The future of US-China relations: a scientific investigation

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Abstract

In earlier centuries kings and governments employed astrologists to help them take the best decisions. Present-day governments no longer employ astrologists but still have no clear analytical tool to replace them. Over the past two decades we have developed a methodology for the scientific investigation of recurrent historical events. It consists in two steps. (i) Identification and comparison of historical episodes driven by a common mechanism. (ii) Under the reasonable assumption that what has happened several times in the past is likely to happen again, one then derives testable predictions. This of course is nothing other than the protocol used in experimental science when exploring new phenomena. We believe such a tool can give decision makers much better insight.

In the present paper we illustrate this analysis by considering challenges, that span more than a century, to US hegemony in the Pacific. The outcomes suggest that it is only through the sidelining of one of the contenders that the confrontation will end. At the time of writing (late 2018) early evidence of this confrontation is already visible at three levels. (i) Growing US concerns for domestic security that are leading to a new form of McCarthyism. (ii) Political instability due to China-US polarization in several Asian countries as well as in the countries participating in the "Belt and Road Initiative". (iii) Tension and sanctions in procurement and trade.

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In this paper we address two questions.

- During past decades successive Chinese leaders have repeatedly declared that their objective is a win-win relation and shared leadership with the United States, but is the US side ready to share world hegemony?
- As we shall see, the answer appears to be no and we then ask the second question namely: what form does the confrontation take?

The distinctive feature of the approach is that it is not based on a discussion of present circumstances but on regularities identified within a number of similar events that have previously occurred.

Introduction

The approach taken by historians can hardly be considered to be science (in the sense of being able to produce testable predictions). Furthermore many historians even disagree with the very notion that history can be made into a science.

Here we take the contrary view, acknowledging that the defining condition of any scientific investigation is *replicability*. For example, if the falls of apples and rain drops have common characteristics we may be able to make predictions relating to the fall of hailstones.

Our methodology follows the approach that experimental physics uses to explore new phenomena. It is very much in the spirit of the methodological guidelines defined by the French sociologist Emile Durkheim in his book[1] entitled "The rules of sociological method" (Durkheim 1895). It is perhaps not suprising that Durkheim's methodology is similar to that of experimental physics since at the end of the 19th century physics was seen as *the* compelling approach in science.

To study recurrent events the decisive requirement is replicability simply because otherwise nothing but noise is observed. But note that even in physics replicability is never perfect[2]. When we consider a cluster of similar historical events we must be prepared to see fluctuations that are substantially larger than in most physical observations, and it is necessary to select such events in such a way that the dispersion is minimised.

Precedents in the move toward a scientific approach

[1]Indeed, Durkheim recommends studying social phenomena as if they were "things" ("comme des choses" in the French text).

[2]This point is discussed further with reference to a specific example in Appendix C. A broader analysis of the key importance of the signal to noise ratio can be found in Roehner (2007) in a chapter entitled "The battle against noise in the social sciences".

In order to give credence to the possibility of establishing a "science of recurrent historical events" (which in what follows will be called "analytical history"), it is useful to describe briefly how the transition to science status was achieved in two other fields, namely astronomy and medicine. Such transitions are summarized in Table 1.

It was to provide advice on key-decisions that astrology was developed. This sought to "rationalize" the activity of numerous oracles and shamans who were considered intermediates between humans and the world of spirits and gods. From China and Mesopotamia, to Greece and western Europe the practice of astrology was widespread. We call it a neo-science because it has some characteristics of a real science. It is based on the relative positions of celestial objects which in turn necessitated accurate observations of the positions of stars and planets. In the evolutionary perspective schematized in Table 1, we use the expression neo-science (one could also call it pre-science) rather than pseudo-science because the later conveys a derogatory meaning. Initially, astrology marked progress with respect to divination at least in the kind of data that it was handling.

Table 1: Transitions from divination stage to neo-science and to science.

Divination stage	Neo-scientific factual stage	Scientific stage
Transitions already completed		
Prophecies by oracles	Astrology	Astronomy
Shamanism (vital spirit, soul)	Humoralism, bloodletting	Medicine
Transition under way		
Founding myths, legends	Factual historical narratives	*Analytical history*

Notes:
"Humoralism" was based on four, so called, humors whose equilibrium was deemed to be necessary for a healthy life. Introduced by Hippocrates (460 to 370BC), this view was accepted for over 2,000 years. The neo-scientific stages defined in the second column of the table differ from those in the first in two main ways: (i) They make little or no reference to gods or supernatural notions. (ii) They were formalized into well defined protocols. Thus, following Galen (129-200AD) the location and volume of blood lettings were defined by a complex set of rules based on disease, age, season and weather.
The transitions between stages were gradual rather than sudden. For instance, although Galen was wrong on humoralism, many of his anatomical observations were correct and proved useful for centuries. Incidentally, even today, treatments without real medical justification continue to be performed, as explained in Baugh et al. (2011) for the case of tonsillectomy, i.e. removal of the tonsils on both sides of the pharynx (for more details see the Wikipedia section entitled "Tonsillectomy industry").

In the history of mankind the transition from astrology to astronomy took place only a few times: first in Greece, before the Roman invasion, then around 900 in the Islamic world and finally in Western Europe around 1600. It is also significant here to note that both the Danish astronomer Tycho Brahe (1546-1601) and Johannes

Kepler (1571-1630) were astrologists at the service of the German Emperor Rudolf II. The present-day consensus is that the astrologists' claim of predicting terrestrial events based on celestial observations is not justified[3]. Describing astrology as a "pseudo-science" emphasizes the point that its claims are not justified.

As we have seen the transition from astrology to astronomy was gradual. So was also the transition from alchemy to chemistry. The same observation holds for medicine. Even though, during the neo-scientific stage, weird procedures such as relief by bloodletting were followed, significant contributions were made to anatomy and herbal medicine.

Returning to history, although we are currently in the neo-scientific stage, the transition to the scientific stage does not seem welcome or desirable by mainstream historians. That is perhaps why physicists have a role to play. When astrophysicists want to study a law of neutron stars, quite naturally they do not study just one neutron star but as many as possible. Our approach follows the same methodology.

Incidentally, the transition from the divination stage to the factual stage was not only gradual but also marked by steps backward. Thus, whereas the accounts written by Herodotus (circa 484 to circa 425 BC) or Thucydides (460 to 400 BC) were fairly factual, when one reads contemporary accounts of the "Great London Fire" of 1666 one learns more about the sins of people and the intentions of God than about the real circumstances of the conflagration.

Presently, although there is no science of historical events, some sub-fields of history, e.g. demography, already function as sciences. The main obstacle to the development of analytical history is probably the fact that most historians consider historical events to be unique and therefore inappropriate for scientific analysis. We return to this point in Appendix C.

Outline of the investigation of challenges to US hegemony

The investigation will proceed through the following steps

- First, we define the mechanism on which we shall focus.
- Secondly, we identify historical episodes showcasing this mechanism.
- Thirdly, we compare their outcomes and consider to what extent they help predict the future of China-US relations.
- Finally, we examine recent events that may confirm and foreshadow impending confrontation.

[3] Yet, very few really scientific tests have been conducted. One is described by Shawn Carlson in "Nature" (1985). The paper concludes that predictions based on so-called natal charts are no better than pure chance predictions but also emphasizes that such tests involves many methodological difficulties. Would experimental tests on animal populations not offer better tests of astrological predictions? If planets have an influence on humans, then they must also have an influence on animals.

Because not all readers may need or even wish to know the details of our arguments explanations that rely on historical facts and accounts are in Appendices A and B. However we emphasise that such "details" are often of crucial importance. For instance, our belief (used in Table 2) that in 1900 the United States had already an hegemonic position in the Pacific must be substantiated and we do this by showing that at that time China had lost its power, Japan was still in a development stage and Britain had accepted US ascendancy in return for a free hand in Hong Kong and Malaysia.

Investigation of challenges to US hegemony in the Pacific

Definition of the mechanism

The question investigated in this paper can be stated as follows.

> *Class of events: reactions to actions challenging hegemony.* *We consider situations in which a country (or company or organization), A, holds a dominant position but is challenged by another country, B. What will happen?.*

To say that a historical episode involving two countries A, B belongs to the class defined above one must show two things:

(i) That A holds an hegemonic position in a given area, meaning that A is more powerful in terms of GDP, technology, armed forces than all other countries in this area.

(ii) That, at least in the minds of the leaders of A, the action of B is challenging this position[4].

Sometimes it happens that a country has to give up hegemony just as a result of general circumstances. This is how hegemony was transfered from Britain to the United States. The reason is easy to understand. Basically the two world wars made Europe weaker and the United States stronger. In 1939, the US GDP was already 3.4 times larger than the GDP of the UK. In 1950, the ratio was 7.9[5]. In addition, the UK was heavily indebted to the US. Thus, the transfer of leadership could hardly be questioned. This case illustrates the fact that, as in any competition, the contest is of interest only when the two contenders are approximately of same strength.

In the present paper we analyze the dominant position of the United States in the Pacific.

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[4]Because it relies not only on objective facts but also on their perception, this notion is not always easy to define precisely.

[5]The data are as follows (Liesner 1989, p.20-21,54-55,74-75):
1939: UK GDP=5.96 billion pounds, US GDP=bn $91.3, 1 pound=$4.46
1950: UK GDP=13.0 bn pounds, US GDP=$288 bn, 1 pound=$2.80.

US hegemony in the Pacific: general view

Why do we limit the study to the Pacific?
Historically there have been many cases marked by recurrent conflicts between regional contenders. For instance, one can mention the series of conflicts between Venice and Genoa from 1250 to 1400, the four Anglo-Dutch wars fought on sea from 1650 to 1780, the many wars between Russia and the Ottoman empire. However, all these cases were rather imperfect examples of challenges to hegemony. They were rather conflicts between two powers of similar strength.
The position of the United States in the Pacific is a much clearer case of hegemony.

Nowadays (in 2018) what is at stake is not only hegemony in the Pacific rim but world hegemony. However, the question of world hegemony came on the table only after the demise of the Soviet Union as a global contender. In contrast US hegemony claims in the Pacific are much older.

On 2 June 1954 at a White House Security Conference, President Eisenhower declared: “We have got to keep the Pacific as an American lake”.

