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China Versus USA: A Game-Theoretic Simulation Approach

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ABSTRACT

This paper combines one of the central questions of contemporary political economy, id Est the conflict between China and the USA, with one of the major methodological advances in modelling technique, id Est game theory. Of course, such a task goes far beyond the possibilities of a single research paper, it thus remains a modest sketch of a possible approach.

No formalization attempt is independent of the content it tries to model. Therefore, the first part of the paper provides a very short synopsis of the envisaged global conflict between the two superpowers. Surprisingly, one of the historical contributors to this topic, John von Neumann, also is the scientist, which brought the methodological revolution of game theory to its full blossoming. The second part of the paper discusses von Neumann's vision of game theory as a new formal language to describe human interaction - a somewhat different vision to the one that drove the mathematicians using his approach in the decades that followed. The third part of the paper presents a simple simulation exercise built on the ideas of the first two parts. The conclusion provides two lessons that can be learned from the paper, a methodological one and one concerning the mid-run development of the conflict between China and the USA.

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Stages of the Cold War

It is rather obvious that since the end of World War 2 a conflict between the USA on one side and Russia and China on the other side is going on. This conflict in general has been dubbed Cold War, though its different stages would suggest that such an overarching characterization is hiding more than it reveals. These stages can conveniently be labelled by places at the borderlines of the two conflict parties, which always brought the conflict closer to a Hot War.

The *first stage* started with the end of WW 2 and was characterized by conflicts along the so- called Iron Curtain that divided the Eastern and the Western part of Europe. Most notably the crisis in Hungary in 1957 and the one in Czechoslovakia in 1968 showed that the Soviet Union was ready to intervene with immediate military operations if its sphere of influence in Eastern

European states are challenged. At the other end of the Eurasian continent the USA tried to consolidate the bridgeheads in Korea (1950 to 1953) and Vietnam (1955 to 1975). In Korea the attempt was successful, but Vietnam failed – the resistance on the peninsula was too strong and the peace movement in the young US population added to that. In an attempted counter- strike the USSR tried to get a bridgehead in Cuba, but the thirteen days of Cuba crisis in 1962 proved to be only a very limited success. During the first stage the third fire source of the Cold War was already the Middle East. Since the Arab-Israeli War of 1948 the increasing importance of the area – for trade as well as for the crude oil fueling the booming car industry - lead to reappearing military conflict. It culminated in 1973 in the Yom Kippur War. In general, the second half of the seventies appeared to be a time of calming down of acute military Cold War conflicts. But they marked only a short watershed. On the one hand the worldwide youth rebellion of the late sixties and early seventies had forced some less aggressive political leaders into Western governments. On the other hand, the oil price shock following the Middle East conflicts was a first prove that a combined global energy policy- the cartel of the dominant seven sisters of the oil industry plus OPEC, the organization of oil producing countries – can have a severe impact on the power of Western capitalism. When in the early 80-ties charismatic conservatives - e.g., Thatcher, Reagan and Kohl – became new leaders of the Western hemisphere an era of long-run decline of left-leaning democratic forces started. It also marked beginning of the second stage of the Cold War.

This Second Stage was Mainly Characterized by Massive Build-Up of Military Power in the USA Neither the USSR nor China Could Match this Challenge (Compare Diagram 1).

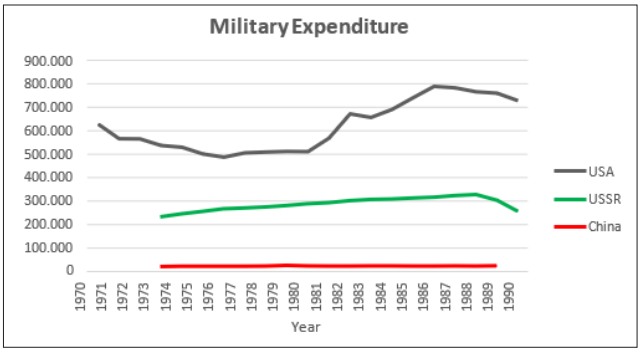


Diagram 1: Military Expenditure Stage 2
Sources: SIPRI, US Arms Control and Disarmament Agency

