

The Military System of Democracies IX: National Defense and the Economic Perspective

Grand strategy should both calculate and develop the economic resources and man-power of nations in order to sustain the fighting services. ... Moreover, fighting power is but one of the instruments of grand strategy – which should take account of and apply the power of financial pressure, of diplomatic pressure, of commercial pressure, and, not least of ethical pressure, to weaken the opponent's will. ... Furthermore, while the horizon of strategy is bound by the war, grand strategy looks beyond the war to the subsequent peace.

Basil H. Liddell Hart (1954 / 1967 / 1991, p. 322)

HARRY Truman famously asked to be sent a one-armed economist, having tired of exponents of the dismal science proclaiming “On the one hand, this” and “On the other hand, that”.

Buttonwood (2010, www.economist.com)

Why Economics of Defense? (continued)

Primary tasks of economics of defense

(1) These **similarities** basically make design solutions in one subsystem suitable for **transfer** – unaltered or modified – to another subsystem: For example, X ENOPHON and the Byzantine emperor MAURICE recommend hunting to hone tactical skills. A long list of historical evidence supports this advice – refer to the impact of Jäger detachments on military operations in the 18th and 19th century, the initial superiority of German snipers in trench warfare during World War I due to the great popularity hunting enjoyed in the Kaiserreich, the military exploits of M ANFRED VON RICHTHOFEN – who often referred to the similarities between his experiences as a fighter pilot and huntsman, and – finally – the corresponding civilian background of German, Finnish or Russian snipers in World War II.

(2) Analogously, concepts can be transferred between the economy and the military – in either direction: It took nearly 150 years before business companies started to discover the advantages of divisional structures – the latter introduced to military organizations during a period ranging from the Seven Years' War to the Wars of Revolutionary and Napoleonic France. In conclusion, these observations constitute three **main functions** to an economic perspective on the military system: a) Investigate the **impact** scarce resources may have on military activities. b) Analyze military organizations for the **similarities** and the **differences** they feature in comparison to society's other subsystems. c) Develop **explanations** and **recommendations** for organizational improvement.

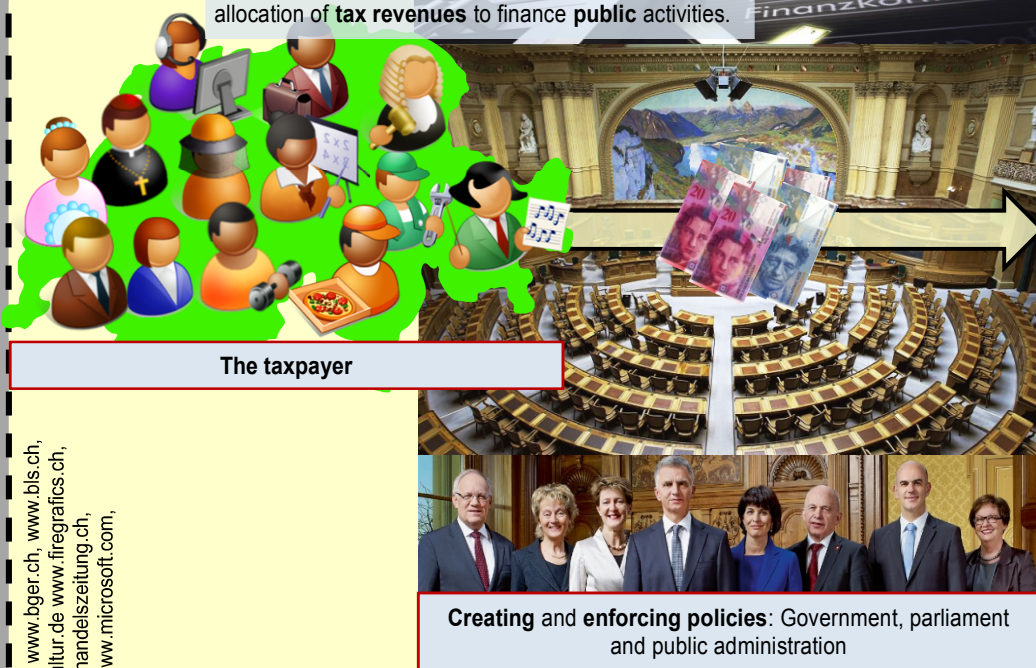
(3) Finally, because economics is usually focused on **another** subsystem of the society, the civilian economy, **significant deviations** – in comparison to textbook economics – are to be expected when applying the economic perspective on military activities – in the **objects** selected for analysis, the **methods** of research and the **results** / recommendations. In turn, this justifies the revitalization of the economics of defense after World War II as an “**interface discipline**” connecting economics with the military system. This discipline had already emerged in the 18th century as “**oeconomia militaria**” – a label coined by G OTTFRIED WILHELM VON LEIBNITZ. The investigation now continues with examples of insights the economics of defense is able to produce on the **national level** of the military system. When applied on this level, economics of defense possesses **two tasks**. First, it must elaborate the implications of the economic perspective on the military system and its **relations** to other **subsystems** of society. Second, it has to prove its capability to develop **recommendations** in regard to essential questions arising on this level.