Fig. 1 Rim of the Pacific A number of historical circumstances (explained in the text) explain that the United States gained an hegemonic position in the Pacific as early as the end of the 19th century through the Spanish American war of 1898.

In contrast to a sea, a lake is most often included within the territory of a country. Naturally, here this sentence does not mean that all the countries around the Pacific should be American but it implies that they should be part of the US zone of influence[6] that is to say should be neither contenders nor opponents.

[6]Before World War II the notion of “zone of influence” was well accepted and duly used in diplomatic language. Nowadays, in contrast, it has been replaced by the delusion that UN membership makes even the smallest countries (e.g.

Actually, we will show that the US hegemony in the Pacific did not start after World War II but in fact several decades before, around 1900. Therefore, by restricting our study to the Pacific rim (see Fig. 1) we can draw on more cases than by considering world hegemony after 1990.

Before closing this subsection we wish to draw attention on an important distinction.

Similar historical episodes or similar mechanisms?

The starting point of our comparative analysis must be a *mechanism*, it cannot merely be an historical fact or episode.

For instance, in China there have been successive dynasties and various mechanisms could be at work in their falls (e.g. see Ferguson 2010) For instance, some collapses may be due to military factors, others to a contraction of tax income or some other factors. In other words, a first step must be to make sure that the falls under consideration belong to the same category. Incidentally, one faces exactly the same problem in medicine in the sense that a comparative analysis of symptoms will be meaningfull only once the disease has been clearly defined. For instance, there must be a clear distinction between tuberculosis and influenza for, although the two diseases attack the lungs, they affect them in different ways. Similarly, an analysis of dynasty falls will be all the more fruitful that the set under consideration will be more homogeneous.

Historical realizations of this mechanism

As already said, for each of the cases included in Table 2 we must examine two points. (i) Whether there was indeed an hegemonic position. (ii) Whether there was a real challenge

Hegemonic position

Everybody would certainly agree that after Word War II the United States enjoyed a hegemonic position in the Pacific. However, case number 1 of Table 2 assumes that the US had already such a position around 1900 which is less obvious and requires some explanations. In Appendix A we explain the factors which account for the fact that US dominance started at the end of the 19th century.

Actions perceived as challenges to hegemony

Once we agree that as early as 1900 the United States had a dominant position in the Pacific, we need to understand why the actions of other countries listed in Table 2 were perceived by the US as challenges to this position.

For most of the cases (namely Pacific War, Korea and Vietnam War) this is fairly clear but there are two cases, namely Russia and Indonesia, for which additional explanations may be helpful. A historical discussion can be found in Appendix B.

"Saint Kitts and Nevis" or Kiribati) fully independent in all and every respects.

In the last three decades of the 19th century the situation in the Pacific can be described as follows.

- China, once the dominant power in East Asia, had become very weak. The two Opium Wars of 1842 and 1856–1860 had shown that a relatively small western army supported by the guns of a naval squadron could defeat fairly easily the armies of the Qing Empire. After this demonstration, China became a prey for western countries just as the decaying Ottoman Empire was in the Mediterranean area.
- Through its success in the First Sino-Japanese war (1894–1895), Japan had shown that it was on the way of replacing China as a regional power. But, as shown in Appendix A, economically it was still far behind the US and even substantially behind Russia. In 1900 its total trade was 2.6 times smaller than the trade of Russia[7].
- Until 1898 Spain was present in the Philippines but its quick defeat in the Spanish American War showed it out.
- It is true that other western powers, particularly Britain, France and Germany were interested in occupying Pacific islands. However, the rapid acceptance by Britain of the US annexation of Hawaii showed that British interests were confined to the Indian ocean and that it did not wish to challenge US influence in the Pacific.

In other words, the only real possible contender was Russia.

US hostility toward Russian expansion
In Appendix B we explain some of the steps in the Russian expansion toward Manchuria, Korea and the shores of the Pacific.

Actually, apart from the geopolitical situation, there was another factor which amplified the US *perception* of Russia as an unpleasant contender. It was the fact that between 1880 and 1905 there were in Russia recurrent waves of anti-Jewish pogroms which attracted great international attention especially in the United States. These events amplified US hostility toward Russia in a way somewhat similar to present day US perception of China as a threat is amplified because China is not only a contender but is ruled by the Communist party.

The only other cases to require some more explanations (given in Appendix B) are Indonesia and Chile.

Analysis of a cluster of challenges

Now we put together the information collected and described previously for the different cases of challenges. This leads to the cluster of challenges displayed in Table 2. What conclusions can one draw?

[7] The numbers were 1,340 million rubles for Russia and 500 milion yen for Japan; the ruble:yen exchange was almost 1:1 (Mitchell 1978,p.306).

Table 2: Cluster of recurrent challenges to US hegemony in the Pacific

	Beginning of challenge	Challenger	Country acting for challenger	Country acting for US	Conflict	Direct US action (no/yes)
1	1890	Russia	None	Japan	Russo-Japan War: 1904-1905	no
2	1938	Japan	None	Several	Pacific War: 1941-1945	**yes**
3	1949	USSR	North Korea	Several	Korea War: 1950-1953	**yes**
4	1948	USSR	North Vietnam	France	Indochina War: 1949-1954	no
5	1962	USSR	North Vietnam	Several	Vietnam War: 1960-1978	**yes**
6	1957	USSR	Indonesia	Indon.army	Mass murders: 1965-1966	no
7	1970	USSR	Chile	Chile army	Near civil war: 1970-1973	no
8	1979	USSR	Afghanistan	Mujahideen	1st Afghan War: 1979-1988	no
9	2010	China	?	Several	?	?

Notes:
Because cases 1-8 all led to the elimination of the challenge, they suggest that the emergence of a contender will simply not be tolerated. This is even more likely when the contender is a major power occupying a vast area of the Pacific rim as is China. As this has occurred several times in the past, it is likely to be repeated again. Despite the interrogation marks left in the row for China, one can draw the conclusion that *the US-China tension will not abate but (most probably) will rather wax.*
Below we give a number of additional comments.
• Direct US action means that US troops were involved.
• "Mujahideen" does not refer to a country but to Muslim people waging a "jihad" that is to say warfare against unbelievers. Although Afghanistan is not on the Pacific rim, the fact that it has been fiercely disputed for almost four decades suggests that, for some reason, it is considered of high strategic value.
• France waged the "Indochina War" on behalf of the US in the sense that, along with weapons and funding, the US side gave strategic and tactical advice.
• It can be noted that every time the US took directly part in a war it had several allies; for instance, Australia, Britain, China, New Zealand and the Netherlands in the war against Japan.
• Note that the Indochina and Vietnam wars were not challenges to US hegemony by themselves but because of the "domino effect" theory which speculated that if a state came under Communist control, then all surrounding countries would also fall one by one. Despite eventually being proved wrong (indeed after the Communist victory in Vietnam no other country changed side), this theory was used as a justification for massive US intervention by successive US administrations.
• The case of Chile was different from the others in the sense that the two sides belonged to the Chilean society which is why the confrontation took the form of a low intensity civil war.
• In this paper, we do not include the trade war between Japan and US during 1980s-90s because that conflict remained constrained in the economic sector. Japan did not challenge the US politically or militarily.
Sources:
https://en.wikipedia.org/wiki/Communist_Party_of_Indonesia; Di et al. (2017), Chapter 5: "The Pacific as an American lake".

The challenges listed in Table 2 are not all of same kind. Some like Japan, Korea, Vietnam or Afghanistan were military challenges from the very start, others were ideological and political challenges. It is the case of Russia which comes closest to the present situation of China as an expanding economic power. On the other hand the struggle for world hegemony is best described by cases 3-5 corresponding to indirect military confrontations with the Soviet Union.

Overall regularities

In the regularities displayed by Table 2 we wish first of all to list the regularities deriving from cases 1-8. These are valid for any challenger irrespective of its specific identity. Then in the next subsection we give some comments which apply specifically to China.

(1) The main conclusion is that in the past no challenges have been tolerated. All possible challengers were targeted and countered.

(2) The challengers were defeated in all but one case, namely Vietnam. Note that regularity (1) holds even in this case. It is only after a bitter struggle and in the face of domestic protests that defeat was accepted.

(3) In all cases, the United States first relied on local forces supported by US military advisers and delivery of weapons. US troops were sent in only when local forces turned out unable to defeat the challenger.

(4) Whenever the US intervened directly it was always together with several allies. In the Pacific War it had 5 major allies namely Britain, China, France, the Netherlands, and the Soviet Union. It is in the second Vietnam War that the number of major allies was smallest: neither Britain nor France took part.

(5) In all cases where it occurred, direct US interventions were in response to an aggression. This is of course clear for cases 2,3 and 8. The US administration wanted a similar pretext for Vietnam. Before sending reinforcements the Department of Defense wished to show that it was responding to an aggression. This led to the two so-called "USS Maddox incidents" in the Gulf of Tonkin (2 and 4 August 1964). Later on, it was recognized by US authorities that the second incident did not take place. Even the first was quite unimpressive in the sense that not a single American was injured[8]. Within hours President Johnson ordered retaliatory air strikes against North Vietnam and announced them to the nation in a TV address broadcast on all channels at 23:30 on 4 August. In response, on 7 August 1964, the US Congress passed the "Gulf of Tonkin Resolution" which authorized President Johnson to use US armed forces to assist any state in Southeast Asia requesting assistance in defense of its freedom. The vote was 476-0 in the "House of Representatives" and 88-2 in the Senate.

On 9 August 1964, China said that the US was trying to create a United Nations force to turn Vietnam into a second Korea and pledged to aid North Vietnam. A

[8] Moreover, the US government did not disclose that the incident of 2 August was preceded on 30,31 July by attacks against two North Vietnamese offshore islands.

massive anti-US demonstration took place in Beijing. Less than two months later China tested its first atomic bomb.

Readers may wonder why we gave a fairly detailed account of this episode. The reason is simple. One expects that whenever the US will decide to escalate the military confrontation there will be a similar attempt to present it as a response to an aggression. For instance an incident between a Chinese warship and an Australian, Filipino or Vietnamese vessel would allow the US media to portray the US Navy as coming to the rescue of a weaker country..

