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Appendix 1. Relation scoring

The relations between China and another country were quantified in five steps. First, a data source was chosen. The *People's Daily* and the website of China's Ministry of Foreign Affairs were commonly used. Reports of relevant events such as official visits of national leaders, the signing of bilateral agreements, public disagreements and military clashes were then extracted. Scores were assigned to the events. They ranged from -9 to +9, with -9 assigned to an event that strongly degrades bilateral relations and +9 the opposite. For example, an official visit of a national leader was scored +1.5, whereas the cancellation of such a visit received a score of -1.5. The detailed scoring table is presented in Table A1.1. All the positive and negative events in the same month related to a particular dyad were summed to determine the overall change in bilateral relations. The same type of event could affect bilateral relations differently depending on the initial status of the relationship. The influence of an event was calculated as

$$I = \begin{cases} \frac{N-p_0}{N} \times I_0, & \text{if } I_0 \geq 0 \\ \frac{N+p_0}{N} \times I_0, & \text{if } I_0 < 0 \end{cases} \cdot (1)$$

Here I is the influence of an event on bilateral foreign relations, N is the absolute value of the range of relationship scores ($N = 9$), p_0 represents the bilateral relations score between two countries when the event happened, and I_0 is the event score assigned in the previous step according to Table A1.1. A final bilateral relation for the month was then the sum of last month's score and the impact of the events that took place in the current month.

Take US-China relations in April 2004 as an example. All the relevant events were collected and scored according to Table A1.1. The positive events in that month accumulated a score of 2.6, and the negative events accumulated a score of -1.9. The score for March 2004 was 1.2. Applying Equation (1), the positive events had an influence of $\frac{N-p_0}{N} \times I_0 = \frac{9-1.2}{9} \times 2.6 = 2.3$, and the negative events had an influence of $\frac{N+p_0}{N} \times I_0 = \frac{9+1.2}{9} \times (-1.9) = -2.2$. By combining the two values yields an overall impact score of 0.1 for the events of the month. Yan (2010) suggests that an impact score of 0.5 will lead to a change in the bilateral relationship of 0.1, so 0.1 will result in a change in bilateral relationship of

0.02. So the relationship score between the U.S. and China for April 2004 was $1.2+0.02 = 1.22$, or to one decimal place, 1.2 as in March.

Table A1.1 Scores of Events

Value	Positive events	Value	Negative events
9	Establish confederate relations Sign a defense or diplomatic integration treaty Declare war on a common enemy Return occupied territory to the other party voluntarily	−9	Declare the end of a confederacy Withdraw from a defense or diplomatic integration treaty Declare war or conduct undeclared war Force the other party to cede territory
7.5	Establish formal diplomatic relations Sign a bilateral military alliance treaty Send troops to help the other government suppress domestic unrest Sign an economic or monetary integration treaty	−7.5	Announce severance of diplomatic relations Withdraw from a bilateral military alliance Provide asylum to the other state's government in exile Exit from an economic integration treaty
6	Normalization of diplomatic relations Sign a bilateral treaty of good-neighborliness and friendly cooperation Declare a truce, sign an armistice, or voluntarily withdraw from a war against the other state Completely lift a political or military blockade	−6	Move from official diplomatic relations to unofficial relations Provide a military base for the other state's anti-government forces for the first time War escalation or send troops to join a multi-nation war against the other state Impose a comprehensive political, military and economic blockade
4.5	Upgrade diplomatic relations from chargé d'affaires level to ambassador level Establish strategic partnerships Reach an agreement on border demarcation Establish a bilateral customs alliance	−4.5	Downgrade diplomatic relations from ambassador level to chargé d'affaires level Announce that the other state is a threat to national security Propose new border formalities Withdraw from a bilateral customs alliance
3	Resume the exchange of ambassadors The Head of State visits a country for the first time since its founding Announce the cessation of military hostilities Lift an economic blockade completely	−3	Recall the ambassador officially First military friction (often bombing) Large-scale military operations or new large-scale military campaigns Impose a comprehensive economic blockade
2.5	Establish non-strategic partnerships Reach a temporary ceasefire agreement Remove an arms embargo Sign a bilateral free trade agreement	−2.5	Establish a military alliance against the other state Recurring military friction Impose an arms embargo Abrogate bilateral free trade agreements
2	Establish a mechanism of regular meetings between the two countries' heads of government Withdraw from a multilateral military alliance against the other state voluntarily or actively join the other state's military alliance End military support for forces opposing the other state's government Sign a military cooperation agreement or	−2	Expel senior diplomats or threaten to recall the ambassador Join a multilateral military alliance against the other state or withdraw from an alliance with the other state Provide substantial military support for forces opposing the other state's government End all military and technical cooperation agreements or withdraw cooperating