During this decade the USA gained a substantial military dominance and the internal difficulties of the governance of the USSR, basically of its still Stalinist political model, lead to the collapse of the Soviet Union. China's military development remained negligible. From a Western point of view stage 2 was the most successful period of the Cold War. In the following decade from 1990 to 2000 it seemed to be questionable if the conflict between the two Eurasian powers, China and the substantially weakened Russia, which had lost its satellite countries, was still existing. The superiority of capitalism had turned out, the way towards a US-lead global capitalist system appeared to be a kind of naturally necessary trajectory. But during this decade this view clearly was shown to be a misperception. It was true that China had already adapted to the rules of global capitalism since Teng Hsiao Ping had advanced to its leader after Mao's death. And it looked justifying a final victory of capitalism that the populations of Eastern European countries escaping from the Stalinist yoke welcomed the introduction of capitalist rules in their economies. But the fruits of the new capitalist system only became visible there rather slowly. In the mid-nineties neither in the West nor in the East Boris Yeltsin's final decision to surrender Russia's economy to just another country driven by capitalist market forces did get much attention. Nor was the stepwise inclusion of Eastern European countries in the military structure of the US-led NATO a big issue – except, of course, in the case of the war in Yugoslavia, where the USA intervened to establish the split of the country. This first full-fledged war on European soil after 1945 showed that even after 1990 the Cold War was not over. The military operation of the USA in Yugoslavia was not supported by the United Nations and the newly founded state Kosovo, which was founded with US support south of Serbia to restrict Serbia's influence in the region, is not acknowledged by several European countries till today. The whole action qualifies as a Cold War-strategy as it shows the same structure of divide-and-conquer strategy, which the USA applied in the Middle East as well as in other parts of the world. The fault lines along which the US fanned the flames of conflict by delivering weapons necessarily were different. They ranged from religious to ethnic-cultural diversities open for amplification via weapons and media power.

But despite the war in Yugoslavia, some commentators even had the vision that Russia itself would apply to become a NATO member and NATO would be nothing less than a kind of global military police. What had remained unnoticed was that beneath the waves of Western propaganda the military elite of the former Soviet Union was not defeated yet. A considerably large group of Russian oligarchs had taken the opportunity to emigrate with their wealth to the Western hemisphere, but some remained. And many of those who went westwards still kept contact with the military leadership in Russia. In fact, the former narrative of a Cold War between capitalism and communism was slowly turning into a global conflict between large conglomerates of Western and Eastern capitalistically organized military-industrial complexes. The point when stage 3 of the Cold War started can be taken as the year, 2000, when Wladimir Putin became president of Russia. His new, mainly nationalist agenda first was well received in the West. Nationalist – or continental – capitalist competition never had been a peaceful process, but more severe wars often had been kept at bay by a well-developed global institutional framework. Unfortunately, the new millennium waited with a sequence of disruptive *global crisis: a* ***global financial crash*** in 2008, a **migration crisis** in Europe in 2015, a global pandemic from 2020 to 2022, and a rapidly aggravating ***global environmental crisis*** from 2023 onwards! For details compare (Hanappi, 2020).

In the first years of the new millennium the Cold War was overshadowed by G.W. Bush's 'War on Terror', which followed the terrorist attack on the Twin Towers of the World Trade Center in New York in 2001. Crisis mode only surfaced when the USA were unsuccessful to convince the security council of the United Nations to support its attack on Iraq. The Iraq War ended in 2003 and implied that the focus of US foreign policy shifted towards the Middle East. The case of Afghanistan was an outstanding example: After the independence in 1973 the country came under the influence of the USSR till 1993. At that time the radical Islamic Taliban were militarily supported by the USA. But after the Twin Tower attack of 2001 the USA started a long-lasting war against the Taliban ending only in 2021. Since 2019 the USA slowly started to withdraw its troops from the area without letting the influence of Russia increase - a difficult task. Following an agreement with the Taliban the latter were able to install a radically Islamist regime again. NATO had lost its war.

A scarcely noticed development during stage 3 – at least in the first years – was the ascent of China to the most powerful economic power in the world.
The Growth of GDP In China Relative to The USA and Russia is Most Obvious If One Uses a Welfare Related Measurement, Like Purchasing Power Parity (compare diagram 2).