Time schedule

Can one say that the confrontations start with a trade war? Not necessarily. The case of Japan shows that US-Japanese trade remained active until a few months before the war. In 1931–1935 the average annual US exports to Japan was $169 million whereas it was 238 in 1940. These exports represented only about 3.5% of the Japanese GDP. As a matter of comparison, in 2017 Chinese exports to the US represented about 4% of the GDP of China. So, one cannot say that economic interdependance is strong enough to prevent a confrontation.
If needed, this case shows that economic and political rivalry are definitely two different things. Economics is about production and consomption whereas politics is about power and hegemony.

In cases 1-8 the average time interval between the start of the challenge and its elimination was about 8 years[9].

What can one say about the duration of economic and financial challenges? For instance, in Di et al. (2017) there is an estimate of how long it may take for the renminbi to replace the dollar as the dominant currency in the reserves of central banks. This estimate is based on only one case namely the replacement of the British pound by the US dollar. The time constant was of the order of 50 years; for the RMB-US$ replacement it may well take longer because the dollar holds a much stronger position than the pound had back in the 19th century.

It is true that the composition of central bank reserves is not the only possible criterion. However, it may reflect the weight of a currency in global *financial* transactions. As a trading currency the weight of the renminbi may increase faster but in fact in present-day market organization trade and financial transactions are closely interconnected, particularly through the mechanisms of currency exchange, trade insurance and debt management. In short, it does not seem that the RMB is a short- or medium-term threat for the domination of the US dollar However, what matters is

[9]Russia: 15, Japan: 4, Korea: 4, Vietnam(1): 6, Vietnam (2): 16, Indonesia: 8, Chile: 3, Afghanistan: 9. The average is: $m = 8.1 \pm 3.6$ (where 3.6 corresponds to a confidence level of 0.95). As in several cases the start of the challenge is not well defined, this estimate should be seen as a mere order of magnitude.

not the threat itself but rather its perception in the minds of American leaders.

We now give some comments which are specific to the case of China.

The China-US honeymoon era

In order to understand why awareness of nascent US hostility took decades to spread in the Chinese public and in the Communist Party it is necessary to remember the situation prevailing in the period 1980-2018.

Numerous statements by Chinese leaders reveal that their vision of US-China relations was a kind of condominium in which the US and China would share world leadership. It is true that between 1980 and 1990 China was considered by the US as a strategic partner in its confrontation with the Soviet Union. Whereas on the US side that perception already changed in the 1990s it remained unchanged on the side of China.

Among Chinese leaders there was a great admiration for the US. Out of numerous facts one can mention the following illustrations[10].

- Leading Chinese universities provided scholarship funding to their best students to allow them to study in American universities and pay the high tuition costs. Naturally, a substantial percentage of them (95% in 1987, 69% in 2007 and 21% in 2017, according to the "South China Morning Post" of 8 December 2018) remained in the US which means that China accepted to lose some of its most promising students[11].
- Whenever a section of the Communist Party wanted to express its satisfaction to one of its members, a common reward was in the form of a study tour in the US. In other words, the best agent for spreading US influence in China was the Communist Party itself. As an illustration, one can mention that from 2002 to 2014 the so-called "Amway Program" brought more than 500 Chinese officials to Harvard's John F. Kennedy School of Government in order to study public management. They were called "Amway Fellows". Another similar program at the Kennedy School was the "China's Leaders in Development Program" set up on the American side by Antony Saich[12]. Such programs were certainly an excellent method for creating a network of Chinese officials fluent in English, and sincere admirers of the American way of life. On the Chinese side such programs were supervised by the "China Development Research Foundation" under the control of the "State Council", the chief administrative

[10] More details can be found in Roehner (2017a) particularly in chapter 4 entitled "Our constituencies".

[11] It can be noted that the first batch of Chinese students was sent to the United States in 1872 that is to say by the Qing Empire. Japan had also sent its students to western countries, but it seems it was done more cleverly in the sense that they came back to Japan and greatly contributed to its scientific and technological advancement.

[12] In an article entitled "Amway bankrolls Harvard course for Chinese cadres", Bloomberg news of 24 September 2013 reported that next to Saich's office there was a cartoon on the wall which pictured the same Chinese official some 20 years apart. In the first frame, dressed in a Mao suit, he was raising his fist before a Chinese flag saying "I staunchly oppose America's hegemony!" In the second frame, he was addressed by a seating official in the following terms: "You are very patriotic. We will send you to Harvard for training next year!"

authority in China.

In short, the United States was seen by Chinese leaders and people as a well-meaning elder brother. Such a climate can probably explain why, despite clear signs of waxing US antagonism in the 2010s (e.g. massive sales of weapons to Taiwan[13], more and more visits of the Dalai Lama to the White House) the official policy remained unchanged. It takes time for younger siblings to rebel against their big brother. Even in late 2018, despite the trade war and a string of actions targeting Chinese telecom companies, an article of "People's Daily" (the official publication of the Communist Party) of 4 December 2018 was entitled[14]: "Jointly promote a healthy, steady China-US relationship".

What does Table 2 say about the Chinese challenge

Coming back to Table 2, in spite of several interrogation marks in the row about China, the clear conclusion is that challengers, including China, should be eliminated. As a matter of fact, through its mere existence and economic expansion, China is a more serious challenger than was the Soviet Union in the 1960s and 1970s. The fact that it will not be tolerated means that the tension between the two countries will not decrease but rather increase. In the next section, we examine how this prediction can be tested.

"Who will win?", a question that we cannot answer.

For the human mind it is a natural tendency to wish a *detailed* view of the future. In particular, one would like to know who will win. Will the challenge be suppressed as it was in almost all previous cases except Vietnam?

It must be strongly emphasized that Table 2 only allows us to say that the challenge will not be tolerated and will give rise to a confrontation. This will certainly be found unsatisfactory by many readers, but to predict who will win is a much more difficult question.

Instead of restricting ourselves to the regularities which can be derived from Table 2 it may be tempting to indulge into an exercise of political fiction. We will refrain from doing that. Just to indicate why let us consider the column "Countries acting for US". One would of course wish to know which countries may be among the "several" indicated in Table 2. On account of recent events, it may be tempting to predict that Japan will be among them for indeed the re-armament program undertaken since 2015 by the government of Prime Minister Abe suggests that Japan will

[13]The implicit understanding of the agreement of 1979 which led to diplomatic recognition of the PRC was that such sales would gradually slow down. Instead there was an acceleration.

[14]To some extent, this policy may be "tactical" in the sense that as time is on the side of China, it is better to postpone any confrontation as long as possible. Naturally, the same reason may convince the US side to start it as soon as possible, yet at the same time avoiding (thanks to its hegemonic position in world media) being perceived as the aggressor.

increase its military role in the Pacific. However, this prediction would not be based on the methodology of recurrent events but rather on a short-term anthropomorphic argument. Would Yukio Hatoyama come back to power the propect would change completely. Moreover, contrary to what happened in 1904-1905, this time Japon will not be able (and would certainly be unwilling) to do the job alone. In this respect, it can be observed that the size and economic system of China makes its challenge more serious than any of the previous challenges listed in Table 2.

Is the US a declining power?

This question goes in the same direction as the "Who will win" question but it seems easier to answer because it is a more structural issue. It is not surprising that different authors give different answers for the question has several facets. Whether we talk about economy, finance, foreign relations, scientific leadership or military domination, the answer will not be the same. Just as illustrations consider the following facts.

- **Economic facet** The only reliable way to compare two economies is in terms of "Purchasing Power Parity" because otherwise the comparison depends on the exchange rate[15].

According to the World Bank, in 2017 China's GDP at Purchasing Power Parity was 23.3 trillion USD whereas the US GDP was only 19.4 trillion USD, that's a difference of 20.1%. Actually, the fact that China is already No 1 is well recognized by some lucid western publications; see for instance a Blomberg article published on 18 October 2017 and entitled:

> "Who has the world's No 1 economy? Not the US. By most measures, China has passed the US and is pulling away".

In other words, economically, with respect to China the US is certainly a declining power but so are also Japan and the European Union.

- **Foreign relations facet** Instead of embarking in a broad discussion, one can observe that in the Vietnam War the US had 5 allies, namely Australia, New Zealand, the Philippines, South Korea and Thailand whereas in the war in Afghanistan (2001–Dec 2014) the US has been leading a coalition of 44 countries. For the occupation of Iraq in the wake of the invasion of 2003 the US had 36 Allies.

The ways and means of the confrontation can be predicted

What can be predicted are the ways and means of the confrontation for these features do not change much in the course of time. They were essentially the same in the Roman Empire, during the Cold War and now.

[15]Another way to make a comparison that is fairly independent of exchange rates is through foreign trade (at least if it is mostly carried out in dollars). In 2009, the foreign trade of China surpassed the foreign trade of the US.

A non exhaustive list would include the following facets.

(W_1) Targeting of people (e.g. scientists) suspected of informing the opposite side.

(W_2) Economic, industrial and financial warfare.

(W_3) Effect of confrontation on separatism.

(W_4) Information warfare and public relations campaigns

(W_5) Containment policy.

(W_6) Arms race

In the following sections we describe the first three items; the last three will be left for a closer study in a subsequent paper.

For each of the issues in the previous list we are on fairly solid ground because we can rely on a series of previous cases; for instance, several cases of industrial warfare are listed in Table 3.

Events indicative of a brewing confrontation

Within five or ten years it will become easy to judge if the Chinese challenge has indeed led to a serious confrontation. If we do not wish to wait several years, we can try to detect in recent events indications of a brewing confrontation.

Targeting of scientists seen as security risks

The Cold War precedent: targeting socialists and communists
During the first Cold War US scientists who were Communists or had some sympathy for socialist ideas were kept under close surveillance by the FBI and in several cases were blacklisted. This was true even for prominent scientists like David Bohm, Albert Einstein or Robert Oppenheimer. Unlike Einstein, Bohm and Oppenheimer were both born in the US. Several other colleagues of Oppenheimer at Berkeley were blacklisted, e.g. Ross Lomanitz, Philip Morrison, Steve Nelson, Frank Oppenheimer (Robert's younger brother), his wife Jackie Quann and Joseph Weinberg.

