Aggregate Variables

	Trade	R_A	P_A	R_M	P_M	R_S	P_S
CO_2	0.9376	0.4989	0.7706	0.7231	0.8877	0.8317	0.9907

Table 7: Correlation Coefficient Between CO_2 per capita with Micro Variables

	TOI	r_A	π_A	r_M	π_M	r_S	π_S
CO_2 pc	0.9165	0.9510	0.8806	0.7224	0.8865	0.7528	0.9928

4 Emiprical Model

4.1 Benchmark Models

First of all, I set up a macro benchmark model to estimate the effects on the firms' profits and the returns of labor by the trade volume and the trade openness index. I apply the Ordinary Least Square method to total production and aggregate return of production input (labor compensation, wage) on the trade volume. The following equations represent the mathematical formats of the regressions, and the results of Ordinary Least Square operated by Stata will be displayed in section 5.

$$\text{Total Returns of Production}_{i,t} = \alpha + \beta * \text{Trade Volume}_{i,t} + e_t \tag{8}$$

$$\text{Total Profits}_{i,t} = \alpha + \beta * \text{Trade Volume}_{i,t} + e_t \tag{9}$$

i = Agriculture(A), Manufacture(M), and Services (S)

t = Year 1981–2015

As mentioned before, we consider the trade impact on the micro-level as well. Hence, we construct the micro benchmark model by using per capita data as follows. The estimation results of this model will be displayed in section 5.

$$\text{Return of Production Per Capita}_{i,t} = \alpha + \beta * \text{Trade Openness Index}_{i,t} + e_t \tag{10}$$

$$\text{Profits Per Capita}_{i,t} = \alpha + \beta * \text{Trade Openness Index}_{i,t} + e_t \tag{11}$$

i = Agriculture(A), Manufacture(M), and Services (S)

t = Year 1981–2015

And then, we add three more exogenous variables to the model. The first two dummy variables aim to control the different environments of the time series data. As we have mentioned in data section (section 4) previously. We call the first dummy variable "China," representing the regulations (barriers) of trade activities across the Taiwanese strait lifted officially. Starting from 1991, the value of this variable is indexed as "1," whereas before then is "0." Also, to capture the second chapter of the trade expansion era, the dummy variable we referred to as "WTO." The observation points before 2002 are assigned a dummy WTO with a value equal to "0." After then, when Taiwan becomes a member of the World Trade Organization (WTO), the value of this dummy becomes "1." As those two variables we include are theoretically exogenous to firms' profits and the returns of labor. We compare the results with the benchmark model. The dummy variable models represented by the mathematics equation become as follows, and the estimation table will be reported in section 5 also.

$$\text{Total Profits}_{i,t} =$$

$$\alpha + \beta_1 * \text{Trade}_{i,t} + \beta_2 * \text{China}_{i,t} + \beta_3 * \text{WTO}_{i,t} + \beta_4 * \text{CO}_{2,t} + e_t \tag{12}$$

$$\text{Total Returns of Factors}_{i,t} =$$

$$\alpha + \beta_1 * \text{Trade}_{i,t} + \beta_2 * \text{China}_{i,t} + \beta_3 * \text{WTO}_{i,t} + \beta_4 * \text{CO}_{2,t} + e_t \tag{13}$$

i = Agriculture(A), Manufacture(M), and Services (S), t = Year 1981–2015. (T = 35)

Then, the micro regression model represented by the mathematics become as following,

$$\text{Profit Per Capita}_{i,t} =$$

$$\alpha + \beta_1 * \text{Trade Openness Index}_{i,t} + \beta_2 * \text{China}_{i,t} + \beta_3 * \text{WTO}_{i,t} + \beta_4 * \text{Per Capita CO}_{2,t} + e_t \tag{14}$$

$$\text{Factors Returns Per Capita}_{i,t} =$$

$$\alpha + \beta_1 * \text{Trade Openness Index}_{i,t} + \beta_2 * \text{China}_{i,t} + \beta_3 * \text{WTO}_{i,t} + \beta_4 * \text{Per Capita CO}_{2,t} + e_t \tag{15}$$