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Scarcity – the general restriction to organizing national defense in politics

(1) The employment of **scarce resources** to satisfy the needs either in the military or in **other** subsystems of the society is confronted with **opportunity costs**. The respective opportunity costs are determined by the benefit resulting from the **second best alternative** if the resources would be employed to realize this alternative instead.

(2) Backed up by **elections, referenda, expert committees** and **feedback** by the administration, the political-administrative organization decides on the allocation of **tax revenues** to finance **public activities**.



Pictures: www.admin.ch, www.bger.ch, www.bis.ch, www.deutschlandradiokultur.de, www.firegraphics.ch, www.hamburg.de, www.handelszeitung.ch, www.kapo.zh.ch, www.microsoft.com, www.wikipedia.org

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(6) Foreign Affairs



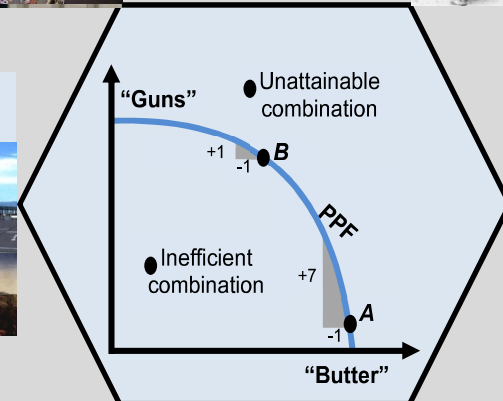
(1) Social Welfare



(5) Education



(2) Infrastructure



(4) Justice / Rentseeking Protection

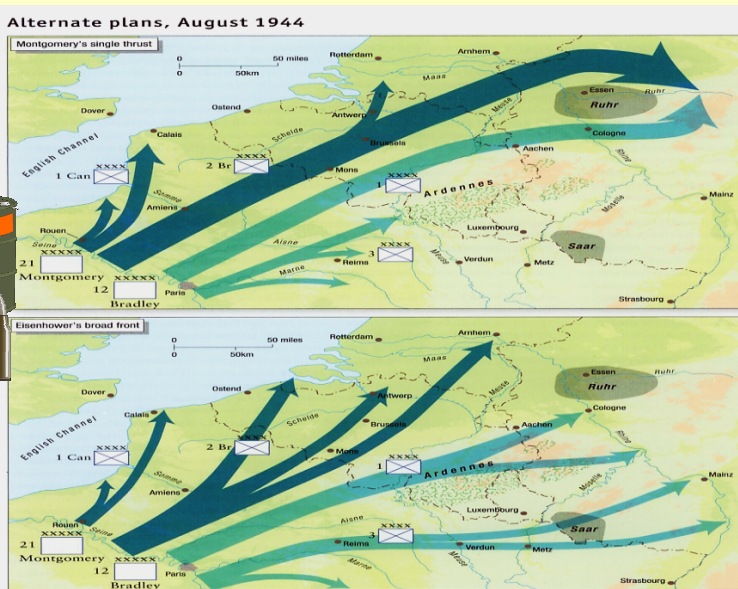


(3) Security



(2) The illustration in the **hexagon** focuses on the classical decision problem in the economy: The production of “guns” and “butter” for a given amount of **inputs** – labor, capital and land. This fixed amount of inputs implies that certain combinations of output are **not feasible** with the **production technologies** available. Other combinations, while attainable, are characterized by **inefficient** combinations of output. Inefficiency implies that the inputs available could produce a greater amount of either goods – or it is possible to **increase** the output of one good while the output of the other good remains **constant**. The **production-possibility-frontier** (PPF) represents **all efficient combinations** of goods that can be produced with the given endowment. The PPF illustrates the first lesson in economics: Efficient decisions face trade-offs or as previously stated: “There's no such thing as a free lunch”. Consequently, **increasing** the quantity of guns requires a **sacrifice** in butter and vice versa. The **concave shape** of the PPF is caused by **rising** opportunity costs: A rational strategy to expand guns production would first re-allocate those inputs less productive in butter production. The sacrifice is then not too costly – refer to point A. In contrast, when the economy is already heavily engaged in guns production, the costs are much higher – refer to point B.