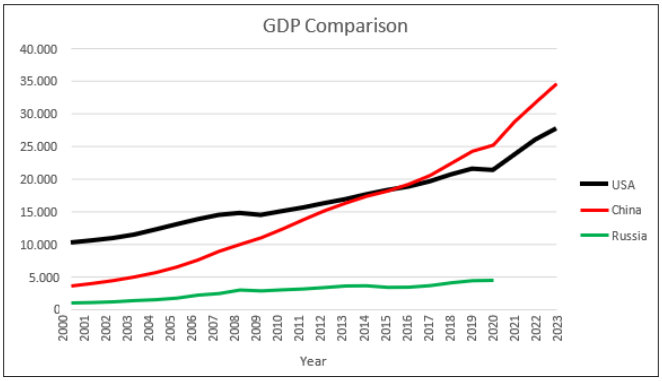


Diagram 2: GDP Comparison using PPP Source: OECD

If a different measure, like the simple average annual nominal exchange rate is used, then the dominance of the USA remains intact (compare diagram 3).

The major reason for the difference stems from the fact that exchange rates are heavily influenced by purely monetary developments, e. g., the role of the US Dollar as preferred 'world money' in global trade flows. As long as the US Dollar is accepted as the most important currency in world trade, the dominance of the USA in global political economy cannot be doubted.

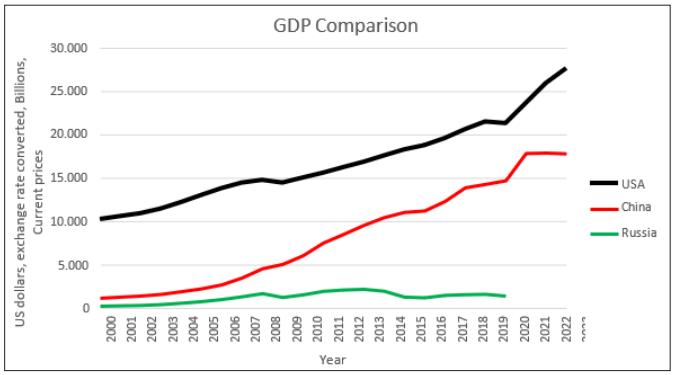


Diagram 3: GDP Comparison Using Nominal Exchange Rates Source: OECD

Nevertheless, the year 2014, when China started to lead in diagram 2, can correctly be taken as the start of start of stage 4 of the Cold War. Two other events point in this direction. As can be seen in diagram 4 the increase of economic importance of China was accompanied by a closer financial interweaving of China and the USA.

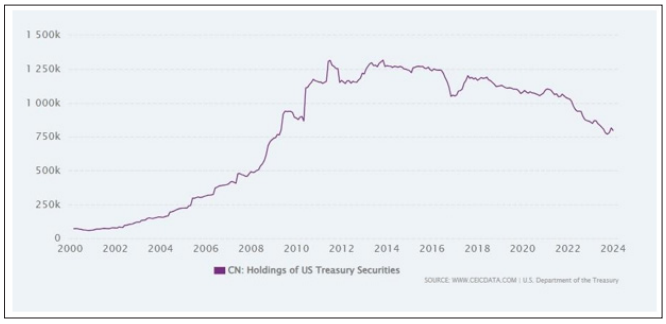


Diagram 4: Chinese Holdings of US Treasury Bods Source: U.S. Department of Treasury

As can be seen this year was the time when China became the most important creditor to the USA. One might argue that this is a strange role for a player in a Cold War conflict – and it indeed is. In the light of the difficult recovery from the Grand Financial Crisis of 2009 and the new president Barack Obama since 2009, this development is less surprising.

The second important political watershed in 2014 happened in Ukraine. There the elected president Yanukovych, having won the elections in February 2010, put forward the European Union–Ukraine Association Agreement. This agreement would have been a first step towards a tighter economic integration between Ukraine and the European Union. Despite the fact that Yanukovych was an ally of Putin, to propose such an economic rapprochement was interpreted by Russia as a dangerous political and military development. In recent years several former Russian satellite states in Eastern Europe had been economically included in the EU – and within a short time also had become members of NATO. Western propaganda already saw Ukraine and Belarus as the logical next domino pieces to fall into the hands of NATO. It will probably always remain unclear what happened in the following during the so-called Euromaidan of Ukraine, different interpretations of the events persist. What is clear is that a new pro-Western president took on power, the elected president Yanukovych had to flee, and Russia occupied the Crimean Peninsula to keep its access to the Black Sea open. At that point in time the advance of NATO from the earlier 'Iron Curtain' towards the Russia was stopped. Thus, in 2014 a new stage of the Cold War was reached.