4.2 First Difference Model

Then we use the same data but run the regression in the first-difference level. Unlike the model with $N = 35$ observations, the difference-in-difference model will lose one data, and the sample size becomes $N - 1 = 34$. The estimation results could be treated as the growth rate of each variable and the impulse response of the exogenous shocks. The following are the mathematical representations. And the result will be shown in the section 5. We compare the estimations with the two previous models and conclude in section 6.[33]

[33]Hence, we will pick one of the most interested models and run a Breusch-Pagan Test. If the serial correlation coefficient is statistically significant, we will use the Cochrane-Orcutt transformation to the data.}

$$\Delta\text{Total Profits}_{i,t} =$$

$$\alpha + \beta_1 * \Delta\text{Trade}_{i,t} + \beta_2 * \Delta\text{China}_{i,t} + \beta_3 * \Delta\text{WTO}_{i,t} + e_t \quad (16)$$

$$\Delta\text{Total Returns of Factors}_{i,t} =$$

$$\alpha + \Delta\beta_1 * \text{Trade}_{i,t} + \beta_2 * \Delta\text{China}_{i,t} + \beta_3 * \Delta\text{WTO}_{i,t} + e_t \quad (17)$$

i = Agriculture(A), Manufacture(M), and Services (S), $\Delta_t = 1981 - 1982 \ldots 2014 - 2015$, (T = 34)

Also, for the per capita difference in difference model, it becomes

$$\Delta\text{Profit Per Capita}_{i,t} = \alpha + \beta_1 * \Delta\text{Trade Openness Index}_{i,t} +$$

$$\beta_2 * \Delta\text{China}_{i,t} + \beta_3 * \Delta\text{WTO}_{i,t} + e_t \quad (18)$$

$$\Delta\text{Factors Returns Per Capita}_{i,t} = \alpha + \beta_1 * \Delta\text{Trade Openness Index}_{i,t} +$$

$$\beta_2 * \Delta\text{China}_{i,t} + \beta_3 * \Delta\text{WTO}_{i,t} + e_t \quad (19)$$

i = Agriculture(A), Manufacture(M), and Services (S), $\Delta_t = 1981 - 1982 \ldots 2014 - 2015$, (T = 34)

4.3 Two-stage Least Square with Instrumental Variables

I theoretically follow the two-stage least square (2SLS) model and apply it to the micro and macro regressions. At the first stage, we run the endogenous variables on all exogenous variables. Take the original aggregate model as an example, which would like to explore the relationship between trade volume and firms' profits and returns of labor.

$$\text{Total Profits}_{i,t} =$$

$$\alpha + \beta_1 * \text{Trade}_{i,t} + \beta_2 * \text{China}_{i,t} + \beta_3 * \text{WTO}_{i,t} + e_t \quad (20)$$

$$\text{Total Returns of Factors}_{i,t} =$$

$$\alpha + \beta_1 * \text{Trade}_{i,t} + \beta_2 * \text{China}_{i,t} + \beta_3 * \text{WTO}_{i,t} + e_t \quad (21)$$

After the first stage regression, we found the predicted value of the trade, based on the estimation of the first stage regression.

$$\widehat{\text{Trade}}_{i,t} = \hat{\alpha} + \hat{\beta}_1 * \text{China}_{i,t} + \hat{\beta}_2 * \text{WTO}_{i,t} + \hat{\beta}_3 * \text{CO}_{2i,t} \tag{22}$$

In the second stage, we replace the endogenous variables with the estimated values from (22) and apply the OLS again. Since we only have an endogenous variable in the model and the outside instrument is only one, this is a just identified case. The 2SLS result will end up with the same with simple instrument variables method.[34]

$$\begin{aligned}&\text{Total Profits}_{i,t} = \\ &\alpha + \beta_1 * \widehat{\text{Trade}}_{i,t} + \beta_2 * \text{China}_{i,t} + \beta_3 * \text{WTO}_{i,t} + e_t \qquad (23)\\ &\text{Total Returns of Factors}_{i,t} = \\ &\alpha + \beta_1 * \widehat{\text{Trade}}_{i,t} + \beta_2 * \text{China}_{i,t} + \beta_3 * \text{WTO}_{i,t} + e_t \qquad (24)\end{aligned}$$

i = Agriculture (A), Manufacture(M), and Services (S); t = Year 1981-2015, (T = 35)

[34]The endogeneity of the IV, the χ^2 statistics have been attached to the result of the 2SLS table.