	jointly develop military equipment and technology Lift economic embargoes or comprehensive sanctions		military personnel Freeze assets, an economic embargo, or comprehensive economic sanctions
1.5	Official visits and state visits by the Heads of State and government. A government statement firmly supporting the other state Hold large-scale joint military exercises Mass withdrawal of troops from the border Sign a bilateral comprehensive economic agreement	-1.5	Suspend or cancel visits by the Heads of State and government Issue a government protest or warning statement Hold large-scale military exercises threatening the other state Mass deployment of troops on the border Abrogate a bilateral comprehensive economic agreement
1	Working visits by the Heads of State or government Support the other state's positions through legislation or in international bodies Hold or resume ambassadorial talks Issue a serious warning to a common enemy Hold small-scale joint military exercises	-1	Postpone the visits of the Heads of State and government Dispute the other state's positions through legislation or in international bodies Suspend or withdraw from ambassadorial talks Issue a serious warning Deploy military assets against the other state
0.8	Visits by the Deputy Heads of State, legislators or Foreign Ministers Express support for the other state's domestic policies Sign an agreement on security issues Resume military exchanges	-0.8	Postpone or cancel visits by Deputy Heads of State, legislators or Foreign Ministers Enforce administrative policies interfering in the other state's internal affairs Small-scale border conflict or military friction Suspend military exchanges
0.6	Issue a joint statement or communiqué Establish, resume or institutionalize political and security dialogue Announce settlement of a trade dispute Propose the lifting of an arms embargo	-0.6	Speeches strongly expressing indignation International conference proposals attacking the other state Solemn representations or a joint statement opposing the other state Suspend dialogue on political or security issues Prosecute trade disputes internationally or publish an economic and trade counter-sanction list
0.5	Begin negotiations on important issues Relax a policy stance for the first time A large fleet visit to the other state's ports Transfer of military technology Reduction in the number of troops on the border Lift a ban on entry of the the other state's nationals (such as journalists)	-0.5	The ambassador lodges solemn representations Military exercises to deter the other state Prevent other countries from selling arms to the other state Small-scale military deployment and small-scale military friction. Ban some nationals of the other state from entering the country
0.4	Diplomatic statements supporting the other state's international actions or policies Participate in other the other country's international mutual support proposals Sell arms to the other state Positive editorials or signed articles	-0.4	Diplomatic statements expressing dissatisfaction with and resolute opposition to the other state's international actions or policies. Participate in international proposals against the other state Aerial bombing Negative editorials or signed articles

0.3	Diplomatic statements firmly supporting the other state's policies State leaders' phone calls General military exchanges (e.g., a warship visits) Conduct political and security dialogues and consultations. Extend normal trade relations (e.g., most-favored-nation treatment) Large-scale cultural exchanges	-0.3	Diplomatic speeches criticizing the other state for policies causing unfavorable bilateral relations Suspend general military exchanges Postpone bilateral security dialogue Introduce policies restricting people-to-people exchanges Strengthen restrictions on the export of dual-use technologies and materials
0.2	Diplomatic speeches appreciating the other state's policies Foreign Ministers' phone calls Relax an economic embargo or sanctions on individual items Major civil disputes resolved Large-scale activities organized by the government to support the other country.	-0.2	Condemnatory diplomatic speeches Extend an economic embargo or impose economic sanctions on individual items Transactional disputes or major civil disputes Large-scale activities organized by the government against the other country.
0.1	Diplomatic speech welcoming the Head of State A letter or telegram of congratulations Reiterate the principle of supporting the other state Positive editorials and press commentary Government donations Signing of an economic cooperation agreement	-0.1	Diplomatic speech expressing "concern" or "regret" Reiterate opposition to the other state's position Negative editorials Negative press commentary Abrogating economic agreements Postponing large-scale cooperation projects Issuing trade policies against the other state Demanding revisions of bilateral economic and trade treaties Imposing anti-dumping sanctions on specific enterprises