Scarcity in War



(1) The Allied “**Race to the Rhine**” campaign after the breakout from Normandy in 1944 illustrates the impact of scarce resources on military decisions in times of war: The battle of Falaise destroyed almost all combat capacities the **Germans** could still muster after two months of heavy fighting west of the Seine River. Thus, they were forced to a hasty **retreat** towards the Reich's Western frontier. With the beachheads secured and a first harbor – Cherbourg – slowly becoming available as a supply source, the **Allies** faced the task to organize a swift **pursuit**.

(2) The Supreme Headquarters Allied Expeditionary Force (SHAEF) basically considered **two options** for the corresponding campaign – refer to the left picture: a) SHAEF's commander, D WIGHT D. EISENHOWER, favored the “**broad front**” concept – closely resembling a general advance on the Rhine. In contrast, the victor of El Alamein, Marshal BERNARD L. MONTGOMERY, preferred a **concentrated thrust** towards the Netherlands and Belgium. This would allow capturing the Ruhr area – one of the Reich's most vital armament centers – as soon as possible.

(3) The controversy resulted in a bitter exchange of arguments between protagonists like G EORGE S. PATTON and MONTGOMERY. It was finally settled in favor of MONTGOMERY's plan because the supplies available were considered to be below the level required for EISENHOWER's approach. In conclusion, the analysis has shown that military activities are also determined by the scarcity of resources in peace and war. Thus, the military requires decision tools capable to justify its resource claims– **internally** (other military claimants) or **externally** (taxpayers or other stakeholders).

Scarce Resources and the Military in Peace and War

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Pictures: Zaloga (Noon (2011), www.firegraphics.ch

The Military System of Democracies X: Three Showcases on the National Level

Therefore the superior militarist strikes while schemes are being laid. ... The next best is to attack alliances. ... The next best is to attack the army. ... The lowest is to attack a city.
Sun Tzu (1988, pp. 35)

EUROPE IS AMERICA'S NATURAL ALLY. It shares the same values; partakes, in the main, of the same religious heritage; practices the same democratic politics: and is the original homeland of a large majority of Americans.
Zbigniew Brzezinski (1997, p. 57)

The concept that a coalition of weaker states would bind together to form a counterweight to the stronger was not in itself remarkable. Yet the balance of power requires constant tending. In the next century, American leaders will have to articulate for their public a concept of the national interest and explain how that interest is served – in Europe and in Asia – by the maintenance of the balance of power. America will need partners to preserve equilibrium in several regions of the world, and these partners can not always be chosen on the basis of moral considerations alone. A clear definition of the national interest needs to be an equally essential guide to American policy.
Henry Kissinger (1994, pp. 810)

Economic Tools for Decisions in National Security

Vital decisions on the level of national security

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(1) The analysis now continues in its **demonstration** of how economic models can contribute to a **better understanding** of national security.

(2) Therefore, **three central issues** will be investigated that determine how a country organizes its defense: a) How should politicians decide on the allocation of scarce resources between the different *schwerpunkte* in politics? b) Should a country fight at all? If yes, should it enter an alliance? c) If a country possesses military capacities, what are the conditions to pursue an expansionist policy? And finally, why would a country declare its neutrality in an ongoing conflict?

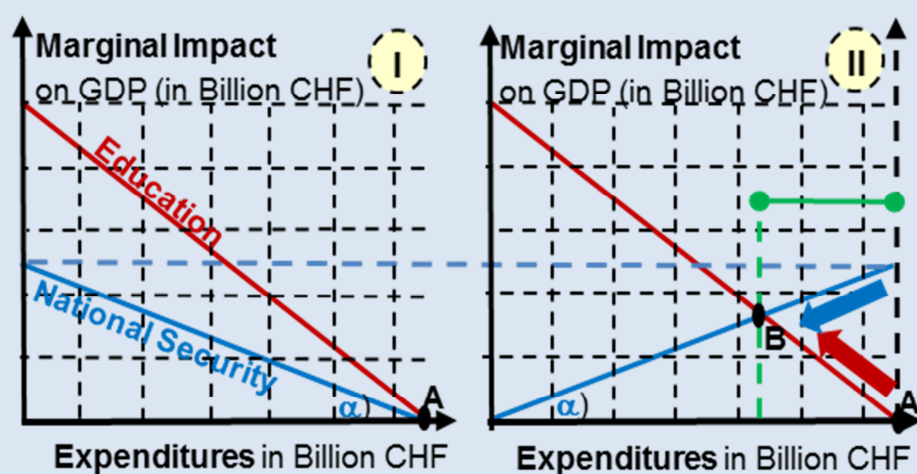
The law of leveling marginal utilities by Hermann H. Gossen

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(1) The 19th century Prussian HERRMANN H. GOSSEN can arguably claim to be the founder of the **marginal revolution** in economics. Put simply, the concept considers the following situation: A player is confronted with the state of the world x and is able to change this by selecting different levels of action y . GOSSEN assumes that the impact of y on the state of the world is characterized by **saturation** – each additional increase of y results in a smaller effect. For example, opening the first “clone store” of a retail chain in a town will result in higher revenues than the opening of the 10th store. Schema XXX provides a simple model to explain why many military relationships are also characterized by a saturation effect. In such settings, the question arises, what is the optimum level of y ? GOSSEN recommends starting with the smallest change of y and comparing the result with the initial state x .