5 Results

Table 8: Benchmark Model Result, Aggregate Data. (* for $p < 0.1$)

	Dependent Variable					
	Total Factor Returns			Total Profits		
	(A)	(M)	(S)	(A)	(M)	(S)
Cons	53331.47*	378539.6	846013.8	101627.9*	206271*	212253.9*
	(1506.085)	(195134.6)	(298320)	(6683.3)	(53190.4)	(106100.3)
Trade	0.00416	0.1348579*	0.1870797*	0.0051483*	0.072664*	0.2054319*
	(0.001504)	(0.0194814)	(0.0297829)	(0.0006672)	(0.0053103)	(0.0105926)
R^2	0.1883	0.5922	0.5446	0.6340	0.8502	0.9193
$adjR^2$	0.1367	0.5798	0.5308	0.6322	0.8456	0.9169
N	35	35	35	35	35	35

Table 9: General Model Result, Aggregate Data. (* for $p < 0.1$)

	Dependent Variable					
	Total Factor Returns			Total Profits		
	(A)	(M)	(S)	(A)	(M)	(S)
Cons	50329.79*	327967.2	-811558.9	101639.4*	96692.54	-880255.9
	(3803.426)	(563400.7)	(709740.4)	(15017.11)	(153676.2)	(110684.7)
Trade	0.0005237	0.1879449*	-0.0763661	0.0094569*	0.0483223*	0.0662988*
	(0.0004784)	(0.0708616)	(0.892675)	(0.139213)	(0.0018888)	(0.0193286)
China	5549.885	542999	301507.7	31138.56*	-62938.68	-26052.07
	(3665.698)	(536063.6)	(684039.6)	(14473.31)	(148111.3)	(106676.6)
WTO	-5612.016	-548640.4	101987.7	-41812.82*	79238.73	-191188.6
	(3818.878)	(536063.6)	(675302.8)	(14288.46)	(146912.6)	(105314.1)
CO2	50329.79*	-1.622482	18.66817*	-0.2153824	1.690673	12.17808*
	(3803.426)	(6.603125)	(8.318246)	(0.1760024)	(1.801104)	(1.297239)
R^2	0.4138	0.6150	0.7081	0.7959	0.8584	0.9901
$adjR^2$	0.3356	0.5637	0.6691	0.7686	0.8395	0.9887
N	35	35	35	35	35	35

Table 10: First Difference Model Result, Aggregate Data. (* for $p < 0.1$)

	Dependent Variable					
	Δ Total Factor Returns			Δ Total Profits		
	(A)	(M)	(S)	(A)	(M)	(S)
Cons	436.8073	116301.9	3514.309	4694.627*	23851.46*	86909.12*
	(507.886)	(89869.24)	(133088.4)	(2366.179)	(28569.54)	(13865.01)
Δ Trade	0.0003	0.591153	0.003957	-0.00982	0.0445373	0.0378857*
	(0.0004)	(0.0732913)	(0.108538)	(0.00193)	(0.0232994)	(0.113074)
Δ China	-1343.287	-62254.11	178169.7	-822.9062	16839.31	6782.788
	(2743.454)	(485447.8)	(718905.4)	(12781.42)	(15432.4)	(74894.78)
Δ WTO	4616.648	485846.2	33060.07	-9361.913	261787.1*	-49324.65
	(2754.706)	(-186687.4)	(719495.3)	(12791.91)	(154451.1)	(74956.24)
R^2	0.1111	0.0255	0.0021	0.0269	0.1859	0.2274
adj R^2	0.0222	-0.0719	-0.0976	-0.0704	0.1035	0.2051
N	34	34	34	34	34	34