Source: Yan (2010)

Table A1.2 Periods of Political Tension Between China and Other Countries From 1992 to 2020

Year	Country	Event	Source
1999	US	The bombing of the Chinese embassy in Yugoslavia by NATO.	Foreign relations dataset
2001	US	The collision of an American spy plane with a Chinese fighter jet, resulting in the Chinese pilot's death.	MID
2016–2020	US	The US designated China a major strategic competitor and launched a series actions amounting to a US-China trade war.	Foreign relations dataset
2004	Japan	The Japanese Government issued a visa to Li Denghui for visits.	Foreign relations dataset
2005	Japan	China dispatched five warships to a disputed area of the East China Sea surrounding the Chunxiao gas fields. Another Chinese ship violated Japanese waters in the area two months later.	Foreign relations dataset; MID
2010–2012–2013	Japan	Japan and China disputed control of the Diaoyu (Senkaku) Islands.	Foreign relations dataset; MID
2016–2017	South Korea	South Korea's hosting of American missile radar.	Foreign relations dataset
2017	India	Military confrontation between China and India in the Himalayas.	Foreign relations dataset
2020	Australia	A series of conflicts between China and Australia leading to trade restrictions, Australia suspending its extradition agreement with Hong Kong, and Australia refusing to recognize China's territorial sovereignty in the South China Sea.	Foreign relations dataset
2019–2020	UK	The UK government decided not to use Huawei telecommunications equipment. A former head of the MI6 accused China's government of deliberately concealing the true COVID-19 situation.	Foreign relations dataset

Foreign relations dataset: a foreign relations dataset developed by the Institute of International Relations at Tsinghua University.

MID: Militarized Interstate Dispute dataset.

Appendix 2. Robustness checks

There were a number of robustness checks, but only the full models were reported in the main text. The first used an alternative dependent variable. Number of patents granted was used instead of patent applications. About two-thirds of the patent applications in the sample were eventually granted. The results are summarized in Model 1 of Table A2.1. They are consistent with those reported in Table 3.

Another test used panel data negative binomial models instead of the zero-inflated negative binomial formulation using Stata's *xtnbreg* command. Panel data negative binomial models account for the data's panel structure directly, although not for the large number of zero values. The results summarized in Model 2 of Table A2.1 were again consistent with those in Table 3. Beyond that, since the study's independent variable and some of the moderators were on the country level while the dependent variable was on the firm level, a multilevel mixed effects negative binomial model was also tested. That formulation accounts for the multilevel nature of the data, though it too fails to consider the excessive zeros. Stata's *menbreg* command was used to run the analyses. The results are summarized in Model 3 of Table A2.1. They too are consistent with those reported in Table 3. The LR test versus a negative binomial model had a chi-squared value of 0.00 (n.s.) resulting from that lack of variability among the countries. That favors a mixed-effect negative binomial regression over the negative binomial formulation.

Any relationship between *political tension* and the *number of local patent applications* would be expected to operate with a lag. One- and two-year lags were tested. Models 4 and 5 of Table A2.1 summarize the results, which again are consistent with those in Table 3. All the significant results in Table 3 remain significant in Table A2.1. Therefore, the results are robust to different measures, model specifications, sub-samples, and time-lagging.

MNEs may of course file patent applications during political tension simply to protect their IPR, even though the enforcement of patent law in China is relatively weak. If the relationship between political tension and patenting of local innovation were driven primarily by MNEs' desire for protection, a firm's level of technology should positively moderate the relationship between political tension and patenting, because firms with better technology have more to lose. And the quality of the IPR protection

available should also positively moderate the relationship. A firm is more likely to file for a patent which offers more protection. Model 1 of Table A2.2 tests for any moderating role of IPR protection, finding none that is significant. Signaling rather than protection seems to be the typical motivation.