(2) If this action results in a (net) increase in welfare, the player continues to increase the level of y step by step as long as the respective net changes are positive – each increase of y results in a smaller change due to the saturation effect, but these changes still represent improvements in comparison to x . If the latest (marginal) change of y results in a net increase of **zero**, the (local) optimum is found. This approach enabled GOSSEN to identify a basic rule of resource allocation – the **law of leveling marginal utilities**.

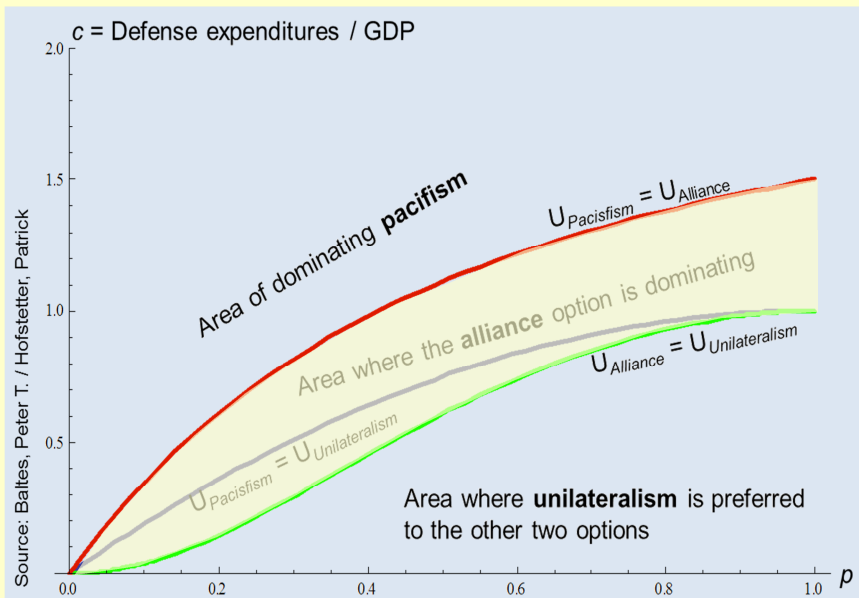
(3) This law can be applied to a vital decision problem in politics: The allocation of tax revenue to the various policy *schwerpunkte* like security or education. Here the concept is illustrated by a **fictional** case where the amount of 6.5 billion CHF is earmarked for two projects in national security and education. A survey has been able to calculate the marginal returns (as impact on the GDP) for each project – refer to (I).



(4) Again, both investments face a **saturation effect**. Investment of the **first** Swiss franc in education results in a **marginal** impact on the GDP of 5 billion (“bang per buck”). In contrast, the **last** Swiss franc of the **first** billion invested in education only features a marginal impact of $5 - \frac{5}{6.5} \times 1 \approx 4.23$ billion CHF. In total, this first billion would generate $\int_0^1 (5 - \frac{5}{6.5} \times x) dx = \{5 \times 1 - \frac{5}{6.5} \times \frac{1}{2}\} - \{5 \times 0 - \frac{5}{6.5} \times \frac{0}{2}\} \approx 4.6$ billion CHF. When the full amount is committed to education, the last franc has zero impact. In total, this investment would increase the GDP by 16.25 billion CHF. Because each marginal return of the security investment is lower than their respective counterparts of the education project, should **all** money go to education – refer to A? Gossen shows the **fallacy** of this argument: Withdrawing in A the **last** franc from education and its **transfer** to the security project implies a **first** franc invested there – refer to (II). As the latter’s marginal impact is greater than in education, the transfer results in an **improvement**. Analogously, the second last franc should be invested in security and so on – the two arrows show the opposing developments of the marginal impacts when these transfers are realized. The optimum allocation is B. Here the marginal impacts are **equal** – a further reduction of the education budget would only result in a loss. The share to be invested in security is marked by the **green bar**.