Table 11: 2SLS Model Result, Aggregate Data. (* for $p < 0.1$)

Instrumented: Trade; Instruments: China, WTO, CO_2

	Dependent Variable					
	Total Factor Returns			Total Profits		
	(A)	(M)	(S)	(A)	(M)	(S)
Cons	50440.55*	237310.9*	231526.1	89604.87*	151159*	-199805*
	(1743.027)	(258754.8)	(381376)	(7255.045)	(72694.72)	(139478.9)
$\widehat{\text{Trade}}$	0.0005555	0.1619213*	0.2230596*	0.006023*	0.0754396*	0.2616276*
	(0.000492)	(0.0730367)	(0.107648)	(0.0020478)	(0.020519)	(0.0393696)
China	5610.703*	145670.9	874300.6	24530*	-11063.97	347606.4
	(2545.135)	(377828.9)	(556878.1)	(10593.68)	(106147.5)	(203644.5)
WTO	-5705.291	-472290	-776494.8	-31677.4	-320.6051	-764262.1*
	(1743.027)	(650259.8)	(958441)	(18232.18)	(182684.3)	(350515.3)
R^2	0.4137	0.6133	0.5986	0.7731	0.8491	0.9248
$p > \chi^2$	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
N	35	35	35	35	35	35

Table 12: Benchmark Model Result, Per Capita Data. (* for $p < 0.1$)

	Dependent Variable					
	Per Capita Factor Returns			Per Capita Profits		
	(A)	(M)	(S)	(A)	(M)	(S)
Cons	-40.00906*	-269.3303*	-158.6323	-215.6313*	-188.4373*	-342.1885*
	(7.430142)	(145.6874)	(121.624)	(38.73602)	(45.57937)	(60.94646)
TOI	126.2123*	757.751*	691.9461*	457.1276*	457.9425*	776.4848*
	(8.037499)	(157.5962)	(131.5658)	(41.90239)	(49.30513)	(65.92837)
R^2	0.8820	0.4120	0.4560	0.7829	0.7233	0.8078
$adjR^2$	0.8784	0.3941	0.4395	0.7763	0.7149	0.8020
N	35	35	35	35	35	35

Table 13: General Model Result, Per Capita Data. (* for $p < 0.1$)

	Dependent Variable					
	Per Capita Factor Returns			Per Capita Profits		
	(A)	(M)	(S)	(A)	(M)	(S)
Cons	-8.425565*	77.3957	-155.2249	-116.9504	24.57064	-176.6879*
	(10.32115)	(251.0363)	(195.9949)	(68.42477)	(66.62647)	(27.59853)
TOI	41.58652	-310.1351	342.551	216.3336	-83.5805	22.25179
	(18.96071)	(461.1719)	(360.057)	(125.7007)	(122.3977)	(50.70052)
China	1.471132	-16.6879	123.6423	16.60743	-35.12413	5.941623
	(6.091204)	(148.1533)	(115.6697)	(40.38186)	(39.32074)	16.28874
WTO	8.792988	67.92762	-122.9182	30.64287	79.02007*	-36.8543*
	(5.360122)	(130.3716)	101.7868	(35.53513)	(34.60137)	(14.33285)
Co2pc	4.5779	68.46824	31.01813	10.76025	30.63194*	59.78702*
	(1.721146)	(41.86259)	(32.68394)	(11.4104)	(11.11057)	(4.602307)

Table 14: First Difference Model Result, Per Capita Data. (* for $p < 0.1$)