Difference-in-differences (DID) modeling was also tested to demonstrate causation. The U.S. and Japan were the two countries with most tense political relations with China during the period studied. Because their firms received the treatment at different times, their firms were separated to conduct two separate analyses. For each analysis, two dummy variables—*treat* and *time*—were created. The value of *treat* was one if a firm's home country was the U.S. (or Japan), and otherwise zero if it was from a home country that never experienced political tension with China during the period studied. The value of *time* was one when there was political tension between China and the U.S. (or Japan) and zero at other times. The results of the DID approach are summarized in Models 2 (for U.S. firms) and 3 (for Japanese firms) of Table A2.2. The interaction term relating *treat* and *time* was a positive and significant predictor. The results of the DID analyses to some extent support the existence of a causal relationship between political tension and local patenting.

Table A2.1 Robustness Checks

Model Specification	Model 1	Model 2	Model 3	Model 4	Model 5
	DV=Granted indigenous patents	Fixed-effect negative binomial	Multi-level mixed-effect model	Political tension lagged one year	Political tension lagged two years
Political tension	0.02 (0.01) [0.040]	0.18 (0.09) [0.047]	0.36 (0.18) [0.048]	0.36 (0.15) [0.012]	0.35 (0.10) [0.001]
Political relations × Home country's dependence advantage	-4.19 (1.44) [0.003]	-1.11 (0.53) [0.039]	-4.86 (1.56) [0.002]	-1.87 (0.76) [0.014]	-7.05 (1.26) [0.000]
Political relations × China's dependence advantage	8.27 (4.13) [0.047]	1.25 (0.62) [0.043]	15.62 (5.82) [0.007]	2.74 (1.12) [0.015]	0.50 (0.13) [0.000]
Political relations × R&D intensity	-0.02 (0.01) [0.043]	-0.04 (0.01) [0.000]	-0.02 (0.01) [0.041]	-0.03 (0.01) [0.011]	-0.04 (0.02) [0.046]
Political relations × Host country subsidiary	0.17 (0.06) [0.006]	0.06 (0.03) [0.048]	0.17 (0.05) [0.002]	0.18 (0.05) [0.000]	0.05 (0.01) [0.000]
Home country's dependence advantage	-16.70 (5.47) [0.002]	-6.01 (2.92) [0.039]	-6.92 (4.90) [0.158]	-2.56 (5.62) [0.649]	-0.60 (5.24) [0.908]
China's dependence advantage	0.95 (5.47) [0.861]	1.42 (2.23) [0.527]	33.09 (5.68) [0.000]	11.41 (5.10) [0.025]	9.60 (5.17) [0.063]
R&D intensity	0.02 (0.01) [0.022]	0.02 (0.01) [0.042]	0.29 (0.03) [0.000]	0.04 (0.01) [0.023]	0.03 (0.01) [0.015]
Host country subsidiary	0.04 (0.03) [0.077]	0.05 (0.01) [0.000]	0.12 (0.01) [0.000]	0.05 (0.03) [0.102]	0.07 (0.04) [0.059]
ROA	0.02 (0.01) [0.022]	0.01 (0.01) [0.031]	0.01 (0.00) [0.168]	0.01 (0.01) [0.017]	0.01 (0.01) [0.162]
Current ratio	0.38 (0.18) [0.030]	0.19 (0.10) [0.052]	0.97 (0.13) [0.000]	0.55 (0.24) [0.021]	0.78 (0.23) [0.001]
Firm age	0.00 (0.00) [0.672]	0.00 (0.00) [0.606]	0.01 (0.00) [0.000]	0.00 (0.00) [0.458]	0.00 (0.00) [0.548]
Firm size	0.70 (0.19) [0.000]	0.23 (0.06) [0.000]	0.60 (0.08) [0.000]	0.83 (0.21) [0.000]	0.26 (0.22) [0.228]
Time in China	0.06 (0.02) [0.000]	0.01 (0.01) [0.251]	0.08 (0.01) [0.000]	0.07 (0.02) [0.001]	0.07 (0.02) [0.000]
IPR protection	0.02 (0.09) [0.835]	0.01 (0.01) [0.221]	0.22 (0.04) [0.000]	0.05 (0.02) [0.012]	0.01 (0.00) [0.122]
GDP growth	-0.10 (0.06) [0.075]	0.04 (0.03) [0.136]	0.01 (0.03) [0.716]	0.06 (0.05) [0.255]	0.06 (0.05) [0.216]
Openness	0.02 (0.01) [0.052]	0.01 (0.01) [0.338]	0.01 (0.01) [0.379]	0.02 (0.01) [0.073]	0.02 (0.01) [0.077]
Number of competitors	0.04 (0.10) [0.671]	0.15 (0.06) [0.009]	0.41 (0.10) [0.000]	0.03 (0.09) [0.737]	0.05 (0.09) [0.535]
Year & Industry dummies	Included	Included	Included	Included	Included
Number of observations	10,158	3,008	10,158	10,158	9,915
Wald's chi-squared	7848.57	697.12	978.30	7371.23	7011.17
Log pseudo-likelihood	-2934.76	-3005.17	-7490.12	-4644.39	-4670.64