It should be noted that none of these physicists was accused of spying for the Soviet Union; it was only assumed that because of their *opinions* they could become security risks.

The case of Bohm can serve as an illustration. A close collaborator of Einstein at Princeton, he was called to testify by the "House Un-American Activities Committee" (HUAC) in May 1949[16]. Following the non-compliance attitude recommended

[16]Contrary to senator McCarthy himself, the HUAC was active over several decades (see Roehner 2007, p. 147). However, as it was not a tribunal it did not offer the usual garantees given to defendants: most often they had no counsel and it was not uncommon that false witnesses were used against them (see Schrecker 1986, Rader 1979). The HUAC was only one of several similar committees, e.g. one can mention the Rapp-Coudert, Canwell, Tydings, Jenner, Nixon

by Einstein himself, he refused to testify. As a result, he was arrested in early 1950, indicted for contempt of Congress, nevertheless freed on bail and eventually acquitted by a federal district court in May 1951. However, in the meantime Princeton University had suspended him and refused to reinstate him. He found a position at the university of Sao Paulo, but once in Brazil he had to give up his US passport which prevented him from traveling. In 1955 he was allowed to move to Israel where he spent two years before eventually joining Bristol University in the UK.

While Bohm did not collaborate with the HUAC, many others who were called to testify did. For instance, in his testimony[17] of 25 February 1953, Mr. Robert Davis, a teacher from Massachusetts, gave at least 15 names of persons who were members of the Communist Party in 1938–1939. That is why, just like an epidemic, this hysteria spread wildly (in the sense that the geometric series 15^n increases very fast). Incidentally, in those years the Communist party was supporting the "New Deal" policy of President Roosevelt.

Targeting scientists who have contacts in China

Coming back to the case of China, a law was passed by the US Congress in April 2011 which reads as follows (simplified form).

> None of the funds made available by this Act may be used for the "National Aeronautics and Space Administration" (NASA) or the "Office of Science and Technology Policy" (OSTP) to develop a bilateral policy or contract of any kind with China.

In other words through this law scientists working in the US, whether US citizens or not and whether or not employed by NASA, were barred from any NASA or OSTP funding whenever they had contacts with Chinese research institutions.

In fact, the collaboration interdiction did not start in 2011 but already in 1998. Following an investigation by a congressional commission led by Christopher Cox, there was an embargo on US-Chinese cooperation in space. However, the target of the law of 2011 was much broader than a prohibition of official NASA-China cooperation. It barred cooperation not only with space science researchers but with all Chinese researchers whatever their fields.

The bill of 2011 was sponsored by Representative Frank Wolf who was well-known for his anti-Chinese positions and speeches. However it would be a mistake to think that it was a personal matter. When he retired in 2015 he was replaced in the "Science Subcommittee" by John Culberson who, like his predecessor, vowed to uphold the embargo on space cooperation with China. Actually, in the shadow of Wolf and Culberson one would expect the Pentagon to be the key factor. The fact that the US

committees or the "Senate Internal Security Subcommittee" (SISS).

[17] The proceedings of the public hearings (most hearings were in fact *not* public) are available on line.

has an ongoing collaboration with Russia but refuses to cooperate with China clearly suggests that it is China that is now seen as *the* strategic opponent.

Espionage charges

The Cold War precedent

Arrests on the charge of spying for the Soviet Union started right after the end of the war. The defection of Igor Gouzenko on 6 September 1945 led to the arrests of 39 persons in the US and Canada on the charge of espionage for the Soviet Union. Numerous others were to follow in subsequent years. These arrests targeted employees and civil servants of the State Department but also many scientists.

Chinese American scientists arrested on espionage charges

On 21 December 2018 US Deputy Attorney General Rod Rosenstein declared that between 2012 and 2018 more than 90% of the Department of Justice cases concerning economic espionage involved China (Taipei Times 22 December 2018).

On Wikipedia there is an article entitled “List of Chinese spy cases in the United States” which describes the cases of 32 scientists, mostly of Chinese origin, who were arrested on espionage charges. Except for a few older ones, most of the cases occurred in the period 2000-2018. The list is not complete; as examples of missing cases one can mention: Gwo Bao Min, Xiaodong Meng, Billy Yui Mak, Fuk Heung Li, Xiaoqing Zheng.

The most striking fact is that in about one third of the cases the charges were dropped either completely or drastically narrowed in a way tantamount to recognizing that the accusation had collapsed[18]. It is of interest to understand the reason.

Most of the persons arrested were Chinese Americans (either born in the US or naturalized US citizens) working in the US and maintaining contacts in China. These contacts may have been just for the purpose of scientific cooperation or in the intention of creating Chinese start-ups. In both cases, this kind of activity involved moving scientific information from the US to China. If this information was deemed proprietary information without even being officially classified it was enough to motivate an arrest.

In most cases where the accusation had to be dropped it was because the defense side could convince the prosecution (represented at state level by a district attorney or a US attorney at federal level) that the information that was passed on was in fact freely available in scientific journals. Needless to say, for scientific or technical matters such distinctions can be difficult to make.

[18] The following persons can be mentioned in this respect (more details about them can be obtained through Internet keyword searches.): Xiafen Chen, Michael Haehnel, Bo Jiang, Peter Lee, Wen Ho Lee, Katrina Leung, Tai Mak, Xiaoxing Xi, Hua Jun Zhao.

Although we know a number of cases in which the accusation was dropped there may also be cases in which defenders were wrongly sentenced to terms of several years. This can be understood by considering the case of Los Alamos scientist Wen Ho Lee. The government brought against him 59 charges, including 39 that each carried a life sentence. Fortunately, soon after his arrest a prominent law firm who had agreed to represent him sprang into action. In addition, led by Lee's daughter, a network of people and organizations started to mobilize public opinion on his behalf and contributed to cover the cost of Lee's lawyers[19].

The question of what would have happened without such a support is a matter of speculation, but it is clear that not all scientists who were indicted benefited from such an effective support. In addition it can be observed that in such affairs the political climate plays a role; in 1999 when Lee was arrested US-China relations were certainly more friendly than 20 years later.

Cluster of industrial warfare cases

In 2018 the Chinese telecom giant Huawei was targeted by several rules issued by the US government. At first sight this may not seem of great significance regarding a looming confrontation for indeed in the past such methods have also been used against foreign companies belonging to US allies. However, the Huawei case was quite different from the previous ones. To see this point more clearly let us again use the analytical methodology employed for hegemony challenges.

This time the mechanism can be defined as follows.

> *Industrial warfare* *How to use US federal rules to limit the penetration of foreign companies into the US market.*

A set of such cases is displayed in Table 3.
The cases 1-6 show that there is always a combination of three elements. (i) Technical reasons which at first sight seem reasonable. (ii) An amplification of this technical factors beyond what is reasonable. (iii) An intervention of the US government. The weighing and timing of these elements may change but they are always present in one form or another.

The Huawei cases are different from the others in several respects.

(1) It is no longer a technical reason that is given but instead a national security reason.

(2) The enacted rules no longer concern a specific product but instead *all* Huawei products. In other words it is the company itself which is targeted.

(3) The industrial warfare against Huawei is not limited to the US but instead is

[19] In his book (Lee 2002) Lee says that the cost was of the order of one million dollars. He thanks the following organizations which supported him: (i) "Asian Law Caucus", (ii) "Chinese for Affirmative Action", (iii) "Organization of Asian Americans".

Table 3: Cases in which foreign competitors were targeted on technical grounds

	Year	Product	Country	Company or brand
1	1973	Supersonic airliner (Mach 2)	France-UK	Concorde
2	1982	Car	Germany	Audi/Volkswagen
3	1990	Mineral water	France	Perrier
4	2010	Car	Japan	Toyota
5	2015	Car	Germany	Volkswagen
6	2016	Cell phone	South Korea	Samsung
7	2018 (27 Mar.)	Cell phone	China	Huawei
8	2018 (15 Nov.)	5th generation smartphones	China	Huawei
9	2018 (24 Nov.)	Telecom equipment	China	Huawei

Notes:
Audi is the luxury brand of Volkswagen.

- On 27 March 2018 it became known that a planned partnership between Huawei and the US telecom company ATT will not happen due to political pressure. Verizon had similarly dropped plans to sell Huawei smartphones. Thus Huawei phones could be sold only through independent retailers which represents a very small part of the US market.
- On 15 November 2018 it became known that the US and Australia have excluded Huawei from the 5th generation auction for mobile phones and that the British and German governments were being pressured to do the same.
- On 24 November 2018 it became known that the US government was trying to persuade key allies to avoid using Huawei telecom equipment. This concerned particularly the countries hosting US military bases.

In subsequent weeks, there were news in a number of countries of arguments between governments and intelligence agencies. The latter claimed that Huawei was definitely a threat to national security whereas the governments observed that previous investigations had not found any problem. In order to understand such disagreements one should recall that since the end of World War II, in all countries which are US allies, the intelligence agencies have a close but highly asymmetrical relationship with US intelligence agencies. In contrast, the governments were trying to keep open economic opportunities.

- Most of the cases listed in the table gave rise to criminal investigations due to accidents allegedly resulting from technical defects.
- We did not include in this table the sanctions against the Chinese telecom company ZTE, nor the arrest in early December 2018 of Huawei's chief financial officer because these events were not based on technical reasons like others in this table, but on political reasons, namely trading with Iran (although later on the charges were changed in order to make the US extradition request more acceptable by Canada). We neither included cases of companies submitted to increased duties as the result of a trade war.

Sources:
1: NYT (11 Jan 1978); 3: NYT (10 Feb 1990); 7: https://www.cnet.com; 8: "Taipei Times" (15 Nov 2018); 9: "Taipei Times" (24 Nov 2018).

extended to all US allies. Worldwide there are 77 countries which host US bases.

(4) From March to November 2018 there is an intensification of the offensive.

It seems that Huawei must be eliminated because its very existence and success is an intolerable challenge to US technological hegemony (just as was the Concorde some decades ago). In short, the anti-Huawei campaign can be seen as a first step in a coming confrontation with China.