It is this stage 4 of the Cold War, which is the content to which the following game theoretic framework is pointing to. It has been characterized so far by a 'Hot War' in Europe's East and along the South East border of Russia's sphere of influence – the Middle East. The borderlines will have to be drawn anew. For the USA a new constellation has become evident: From the West NATO has reached the Russian border and has consolidated it by additional troops. In the Middle East the US ally Israel is translating its latent military dominance – it is the only nuclear power in the region – into an actual military and political dominance. This development freezes all attempts of Russia to expand in this region via its ally Iran. Eventually, it will also close the door to the Mediterranean for Russia as soon as the new Syria joins the West. As soon as the frontiers to Russia are settled by preliminary peace treaties, which come into sight now, the Westside of the Cold War can move somewhat in the background.

The only drawback that any leading super power has to face is that its vassals at the borders of its empire are prone to become seduced to the so-called 'vassal effect': Since such political entities - like Turkey, Israel, Ukraine, the Taliban, the Kurds, Al-Qaeda and the like – often have been weaponized heavily with the empire's military armament, they tend to reach out for more regional power spreading rivalry with neighboring vassals (Turkey, Kurds, Israel) or even challenging the sovereignty of the super power's core (e.g. Israel). For Russia the parallel experience with the army of Prigozhin was solved rather drastically by an air crash of the latter; though possible upcoming vassal effects might be more difficult to solve.

This situation on the Western side of the Cold War in stage 4 has led to a marked shift of focus of the US on the potential conflict on its pacific side. The steady increase of China's economic power – relative to the USA but also relative to Russia – was perceived as dangerous. Sooner or later China would be able to translate its economic superiority into military superiority. As an immediate reaction the USA thus had to counteract this development by an opposite development, namely translating its currently existing military superiority into an unchallenged economic hegemony. As Diagram 5 Shows, The Military Strength of the USA is Impressive; Even More So if One Adds the Five Strongest NATO Members in Europe (Germany, France, United Kingdom, Italy, Spain).

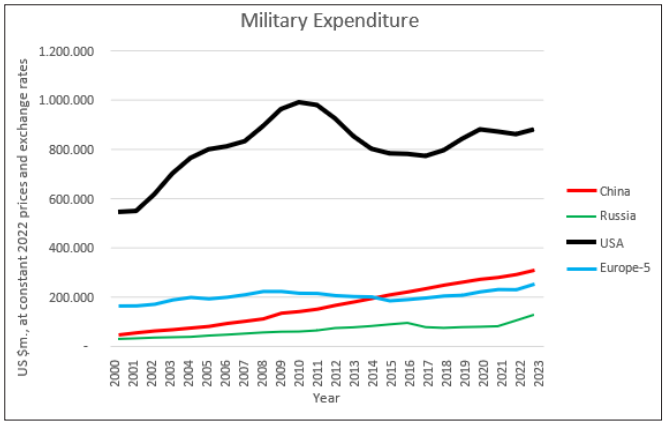


Diagram 5: Military Expenditure Stage 3 and 4 Sources: SIPRI

It remains to be reiterated that from the perspective of political economy the Cold War in stage 4 has changed one of its underlying characteristics: It is not a war between capitalism and communism anymore, however these two labels might be defined and however they serve as misused war propaganda tools by mass media. The Cold War now is a conflict between a large military industrial complex in the West and its opposing two large military industrial complexes in Eurasia, that is between the latest forms of authoritarian capitalism.

The special characteristics of this stage 4 of the Cold War suggest to model them as a game between the two players that today turned out to be its major opponents, China and the USA. The brief synopsis of their emergence during the Cold War has to serve as the background for such a modelling attempt. A final remark concerning the time frame of this simulation attempt is necessary. In a rather underdetermined situation of geopolitical dynamics like the current one the predictive force of any modelling attempt is

extremely restricted, covering say the time till 2030. It is confined to remain what I call founded speculation. Every more long-run oriented preview of the development of capitalism first has to look in the evolution of the global political economy during the last several hundred years. This is not the task of this paper – a modest attempt to do so is provided in a forthcoming companion paper (Hanappi, 2025).

The Essence of von Neumann's Game Theory

It is a strange coincidence that the same person that introduced the path-breaking methodological instrument to formalize the dynamics of social interactions (i.e., game theory) was at the same time one of the most influential consultants of president Truman in the times when the Cold War started: John von Neumann. As anecdotical evidence has it, von Neumann – being on the construction team of the atomic bomb – said that from a game-theoretic point of view 2-person games are more stable than 3-person games, so it would contribute to global stability if a third player would be eliminated in time: Drop the bomb in Japan to keep Asia out of the game between the USA and Russia, even if Hitler has already been defeated in Europe. Outstanding scientists evidently are not always humanist role models, and as we see today, they might easily err in predicting the distant future of social dynamics.

