**Review Article**

# Mathematical Model to Predict Wars

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## Abstract

The three-year course of the Ukrainian war suggests one possibility. Mathematical models can be used to calculate or predict complex and large-scale coalition wars. A mathematical model created in 2022 suggests that the Ukrainian war will be a long-term struggle in the area between the L1 and the L2 line. This model also assumes a high-risk scenario. In the future of 2026, if there is a full-scale war between the US alliance and the Chinese alliance in East Asia, it will be difficult for the US alliance to win. If this model is verified again in 2026, the mathematical model can be used to predict a large-scale coalition war.

**Keywords:** Nation War Strength; War; Total war; Alliance; Mathematical model; Calculation; Prediction; Politics.

## MAIN TEXT

The Russo-Ukrainian war can be viewed without regard to emotions or political leanings. The current outcome of the war is far from the initial expectations of all the politicians who drove it. This is an inevitable drawback when major political decisions have been made solely on the basis of emotions and political leanings. Whether mathematical models can be used for political decision-making is a viable option worth exploring. A model has been developed to calculate Total War Capability or Total War Strength at the level of nations or alliances. This model can not only assess Nation War Strength, but also predict the outcome of complex alliance wars. All political realism and statistical data from the year 2021 are used to assess the outcome of the Russia-Ukraine war in 2022. This mathematical model also suggests that the US-China alliance will engage in a full-scale war in East Asia in 2026.

### I. Nation War Strength Calculation Model

Two trends suggest that the world faces a major threat of war. As conventional weapons with high explosive yields and large destructive radii enter combat, the moral force that prevents the use of nuclear weapons is weakening. In addition, total wars and even complex coalition wars are returning to the international political arena. There is a practical necessity to calculate or compare the total war capability of states or war coalitions. For this need, a mathematical model has been developed.

The computational model of Nation War Strength consists of the following components.

**Table 1: Nation War Strength Evaluation Project**

| Item | subproject | element | Rationale or context |
|---|---|---|---|
| Geographical Assets: 300 points | land area ratio | Key assessment factors | The most powerful force for the country to bear the brunt of war in the scenario of the practical application of high-explosive, wide-damage radius weapons. |
| | geographic pattern | Coefficients in the assessment | The complexity of geographic patterns increases the country's ability to withstand the shock of war. |
| | Land use efficiency | Items being counted instead | Difficult to measure the efficiency of land use. Adjusting the weight of population density appropriately would be equivalent to dealing with this parameter. |

| Political Power:<br><br>320 for national points;<br><br>350 for Coalition | Demographic (100 points for Nation) (120 for Alliance) | Population | The actual operational unit of the state involved in the war; the main counting unit that bears the brunt of the war; and the counting basis for the revival of the state after the war. |
|---|---|---|---|
| | | Labour force | The actual ability to support the country's political, economic and military activities in wartime. |
| | | Percentage of dominant ethnic | A key factor in sustaining war-fighting capability, organisational capacity, and political stability under the blows of brutal war. |
| | Organisational Power (90 points for Nation; 100 for Alliance) | Centralised capacity | Models of state organisation in peacetime, a key factor in resisting the blow of war. |
| | | Stabilisation capacity | How people accept their national system in peacetimes, how they keep pace with the state in wartimes. |
| | History Honor 10 points or 5points | World superstates in history plus 10 points | National historical honours would appropriately raise the national tolerance for war. |
| | | Add 5 points for a powerful country in history or reality | Realistic national honours would appropriately raise the national tolerance for war. |
| | Existing military assets 120 points | Existing military assets of States | Existing military assets to have a significant impact on the course and outcome of wars. |
| Economic factor:<br><br>380 national points<br><br>Coalition counts 350 points | 80 points for agricultural productivity | Self feed security are the most important thing in wartime. | Agricultural GDP and the Global Food Security Index are the main indicators calculated |
| | Industrial Productivity 110 points | The industrial capacity supports war and protects country most. | National industrial GDP and national innovation indices are the main calculation indicators |
| | 40 points for capacity to serve industry | Services industrial capacity support support war. | The ability to service productivity, in the course of a war, is an important capability to support the war effort |
| | 120 points for military spending capacity | Military spending conducts the outcome of war | The capacity to invest in military expenditure reflects a country's long-term ability to develop its war assets in a comprehensive manner. |
| | Military science and technology 30 points | War alliances do not count this item | War tech can pay considerable war dividends in short-term wars or in the early stages of a war. |
| State of war | Coefficient of defence effect | 2.2 | Intensity of war coefficients in the case of defensive wars conducted by the United Nations P5 countries |
| | | 1.8 | For "country-specific" defence wars. Includes India, Israel, North Korea, Pakistan,Saudi Arabia, |
| | | 1.4 | For other countries are engaged in defensive wars. |

**Table 2: Weapons Science and Technology Scale (30 points)**

| Military high technology<br><br>(Points highest score in each classification)<br><br>(Not for alliance counting) | remote projection technology 9 points | Weapons range> 10K kilometres | 9 |
|---|---|---|---|
| | | Weapons range> 5K kilometres | 7 |
| | | Weapons range> 3K kilometres | 5 |
| | | Weapons range> 1K kilometres | 3 |
| | aviation technology 7 points. | Hypersonic vehicle manufacturing | 7 |
| | | Stealth fighter manufacturing | 5 |
| | | Generation 4 aircraft manufacturing | 4 |
| | | Generation 3 Light Combat Aircraft Manufacturing | 3 |
| | | Unmanned Aerial Vehicle Manufacturing | 2.5 |
| | | Space or near-space presence | 7 |
| | | Satellite navigation capability | 5 |

| | High Altitude Operations Technology 7 points. | Meteorological/imaging satellite capabilities | 4 |
|---|---|---|---|
| | | Other 24-hour hold capacity | 3 |
| | Conventional weapons science and technology 7 points. | Aircraft Carrier Manufacturing | 7 |
| | | Manufacture of conventional bombs above 1K tonne yield | 7 |
| | | 7K tonne warships built | 6 |
| | | Manufacture of cruise bombs over 800 kilometres | 6 |
| | | Manufacture of air-launched bombs over 500 kilometres | 6 |
| | | 3K tonne warship manufacturing | 5 |
| | | Main battle tank manufacturing | 4 |
| | | Manufacture of light and medium tanks | 3 |
| | | 1K tonne battleship manufacturing | 3 |
| | | Manufacture of projectile weapons over 30 kilometres | 2 |

**A. *Geographical Assets*** (300 points). The calculation factors include the size of the national territory, the diversity of its geographical forms and the efficiency of its use. Rationale for scoring: Land area and geographic diversity are the strongest foundations for a nation's ability to withstand a WMD attack. It is also the strongest support for the country to withstand nuclear risk. At the same time, it has a strong ability to withstand rapid warfare.