Outcry in the US against Confucius Institutes

When the Confucius Institutes were set up in 2002, their main purpose was to teach the Chinese language. In this sense they were similar to the "Goethe Institutes" for learning German or the "Alliance Française" centers for learning French. However, the Confucius Institutes were a more ambitious project in two respects. (i) Each foreign institute is located on the campus of an American University. This contrasts with the German and French institutes which have their own buildings off campus. (ii) Each American university which hosts a Confucius Institute has a partnership with a Chinese University.

To establish partnerships with foreign universities is something fairly common in many countries worldwide. However, the Confucius Institutes mixes two fairly different traditions: (i) The Goethe-Alliance Française tradition through which German or French culture is promoted abroad and funded by the respective governments. (ii) International partnerships in higher education which is supposed to be funded by the respective universities. When such partnerships are established with state universities (as are the majority of German or French universities) they are of course also indirectly funded by the state but in a less visible way.

In the present trade war climate one can hardly be surprised by manifestations of hostility directed at Confucius Institutes. On the website "The Hill" (which reports news from the US Congress) one can read an article of 22 February 2018 which has the following title: "Get China's pernicious Confucius Institutes out of US colleges" and which ends with the following sentence: "Confucius Institutes are an affront to intellectual freedom, national security, and American interests. It is time for them to close, and it is time for the US to act."
For the time being (December 2018), only four US universities in a total of about one hundred hosting Confucius Institutes have followed this advice.

Effects of China-US antagonism in South East Asia

During the Cold War there was a power struggle in many countries between leftist parties often suspected of sympathy for the Soviet Union and conservative parties supported by the US. Leaders considered too friendly to the Soviet Union were usually removed through a coup led by the army. Examples are Chile in 1973, Thailand in 1976 or Pakistan in 1977. One would not be surprised to see a similar effect as a result of the China-US power struggle. This prediction seems indeed confirmed by current events in several countries of South-East Asia. However it would take too long to analyze these cases here. One must realize that in each country the antagonism between China and the US will materialize in a different form determined by domestic factors. This makes it difficult to decode local events but at the same time knowledge of the China-US antagonism gives a useful interpretation key.

Effects of China-US antagonism in Taiwan, Tibet and Xinjiang

Core interests targeting as a thermometer of China-US antagonism

Taiwan, Tibet and Xinjiang are usually referred to by the Chinese Ministry of Foreign Affairs as part of China's "core interests". Therefore, the way they are targeted by the US State Department reflects fairly well the condition of China-US relations. For instance between 1980 and 1990, the period of strategic partnership, there was not a single meeting between a US president and the Dalai Lama[20].

The case of Taiwan

Taiwan-US relations reflect China-US antagonism in a much "cleaner" way (that is to say with less noise due to local factors) than US relations with neighboring countries.

When one compares the so-called "Six Assurances" given to Taiwan in 1982 by President Reagan with the "Taiwan Security Enhancement Act" of 2000 (a bill never passed), the "Taiwan Security Act of 2017" (a bill in committee discussion since November 2017), the "Taiwan Travel Act" (signed into law in March 2018), one gets the feeling of an accelerated process through which the US encourages Taiwan's independence[21].

In our comments about Table 2 we observed that US military interventions were always[22] in response to an agression (e.g. Japanese attack of 1941, attack of 11 September 2001) or to come to the help of a small country under attack (e.g. South Korea, South Vietnam, Kuweit). Pushing China to an intervention in Taiwan and then coming to Taiwan's rescue might seem an appropriate way to start a limited conflict with China; but would it remain limited?

The case of Tibet

The "Reciprocal Access to Tibet Act" was passed by the US Congress on 11 December 2018. It requires the US Secretary of State, within 90 days of the bill being signed into law by the president, to identify Chinese officials responsible for excluding US citizens (particularly journalists) from Tibet and then ban them from entering the United States.

The case of Xinjiang

In recent months there have been US decisions targeting the Chinese officials in charge of the administration of Xinjiang.

Needless to say, all these actions are of a *political* nature. They show that the trade war which started in the Spring of 2018 is only one aspect of a global struggle.

[20]The source is a Wikipedia article which lists all trips of the Dalai Lama out of India. This article also reveals that, in the same decade 1980–1990, and in contrast with the US, there were four meetings of Pope John Paul II with the Dalai Lama.

[21] For instance in August 2018 Taiwan's president Tsai was allowed to give a public speech in the US and to visit NASA's Houston Space Center, a place closed to Chinese space scientists.

[22]The invasion of Iraq of 2003 seems to be the only exception.

Changes in number of Chinese graduate students in the US

So far most of our predictions were of the no/yes type, that is to say we predicted the occurrence of some new events and features. By putting together data given previously we can venture to predict that from 2017 onward the number of Chinese graduate students in the US will grow at an annual rate which will certainly remain under 3%. Actually, one would, with good likelihood, expect it to become negative. This prediction is based on the combination of two factors.

(1) In the past 10 years the proportion of Chinese students staying in the US after graduation has shrunk from 69% in 2007 to 21% in 2017. This limited the brain drain and in addition when returning to China, these students brought back the skills and knowledge acquired during their studies. In a climate of technological warfare such a feature will not be seen with favor by the US government.

(2) From 2007 to 2013 the number of graduate students in the US has increased at an annual rate of 20%, but from 2013 to 2017 the average increase rate fell to 3% (Mervis 2018). The inflection following 2013 was likely due to rising tuition costs combined with reduced Chinese scholarships.

As one does not expect these trends to be reversed, the increase rate should decline under 3%, perhaps even become negative. As a matter of fact, it is this last case which would best agree with the expectation of Table 2.

Financial implications of strained China-US relations

Currently (in 2018) there are three strong financial connections berween the PRC and the US.

(i) China owns a sustantial part (over one trillion dollars) of the foreign debt of the US federal government.

(ii) More than one hundred major Chinese companies are listed on the New York Stock Exchange.

(iii) In 2018 about 80% of the foreign trade of China was still in dollars.

It is difficult to say what will happen in case of an open confrontation for such a situation never happened before. If financial exchanges become frozen one may expect the following consequences.

(1) US interest payments on Treasury bonds are likely to be suspended. If one assumes an average interest rate of 5% this represents an annual amount of $50 billion, i.e. 0.40% of the Chinese GDP of 2017. In other words this effect is quite negligible.

(2) Chinese companies whose physical assets are located in China will probably interrupt dividends payments to American share holders. However, assets of Chinese companies located in the US or in allied countries may be taken over.

(3) Interruption of the flow of dollars to China and its allies will probably accelerate the dollar to renminbi substitution, at least in those countries.

Before coming to the conclusion we wish to attract the attention of the reader on the discussion of the question of replication which is given on Appendix C. This is a key-point in our approach for the obvious reason that replicability is the hallmark of science.

Conclusion

Main results

In this paper we have defined a methodology for the scientific analysis of recurrent events and we have used it in the investigation of the relations between China and the United States and also in the analysis of industrial warfare episodes. This methodology was already presented (although in a less formalized form) in a book published some 16 years ago (Roehner and Syme 2002). In the meanwhile its relevance and effectiveness were tested by using it in the investigation of various phenomena (see Roehner 2007).

Our main conclusion based on similar previous episodes (listed in Table 2) is that the very existence and development of China is to be perceived as a threat by the US and will not be tolerated. This means that the confrontation will become harsher; it will take many forms just as was the case during the Cold War. We listed and described some events which are early confirmations of this prediction.

Actually, Table 2 and the ensuing conclusions were already published in Di et al. (2017) and in Roehner (2017b), that is to say prior to the start of the trade war. At that time the bywords were still cooperation and win-win relations. It is quite possible that, in line with the wishes of big US corporations, there will be a truce in the trade war. However, this will not end the confrontation in other fields.

A comment about the rationale for hegemony

Some readers may observe that in this paper we did not explain why a country should wish to get and keep hegemony. It was by purpose and we had mainly three reasons in mind.

(1) The motivations may be quite diverse. At the end of World War II the Soviet Union wished to establish its hegemony over East European countries mainly for military reasons. As another example, in the 1950s France wished to maintain its hegemony in North Africa because there were over one million French settlers in Algeria and these people controlled a very effective lobbying network. Even inside the same country different groups may have specific motivations: the army will insist

on overseas bases, large corporations want low taxes both domestically and abroad, and so on.

(2) It seems fairly clear that through its hegemony in India Britain secured economic benefits. However, even in such an obvious case, it would be difficult to give a reliable estimate. In terms of annual GDP growth did they represent 0.1%, 0.5%, 2% or more? If we cannot estimate the benefits reliably is it worthwhile to describe them in detail. Moreover, as already said, for the Pentagon GDP growth may not the main concern.

(3) Finally, the last and probably most compelling reason results from our wish to follow the guiding lines of physics. Physicists focus on the "how?" question, and ignore completely "why?" questions. Why do rain drops fall? Neither newtonian mechanics nor General Relativity gives an answer but the two theories give very accurate predictions about how they fall, e.g. speed and acceleration. As a matter of fact, this focus on "how" is exactly what Durkheim says when he recommends to study social phenomena as "things" so as to avoid anthropomorphic interference.

In short, to see some countries willing to fight to defend their hegemonic position is enough for us. We do not wish to spend time on asking why they are doing that.

Future investigations

In this paper we have described the different facets of the confrontation rather briefly. In fact, for each facet one needs to identify, collect and compare a series of similar cases. We plan to do that in subsequent papers.

For instance, with respect to the question of separatism, one should compare several cases in which the US has supported separatist movements in foreign countries. This can be traced back to the early 20th century with the independence of Panama followed by Ireland, India, Indonesia, Ukraine, Croatia, Kosovo.

What means "sidelining one of the contenders"?

In the abstract we used the somewhat cryptic wording that "it is only through the sidelining of one of the contenders that the confrontation will end". Is it possible to be more specific?

First, one should observe, that strictly speaking, the cases in Table 2 do not really allow to do that for indeed their outomes are fairly different. In 1905 the setback suffered by Russia was mostly confined to the Far East. On the contrary, in 1945 Japan suffered a crushing defeat which had long-term implications up to present-day. Nonetheless, based on reasonable assumptions, is it possible to be somewhat more specific about the possible meanings of "sidelining?

For the United States the answer is fairly simple in the sense that having to share world hegemony with China would constitute a significant set-back.