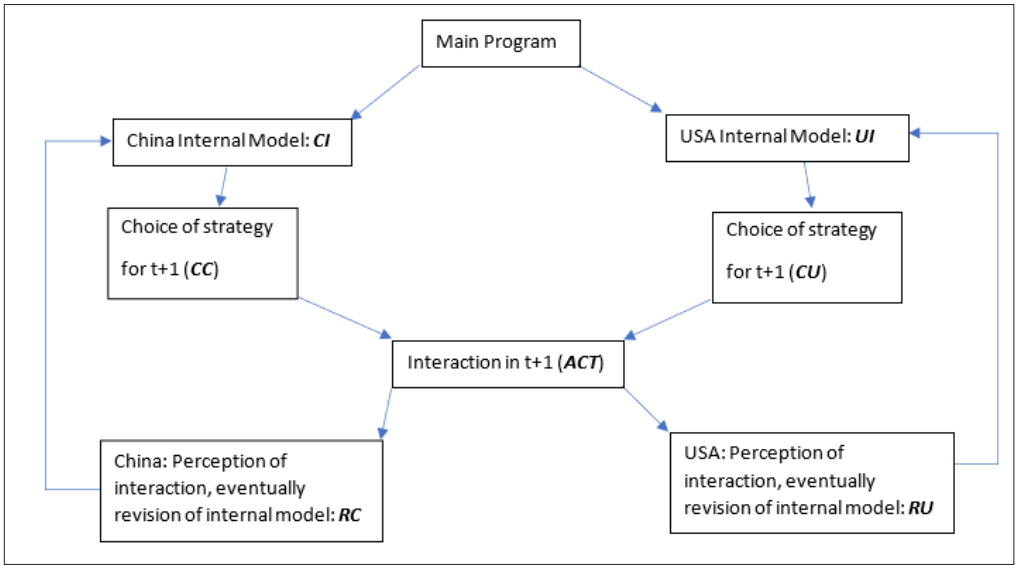
John von Neumann already looked back at an exciting intellectual evolution when he and Oskar Morgenstern published their seminal book on game theory in 1944 (Neumann and Morgenstern, 1944). Being born in 1903 as the son of a rich Jewish banker in Budapest he first studied chemistry and mathematics in Switzerland, then joined the greatest mathematician of the time, David Hilbert, in Göttingen and contributed the most sophisticated growth model of economic theory after he met his co-patriot the economist Nicholas Kaldor in Cambridge. Since he had turned away from research on the foundations of mathematics – his collaboration with Kurt Goedel played an important role for that decision – his attention was shifting towards the application of formalization techniques. From 1939 on onwards John von Neumann lived permanently in the USA and supported the war against NAZI Germany. One of the most difficult problems in naval warfare in WW2 was how to shoot on moving targets. To predict the trajectory of a target is easy as long as it only follows known laws of physics and starting values (position, speed and momentum) are given. But it still is time-consuming to calculate the position where a bullet could hit the target, it needed the assistance of a mathematical helper using logarithmic tables. A computing machine could simplify this job considerably. But in the case of a target that itself was steered by a human being, which was not only a physical object but was governed by an internal modelling of its own situation – being a conscious object – in this case the formalization of the dynamics needed a radically more sophisticated approach. This idea led John von Neumann directly to the invention of game theory!

In a dynamic setting to take a decision on how to set the variables that an entity controls needs an internal model. This model has to include quantitative assessments of all the essential properties of all elements of the process envisaged. But in the case of social interactions this is not enough. If by '*shooting at a moving target*' this target is itself a conscious model-building entity, then the shooter has to include the internal model of the target in its own model. But the problem is even more complicated, because the target also will have a shooter's model (not necessarily the correct one) in its own model – and this will have to be included in the original model of the shooter. Obviously, this argument leads to an infinite regress problem of building an infinite series of internal models including the opponent's model, call it the IR-problem. This IR-problem resembles the problem of programs with a recursive call-in informatics. Programmers know that in this case a jump condition is necessary to avoid getting stuck in an endless loop. A plausible assumption for social interaction characterized by an IR-problem is to assume that social entities have only limited information processing capacity, they have only a finite amount of storage and have only a limited amount of time till they have to make their decision. This opens up the possibility to include assumptions on the information processing capacities and the possibly different time constraints in an algorithmic simulation of the IR-problem. Mainstream economic theory, which discovered the IR-problem via putting emphasis on expectation modelling in the early 70-ties, solved it by the now infamous assumption of 'rational expectations. By assuming that all internal models of all involved social entities are the same, are correct models, and every social entity knows about this (!), the IR-problem evidently disappears. Unfortunately, the possibility to simulate learning processes, which play the central role in social interactions, disappears too. Tom Sargent, who was the mastermind behind the 'Rational Expectations Revolution' during the Reagan era, had an outstanding education in mathematics – at least for an economist – and saw that with this approach the standard result of neoclassical theory, namely stating that a pure general equilibrium market economy is the best of all worlds, can be saved.