**B. *Political Power*** (320 points for national; 350 points for coalition): It has four components.
***Demographic*:** Three parameters are calculated. These are population, labour force and the proportion of the dominant ethnic group. 100 points are awarded for a nation, and 120 points for a coalition. Rationale: Population is the direct unit of operation in the overall war effort, the basis for the recovery of national power after a war, and the basis for the endurance of long and severe wars.

***Organisational power*;** the state's ability to centralise power and maintain national stability reflects not only the state's ability to concentrate national resources, but also the tendency of the people to follow the national strategy in wartime. It is worth 90 points for a nation and 100 points for a coalition.

***National honours*:** Honours inherited from historical superpowers increase a nation's ability to withstand the blows of war. Adds 10 points to China, Germany, Holland, Portugal, Russia, Spain, United Kindom, and the United States. Adds 5 points to real regional powers such as Brazil, Egypt, France, India, Iran, Italy, Japan, Saudi Arabia, South Africa and Turkey.

***Military assets:*** 120 points. Military assets have a significant effect on the course of a war, both in the early stages of a rapid war and in a long war.

**C. *Economic forces*;** there are five components to the score.
***Agricultural production*:** 80 points. Self-sufficiency is an important force for the country to withstand the blows of war.

***Industrial production*:** 110 points. Industrial capacity is the most powerful force a nation can have to win a long war of attrition.

***Service industries*:** 40 points. The ability of the service industries to support the war effort is very important.

***Sustained military spending*:** 120 points. The ability to sustain military spending is a direct reflection of a nation's ability to wage war.

***Military science and technology*:** 30 points at national level. Differences in military science and technology between countries reflect differences in their war-fighting capabilities. No points are awarded at alliance level. Alliances that have been at war for a long time will not have significant differences in overall military science and technology.

**D. *State of war*:** The defensive state of war mobilises the war capacity of the entire state. The defending nation has the political and moral advantage of using the unlimited war mode. They also have the political advantage of being the first to raise the war response level. The defence factor for the P5 countries is set at 2.2; a defence coefficient of 1.8 is set for some special countries, including India, Israel, North Korea, Pakistan and Saudi Arabia. The coefficient for all other countries is 1.4.

**II. Ranking of Nation War Strength**
Tables 1 and 2 show the composition and annotations of Nation War Strength calculation model. Table 3 shows the ranking table of Nation War Strength in 2022 based on statistical data. The data was obtained from public databases such as the WorldBank. Table 4

shows the data used to calculate Nation War Strength (no formulae).

**Table 3: Ranking of Nation War Strength (year 2022)**

| | Country | Score | | Country | Score | | Country | Score | | Country | Score |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | China | 888.9 | 44 | Malaysia | 276.2 | 87 | Cambodia | 221.2 | 130 | Togo | 167.5 |
| 2 | United States | 820.6 | 45 | Iraq | 276.2 | 88 | Ireland | 221.0 | 131 | Slovenia | 167.4 |
| 3 | Russian Federation | 722.2 | 46 | Sudan | 275.9 | 89 | Cote d'Ivoire | 220.3 | 132 | Panama | 164.5 |
| 4 | India | 607.8 | 47 | Libya | 274.8 | 90 | Cuba | 219.4 | 133 | Armenia | 164.4 |
| 5 | Brazil | 515.8 | 48 | Myanmar | 271.4 | 91 | Madagascar | 218.2 | 134 | Costa Rica | 163.5 |
| 6 | Canada | 482.8 | 49 | Uzbekistan | 270.2 | 92 | Ghana | 217.3 | 135 | Albania | 163.3 |
| 7 | Australia | 474.1 | 50 | Netherlands | 269.1 | 93 | Denmark | 217.3 | 136 | Suriname | 162.9 |
| 8 | Saudi Arabia | 443.7 | 51 | United Arab Emirates | 266.4 | 94 | Syrian Arab Republic | 215.5 | 137 | El Salvador | 162.1 |
| 9 | Japan | 433.0 | 52 | Bolivia | 265.1 | 95 | Jordan | 213.6 | 138 | Haiti | 160.4 |
| 10 | Indonesia | 424.2 | 53 | Romania | 264.8 | 96 | Tunisia | 211.8 | 139 | Iceland | 159.9 |
| 11 | Iran, Islamic Rep. | 413.4 | 54 | Chad | 261.3 | 97 | Qatar | 208.3 | 140 | Liberia | 159.4 |
| 12 | United Kingdom | 412.6 | 55 | Niger | 258.1 | 98 | Congo, Rep. | 208.2 | 141 | Bosnia and Herzegovina | 157.1 |
| 13 | Germany | 396.0 | 56 | Mongolia | 256.7 | 99 | Papua New Guinea | 207.9 | 142 | Cyprus | 156.9 |
| 14 | France | 394.7 | 57 | Finland | 256.7 | 100 | Bulgaria | 207.5 | 143 | Bahrain | 155.6 |
| 15 | Turkiye | 384.2 | 58 | Mali | 254.5 | 101 | Somalia | 206.2 | 144 | Sierra Leone | 155.2 |
| 16 | Mexico | 382.8 | 59 | Kenya | 252.3 | 102 | Senegal | 205.4 | 145 | Lebanon | 154.6 |
| 17 | Argentina | 380.3 | 60 | Portugal | 250.1 | 103 | Uruguay | 204.2 | 146 | Brunei Darussalam | 154.2 |
| 18 | Algeria | 379.6 | 61 | Oman | 249.9 | 104 | Croatia | 204.0 | 147 | H K SAR | 152.8 |
| 19 | Egypt, Arab Rep | 371.5 | 62 | Greece | 248.7 | 105 | Burkina Faso | 204.0 | 148 | Equatorial Guinea | 152.0 |
| 20 | Pakistan | 365.5 | 63 | Mozambique | 245.0 | 106 | Central African Republic | 203.9 | 149 | Eswatini | 151.4 |
| 21 | Italy | 362.8 | 64 | Switzerland | 244.2 | 107 | Singapore | 202.4 | 150 | Moldova | 151.1 |
| 22 | Korea, Rep. | 354.2 | 65 | Turkmenistan | 243.4 | 108 | Sri Lanka | 201.7 | 151 | North Macedonia | 148.3 |
| 23 | Spain | 353.1 | 66 | Korea, Dem. People's Rep. | 241.6 | 109 | Lao PDR | 201.0 | 152 | Luxembourg | 145.2 |
| 24 | South Africa | 342.4 | 67 | Israel | 240.4 | 110 | Serbia | 200.3 | 153 | Jamaica | 144.9 |
| 25 | Kazakhstan | 341.9 | 68 | Paraguay | 239.6 | 111 | Kuwait | 198.5 | 154 | Burundi | 142.1 |
| 26 | Colombia | 341.7 | 69 | New Zealand | 239.1 | 112 | Slovak Republic | 198.2 | 155 | Lesotho | 138.1 |
| 27 | Thailand | 339.7 | 70 | Cameroon | 238.2 | 113 | Guinea | 196.0 | 156 | Fiji | 136.0 |
| 28 | Vietnam | 333.3 | 71 | Belarus | 236.5 | 114 | Tajikistan | 194.6 | 157 | Bhutan | 135.9 |
| 29 | Nigeria | 332.3 | 72 | Afghanistan | 236.4 | 115 | Dominican Republic | 194.3 | 158 | Trinidad and Tobago | 135.1 |
| 30 | Poland | 313.3 | 73 | Namibia | 235.1 | 116 | Honduras | 193.9 | 159 | Guinea-Bissau | 134.7 |
| 31 | Bangladesh | 305.3 | 74 | Mauritania | 233.0 | 117 | Guatemala | 193.5 | 160 | Djibouti | 134.4 |
| 32 | Venezuela, RB | 304.7 | 75 | Zambia | 231.3 | 118 | Nepal | 193.2 | 161 | Timor-Leste | 128.3 |
| 33 | Chile | 303.0 | 76 | Ecuador | 231.0 | 119 | Lithuania | 192.4 | 162 | Montenegro | 128.1 |
| 34 | Congo, Dem. Rep. | 302.8 | 77 | Uganda | 229.8 | 120 | Gabon | 191.9 | 163 | Bahamas, The | 128.0 |