Notes: Two-tailed tests. Standard errors are in parentheses. *p* values are in brackets.

Table A2.2 Additional Tests

	Model 1	Model 2	Model 3
Test	Moderating role of IPR protection	DID (US firms)	DID (Japanese firms)
Independent variable			
Political tension	0.74 (0.36) [0.038]		
Political tension × IPR protection	-0.06 (0.05) [0.246]		
Treat		1.09 (1.47) [0.461]	0.29 (0.45) [0.517]
Time		7.18 (4.94) [0.146]	-4.27 (8.87) [0.630]
Treat × Time		0.13 (0.06) [0.033]	0.49 (0.24) [0.039]
Control variables			
Home country's dependence advantage	-3.63 (5.58) [0.516]	-7.38 (8.39) [0.379]	-9.07 (10.89) [0.405]
China's dependence advantage	9.86 (4.87) [0.043]	2.01 (10.67) [0.851]	6.06 (11.01) [0.582]
R&D intensity	0.03 (0.05) [0.520]	0.06 (0.01) [0.000]	0.02 (0.00) [0.000]
Host country subsidiary	0.03 (0.02) [0.044]	0.03 (0.02) [0.230]	0.03 (0.02) [0.117]
ROA	0.01 (0.00) [0.008]	0.02 (0.01) [0.008]	0.06 (0.02) [0.000]
Current ratio	0.59 (0.23) [0.011]	0.94 (0.29) [0.001]	0.25 (0.28) [0.366]
Firm age	0.00 (0.00) [0.492]	0.01 (0.00) [0.026]	0.01 (0.00) [0.000]
Firm size	0.84 (0.22) [0.000]	0.92 (0.26) [0.000]	0.99 (0.23) [0.000]
Time in China	0.07 (0.02) [0.000]	0.07 (0.03) [0.008]	0.06 (0.03) [0.023]
IPR protection	0.04 (0.02) [0.036]	0.03 (0.02) [0.139]	0.01 (0.03) [0.696]
GDP growth	0.06 (0.05) [0.237]	0.02 (0.04) [0.682]	0.01 (0.05) [0.821]
Openness	0.02 (0.01) [0.077]	0.00 (0.01) [0.610]	0.01 (0.01) [0.459]
Number of competitors	0.09 (0.08) [0.266]	0.11 (0.14) [0.421]	0.03 (0.31) [0.918]
Year & Industry dummies	Included	Included	Included
Number of observations	10,158	6,474	5,162
Wald's chi-squared	7644.75	33749.60	1558.76
Log pseudo-likelihood	-4649.29	-2535.84	-2933.59

Two-tailed tests. Standard errors are in parentheses. *p* values are in brackets.

Appendix A3. Field Interviews

Twenty MNE subsidiaries in Suzhou, Changzhou, Chengdu, Mianyang and Chongqing were selected for study. We chose foreign subsidiaries from home countries that had conflicts with China (U.S., Japan, Korea and U.K.), and those that did not (Germany, France, and Norway) over the recent years. Forty-eight senior managers responsible for patent applications and strategic decisions at those subsidiaries were invited to participate in the research. They included general managers, board members, CEOs, R&D managers and others (see Table A3.1).

Each interview lasted 30 to 90 minutes, with an average duration of 58 minutes. The interviews were in two phases. In the first (a pre-test), a draft interview outline was used to conduct semi-structured interviews on site in three subsidiaries in Suzhou. Even the pre-test generated strong evidence that political tension induced a company to patent. The draft outline was revised and then used to interview the rest of the respondents. Tables A3.2, A3.3 and A3.4 present some particularly relevant responses.