A generation earlier, the probably greatest mathematician of the century, John von Neumann had recognized that the IR-problem was a centerpiece of the new language that a formalization of the social sciences needed. Instead of looking for a possible solution for the problems of conservative macroeconomic policy, John von Neumann followed the usual track of the natural sciences: Reduce the studied phenomenon to its simplest empirically observable setting to get the qualitative elements and their structure. John von Neumann studied board games like chess and card games like poker. In these games learning from the processing game was elementary, knowledge of a player could partly be hidden from other players, the goals and rules of the game were clear-cut and known – and who would win depended partly on chance and partly on the cognitive ability to use internal models. Von Neumann's game theory in its basic setting therefore owned much to his previous methodological approach, he could just apply mathematical knowledge to a new discipline - like in the case of his economic growth model. But the fine-tuning of inventing a new formal language proved to be cumbersome. It might be speculated that his efforts to construct 'symbol manipulating machines' computers, and to study the working of the brain of a human are attempts to overcome these difficulties by attacking them from new sides.

John von Neumann's game theory caused a lot of excitement when it was published in 1944. But after the first decade this attention faded away, no immediately applicable new formalization language had emerged. After all it seemed that it had only been the spleen of an outstanding mathematician that had ignited the enthusiasm of a handful of followers. Even his most apt followers, like John Nash whom Neumann himself considered to be more a mathematician than a game theorist, was only receiving his Nobel Prize in economics in 1994, fifty years after von Neumann's pivotal innovation. For decades game theory was considered to be only a very specialized topic within mathematics – after all John von Neumann was famous as a mathematician, not as the universal scientific mind that he really was. In the end it was the computer –

his invention – which brought game theory back into the attention of political economy. It was Jimmy Carter who invited game theorists to join him during the Camp David negotiations in the Middle East. It was political and economic practice which rediscovered the force of John von Neumann's game theory when it was supported by technologically advanced computers. And finally, there might be new future developments of an algorithmic language that are superior to what now is available as formalization of social dynamics.



A Simulation Framework

After the dense synopsis of the Cold War in part 1 and the short introduction to the breath-taking methodological innovation of John von Neumann in part 2 it can be nothing but disappointing to provide a simple application framework that combines these two streams of thought. It can only count as a modest attempt to reinforce some of the modelling premises – in particular the centrality of the IR-problem – and to show that interesting and practically applicable results can be achieved.

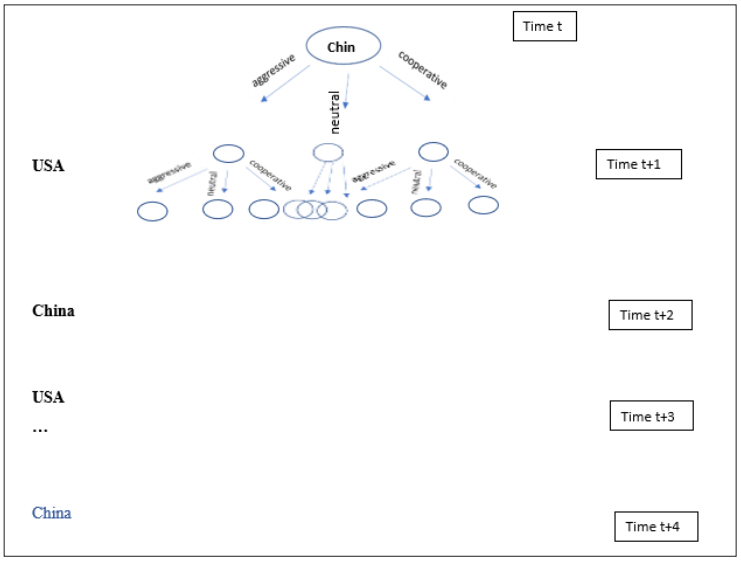
Algorithm China Versus USA

Flow Diagram 1

A typical simulation framework consists of a computer program, which needs certain quantitatively specified inputs and produces a set of outputs. In between inputs and outputs there is an algorithm, which transforms the former into the latter. To get an idea what inputs are needed and what outputs can be expected it is useful to start with the algorithm. Flow diagram 1 shows a rough sketch of the working of the proposed algorithm.