| 35 | Ukraine | 298.3 | 78 | Austria | 228.2 | 121 | Nicaragua | 186.4 | 164 | Belize | 125.6 |
| 36 | Norway | 296.2 | 79 | Zimbabwe | 226.9 | 122 | Kyrgyz Republic | 182.6 | 165 | Gambia, The | 124.3 |
| 37 | Angola | 296.0 | 80 | Botswana | 226.2 | 123 | Georgia | 182.0 | 166 | Mauritius | 117.4 |
| 38 | Peru | 295.4 | 81 | South Sudan | 225.5 | 124 | Benin | 177.7 | 167 | Cabo Verde | 112.1 |
| 39 | Tanzania | 293.1 | 82 | Czechia | 224.4 | 125 | Latvia | 176.3 | 168 | Malta | 111.6 |
| 40 | Sweden | 289.9 | 83 | Belgium | 224.0 | 126 | Guyana | 175.5 | 169 | Barbados | 104.5 |
| 41 | Ethiopia | 285.4 | 84 | Yemen, Rep. | 223.4 | 127 | Malawi | 173.8 | 170 | Seychelles | 99.7 |
| 42 | Philippines | 281.2 | 85 | Azerbaijan | 223.1 | 128 | Rwanda | 172.2 | | | |
| 43 | Morocco | 277.1 | 86 | Hungary | 222.7 | 129 | Estonia | 167.6 | | | |

## III Coalition War Strength Calculation Model

The framework for calculating Coalition War Strength is derived from Nation War Strength. Its computational structure consists of the following components.

**A. Data:** The data is derived from individual country data in the Nation War Strength Measurement System.

**B. Classification***:* Within an alliance, allies are grouped according to the degree of national involvement in the war. Partners within a coalition are classified as: belligerents, frontline allies, supporting allies and background allies. The corresponding coefficients for calculating their contribution to Coalition War Strength are assigned values of 1, 0.6, 0.3 and 0.15.

**C. Risk:** Focus on the risk assessment of alliance structures. Alliance structure risks are classified as predictable and unpredictable. Predictable risks include changing the list of background allies, of possible opposing states, of potential opposing states, and of potential enemy allies. Unpredictable risks include the emergence of a war genius, sudden natural and environmental disasters, and random political and military surprises. Unfortunately, this part has not yet been modelled, but it is definitely worth paying close attention to. This important parameter of assessment should not be ignored just because a method of calculation has not yet been found.

**D. Dynamic tracking:**

*Upgrading and renewing alliances.* The composition and classification of alliances is a dynamic process over the course of a war. Upgrading and updating alliance structures in response to changes in the political context is a routine process. A change in the composition of an alliance can be considered a renewal if there is no major change in the roster of belligerents. Once the roster of belligerents has changed substantially, it is a sign that the alliance structure has been upgraded.

*Defence status changes***:** (1) The nation where the war is taking place automatically gains defence effects. Other allies do not calculate defence effects. (2) The defending nation's Nation War Strength values remain unchanged for one year. (3) Land lost and its associated finances are not counted as lost for 2 years. (4) As soon as the defending side switches to the attacking side, the captured land and its associated finances do not count as assets for 2 years. (5) The defensive effect disappears as soon as the defending side becomes a stable attacking side.

*Changing the offensive status:* (1) The offensive side's base for calculation remains unchanged for one year. (2) Land and finances captured by the attack become part of the calculation base after 4 years of stable occupation. (3) Defensive effects are not calculated until 6 months after the attacking side is repulsed and becomes the defending side.

### Table 4: Dynamic Assessment on Coalition War Strength

| Item | Note 1 | Note 2 | Note 3 | Note 4 |
|---|---|---|---|---|
| Warring Mode | (Defender counts defensive effect). Geography strongly support defencer. | Defender automatically enter into the national war mode. | Defender has political priority to escalate the war effort first. | Only the countries where the war taking place have defence effect. |
| Belligerent Countries (Coefficient 1) | direct involvement in the course of the fighting | Holding the same political pursuits | The countries in a state of war | Countries focus on objectives of the war |
| Frontline Allies (Coefficient 0.6) | No direct involvement in the war | Share the same political pursuits with Belligerent Countries | The countries not in a state of war | The countries politically mobilised to support the ongoing war. |
| Supporting Allies (Coefficient 0.3) | No involvement in the war. | Have close political pursuits or aspirations with Belligerent Countries | The country is largely uninvolved in the war | Practical military and economic support to Belligerent Countries at the governmental level |

| Background Allies (Coefficient 0.15) | Will not intervene in the war. | have fairly strong political and economic ties with Belligerent Countries. | Wouldn't actively get involved in the war. | Provide some degree of economic and political background support to Belligerent Countries. |
|---|---|---|---|---|
| Predictable risk | Original background allies change their position | List for likely opposition countries | List for potential opposition countries | Potential allies of the enemy |
| Unpredictable risk | Military genius born during the war | Sudden changes in the philosophical and political orientations of ordinary people | Unpredictable and unexpected political events | Unpredictable geographical or environmental disasters |
| The defence process | The defense's score remains unchanged for one year. | The lost territory and finances not be counted as lost within 2 years of the loss. | After switch to attacker, the captured things do not count for 2 years. | Once switched to the attacker, the defensive effect of the war will disappear. |
| The offensive process | The war intensity score before the war remains unchanged for one year. | Occupied territory and finances will be calculated after four years of stable occupation. | If switched to defencer, the defensive effect is not counted till 6 monthes later. | 6 months after being defender, the defensive effect was calculated in the new environment. |