Table A3.1 Basic Case Information

Case ID	A	B	C	D	E	F	G	H	I	J
HQ Location	Germany	Japan	USA	USA	Japan	USA	Germany	Japan	Korea	Japan
Year of Establishment	2001	2001	2006	2005	2001	2019	2006	1996	2013	1995
Number of Staff in China	468	1,082	1,808	341	256	63	322	89	20	430
Interview Duration	75mins	59mins	58mins	46mins	58mins	47mins	79mins	32mins	45mins	74mins
Interviewees' Positions	3 (China Application Centre Director, 2 Supply Chain Directors)	3 (CEO, Head of Foreign Economic Planning, Head of Development Planning)	2 (Chairman of the Supervisory Board & Assistant President, Head of Equity Operations)	1 (China Operations General Manager)	1 (Board Member & Deputy General Manager)	5 (Head of Bioanalysis, Head of Vaccine R&D, Head of Biological Samples, 2 General Managers)	3 (Operations Director, Head of the Legal Department, Head of R&D)	1 (Head of the Finance Department)	1 (General Manager)	4 (CFO, HR Director, Office Director, Office Manager)
Industry	Non-metallic mineral products	Computer, communications and other electronic equipment manufacturing	Network security	Specialized equipment manufacturing	Chemical raw materials and chemical products manufacturing	Research and experimental development	Automotive manufacturing	Chemical raw materials and chemical products manufacturing	Computer, communications and other electronic equipment manufacturing	Instrumentation

Table A3.1 Basic Case Information (Continued)

Case ID	K	L	M	N	O	P	Q	R	S	T
HQ Location	USA	Germany	Korea	U.K.	France	Germany	USA	Japan	Japan	Norway
Year of Establishment	2001	2004	2013	2006	2005	2005	2009	2001	2004	2003
Number of Staff	20,000	154	3,054	788	214	320	1,601	24,862	937	330
Interview Duration	33mins	1h8mins	79mins	46mins	33mins	90mins	35mins	49mins	62mins	92mins
Interviewees' Positions	2 (Senior Operations Manager, Investment Manager)	3 (Vice Manager, Market and Product Manager, HR Manager)	3 (Director, Leasing Executive, Senior Manager)	3 (Public Relations Manager, Network Development Leader, General Manager)	1 (General Manager)	3 (CEO of China Region, Vice CEO of China, HR Director for China)	1 (General Manager)	3 (President, Deputy General Manager, R&D Manager)	3 (President, R&D Manager, Operations Director)	2 (General Manager, R&D Manager)
Industry	Automotive manufacturing	Automotive manufacturing	Computer, communications and other electronic equipment manufacturing	Energy and retailing	Equipment manufacturing	Software and Information Technology Services	E-commerce	Non-metallic mineral products	Non-metallic mineral products	Non-ferrous metal smelting and rolling

Table A3.2. Selected interview quotes related to the impact of political tension on foreign subsidiaries

Case ID	Is there any influence on your company when there is political tension between your home country and China? How about with improved political relations? Please give us some examples.
A	“[The international situation] absolutely has certain impacts on us...They are clear...global sales of our group are increasing, but that in China going down, which may be the negative effect of COVID19...maybe it was caused by several other factors together.... including US interest rate hike...also including USA taking the policy of isolation and containment to China.”
F	“Overall, our feeling is that customs supervision on imports has been tightened, making the import process complex...During the Sino-US trade war China imposed import tariffs on some products from the United States. We had to go through additional procedures to declare and claim this tax; it increased the operating costs.”
G	“Future direction is not clear because of Germany’s new leader coming into power. Our CEO once held a good relationship with the last president of Germany. He was always present in activities with government officials. Since there was a nice Sino-German relation in the past, we are quite confident in general.” “If we meet force majeure, including the war or other factors mentioned before, the production cost will increase.”
N	“Recently the Innovation and Industrial Vice Director from Britain came to Shanghai, Chongqing and Beijing. In Chongqing, together with some British enterprises, he visited Liangjiang New District, just like G2G in the beginning, and B2B then. He helped to build a communication platform for the British Consulate and Liangjiang New District, building a bridge to see if there is any cooperation opportunity between automotive energy and British-funded enterprises. The British Consulate also promotes our cooperation and development in Chongqing.”
O	“[Political tension] definitely exerts influence on us. In China, from the view of our parent company, politics affect business interests. For example, during the past two years, concerning steel export tariffs, there previously were export subsidies. But now there is no tax reimbursement, which may further negatively influence our profits...our export tariff increases, lowering the profit margin of exportation...We think maybe we need to strengthen domestic R&D to get a high-tech enterprises qualification. After that, there will be opportunities for policy negotiation. This is also of importance for our development.”
P	“Thanks to the good Sino-German relationship, political factors seem to have no impacts on us...But because of the Sino-US frictions concerning digitalization, big data and cloud computing, IBM China is now shrinking, which, in turn, provides an opportunity for us to expand in China. At present, we cover 4 cities in China, with 150 employees; we are planning to have 500 employees in 2030.”
R	“Political influences definitely exist. Especially due to the influence of the USA there are some changes in the Japanese government’s policies...The Chinese government has also put some restrictions on foreign-owned enterprises’ importing of certain merchandise and technologies...” “Important R&D needs to be developed jointly with the Japanese headquarters. But in recent years, due to political factors, there are more restrictions and controls both domestically and overseas than before, which exerts great negative impacts on us.”
S	“Concerning local policy, there may be also some influences. Because of the international situation or COVID-19 in recent years, there are strict regulations and controls on the import and export of product and technology. We also have some difficulty in exporting certain products.”