The options “pacifism”, “alliance” and “unilateralism” – a simple model

(1) This simple model explores the economic conditions of three *security options*: a) **Pacifism** – a country passes on military forces for **cost-saving** reasons or because it considers the benefits not worth the effort – e.g., it is feared the armed forces would *destabilize* the own society. Thus, the country’s hope rests on being *spared* from an attack – refer to Costa Rica since 1949. b) **Alliance** – a country shares with maximal one ally the burden of defense against a common threat. While this reduces the country’s costs, it also increases the risk of **coordination failure** between the allies – e.g., the difficulties of the coalition against Prussia after the death of the Russian Empress Elisabeth during the Seven Years’ War. c) **Unilateralism** – the country prefers to organize its defense alone. This eliminates the coordination issue, but the country also has to bear the **full** costs.



(2) The model assumes the **risk-averse** country’s preference is reflected by the **utility** function $U = \sqrt{x}$. Each country’s wealth is standardized to “1”. Raising national debts – to finance military expenditures exceeding “1” – is not possible. An **attack** will happen with the exogenous **probability** of p . Successful **deterrence** requires specific levels of defense expenditures $0 \leq c \leq 2$ (a fraction of the GDP of two countries). If this condition is **not** met, the attack automatically succeeds and the country’s wealth is reduced to **zero**. This information is known to the decision makers. They choose the option offering the highest expected (net) utility.

(3) The latter is determined for each option as follows: In the case of pacifism, the country will experience the **expected utility** of $E(U_{Pacifism}) = (1-p) \times \sqrt{1}$. Entering an alliance cuts expenditures by half and results in: $E(U_{Alliance}) = (1-p^2) \times \sqrt{1 - \frac{c}{2}}$. The model also assumes that coordination failure – automatically resulting in defeat – occurs when both allies are **simultaneously** attacked. This event happens with a probability of p^2 .

(3) Finally, the option of unilateralism leads to: $E(U_{Unilateralism}) = \sqrt{1-c}$. Solving the respective inequalities for either c or p produces the conditions of a preference for one option. I.e., one option **dominates** the other two for specific combinations of c and p – the graphic on the left provides an illustration of the corresponding conditions. Despite its simplicity, the model is able to offer some interesting insights for the Swiss defense policy or for the country’s general relationship with the European Union in times of globalization.

(4) A switch from a majority position of unilateralism to pacifism is extremely **unlikely** because this would either require a veritable “explosion” of the defense expenditures or a drastic reduction in the threat probability. Except for values of p close to zero, a country – finding itself in a position where the previously preferred position of unilateralism is unattainable – will first seek to enter a (cost-saving) alliance before it completely abandons its defense effort by switching to pacifism. To increase its **chances of success** in the long-run, a movement like “Group for a Switzerland Without an Army” should organize its political campaigns focusing on **two leitmotifs**: Downplaying the probability of threats and stressing the cost-saving impact of alliances. In contrast, the Swiss People’s Party preferring a unilateral approach is able to gain popularity when it succeeds either in cutting back defense expenditures – for example, by acquiring low-cost fighters like the Gripen – or highlighting the threats that only can be solved by military capacities.

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When and How to Fight

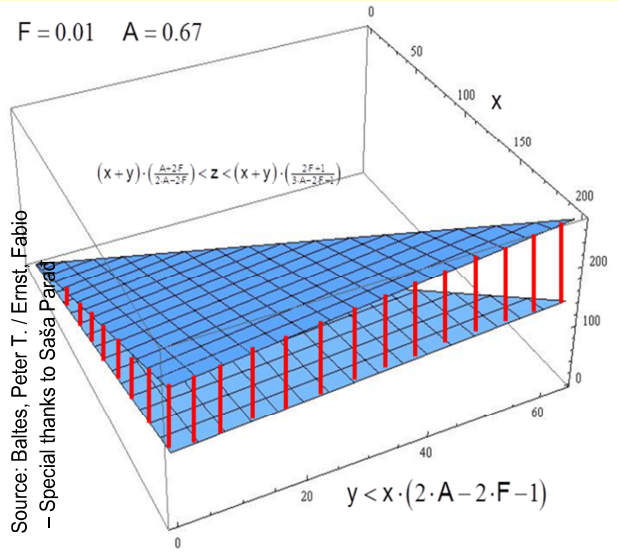
The Military System of Democracies XI: Military Decisions and Economic Concepts

The United States is fortunate to have the next decade in which to make the transition from an obsessive foreign policy to a more balanced and nuanced exercise of power. By this I don't mean that the goal is to learn to use diplomacy rather than force. Diplomacy has its place, but I am saying that when push comes to shove, the United States must learn to choose its enemies carefully, make certain they can be beaten, and then wage an effective war that causes them to capitulate. ... The lesson we should have learned from the British is that there are far more effective, if cynical, ways to manage wars in Asia and Europe. One is by diverting the resources of potential enemies away from the United States and toward a neighbor. Maintaining the balance of power should be as fundamental to American foreign policy as the Bill of Rights is to domestic policy. ... The foundation of American power is the oceans. Domination of the oceans prevents other nations from attacking the United States, permits the United States to intervene when it needs to, and gives the United States control over international trade. The United States need never use that power, but it must deny it to anyone else. Global trade depends on the oceans.