What would be a significant setback for China is less clear for, contrary to the USSR, China does not yet have a superpower status that it is at risk of losing. However, the following outcomes may be seen as significant US "victories".

(1) To be able to maintain a technological edge in critical hightech sectors (such as the semiconductor industry) which are essential elements of the supply chain[23]. Although, as already mentioned, the 2017 PPP GDP (Purchasing Power Parity Gross Domestic Product of 2017) of China already surpassed the one of the US, this would imply a fateful enduring weakness.

(2) Through clever use of softpower, (a combination of financial threats and sanctions, use of captive media, public relations campaigns, military cooperation) to be able to isolate China particularly from its Asian neighbors (e.g. India, Vietnam, Malaysia, Indonesia) or from the Central Asian countries located on the silk road.

This is but a partial list of possible developments. It is by purpose that we mentioned neither military aspects nor possible domestic upheavals for in such areas predictions are notably hazardous.

What can be learned from the case of the USSR?

We already said that we will refrain from politics fiction and only rely on series of recurrent events. One former occurrence is the demise of the USSR. What can it tell us?

If one discards the occurrence of a war, what else can make the US accept a lower status? Although the case of the USSR is certainly not the best possible parallel let us nevertheless see what it suggests.

Around 1975 after its victory in the Vietnam war the USSR was a very successful superpower. In East Asia it had four vassal states, namely North Korea, Vietnam, Cambodia (at least after the occupation by Vietnam) and Afghanistan. With its allies it created the "Council for Mutual Economic Cooperation" (Comecon) which also included East European nations. However, the Comecon could not deliver much in terms of economic achievements despite the fact that the tripling of the price of oil was a huge bonanza for the USSR which is a major exporter.

Then, at the end of 1979 the USSR occupied Afghanistan which turned out to be a disaster, and in 1989, encouraged by the US, the East European countries and even Ukraine, Belarus and other Soviet Republics sided with the west. Among other things, they were of course expecting faster economic growth. Did that materialize?

One can imagine a similar scenario. Presently, the US has bases in 77 countries which are all more or less vassal states. What will happen if by establishing com-

[23] In contrast, high speed trains or nuclear power plants are not critical elements of the supply chain which is why the US accepted to lose its leadership in such sectors.

mercial links with China these countries are led to turn their back on the US?

We do not suggest that this scenario is likely. In fact, under present conditions it *seems* very unlikely. However, this is a purely anthropomorphic judgement, that is to say of the kind Emile Durkheim cautioned us to avoid.

Appendix A: Built up of US hegemony in the Pacific

As the annexation of Guam, Hawaii and the Philippines occurred only in 1898, one might think that there was no real US interest for the Pacific until the end of the 19th century. Thus, our argumentation will involve two steps.

- First, we explain that US naval and diplomatic activity in the Pacific and in East Asia has already started in the early and mid-19th century, that is to say decades earlier than is usually assumed.
- Secondly, we show that at the end of the 19th century the US was already far ahead of all its contenders in the Pacific in terms of national product and naval power.

Early inroads in the 19th century

There are several facts which suggest that US involvement in the Pacific started in the early-19th century and developed considerably in the first half of this century.

- Diplomatic relations between the US and Thailand were established as early as 1818; at that time Thailand was the only country of South East Asia which was not part of the British Empire. Then, in 1833 the two countries signed a "Treaty of Amity and Commerce".

In 1853 through the use of gunboat diplomacy, the United States obtained the opening of Japan to western trade.

- Despite the fact that annexation occurred only in 1898, from 1840 on the Hawaiian monarchy was virtually controlled by US missionaries who were so to say the Trojan Horse of the State Department. For instance, in 1874 following riots the United States landed troops to restore order.

The same can be said of Korea. Although a "Treaty of Peace, Amity, Commerce and Navigation" was only signed with Korea in 1882 the influence of US missionaries started several decades before.

- In 1856, the US Congress passed the "Guano Island Act" which authorized US citizens to take possession of unclaimed islands containing guano deposits, that is to say accumulated excrement of seabirds. Guano was used for making gunpowder and fertilizer. In the course of the following decades at least 46 islands came under US possession. They extended all the way from the coast of Peru and Chile to the Philippines and Indonesia; nine of them are still officially US Territories.

US hegemony around 1900

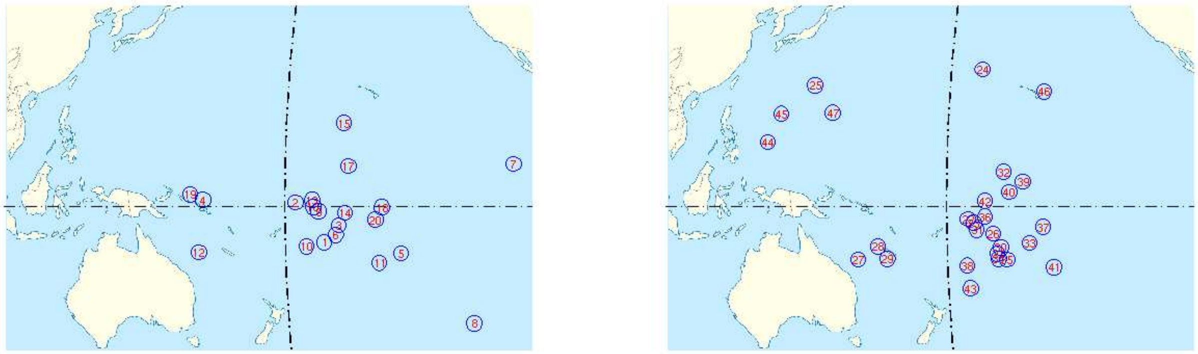

Fig. A1 American guano islands. The two pictures were separated for the sake of clarity. Altogether they show 46 islands. These islands were occupied by the United States following the “Guano Islands Act” of 1856. Although many were occupied only temporarily, others are still unincorporated US territories. The two broken lines show the equator and the division line between east (left) and west (right) of Greenwich. *Source: Wikipedia article entitled “List of Guano Island claims”*

The clearest indication of a watershed was of course the Spanish American War of 1898 through which Guam and the Philippine islands were annexed by the US. A display of the effectiveness of US naval forces was given in the Battle of Manilla Bay where the Spanish squadron was destroyed within a few hours with only 9 wounded on the American side.

What was the situation of the other contenders? At that time, the Chinese Empire was in chaos.

Was Japan a more serious competitor? It is true that in the Sino-Japanese War Japan won a resounding naval victory. However, one should remember that around 1900 most of the Japanese warships were still imported from Europe. At that time Japan had only a small industrial sector which weighed less than the agricultural sector and represented 24% of national income. In 1900 the US GDP was about 15 times the GDP of Japan. In 1940, the GDP ratio was still about 10 which means that in a war of long duration Japan was no match for the US. This was of course even more true in 1900[24].

The fact that the European powers (mainly Britain, France and Germany) did not wish to challenge US hegemony in the central Pacific is well shown by the fact that the annexation of Hawaii was hardly opposed.

[24]The detailed figures are as follows: US GNP=$19,000 million, Japanese income=2520 million yen, exchange rate: 1US$=2 yen. A comparison based on trade data leads to a ratio which is somewhat lower but one must take into account the fact that the larger a country, the smaller its GDP/trade ratio. The sources are: Hundred-year statistics of the Japanese Economy, Statistics Department of the Bank of Japan 1966, p.28 and Liesner (1989, p.74,102,270).

Appendix B: Threats to US interests in the Pacific

Russian expansion toward Mongolia, Manchuria and Korea

First of all, one should emphasize that the sale of Alaska to the US in 1867 does not signal a lack of interest for the Far East. Why? The main reason of the sale was because Russia realized it would be unable to defend Alaska in case of a conflict with Canada (still a British dominion) or the US. Secondly, Russian penetration in Alaska was limited to a few fur traders. Thirdly, Russian expansion was directed toward the southeast of the Pacific and for that purpose Alaska was completely out of the way.

In 1900 Outer Mongolia was still part of China but because of the weakness of the Qing Empire it was in fact controlled by Russia. From Outer Mongolia, Russian influence could spread to Inner Mongolia and from there to Tibet because of the strong cultural ties between the two countries. It was partly in order to prevent the spread of Russian influence that Britain invaded Afghanistan in 1978–1880[25] and Tibet in 1904–1905.

Some of the landmark steps in Russian expansion can be summarized as follows (detailed explanations can be found on Internet)

(1) 1860: Through the treaty of Peking, Russia got Vladivostok; yet it was *not* an ice-free port.

(2) 1875: Through the Treaty of Saint Petersburgh, Russia received the Sakhalin peninsula.

(3) 1896: Through the treaty Li-Lobanov, Russia was allowed occupation and administration of the Liaodong Peninsula including the ice-free port of Port Arthur (now Dalian).

(4) 1900: After the Boxer Rebellion Russia occupied the whole of Manchuria with a substantial force.

(5) 1901: The “North Manchuria Railway” was established by a Russian company.

Simultaneously, and in contrast to Alaska, there was a substantial inflow of Russian populations. Its legacy is still visible in the architecture of cities like Harbin and Dalian.

Russian expansion was all the more perceived as a threat because the US could do little to counter it. Manchuria may have been far away from Moscow but it was even more far away from Washington. At that time the US had no bases in South Korea or Japan. Thus, in order to stop Russian expansion the US administration had to convince Japan to confront Russia.

[25] It can be noted that in its attempt to fight off the invasion the Afghan leader asked for Russian help.

Japan pushed to wage war against Russia

In the cartoon of Fig. B1 Britain is shown as trying to interpose itself; it is indeed true that Britain was much less pushing to war than the US but nevertheless, after the war had started, Britain was on the side of Japan and welcomed Japan's victory[26] .