## IV. Predicting the War in Ukraine with the Coalition War Strength Model

### 4.1 Coalition wars when the battlefield is between the L1 and L2 lines

The calculation of Coalition War Strength was based on political realities. First of all, the Ukrainian theatre of war was defined by two important dividing lines. The L1 line is the imaginary line drawn along the Dnieper River. Another line, L1a, can be derived from the L1 line. It consists of a line along L1 plus the northern borders of the Mykolaiv and Odessa oblasts, and L2 is the northern and western administrative border of Donbass, the zone between L1 and L2 being the area where the two sides of the Ukrainian war have been fighting for a long time.

### Table 5: Coalition Structures between L1 and L2

| Class | Ukrainian Alliance I | Russian Alliance I |
|---|---|---|
| Belligerent Countries (weight 1.0) | Ukraine (With defence effect; coefficient 2.2) | Russia |
| Frontline Allies (weight 0.6) | Lithuania, Poland. | |
| Supporting Allies (weight 0.3) | Czech Republic, France, Germany, Israel, UK, USA. | Belarus |
| Background Allies (weight 0.15) | Australia, Austria, Belgium, Bulgaria, Canada, Croatia, Denmark, Estonia, Finland, Greece, Hungary, Iceland, Ireland, Italy, Japan, Korea, Latvia, Luxembourg, Mexico, Moldova, Netherlands, New Zealand, Norway, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland. | China, Cuba, India, Iran, North Korea, Saudi Arabia, Serbia*, Syria*, UAE. |
| Likely Opposition | Some South American countries (Anti-Existing Imperial Institutional Forces) | Four Central Asian countries, Mongolia (aftermath of the breakup of the Empire) |
| Potential opposition | Some countries in Africa (Anti-Existing Imperial Institutional Forces) | Kazakhstan, Turkey. (multifactorial role) |
| Potential allies of the other side | Most countries in the Arab world (Anti-Existing Imperial Institutional Forces) | Philippine (Political and economic rationale) |

The composition of the military alliances of the opposing sides in the event of a conflict in this region is shown in Table 5. Their corresponding Coalition War Strength are shown in Table 6. Figure 1 illustrates the differences in war intensities in this region. Figure 2 shows a forward projection of the Ukrainian theatre of operations.

**Table 6: Coalition War Strength when battlefield between L1 and L2 lines**

|  | Ukrainian Union I | Russian Union I | Score |
|---|---|---|---|
| Geographic scoring | 232.7 | 314.9 | /300 |
| Demographic scoring | 68.0 | 84.7 | /120 |
| Organisational power scoring | 94.8 | 107.9 | /100 |
| National History Plus | 0 | 10 | /10 |
| Military Assets scoring | 134.3 | 122.4 | /120 |
| Agro-industrial capacity | 42.5 | 52.9 | /80 |
| Industrial industry capacity | 82.2 | 72.7 | /110 |
| Service industry capacity | 32.9 | 22.2 | /40 |
| Capacity to invest in armaments | 97.4 | 87.5 | /120 |
| Total Coalition War Strength | 784.9 | 875.2 |  |
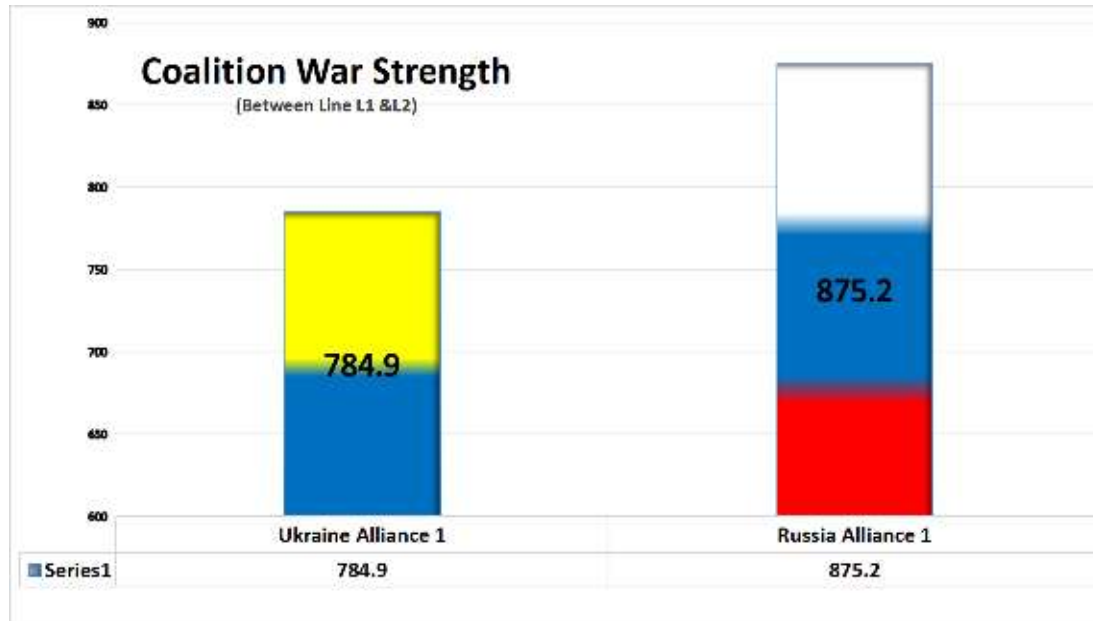


**Figure 1: Coalition War Strength between L1 and L2**



**Fig. 2: Prospects for War in Ukraine (year of 2022)**

**The following speculation can be seen in the Alliance Structure Table 5and War Strength tables 6.**

In the political realities of 2021 and 2022, the Russian Coalition fights with greater intensity than the Ukrainian Coalition on the battlefields between the L1 and L2 line zones. This is the main reason why the Ukrainian Coalition is at a disadvantage in Southern Ukraine and Central Ukraine. But the Russian Coalition does not have an overwhelming advantage everywhere. The Ukrainian coalition has advantages in terms of military assets, industrial capacity, service capacity and military spending. The Ukrainian coalition can build on these advantages to exploit the long-term trends of the war. The Russian coalition has advantages in geography, demography, organisational strength and agricultural capacity. Russia can exploit the long-term trends on the battlefield through its human resources and political stability. Without a significant renewal of the Ukrainian coalition, it will be difficult to avoid a gradual retreat in central Ukraine. The Ukrainian coalition needs an optimised strategy to avoid losing the entire eastern bank of the Dnieper.