Table A3.3. Interview quotes related to motives for patenting

Case ID	In addition to the purpose of protecting IPRs, is there any other reason why your company applies for patents in China?
A	“We can see that applying for patents and high-tech enterprise certification have created great value for Suzhou. We have not only brought profits to the headquarters, but also had our strength and development prospects recognized by Suzhou’s government.” “By doing well in R&D, we then negotiated with the government and proposed to expand our production capacityWe also have received great help from the government for being a technology-innovative enterprise, as the government would like to invest more and provide greater preferences. Besides, it was of great help for our own development, especially under the current circumstances, to apply for high-tech enterprise certification. ”
C	“During times of environmental instability, we have always expected to build a technology moat, or firewall, through intellectual property.[Intellectual property] is the moat, the second is the science and technology innovation board, and the third is government technology projects. When declaring some specific R&D projects, patents are the most direct proof; and when bidding, patents are a desirable plus. The bidding process involves examining a company’s qualifications, certifications and patent authorizations, etc. ...So through patent applications we can enjoy some benefits from government policies.” “This series of products was a science and technology project in itself, during which our patents were naturally generated...We have attached great importance to innovation all the time. Relatively speaking, for a company of our size, with such a robust R&D system, then generating patents is a matter of course. The government was also pleased to witness the output of such a large number of patents. When leaders and experts came to visit us, they would remark that the enterprise is quite strong, as a result we then could get a lot of help in bidding and applying for certain policy certifications.”
F	“Definitely, we desire to carry out R&D activities and apply for patents in China. Our industry technologies and biological samples now have been severely restricted from entering China, thus the only way by which we can capture more market share is to engage in R&D activities in China.” “Much of our business is about analyzing big data samples and providing respective solutions. Only when we innovate data analysis methods ahead of our Chinese competitors in the industry and are able to provide better solutions to problems can we become more involved in working with public healthcare organizations, obtain more valid and realistic data, and ultimately serve the Chinese market better. This is actually a virtuous cycle.”
J	“First, patents are important for our company's image as well as advertising for customers. Why do customers choose us? The reason has been certainly based on our R&D strength. Patenting is one of the major external indicators of R&D strength, and it is also a dominant manifestation. Regardless of your technological capability, patents indeed would exhibit a certain additive effect when developing the market or improving the brand’s premium trading. Another thing I want to talk about is that in the current context patents also matter a lot for applying for various subsidies provided by the government. The patent is an influential criterion in R&D subsidy applications, R&D center applications and national advantageous enterprise applications. Some applications for enterprises and government projects were required to meet the basic conditions of patent numbers.”
K	“To tell the truth, we started to develop patents in order to apply for the government's high-tech enterprise certification, as patented technology was the compulsory requirement. In the beginning, we were auxiliary to the foreign party, and on the matter of patents, they almost didn't give