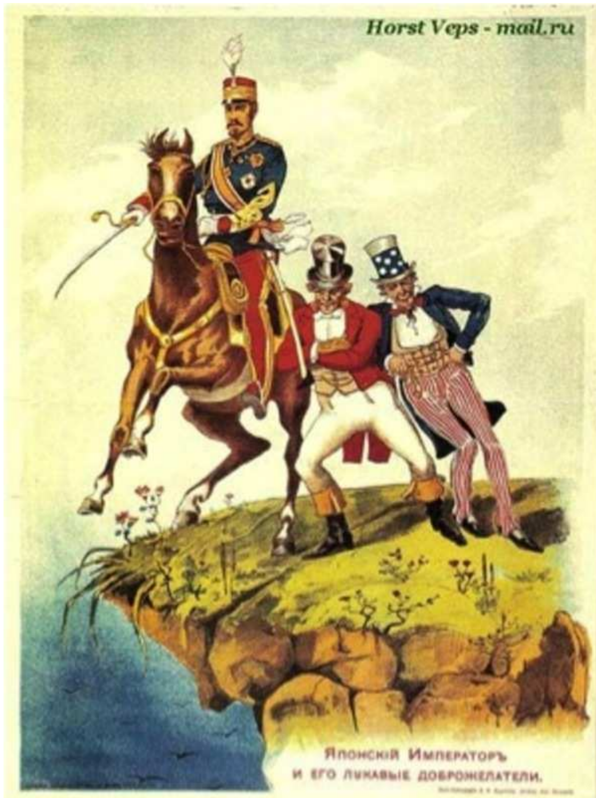

Fig. B1 Cartoon about the respective roles of Britain and the US in the conflict between Japan and Russia. In this Russian cartoon the USA is pushing the horse of the emperor of Japan over the brink while Britain (in red) is trying to interpose itself. At that time Britain had an alliance with France which itself was a close ally of Russia. In addition in 1902 England had signed a treaty with Japan. Thus, it was certainly not the wish of Britain to see Russia go to war against Japan. *Source: Internet*

From the articles published in the "New York Times" in the years 1895–1904 it is clear that this was indeed the policy of the State Department. Whereas, Britain tried to encourage discussions between Japan and Russia, the NYT seized every occasion, not matter how small, to announce that the war was imminent. This was very clear for the public opinion as shown by cartoons of the time such as the one shown in Fig.B1. In order to illustrate that the US played the role of a rablerouser here are a few excerpts of the "New York Times". Usually the NYT represents fairly well the positions of the State Department.

- The Japanese Army is full of Russian spies disguised as Japanese. (24 Dec 1897) [A rather surprising allegation.]
- Seventeen British warships back an ultimatum against Russian domination. Japan supports the British action. Her fleet of 30 vessels is awaiting the result of the protest against the dismissal [in Korea] of an English customs officer. (27 Dec 1897) [To see three major fleets go to war for the dismissal of a customs officer would be quite surprising. Indeed, nothing happened.]

[26] In contrast France was a close ally of Russia and tried to help it as far as possible for instance by permitting a refueling stop of the Russian Baltic Fleet in a port of French Indochina.

- Japan feels warlike. Captain Sakuzzi, who is in San Francisco, says Russia is treating his country shamfully. (1 Jan 1898) [Should one take great account of the declaration of a captain?]
- The Korea question is settled. England, Japan and Russia have arrived at an agreement. (10 Jan 1898)
- Japan is prepared for war. (22 Jan 1898)
- There is a war feeling in Japan. (6 April 1898)

[Coming 6 years before the war and just weeks after a partial agreement was reached such titles show that, contrary to Britain, the US did not welcome a peace agreement.]

More excerpts of that kind can be found in Roehner (2017, chapter 3).

These excerpts also show that it was Korea which was at stake. Japanese goals began to include Manchuria only after 1917 when the grip of Russia over this region was weakened as a result of the revolution. It is true that in the war of 1905 there was a battle for Mukden (present day Shenyan) a city which located in South Manchuria but in fact near the border with Korea; its control was necessary for the purpose of securing the occupation of Korea.

The United States welcomes Japan's victory

If, as we argued, the US pushed Japan to confront Russia one expects of course that it was happy with Japan's victory. This is indeed confirmed by NYT excerpts in the days following the great Japanese naval victory of Tsushima (27-28 May 1905)

Togo and the men who helped him win his Trafalgar of the Far East shared with the heroes who fought and died for this country in both eulogy and applause at the memorial exercises held in Carnegie Hall last night. (31 May, 1905)

Japan has now free hand on land and can drive Russia from the Pacific coast of Asia (3 June, 1905)

The Russian cruisers must sail or be interned. By denying the request of [Russian] Admiral Enquist for an opportunity to repair his fugitive Russian cruisers [including injured sailors] at Manila President Roosevelt laid down a doctrine that is new. (6 June, 1905)

The last excerpt regarding Russian cruisers which found refuge in the Philippines is particularly harsh and shows very little sympathy for Russia in Washington.

Indonesia and its powerful Communist party

The second case that requires some explanations is Indonesia.
Before its eradication in 1965 after a military coup, the Communist Party of Indonesia (PKI in Indonesian) was the largest non-ruling (that is to say outside the Soviet Union and China) Communist party in the world. It had been founded in 1915 by Dutch socialists (Indonesia was at that time a Dutch colony). Although banned by the Dutch authorities, it was able to survive underground until when Indonesia became independent around 1947. Because of the role it had played in the fight for independence and against the Japanese, duly authorized by President Sukarno its membership grew quickly to the point of reaching some 3 millions in 1964. In February 1957 there was a first coup attempt by the pro-US fraction of the military which failed. A

second coup was staged in October 1965 which started (as later on in Chile) with the assassinations of all pro-Sukarno top generals. It was followed by a terrible repression which, according to most sources, claimed of the order of 500,000 deaths. As a result, the PKI was eradicated and President Sukarno was replaced by President Suharto.

Why were Sukarno and the PKI perceived as a major threat by the United States? Firstly, there is a preliminary question. Was the PKI close to the Soviet Union or to China? Despite the existence in Indonesia of a large minority of ethnic Chinese, the PKI had closer links with Moscow. Secondly, the case of Indonesia should not be considered in isolation. It was part of an expansion of Soviet influence not only in Asia but also in the Middle East with Baathist (i.e. socialist) coups in Iraq and Syria.

Chile, 1970-1973

The case of Chile is fairly similar in the sense that a leftist government was toppled over through a military coup in September 1973. This case should also be seen in the broader context of the USSR-US confrontation. The Paris Peace Accords of 27 January 1973 had officially ended direct US involvement in the Vietnam War. They created a ceasefire between North Vietnam and South Vietnam and allowed 200,000 Communist troops to remain in the south. Thus, they were in fact an acknowledgment of US defeat as indeed confirmed by the fall of Saigon in April 1975. In a position of weakness the US would not tolerate any other challenge. Apart from the military coup in Chile, there were also similar ones in Pakistan and Thailand.

Why was Cuba tolerated? In fact, it was not

Finally, a word is required to explain the case of Cuba. Although Cuba is in the Caribbean Sea not in the Pacific, this is certainly also an area that the Americans wish to see as an American lake. Why, then, did they tolerate the leftist regime at their doorstep?

Firstly, one should observe that in fact they did *not* tolerate it in the sense that the failed "Bay of Pigs" landing of April 1961 and the 5-year rebellion (1959–1963) in the Escambray Mountains against the Castro government were clear attempts to remove it. However, the real turning point was the missile crisis of October 1962 for the agreement which settled the crisis implied that together with Soviet missiles in Cuba, US missiles in Turkey would also be removed and that no other invasion attempt would be made in Cuba.

In the decades following the missile crisis the United States continued its attempts to remove the Castro government. As open action was barred, it used some of the other standard and less visible means: (i) Containment policy by having Cuba excluded from the "Organization of American Countries"; the exclusion was only lifted in

2009. (ii) Economic and financial embargo[27]; however several US allies did not enforce the embargo. (iii) Support to organizations Cuban defectors in Florida (e.g. the “Cuban American National Foundation”) and to domestic opponents in Cuba. (iv) International public relations campaigns directed against Cuba.

In short, it is only thanks to Soviet support and cracks in the anti-Cuban coalition that the socialist regime was narrowly able to survive. In 2015-2016 there was a short-lived normalization in which Pope Francis played a key-role but a

Appendix C. Replication in history versus physics

The question of replication has two facets.

- Firstly, we want to specify under what conditions historical events can be separated from their context.
- As the questions of uniqueness and replication are a key issue we want to explain why from physics to history there is a continuity rather than a radical change.

This discussion could have been presented in the introduction but it may better be understood once a case-study has been presented.

Can one extract events from their historical context?

At first sight the Russo-Japanese War and the Vietnam war seem to have very little in common. As a matter of fact, the time intervals as well as the countries involved are not at all the same. However, we do not intend to compare them; the only thing in which we are interested is the fact that they took place. Similarly, from an anthropomorphic perspective an apple and the Moon seem completely different objects; what they have in common is that they are both attracted by the Earth according to the law of gravitation.

The advice to refrain from studying social phenomena from an anthropomorphic perspective was not given by an econophysicist but rather, more than one century ago, by Emile Durkheim, one of the founding fathers of sociology (Durkheim 1894). In his book about the methodology of sociology he devotes many pages to this question and insists on the fact that social effects should be studied “like things” (in the English translation), “comme des choses” in the original French text. Clearly such “things” can be extracted from their historical context for the purpose of comparison. We wished to emphasize this point because it is often a source of misunderstandings with historians.

Replication in physics and in history

Semi-repetition in history

[27] Every year since 1991 the US embargo is denounced by the General Assembly of the United Nations.

The fact that something which has happened several times is likely to happen again is a crucial step in our methodology but one must recognize that this statement must be given a fairly “elastic” meaning. What we mean is best explained by a few examples.

- If sunrise was at 6:00 three days ago, at 6:05 two days ago, at 6:10 yesterday and at 6:15 today is it not likely to occur at 6:20 tomorrow? This may seem a trivial example, but if we look at it more closely it is less obvious than it could seem. Firstly, one must assume that the person remains at the same location. If he or she moves eastward or westward the prediction will not hold. Moreover, even if the person does not move, the prediction is only approximately correct.
- A more realistic illustration is provided by influenza outbreaks. According to statistics for New York City covering a period of 31 years from 1889 to 1919, the monthly number of deaths due to influenza displayed a peak usually in December-January. This regularity allows fairly accurate forecasts, at least in “normal” years. However, it is well-known that for reasons not yet well understood, in 1918 the outbreak took place in early November and its magnitude was some 8 times higher than in normal years. This example shows that the predictions based on recurrent events are probabilistic rather than deterministic. This is related to the fact that there are parameters which are either not well known or not well controlled. This leads us to replace the notion of recurrent events by the broader notion of *paronymous events*. It is explained below.
- Everybody knows what are homonyms; they are words which have the same spelling but different meanings; an example is left (past tense of the verb “to leave”) and left (opposite of right). The notion of paronyms is less well known but is merely a generalization: paronymous words are like homonyms whose spellings are allowed to be slightly different; examples are: collision-collusion, differ-defer, continuous-contiguous. The main purpose of this change in vocabulary is to acknowledge two things (i) That historical events do not, strictly speaking, repeat themselves. (ii) That we are more interested in the form of the events than in their meaning.