**4.2 Coalition wars west of L1 line or north of L1a line.**

The advantages of the Russian coalition's war intensity do not extend west of the L1 line or north of the L1a line. For this would seriously undermine the long-term political interests of the US bloc. Thus, as soon as the Russian coalition power crosses this line of denial, it will inevitably inspire the escalation of the Ukrainian Coalition I into the Ukrainian Coalition II; and thus a change in the intensity of the coalition's war will take place.

The composition of the war coalition and the corresponding intensity of the war in the Western Ukrainian theatre of operations are shown in Tables 7 and 8 and Figure 3.

**Table 7: Coalition Structures Westwards L1 and Northwards L1a**

| Class | Ukrainian Alliance II | Russian Alliance I |
|---|---|---|
| Belligerent Countries (weight 1.0) | Ukraine (With defence effect; coefficient 2.2) | Russia |
| Frontline Allies (weight 0.6) | Czech Republic, France, Lithuania, Poland, United Kingdom, United States. | |
| Supporting Allies (weight 0.3) | Australia, Austria, Belgium, Bulgaria, Canada, Croatia, Denmark, Estonia, Finland, Germany, Iceland, Ireland, Israel, Italy, Japan, Korea, Latvia, Luxembourg, Mexico, Moldova, Netherlands, New Zealand, Norway, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland. | Belarus |
| Background Allies (weight 0.15) | Greece, Hungary, Philippines, Singapore | China, Cuba, India, Iran, North Korea, Saudi Arabia, Serbia*, Syria*, UAE. |
| Likely Opposition | Some South American countries (Anti-existing imperial forces) | Four Central Asian countries, Mongolia (aftermath of the breakup of the Empire) |
| Potential opposition | Some countries in Africa (Anti-existing imperial forces) | Kazakhstan, Turkey. (multifactorial role) |
| Potential allies of the other side | Most of the Arab world (Anti-existing imperial forces) | Philippine (Political and economic rationale) |

**Table 8: Coalition War Strength West of the L1 Line**

| | Ukrainian Union II | Russian Union I | Score |
|---|---|---|---|
| Geographic scoring | 285.9 | 314.9 | /300 |
| Demographic scoring | 80.8 | 84.7 | /120 |
| Organisational power scoring | 105.6 | 107.9 | /100 |
| National History Plus | 0 | 10 | /10 |
| Military Assets scoring | 159.7 | 122.4 | /120 |
| Agro-industrial capacity | 51.7 | 52.9 | /80 |
| Industrial industry capacity | 100.6 | 72.7 | /110 |
| Service industry capacity | 40.7 | 22.2 | /40 |
| Capacity to invest in armaments | 119.2 | 87.5 | /120 |
| Total Coalition War Strength | 944.1 | 875.2 | |

As soon as the Ukrainian Union I is upgraded to the Ukrainian Union II, the Coalition War Strength undergoes a serious reversal. The Ukrainian Union gains a war power advantage. This change may cause Russia to retreat from already occupied territories. The Ukrainian Coalition side may gain an advantage on the

battlefields of Western Ukraine, Central Ukraine and even Southern Ukraine.
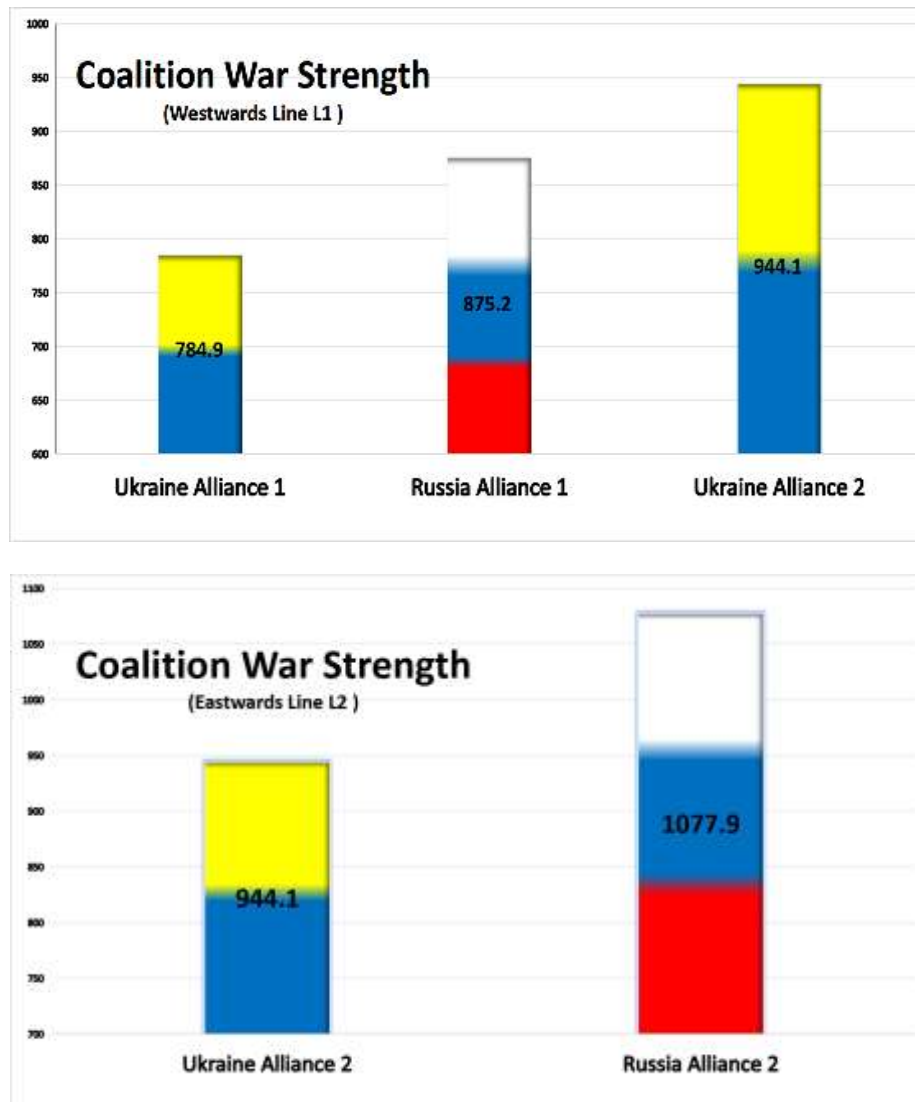




**Fig. 4: Coalition War Strength eastwards L2 line**

**4.3 Coalition wars when the battlefield passes east of the L2 line**

The intensity advantage of Ukrainian Alliance II cannot push the war effort east of the L2 line. Because east of the L2 line, it will inevitably inspire an escalation of the Russian Alliance structure.