George Friedman (2011, pp. 211)

When and How to Fight (continued)

Neutrality in a Machiavellian world



(1) This model investigates the economic reasons behind a country's decision to declare its neutrality in an ongoing conflict. Three countries are at the focus of its setting. Each of them owns a standardized wealth of "1" and is ruled by a risk-neutral and omniscient **Machiavellian** government – i.e., if a neighboring country lacks sufficient military capacities, the former will not hesitate to exploit this weakness by starting a war of conquest to obtain the victim's resources. The corresponding decision is based on the simplest model of combat available: a) Each country has a number of military units featuring **homogeneous** quality.

(2) Thus, all that counts is the **number** of units a country is able to field in this setting. For reasons outside the model, the number each country controls can differ: *Country 1* owns x units, *country 2* owns y units and *country 3* owns z units. If, for example, *country 1* attacks *country 2*, the probability of victory for country 1 is calculated as: $\frac{x}{(x+y)}$. Because each war results in death, grief and destruction, the model assumes that a conflict reduces the wealth of *all* warring countries to the fraction $0 < A < 1$ of their **initial endowment**. As in the previous model, a defeat reduces the country's wealth to "zero".

(3) When *country 1* starts a war of aggression against *country 2*, *country 3* faces two options – either it may *join* the conflict as an ally of *country 1* or *country 2*. Or it can declare its **neutrality**. Entering the war naturally implies the risk of suffering a defeat – reducing its wealth to zero. However, being part of a victorious coalition would be compensated by its ally with a share of the "spoils of war". This payment is determined by the impact *country 3*'s troops would have on the outcome of the conflict. According to the combat formula described above, the troops increase the probability of victory for the country they are siding with.

(4) It is here assumed that *country 3* would be able to **completely claim** the increase in the expected value of the spoils as a compensation for its participation. In contrast, when declaring neutrality, *country 3* not only keeps its wealth of "1" with certainty, it also receives – as covered by the **Hague conventions on neutrality** – additional (net) income from transactions with each of the belligerent countries. The amount of this additional income, F , for *country 3* – resulting from transactions with *one* of the other two countries – is restricted to $0 < F < A$. The analysis focuses on a "one-shot-game": Each country may decide *only once* if it prefers to remain peaceful or go to war. After the resolution of this decision round, a **permanent** peace is established between the three countries – based on the results of a possible war. Consequently, the model explicitly excludes the application of the notorious "**salami tactic**" by the aggressor.

(5) In this case, the aggressor reassures a (possible) second victim that the war against a first victim will have *no* consequences for the second victim. However, after the successful campaign against the first victim, the aggressor attacks the second – now isolated – victim from a position bolstered by their recent victory. The model then determines the conditions for the following constellation representing a stable equilibrium: While *country 2* and *country 3* prefer to remain peaceful, *country 1* chooses to attack "singlehandedly" *country 2*. The latter requires a military capacity of *country 2* that is lower than $x \times (2 \times A - 2 \times F - 1)$ – refer to the graphical representation. The inequality states that the military capacities of *country 1* must excel those of *country 2* in such manner that it secures for *country 1* an expected value for the spoils of war, $2 \times A - 2 \times F$, that improves its welfare position in comparison to the opportunity costs of peace: the welfare of "1".

(6) The formula for the strength of *country 3*'s forces z – refer again to the graphic – represents the **corridor of neutrality** for the values $F = 1\%$ and $A = 0.67$. The left side of the inequality stands for the minimum requirement of its force strength that spares the country the fate of falling victim to the aggression by *country 1*. The right side describes an upper limit – when below this level, *country 3*'s forces are not strong enough to enforce an own course of military expansionism. Thus, the model is able to offer an illustration of turning points in the last 600 years of Swiss history: Some historians claim that the setbacks the old confederation suffered in Northern Italy during the early 16th century forced an end to its previous course of expansionism and caused its repositioning as a neutral power. In addition, its independence had often been challenged in times of military weakness: In particular, Switzerland experienced the invasions by several armies during the age of Revolutionary / Napoleonic France and it was only able to end the provocations by the Luftwaffe during World War II after the strength of its own air force was successfully tested in several skirmishes.