Paronymous repetition is a weak form of replicability. Does this introduce a drastic difference with what we see in physics? Actually, in the next subsection we show that even in physics, strictly speaking, it is impossible to repeat an experiment.

Semi-replication in physics

The main objection of historians to the comparative methodology is to say that historical events are unique and therefore cannot be compared. Here we show that the same objection can be made to experiments in physics. To prove this point we do not need to consider a sophisticated experiment in quantum physics. Instead, our argument is based on one of the simplest possible experiments in classical mechanics, namely the swing of a pendulum (Fig. 2).

High accuracy measurement of the period of a pendulum by two different teams

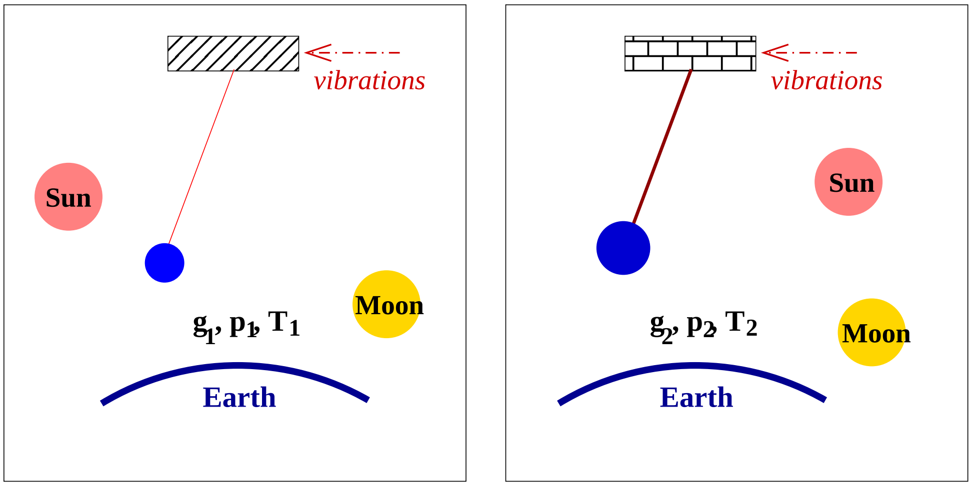

Fig. C1a,b High accuracy measurements of the periods of a pendulum. When a high accuracy is desired one must take into account many effects: amplitude of the angular deviation (the small angle approximation will no longer be sufficient), local gravity, air pressure and temperature, tidal effect due to the attraction of the Sun and Moon. As a result, the experiment becomes strictly speaking non reproducible in the sense that when performed on successive days it leads to different results. It is only when all such changing perturbations are well understood and can be corrected that successive measurements (done either by the same team or two different teams) become comparable. For over three centuries physicists have been working with patience and determination to get a full understanding of all such secondary effects. From Galileo (circa 1600) to Friedrich Bessel (circa 1840), to Thomas Mendenhall (circa 1920) the accuracy of the measurement was improved. For instance, in 1817 by using a new type of pendulum Henry Kater was able to determine the length of a seconds pendulum (i.e. a pendulum whose period is 2s) as equal to: $L = 994.137 \pm 0.003$mm. Such accurate measurements in turn led to several important discoveries for instance the measurement of the density of the earth.

The key-point is the connection between replicability and accuracy.

- If the period of the pendulum is to be measured with a low precision of one second, then even two fairly different experiments in terms of location (which influences the gravity g), diameter and elasticity of the wire, air pressure and temperature will give the same results, provided the two pendulums are (approximately) of same length.
- On the contrary, is the period to be measured with millisecond accuracy then all previous parameters must be controlled. Moreover, it is likely that due to differences in vibrations the results on week days will differ from those obtained during weekends.
- If nanosecond accuracy is required then one must take into account the tidal force due to the combined effects of the Sun and Moon. This makes the measurements fully time-dependent, in the sense that two observations done at 12:00 and 15:00 respectively will give different results.

In summary, when only low accuracy is demanded even fairly different historical episodes can be considered as acceptable realizations of the same core mechanism.

This is all the more true when the observations are of a qualitative nature[28].

Appendix D. A case-study book by political scientists

A remarkable book

In April 2018 a book[29] was published by Cornell University Press (MacDonald et al. 2018) which investigates the issue of power struggles between nations. It is written by two political scientists but whereas most of the papers or books on the question of China-US relations have a short-time perspective which hardly exceeds two decades, this one relies on a series of case-studies which goes back to 1870. A summary table (Table 1, p.22) which lists 16 cases ressembles our Table 2 in the sense that it lists both the challengers, the powers being challenged and the outcomes. At first sight, this seems a sound starting point and methodology.

Table 1 Great power responses to decline

Country year	*Depth of decline*	*Ordinal rank*	*Ordinal challenger*	*Strategic adjustment*
1879 Russia	0.36	3	Germany	low retrenchment
1873 France	0.90	3	Germany	low retrenchment-status quo
1926 United Kingdom	0.96	2	Germany	low retrenchment
1908 United Kingdom	1.41	2	Germany	medium-low retrenchment
1872 United Kingdom	1.46	1	United States	low retrenchment-status quo
1883 France	1.99	3	Germany	status quo
1930 United Kingdom	2.17	2	Soviet Union	medium-low retrenchment
1888 Russia	3.22	3	Germany	medium retrenchment
1935 United Kingdom	3.22	3	Germany	high retrenchment
1893 France	3.23	4	Russia	medium-low retrenchment
1931 Germany	3.24	2	Soviet Union	expansion
1925 France	4.00	4	Soviet Union	medium retrenchment
1903 Russia	4.22	3	Germany	medium-low retrenchment
1946 United Kingdom	5.54	2	Soviet Union	high retrenchment
1992 Japan	6.32	2	China	status quo
1987/88 Soviet Union	9.0/10.8	2/3	Japan/China	high retrenchment

Fig. D1 Cases of responses to national declines given in MacDonald et al. (2018). "Ordinal rank" means the rank of the country in terms of world leadership. In its spirit this table ressembles our Table 2 in the sense that it lists similar realizations of the same phenomenon. However, a crucial difference is that these cases are small incidents rather than major events as in Table 2. *Source: MacDonald et al.(2018, Table 1, p.22).*

Why, then, do the authors arrive to a conclusion which is the exact opposite of ours? Indeed, in their conclusion they say:

> "If our theory is correct, then the United States will respond to its impending decline by retrenching. Yet retrenchment will be mild and war very unlikely" (p.191).

A misguided comparative methodology

[28]A qualitative description can be seen as made in terms of "no-yes", i.e. $0 - 1$, which corresponds to error bars of the order of $1/0.5 = 200\%$.

[29]It has 275 pages, with 61 pages of notes and index; 100% of the references are sources in English.

In implementing their comparative program the authors neglect three key lessons that experimental physics tells us.

- The mechanism that one wishes to explore must be clearly defined. In the 16 cases listed in Table 1 there does not seem to be a common mechanism. In some cases a neighboring country tried to take advantage of the supposed decline of a country, in others it is the challenge itself which led to the decline. In other words, this is very different from the challenges to an hegemonic country listed in Table 2.
- When one wishes to study a new phenomenon (e.g. period of a pendulum or surface tension) one should design experiments which display this phenomenon with greatest possible clarity and strength. One should not try to observe it in cases where the effect is weak for in such cases it will be in competition with other effects which will make any conclusion uncertain.

Regrettably, this is what the authors are doing. In the langage of physics, instead of concentrating on first-order effects they mix these with second- and third-order effects. The cases considered in their Table 1 are not restricted to major strategic challenges but includes many situations of short-time regional challenges. For instance, in 1883 there is mention of Germany challenging France. However, in 1883 France did not have a hegemonic position in Europe. In 1908 there is another mention of Germany challenging the UK, but curiously the German challenge of the war of 1914 directed against both France and the UK does not appear in the table[30].

- The second problem is that the authors do not follow Emile Durkheim's advice to avoid anthropomorphism. Instead of relying on hard facts and let them speak by themselves, they depend on statements, opinions and motivations of political leaders. This adds further uncertainty for at any time one can find leaders advocating one course of action or its opposite.

In their conclusion chapter the authors rely mainly on declarations made by President Obama and members of his administration which suggest a policy of moderate retrenchment. They overlook completely the aggressive sanction policy of the Department of Justice or the restrictions to scientific exchanges with China (see above).

Anyway, the best test will be to see what the future will tell us. This book was published shortly before the beginning of the trade war[31]. In the meawhile there were also several pro-Taiwan bills passed by Congress. All this points to a direction which is at variance with the predictions of the authors. Of course, one should not rely on such short term events, let us see what will happen in the next five years.

Acknowledgments One of the authors (B.R.) would like to express his gratitude

[30] There are other cases which are difficult to understand. The United States is involved in only one of the 16 cases and this is not the Japanese challenge which led to the Pacific War, but a problem with the UK in 1872. Quite surprising!

[31] Let us recall that our Table 2 was first published in 2017.

to the colleagues who gave him the opportunity to give lectures or hold discussions in their respective departments, particularly to: Hideaki Aoyama (Kyoto University), Yuji Aruka (Chuo University), Xiaosong Chen (Beijing Normal University), Marco Cirelli (University of Paris-Sorbonne), Zengru Di (Beijing Normal University), Yoshi Fujiwara (Kobe-Riken), Marc Gingold (CEA), Beomjun Kim (Sungkyunkwan University), Ruiqi Li (Beijing University of Chemical Technology), Wei Pan (Peking University), An Zeng (Beijing Normal University). These lectures and discussions served as a testing ground for the ideas and cases developed in the present paper.

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