Note that it already contains the central idea of game theory, namely to take the IR-problem serious: The two opponents maintain separate internal models and no 'true' model is introduced. Instead of an equilibrium assumption learning is assumed to be implicit in the revision of the respective internal model. The names in bold letters and in italics are calls of sub-programs performing the described tasks. In these sub-programs most of the action occurs. Take sub-program **CI** as an example.

Internal Model of China, Sub-Program CI:



Flow Diagram 2

What is immediately visible is, is that the input variables for the algorithm have to be highly aggregated. For the problem at hand the actually possible actions of a player are incredibly many. Opposed to the rules of a board game that prescribe a manageable set of possible actions in this case only three categories are assumed: aggressive actions, neutral actions and cooperative actions. As part of China's internal model, the reaction of the USA at time 1 and time 3 is included. This assumption covers the IR-problem (modelling the models of the other player) by specifying that China only uses a time horizon of four future periods. Note that the anticipated model of the opponent in this scarce diagram only is displayed as the set of probabilities (the blue arrows) assigned to its possible reactions. In a more elaborate simulation these probabilities would have to be calculated as the outcomes of fully specified models used by the opponent – again with the respective use of time horizons.

Another important simplification concerns the assumption that a unique player exists on the two sides of the game. In the case of China its connection to Russia is not included in the model, since this would produce an extremely difficult 3-player model and seems to be justified by the actual recent developments (see part 1). Uniqueness is also assumed for the respective ruling class of the two opponents. This seems to be easier to swallow for China, where its internal hierarchical structure is rarely called into questions. But it is a stronger assumption for the USA, where the military industrial complex represented by the president sometimes has diverging goals concerning cooperation and aggression. With Donald Trump in the driver's seat again accompanied by big-tech bosses with diverging goals, this complication might call for additional fine-tuning in the respective sub-program.With this specification of time horizons sub-program CC then can select an optimal strategy at time t. To do so it has to consider all the possible sequences that can occur in the future. For each of the nodes passed by in a sequence a valuation – the assignment of a utility number – has to be determined. It also has been assumed that nodes lying further in the future have a lower weight than those which are closer, in other words a time preference rate is applied. The weighted sums of the utilities of a sequence then are compared and the best choice for time t+1 is taken.

After sub-programs ***UI*** and ***UC*** have done the analogue job for the US model, the sub-program ***ACT*** lets the two choices interact. In this program mayor external flags are set, which then in turn influence how the internal models of the two players look like in t+2. The most important element of the simulation – the learning due to the results of the previous round – follows in the two sub-programs ***RC*** and ***RU***. In them the internal models are adjusted and eventually revised. It is not only the observed action of the adversary which now is known, there also will have been changes in the social and environmental surrounding of the conflict – think of military, technological, environmental, demographic events – which are important during period t. From the point of view of political economy, it often plays a big role how the domestic population perceives the foreign policy of the ruling class. It is easy to implement, though much harder to argue, how such exogenous influences should enter the internal models of the deciding ruling class. Of course, singular specific events that happened in the past can be collected and listed, e.g.,

- the mutual communicative exchanges in the course of the pandemic,
- the visit of speaker of the US senate Nancy Pelosi in 2022 in Taiwan,
- the introduction of sanctions like special taxes or legal measures hurting foreign firms,
- the reactions on incidents of war ships in the South Chinese Sea, and the like.

The quality and impact of such events differ substantially and a wide field for the intuitive ability of model-builders is opening. But it should not be ignored that even in the course of this step of seemingly unbound simulation construction, important scientific knowledge can be gained.

To test what a simulation following these lines can provide the algorithm was coded (in the interpreter language APL) and run. As expected, it turned out that depending on the assumed set of scenario variables – stable properties of internal models and exogenous sequences of events – a whole variety of simulated pairs of behaviours could be produced. A produced simulation run would look like that
CA – CA – NA – NA – AN – CA – AN – NA – CA – CA – AN – NC – CC– CC.