The composition and war intensity of the upgraded war coalition is shown in Table 9, Table 10 and Figure 4.

**Table 9: Coalition Structures Eastwards L2**

| Class | Ukrainian Alliance II | Russian Alliance II |
|---|---|---|
| Belligerent Countries (weight 1.0) | Ukraine (With defence effect; coefficient 2.2) | Russia |
| Frontline Allies (weight 0.6) | Czech Republic, France, Lithuania, Poland, United Kingdom, United States. | Belarus |
| Supporting Allies (weight 0.3) | Australia, Austria, Belgium, Bulgaria, Canada, Croatia, Denmark, Estonia, Finland, Germany, Iceland, Ireland, Israel, Italy, Japan, Korea, Latvia, Luxembourg, Mexico, Moldova, Netherlands, New | China, Iran, North Korea. |

| | | |
|---|---|---|
| | Zealand, Norway, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland. | |
| Background Allies (weight 0.15) | Greece, Hungary, Philippines, Singapore | Cuba, India*, Saudi Arabia, Serbia*, Syria*, UAE. |
| Likely Opposition | Some South American countries (Anti-existing imperial forces) | Four Central Asian countries, Mongolia （aftermath of the breakup of the Empire） |
| Potential opposition | Some countries in Africa (Anti-existing imperial forces) | Kazakhstan, Turkey. （multifactorial role） |
| Potential allies of the other side | Most of the Arab world (Anti-existing imperial forces) | Philippines, Mexico （Political and economic rationale） |

**Table 10: Coalition War Strength after Battlefield Crosses East of L2 Line**

| | Ukrainian Union II | Russian Union II | score |
|---|---|---|---|
| Geographic scoring | 285.9 | 405.0 | /300 |
| Demographic scoring | 80.8 | 101.6 | /120 |
| Organisational power scoring | 105.6 | 115.0 | /100 |
| National History Plus | 0 | 10 | /10 |
| Military Assets scoring | 159.7 | 155.0 | /120 |
| Agro-industrial capacity | 51.7 | 64.5 | /80 |
| Industrial industry capacity | 100.6 | 90.8 | /110 |
| Service industry capacity | 40.7 | 27.7 | /40 |
| Capacity to invest in armaments | 119.2 | 108.3 | /120 |
| Total Coalition War Strength | 944.1 | 1077.9 | |

The battlefield situation beyond the L2 line to the east is extremely complex and hides many possibilities for development. The fundamental changes is China's entre into the list of supporting allies of the Russian coalition. This was the basis for an important escalation in Coalition War Strength of RussianCoalition. It also triggered another reversal of war power in the Ukrainian theatre.

**4.4 Basic predictions for the Ukrainian theatre.**
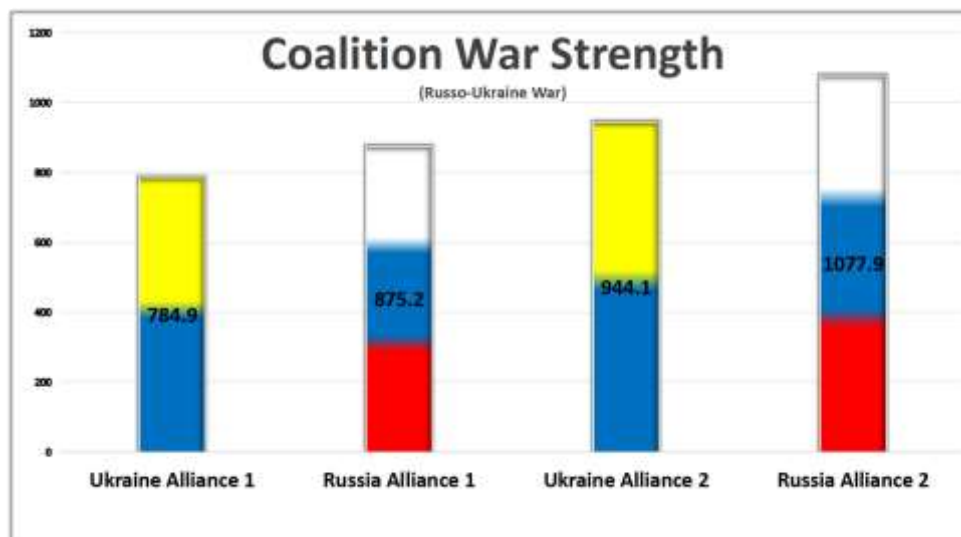


**Figure 5: Coalition War Strength listed in Ukrainian theatre**

Lines L1 and L2, two hypothetical battlefield dividers. Their establishment depend on the political realities of 2021. Crossing the L1 line to the west or the L2 line to the east would seriously change the political orientation of international political forces. This will trigger a reorganisation of the composition of military alliances and the balance of military forces on the battlefield. In other words, the war in Ukraine will become permanently entangled in the region between the L1 and L2 lines. In this region, the war capacity of the Russian coalition is stronger than that of the Ukrainian coalition. The Ukrainian coalition will have to develop a long-term strategy to avoid losing the entire territory of the eastern bank of the Dnieper.

**V. Calculating a hypothetical war in East Asia in 2026**
**5.1 Complexity on Sino-US War Patterns**

Assuming that China will launch its reunification in 2026, this will stimulate the United States and its bloc's response to this event. One tough issue facing the United States and its alliance is to select response option. Theoretically, the U.S. and its allies have several response options to meet China's challenge. For these options, see the corresponding articles [1, 2, 3].

Since the Coalition War Strength Calculation Model is based on the total war capabilities of states and coalitions, localised and limited conflicts are not discussed here today. The calculations is based on China's defence mode, which confines the battlefield

area covered by Chinese medium-range missiles. For the reasons, see the corresponding articles [3,4].