	Dependent Variable					
	Δ Total Factor Returns			Δ Total Profits		
	(A)	(M)	(S)	(A)	(M)	(S)
Cons	2.271967*	32.93115	-3.136737	10.61324*	8.256551	13.12937*
	(0.6564801)	(21.22571)	(19.4448)	(3.180513)	(7.35579)	(2.470547)
Δ TOI	15.96107*	76.52549	68.36482	-14.1299	122.2415	78.37754*
	(8.30111)	(268.3965)	(245.8771)	(40.21719)	(93.01266)	(31.23976)
Δ China	-4.954481	-10.5618	34.78049	-9.851605	5.939171	5.050095
	(3.756193)	(121.4475)	(111.2576)	(18.19799)	(42.08765)	(14.13577)
Δ WTO	4.623253	-45.08141	1.881773	-18.04733	81.28001*	-8.515351
	(3.751533)	(121.2968)	(111.1196)	(19.17542)	(42.03536)	(14.11823)
R^2	0.1880	0.0071	0.0062	0.0453	0.1596	0.1855
adj R^2	0.1068	-0.0922	-0.0093	-0.0502	0.0756	0.1041
N	34	34	34	34	34	34

Table 15: 2SLS Model Result, Per Capita Data. (* for $p < 0.1$)

Instrumented: TOI; Instruments: China, WTO, CO_2 per capita

	Dependent Variable					
	Per Capita Factor Returns			Per Capita Profits		
	(A)	(M)	(S)	(A)	(M)	(S)
Cons	-40.43162	-401.3105	-372.11	-192.1883*	-189.6141	-594.731*
	(18.17494)	(389.5076)	(285.8598)	(99.76802)	(118.8901)	(147.5747)
$\widehat{\text{TOI}}$	119.4107*	853.8612	869.9172*	399.278*	437.2197*	1038.743*
	(25.78672)	(552.6356)	(405.6371)	(141.5515)	(168.682)	(209.3799)
China	8.88921	94.26236	173.91*	34.04539	14.51771	102.8319*
	(4.822446)	(103.3499)	(75.85813)	(26.47193)	(31.5457)	(39.15672)
WTO	0.544485	-55.44365	-178.8134	11.2527	23.80277	-594.731*
	(8.143587)	(174.5254)	128.1004	(44.70272)	(53.27971)	(147.5747)
R^2	0.9043	0.4307	0.5928	0.8049	0.7450	0.8474
$p > \chi^2$	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
N	35	35	35	35	35	35

6 Conclusion

In the last two sections, we have explained the empirical models and the results of estimation. So far, we have run 48 regression models,[35] and the results are shown in the tables in section 5 correspondingly. By comparing the results of the two-stage least square model and the other two benchmark models, several things in the empirical results are worth noticing.

First of all, the benchmark model tells us the sectors affected the most by the different trade environments (1981 - 2015) in Taiwan are surprisingly not the agriculture sector, which contrasts our pre-assumptions. Instead, the service and manufacturing sectors during this period are more sensitive to the trade activities, in both aggregate and micro models, we can see this fact from Table 8 and 12. There are more estimated coefficients in the regression that are significant. Whether the estimated coefficients of the total trade volume, opening up the trade with China or joining WTO, the aggregate returns of the production input and the total profits of the firms in the service industry grow. So if we relate the results to our title questions, the firm owners and the employees in the manufacturing and service sectors should be the ones to vote for the increase in trade.

Secondly, the agriculture industry, which was supposed to be the least competitive in Taiwan, didn't suffer much as it opened its borders. From Table 9, 11, 13, and 15, one can see that, after starting trading with China, the total return of production inputs of agriculture industry actually increases, as well as the total profits of the firms in the agriculture. Moreover, this pattern is more obvious in the micro regression model, as we use the per capita level variables and trade openness index (TOI) as our explanatory variables. On the other hand, although theoretically we predict joining WTO will jeopardize the agricultural industry, however, in our regression model, only a few estimated coefficients are significant. If this survey model is on the right track, the farmers, fishers, and the workers employed in the energy companies were supposed not to demonstrate such fiercely when the government proposed to join the multinational trade agreement.