As already mentioned, the length of one time slot was assumed to be 6 months. The simulation started in 2021 and used actual occurring data from 2021 till 2024 for the characterization of the first eight pairs. The first letter of each pair shows the action of China, the second letter the following corresponding action of the USA (C: cooperative, N: neutral, A: aggressive). The following four years 2025 to 2029 were pure forecasts, i.e., the external scenario events were exogenously assumed, internal model properties were kept stable. The meaning of this example run is clear: After some ups on downs of cooperation and aggression a state of mutual cooperation can be established in the mid- run, till 2029.

Starting with such a run it then could be tested how a slow change in scenario variables can more or less suddenly lead to a sequence that ends with a series of AA, of war-like enduring mutual aggression.

Some Cautious Conclusions

First, a definitely deep methodological distinction between the game theoretic approach proposed in part 2 and the standard approach that usually is taken in mathematical neoclassical economics has to be made. In the latter a well-defined difference-differential equation model mirroring a micro- or macroeconomic situation is proposed, often enriched by some independent and identically distributed random variables. Following a general equilibrium assumption to exclude disequilibrium dynamics the equilibrium state then is calculated and its properties – the properties at which the essential variables of the system will not change any more – are interpreted. Since in neoclassical theory the most basic elements on which a general equilibrium state (of a market system) can rest are the inborn utility functions of all individuals, this eternally prevailing equilibrium state only reveals an invisible, metaphysical structure of suggested sources of individual behaviour. The whole formal system burns down to revealed preferences. Despite the possibly most sophisticated mathematical models that were presented along these lines, the pragmatic usefulness of results of this kind clearly had to be extremely limited. Neoclassical economic theory in general was made immune to being corrected by empirical observations.

With the game theoretic approach in John von Neumann's sense, enriched by algorithmic-oriented simulation, a rather different kind of results can be achieved. For such an approach the aggregation of the immensely rich empirical perceptions of a manageable set of different decision-makers is a necessary and scientifically creative first step. In the sequel a computer model can be implemented, which partly reaches in the past to use observed phenomena and partly forecasts the immediate future. To enable this forecast some elements have to be kept stable, e.g., the internal model structure of players, while others are introduced as exogenous scenarios (for such short-term scenarios simple time-series methods like exponential smoothing are sufficient). In the case presented in part 3 the past consisted of four years and the future forecast of four years too. The predictions derived from this approach are much less well-defined as those of the former approach. While the neoclassical model is a strong statement of what is believed to be the correct, the true state of the world in the long-run (equilibrium!), the described simulation approach is a rather vague attempt to talk about possible developments in the near future. The wider variety of influences that are inputs to the simulation approach certainly make it look more arbitrary – or to formulate it more positively: make it more important to believe in the experience (both, with respect to political economy and with respect to simulation techniques) of the model-builder. Of course, the implied flexibility of the simulation approach also has a big advantage: As the simulation moves forward in time-as historical time goes on - shifting one year every year, forgetting the earliest year and forecasting one more year in the future, it allows, even forces, to introduce new events during this monitoring process.

As a second conclusion that could be derived directly from the simulation runs in part 3: For a wide variety of reasonable assumptions a development towards a mutually cooperative behaviour, CC, at the end of the decade seemed to be more probable. In the beginning of the forecasting period ups and downs of the relationship often get stronger mirroring the habit to retaliate singular provocative actions. In disastrous scenarios these waves are amplified – in particular if the mentioned Vassals' Effect tunes in – and the danger of a World War 3 comes into play. Such a doomsday scenario thus would start with local wars at the borderline between China and the USA, e.g., the Middle East, Korea, or Taiwan, which get out of central control in the respective military headquarters. As already mentioned, a more likely type of scenario is that a common cooperative solution of the ruling class in China and the USA is reached. In this case the next five years will see the emergence of a new stage of capitalism, which I call absolute global authoritarian capitalism. It is obvious that the latter type of scenario is to be preferred to a lethal 3rd World War, though this at the same time is bad news for national labor movements around the world – the next five years will be a hard time.

Both conclusions, the methodological one as well the historical one, have rather to be taken as vague best guesses and not as precisely argued forecasts. Their role is to stimulate scientific debates, not to advice where money should be invested [1-24].

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