In the all-out conflict between the Chinese alliance and the American alliance, there was one of the most important influencing factors. Namely, the variable of whether or not Europe as a whole joins the war. In addition to the major political crisis facing American policymakers at the critical juncture of 2026, European nations also face difficult choices[5]. Rather than discussing the political crisis here today, Europe's entry into the war or not will only be used as a variable to calculate the change in coalition war strength in the event of a war in East Asia in 2026.

**5.2 Coalition wars when Europe is not at war.**

**Table 11: Coalition Structures without European Participation**

| Class | American League I: | China League I: |
|---|---|---|
| Belligerent Countries (weight 1.0) | Japan, Korea, Philippines, United States | China (With defence coefficient 2.2) |
| Frontline Allies (weight 0.6) | Australia | |
| Supporting Allies (weight 0.3) | Canada, Czech Republic, France, Germany, Lithuania, UK | Iran*, Russia |
| Background Allies (weight 0.15) | Austria, Belgium, Bulgaria, Denmark, Estonia, Finland, Greece, India, Ireland, Israel, Italy, Latvia, Luxembourg, Mexico, Mongolia, Myanmar, Netherlands, New Zealand, Noray, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland. | Cambodia, Laos, Pakistan, Saudi Arabia, Syria*, UAE |
| Likely Opposition | Selected North African countries (anti-existing imperial order) | Indonesia, Myanmarn (Geographical and historical factors) |
| Potential opposition | Arab States in the Middle East and North Africa (multifactorial role) | Kazakhstan, Mongolia (Geographical and historical factors) |
| Potential allies of the other side | Serbia, and other anti-existing regime countries (historical factor) | Afghanistan, Myanmar, other small countries in South America and Africa (Economic and political factors) |

**Table 12: Coalition War Strength without European Participation**

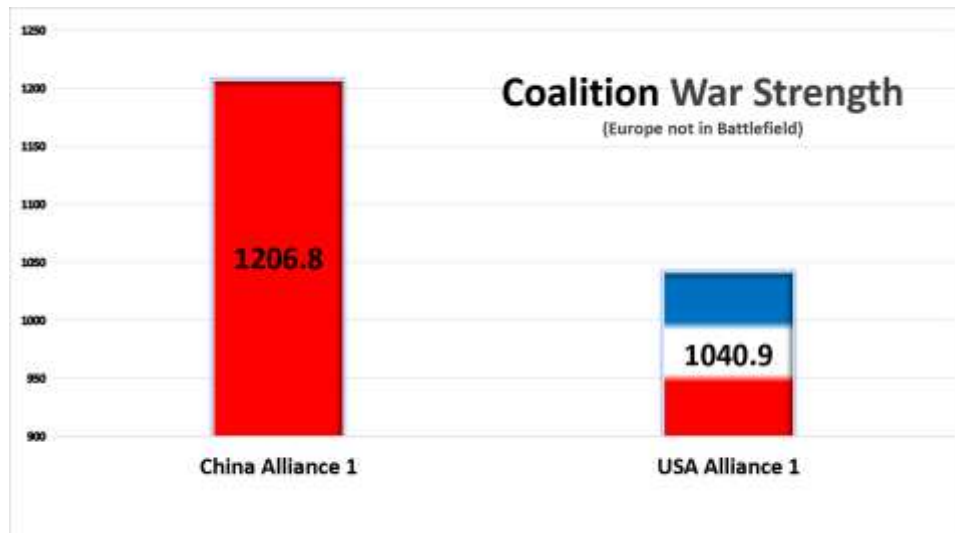| | America League I | China League I | score |
|---|---|---|---|
| Geographic scoring | 317.7 | 351.2 | /300 |
| Demographic scoring | 95.1 | 157.4 | /120 |
| Organisational power scoring | 100.7 | 113.5 | /100 |
| National History Plus | 10 | 10 | /10 |
| Military Assets scoring | 162.9 | 146.2 | /120 |
| Agro-industrial capacity | 59.5 | 104.7 | /80 |
| Industrial industry capacity | 114.0 | 144.2 | /110 |
| Service industry capacity | 45.9 | 42.3 | /40 |
| Capacity to invest in armaments | 135.2 | 137.2 | /120 |
| Total Coalition War Strength | 1040.9 | 1206.8 | |

**Figure 6: Coalition War Strength when Europe is not at war**

## 5.3 Coalition wars when Europe enters the war

**Table 13: Coalition Structures with European Participation**

| Class | American League II: | China League II: | China League III: |
|---|---|---|---|
| Belligerent Countries (weight 1.0) | Australia, Bulgaria, Estonia, France, Germany, Italy, Japan, Korea, Latvia, Lithuania, Philippines, Poland, United Kingdom, Ukraine, United States. (Ukraine with defence effect with coefficient 1.4) | China, Russia

(China has defence effect with Coefficient 2.2) | China, Iran*, Russia, Syria*, Turkey (China has defence effect with Coefficient 2.2) |
| Frontline Allies (weight 0.6) | Austria, Belgium, Canada, Czech Republic, Finland, Sweden. | Iran*, Syria*. | Saudi Arabia |
| Supporting Allies (weight 0.3) | Denmark, Greece, Ireland, Israel, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Portugal, Romania, Slovakia, Slovenia, Spain, Switzerland. | Saudi Arabia, UAE | Egypt, UAE. |
| Background Allies (weight 0.15) | India, Mongolia, Myanmar | Algeria, Argentina, Cambodia, Laos, Nigeria, Pakistan, Serbia, Turkey | Algeria, Argentina, Cambodia, Laos, Nigeria, Pakistan, Serbia. |
| Likely Opposition | Some North African countries | Indonesia, Myanmar. | Indonesia, Myanmar. |
| Potential opposition | Arab States in the Middle East and North Africa | Kazakhstan, Mongolia | Kazakhstan, Mongolia |
| Potential allies of the other side | Numerous anti-existing regime countries | Afghanistan, India, other small countries in South America and the Americas | Afghanistan, Myanmar, other small countries in South America and the Americas |

**Table 14: Coalition War Strength with Europe's participation**

| | American League II | China League II | China League III | score |
|---|---|---|---|---|
| Geographic scoring | 361.0 | 402.8 | 410.3 | /300 |
| Demographic scoring | 107.3 | 159.8 | 161.7 | /120 |
| Organisational power scoring | 128.4 | 124.5 | 137.3 | /100 |
| National History Plus | 10 | 10 | 10 | /10 |
| Military Assets scoring | 194.0 | 164.1 | 171.7 | /120 |
| Agro-industrial capacity | 66.8 | 106.1 | 107.1 | /80 |
| Industrial industry capacity | 126.7 | 146.4 | 147.9 | /110 |
| Service industry capacity | 50.2 | 43.1 | 43.5 | /40 |