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Key players in economics of defense

(1) At this stage of the investigation, the potential for additional **insights** into the military system – by pursuing the research agenda of economics of defense – should have become sufficiently clear.

(2) Thus, the question arises: Who should be the **key players** responsible for the **incorporation** of the economic dimension into the military system? As pointed out before, this task encompasses a) highlighting the impact of **scarcity** on the military system and its relations to other subsystems (in particular, the economy), b) identifying the **similarities** and **differences** in the determinants forging **civilian** and **military** coordination designs and c) offering **explanations** / design **recommendations** for military coordination issues.

(3) An answer – stressing the importance of **interdisciplinary co-operation** – can be given based on an insight that evolved in economics during the last 45 years.

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Who should apply economics of defense in the military system?

(1) This insight stems from the works of Nobel laureates like JOSEPH E. STIGLITZ. He is one of the economists responsible for the **paradigm shift** in economics from the **neo-classical perspective** – focused nearly exclusively on markets as the primary tool to solve problems of scarcity – to the **economics of information**: "The comprehensive approach has involved strengthening markets, but equally important has been strengthening government and figuring out, for each country as it reaches each stage of development, what the right mix of government and market might be."

(2) Interestingly enough, a similar insight is formulated by retired four star general ALFRED M. GRAY in his treatise "Warfighting": "Finally, since all decisions must be made in the face of uncertainty and since every situation is unique, there is no perfect solution to any battlefield problem. Therefore, we should not agonize over one."

(3) The implication of these similar insights for the question on the "key players" in economics of defense is the following: A convincing solution to a specific design issue can almost never come from **outsiders** because they lack the knowledge to develop a *tailored* design fitting to the **specific** situation. Consequently, the military personnel itself and the civilian players, responsible for embedding the military system into society, represent vital assets for the development of military-specific designs.

(4) Furthermore, RUPERT SMITH's explains in "The Utility of Force" why the task of integrating the economic dimension cannot be **delegated** to some "chosen" women and men and cannot be restricted to a specific level of the hierarchy: "... we need to understand that the other organs of power – economic, diplomatic, politic, humanitarian ... – are part of the context of such an operation: they define the confrontational battlefield."

(5) ... The commanders at these sub-strategic levels need to have their actions firmly nested in a context that includes the political, economic and social factors local to the achievement and exploitation of their objective.... Without this wider context commanders at all levels will not be able to achieve their objectives ... In other words, the force will have no utility. ... war as cognitively known to most non-combatants, war as battle in a field between men and machinery, war as a massive deciding event in a dispute in international affairs, industrial war – such war no longer exists. We now are engaged, constantly and in many permutations, in war amongst the people."

(6) While SMITH's emphasis on the value of a **comprehensive approach** in military affairs is supported by the experiences in the war on terror, his Hegelian prediction about industrial war should be taken – in the face of the fragility of societies – cum grano salis.

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Outline of the following overview of economic thoughts

(1) It is now attempted to provide a **theoretical foundation** for the economic understanding required by decision makers in the military system. Economics is the discipline in social sciences focusing on **coordination** in the face of scarcity. Analogously to its subdiscipline, economics of defense, it seeks to explain why certain outcomes occur as well as it provides recommendations for the efficient and morally justified design of coordination mechanisms. The overview features the following sections: a) It starts by highlighting the significance of **decentralized** coordination in economies. b) In turn, this explains why markets are so important to the performance of social market economies. c) To derive a set of theoretical arguments relevant to military decisions, the analysis focusses on two of the most influential paradigms in economics – **neo-classical economics** and the **economics of information**.

(2) d) The main achievement of neo-classical economies lies in the proof that – for an "ideal" setting – a **market** is able to produce an allocation characterized by **Pareto optimality**. However, neo-classical economics is severely hampered by the following weakness: It is not able to explain the existence and performance of different coordination designs very often employed in real economies. e) Different approaches like the **property rights approach**, **agency theory** or **transaction cost** analysis tackle this issue by highlighting the importance of information for coordination design. f) However, these approaches – all part of the economics of information – face several problems themselves: In particular, a **unifying perspective on coordination design** is still missing. Therefore, the overview integrates neo-classical economics and the various approaches of the economics of information into a common framework – the **socio-economic theory of actions**.