Last but not least, in aggregate terms, the start of trade with China has enormous effects on all three sectors, and these effects might never be seriously considered in the modern economic research in Taiwan. The intuition behind it is relatively easy to understand, as we have already pointed out in the data section (section 4). However, how to measure the degree of openness to China remains questionable. After legalizing the commercial activities with mainland China, the agriculture and service sectors positively

[35] 2 dependent variables × 3 industries × 2 types of data × 2 sets of regressors + 12 2SLS models + 12 FD models)

affect, while manufacturing has a substantial negative impact. Before comparing and conducting this empirical research, we are not concerned about these unexpected results. It might be interesting to explore the reasons further behind.

Chapter 3 - The Calm before the Storm:

A Cointegration Test of Political Risk and Trade Volume

1 Introduction

Political risk plays a crucial role in international trade. Firms engaging in international business prefer to choose reliable partners and stable environments. One of the significant causes of business uncertainty comes from political stability. Firms and investments coming from overseas will be easier to operate under stable regions with quality institutions and law enforcement[]. On the contrary, if the regions have the potential political risks, i.e., the instability during the period of party alternation or the possibility to get involved in the conflicts, the macro-international economic variables such as trade and investment volume should be able to detect it or at least shown signs when the shocks are on the corner. The business owners at the foreign market are likely to use their insights and observations to sense the dynamic of the political climate. Hence, forecasting the level of political intensity via the economic variables becomes a feasible target of the researcher.

2 Data and Methodology

This paper would like to examine the long-run relationship between the political index and the trade volume starting from 1972. We extract the annual data political stability indices from the outline database TheGlobalEconomy.Com. We plan to conduct the two-step Engle-Granger procedure and test the cointegration by combining the time series data across the industries and goods. Specifically, whether the cross-strait trade and investment in different sectors cointegrate with political stability. Furthermore, we will discuss if any enterprises could better predict the political risks and establish a new predicting indicator to forecast the future political climate. We expect to apply the results between Taiwan and China to the other regions with political tensions.

3 Cointegration: Long-run Relationship between Variables

If two or more series are individually integrated (in the time series sense) but some linear combination of them has a lower order of integration, then the series are said to be cointegrated. A common example is where the individual series are first-order integrated $I(1)$ but some (cointegrating) vector of coefficients exists to form a stationary linear combination of them. For instance, a stock market index and the price of its associated futures contract move through time, each roughly following a random walk. Testing the hypothesis that there is a statistically significant connection between the futures price and the spot price could now be done by testing for the existence of a cointegrated combination of the two series.

3.1 Engle-Granger Procedure

The Engle Granger test is a test for cointegration. It constructs residuals (errors) based on the static regression. The test uses the residuals to see if unit roots are present, using Augmented Dickey-Fuller test or another, similar test. The residuals will be practically stationary if the time series is cointegrated. The null hypothesis for the Engle Granger test is that no cointegration exists. The null hypothesis is written, using standard hypothesis testing notation. The alternate hypothesis is that the series has cointegration of some kind.

4 Expected Goals

Constructing an index to measure the political risk based on the cross-strait trade data is the primary goal of this research. In other words, we would like to know whether the macroeconomic variables could serve as a precursor of the political risks in the regions. Inherited from the *de facto* unended Chinese Civil War, the complicated China-Taiwan relationship, so-called cross-straits relationship, has re-grabbed the attention of the rest of the world as the concurring China-U.S. trade war intensifies. After the economic reformation under the leadership of Deng Xiaoping, China started to open up the borders to embrace investment and technology from the world around 1980. The historical data shows that Taiwanese firms, mainly in the manufacturing industry, were gradually shifting their assembly lines to China to take advantage of the lower production costs. Although officially until these days, the two sides regard the other as illegal political identities.

In this paper, from the retro perspective, we like to examine the bilateral trade data for around four decades between Taiwan and China. Specifically, whether the cross-strait trade and investment in different industries act differently before the specific time of the policy shocks? We have the time series data across the industries and goods and plan to test this hypothesis with macro-econometric methodologies. Further, we would like to know if any industries could better predict the political risks and try to establish a new predicting indicator to forecast the future political climate. Although the research focuses explicitly on the cross-strait data, we expect the results and implications to apply to the regions with potential political risks in the rest of the world.

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