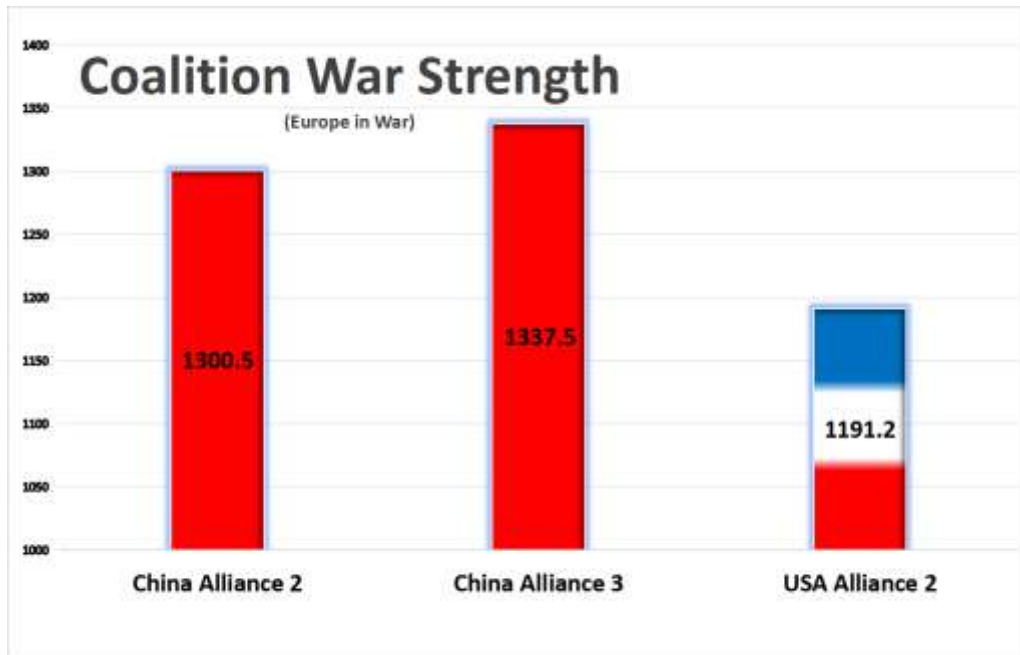| Capacity to invest in armaments | 146.8 | 143.7 | 148.0 | /120 |
| Total Coalition War Strength | 1191.2 | 1300.5 | 1337.5 | |



**Figure 7: Coalition War Strength in hypothetical E Asia War in 2026(with European Participation)**

**5.4 Discussion of trends for the hypothetical East Asian war in 2026.**



**Figure 8: Combined Coalition War Strength in E Asia War in 2026**

**A. European participation seriously influences the course and outcome of the war in the East Asian theatre in 2026.**

If Europe as a whole does not intervene in the war, the military strength of the American coalition is significantly weaker than that of the Chinese coalition. They score 1040.9 against 1206.8, a difference of 14%. Once Europe enters the war, the war strengths of the American and Chinese coalitions reach an equilibrium.

**B. Upgrading the structure of the war coalition is the focus of both sides of the war.**

By improving its alliance structure, the US alliance can achieve a balance of military power. In this way, it can seize the opportunity to win by using the advantages of its political position and global cooperation.

China is not completely passive. China can use its political advantage over Europe to rapidly destabilise the European political order and thus weaken the US-led

alliance. China can also continue to develop its alliance structure to increase its military superiority.

**C. The final outcome of the war was closely linked to the political choices made by both sides.**

Upgrading the structure of military alliances is not absolutely advantageous. Joining the war in East Asia is an extremely difficult and dangerous option for Europe. There is no option for the United States to pit Europe against China without paying a price; on the other hand, Russia is an unavoidable option in China's plan to upgrade its alliances. Russia is committed to preserving its European identity, and the cost to Europe of co-opting Russia must be much lower than that of co-opting China. Compared to Europe, China is destined to pay high political costs, both real and future. In any case, Russia is fortunately in a position to influence the long-term outcome of the war. In general, if the two sides enter into a full-scale war, the Chinese alliance will have certain comparative advantages over the American alliance.

# CONCLUSION

A mathematical model can calculate the intensity of a war between nations or large military alliances. By making such calculations it is possible to predict the outcome of a war. The model suggests that the war in Ukraine could be confined to the area between the L1 and L2 lines for an extended period of time. Both the L1 and L2 lines have the potential to trigger an escalation of the war alliance, thereby pushing the conflict back into the area between the L1 and L2 lines. In particular, the L2 line may cause China to join the war alliance, potentially leading to significant changes in the European region. In the event of a conflict between the Chinese and American alliances in East Asia, Europe will be an important factor in determining the course of the war. But an even more important factor is Russia. In other words, China is a potential, but the most important variable influencing the war in Europe. Russia is also a potential factor with significant influence in the East Asian war. If we compare the military capabilities of the American alliance and the Chinese alliance in East Asia, the Chinese alliance may have a significant advantage. If this system of calculation is validated again in the military conflicts of 2026, it can be considered to have practical significance. At the very least, it can help politicians to calculate, start or avoid wars.

**Endnotes**

All political analyses are based on political realities in 2021. All data cited are for 2021 and some published before April 2022. All projections and analyses focus on the 2022 to 2026 timeframe. Fortunately, the results of the 2022 calculations will still cover today's reality. Please excuse the fact that it is not possible to update the calculations by year due to the sheer volume of work.

# REFERENCES
1. Ye Qiquan. China's Unifying Plan (5): Risk Assessment of Total Sina-US War. PPPNet. Mar. 29, 2023.https://en.pppnet.net/risk-assessment-of-total-sino-us-war/
2. Ye Qiquan. China's Unifying Plan (3): USA's Options. PPPNet. Mar. 29, 2023. https://en.pppnet.net/chinas-unifying-plan3-usas-options/
3. Ye Qiquan. China's Unifying Plan (4): Imagined Sino-US Conflict Scenario. PPPNet. Mar. 29, 2023. https://en.pppnet.net/chinas-unifying-plan4-imagined-sino-us-conflict-scenario/
4. Ye Qiquan. China's Unifying Plan (1): Shaped by 2012, Works in 2026. PPPNet. Mar. 29, 2023. https://en.pppnet.net/chinas-unifying-plan-1-shaped-by-2012-works-in-2026/
5. Ye Qiquan. China's Unifying Plan (7B): Uncertainty about Europe. PPPNet. Mar. 5, 2023. https://en.pppnet.net/chinas-unifying-plan-7b-uncertainty-about-europe/