	us any opportunity to apply by ourselves. However, when applying for high-tech enterprise status we were truly confronted with the hard patent requirement, so we then initiated patenting to break cross that threshold.”
L	“Applying for patents was primarily to protect our own products, and it also helped us to go for some honorable titles issued by the government.”
N	“Yes, the honorary title is definitely icing on the cake. Honorary titles show our good business operations, high social responsibility, and active integration into all aspects of society. They thus could enhance the frequency of our interactions with the government and bring the government-business relationship closer. Although the industry association has been decoupled from the government, it is still guided by the government’s work.”
O	“In view of the reputation of our business, we have conducted patent research and development. We believe that an improving reputation would give us an added advantage in local operation and management.”
P	“In addition to enhancing our own capabilities and better supporting our Chinese partners, R&D achievements in China could also well be transferred back to the German headquarters, improving the firm’s entire operations. Our R&D in China has been supported by the Shanghai Pudong High-tech Zone. In the process of doing business with our Chinese partners, our company’s technology development and patent capability could also be considerably backed up.” “We operate in the Chengdu Hi-tech Zone ‘Eurocenter’ (a comprehensive service platform for trade, investment and technology cooperation between western China and Europe). With strong patenting and R&D, our center now serves as a platform for integrating innovation. Our innovation capacity also promotes local government approvals. For example, when applying for entering the Hi-tech Zone, an ordinary enterprise would need approval from 5 district leaders, which normally takes 3 months. However, due to our establishment of the innovation integration platform, our approval took less than 1 month.”
R	“We also feel that [patenting] indicates our attitude toward the Suzhou government, which is that we truly want to take root in the Chinese market. The relationship between business and government does matter, both in Japan and in China. The government tends to hold that if an enterprise has done well in R&D and applied for numerous patents, it means that the enterprise has strong capabilities. Therefore, when the government considers policy approval or policy preferences, patents made by enterprises would definitely be regarded as criteria.”
S	“Whether applying for a patent or applying for high-tech enterprise certification, there are of course many comprehensive factors to consider. Economic benefits are definitely the most important…We have to protect our technology because the proprietary technology has been quite profitable in the market…Social effects indeed have occurred as well. For example, when recruiting employees, if candidates regard our company quite well we would be more likely to attract more high-end talent. Having witnessed that the enterprise has solved the employment problem and attracted talent, the government would consider the company more favorably when we apply for other projects in the future.”
T	“We have some patented technologies such as new energy and a battery pack that are leading in China. This has really enabled the Suzhou government to be aware of the R&D strength of our company, which has also been of great help for us in applying for high-tech enterprise certification as well as engaging in import and export activities.”

Table A3.4. Interview quotes related to patenting as a response to political tension

Case ID	When there is political tension between China and your home country, do you think patent application in China would be of help for your company to some degree? Please tell us more details.
A	“When policy is not clear domestically and internationally, what we could do is to make ourselves bigger and stronger through R&D, showing our competitive advantages. Only in this way can we get the recognition and support from relevant stakeholders.”
K	“I think the political environment definitely influences our R&D. Regardless of the external environment, you need to apply for patents to show your strength and obtain more preferential treatment in the local environment.”
O	“During political tension our R&D mainly considers meeting the requirements of technology evaluation, which may bring us certain preferential tax or other preferential treatment from the government.”
R	“The relationship with the government is critical. In addition to doing business according to policy & regulations, you must think of and do things that the government values, such as patent innovation, which is now being advocated nationwide. If you do it, [the government] will provide you with resources, projects, and support, and you can cope with some shocks to the international situation in recent years.” “How to address such shock? I think, improving our capabilities comes to the fore. For example, you can invest in R&D and patenting. Besides making profits, R&D and patenting show your value to Japan headquarters and Suzhou’s government.”
S	“In fact, patent application transmits a signal to government. As such, you will get more policy and financial [support], which are quite important to your operations in the Chinese market. Especially in recent years, our Japan headquarters is not very confident about doing business in China. So, after you initially send a signal to the government, the government may in turn give certain support for your operations. This is critical for you to deal with risks and shocks.”
T	“Especially when the external environment is very unstable, like COVID-19 or political tension which you have mentioned, through R&D enterprises will show their competitive competence, which is of help to cope with environment turbulence. You can rely on local policy, so when the local government realizes your healthy operation, your contributions to local GDP, they will believe in your development, and in turn offer you necessary resources. This will help you grow and deal with the external environment.”