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Military Decision Makers and the Economics of Defense

The Military System of Democracies XII: 300 Years of Economics – A Wrap-Up Attempt 1

In most cases, the pursuit of self-interest can lead to a high level of individual welfare generally only if the individual taking action incurs a cost equal to the cost that his or her action imposes on the rest of society. We refer to this as *social cost pricing*. Here is an informal explanation of why social cost pricing works: Let U_i be the payoff (or utility) to individual i , who will act to maximize U_i . This will typically affect the payoffs of others, and we let C_i be the total decline in the payoffs of everyone but individual i , resulting from i 's decision. Then C_i is the cost that i imposes on the rest of society. We modify the rules of the game so that the payoff to i is now $U_i - C_i$, which is what individual i will now maximize. But the change in $U_i - C_i$ is obviously equal to the change in the sum of the payoffs of everyone in society, including individual i . By imposing a cost on individual i equal to the cost that i 's actions impose on the rest of society, we induce individual i to act to maximize the total social payoff, even though i is only directly interested in maximizing his or her own payoff.

Donald E. Campbell (2006, pp. 3)

Markets as Cornerstones in Economics and Economies

The significance of decentralized coordination in economies

(1) A starting point to highlight the significance of decentralized coordination represents the **relationship** between the individual and the economy: The participation in a social market economy offers an individual the promising outlook to realize a life in accordance with a self-determined life concept. In contrast, a policy of **autarky** – realizing all goals of life without committing to any cooperation – implies that the **maximum output** of resources and hence the opportunities are very **low**. Several reasons cause this result. Autarky is hampered by the **scarcity** of time: There is simply not enough time to perform all tasks required to secure a standard of living **beyond** mere existence. DAVID RICARDO combines this insight with the differences in human capabilities of mind and body: Coordinated **specialization in production** offers – based on **comparative cost advantages** – higher outputs in comparison to the state of autarky. This basic **productivity gap** even widens after some time because specialization in one trade profits from the **experience curve effect**: (Average) Production costs decrease as the workers gain experience. For an illustration of this effect, compare the time it takes to assemble the first chair – bought in a store for ready-to-assemble furniture – with the assembly time of the fourth chair. In addition, **uncertainty** motivates (risk-averse) players to sign **insurance** contracts.

(2) These players **sacrifice** a certain amount (the **risk premium**) of the **expected value** of their income. In turn, the insurer offers them a **guaranteed** amount (the **certainty equivalent**) – i.e., this income is then paid out regardless of the insured's actual situation. The insurer is willing to accept this swap because with a certain number of contracts negotiated the corresponding portfolio benefits from **diversification**. I.e., in the portfolio the single performance of incomes cancels out and their total value approximates the **sum** of their respective expected values. **Exchange** represents another source to generate **mutual benefits**: The **Edgeworth box** illustrates how differences in **taste** and in **endowments** motivate players to enter transactions. Cooperation also achieves more likely a **working understanding** of reality (swarm intelligence) because the combination of different perspectives – in the face of subjectivity – minimizes the risk of **misconceptions**. Overall, these various motives for cooperation motivate the search for **decentralized coordination mechanisms** in the economy. Why decentralized coordination? Decentralization enhances the possibilities to live in accordance with a self-determined life concept.

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Markets: Historical evolution and definition

(1) Perhaps mass production of flint tools and weapons or the arrival of agriculture in human history promoted the evolution of the most important class of decentralized coordination mechanisms: **Markets**. For example, agriculture favors the invention of markets by several effects. First, it forces nomads to settle down – creating the **spatial fix points** required for the **organizational setting** of markets. Second, it offers **surpluses** that can be stored over longer periods. Third, these surpluses represent the foundation for **exchange**. In total, agriculture advances a society transcending the blood bounds of clans and featuring professions like huntsmen, nomads (pasturing flocks), farmers and, finally, professional soldiers and administration. The Old Testament offers many examples how this permanent **division of labor** permitted greater variety in diet, but also led to sharp **demarcation** between social groups. Markets can be defined as institutional and organizational settings where **surpluses** of products and services are **voluntarily** exchanged between (otherwise often **independent**) participants. This independence requires market transactions to be based on the principle of **reciprocal compensation**. It also calls for **institutionalized** guidelines – the Code of Hammurabi features the earliest surviving examples – as well as **organizational assets** for the installation, operation and conclusion of markets.

(4) The guidelines and assets relate to the time and place of the market (buildings / web space or opening hours), to the players participating (“free for all” vs. “close shops” restricted by wealth or group affiliation) and – in the face of risks like misunderstandings, robbery, theft, fraud and accidental flaws in quality and quantity – to the **protection and enforcement of private property** by **security** organizations and the **law**. In general, the market participants enjoy **equal rights** because transactions are **voluntary**. This ensures the **moral compatibility** of this coordination design with other subsystems / elements in the democratic society: a) Participants may choose freely their role as **sellers** or **buyers**. b) They can **strike a deal** – if they consider the conditions favorable – or **refrain** from it. Thus, under ideal – refer again to XXX – conditions, the actual buyers of transaction objects **credibly** prove by paying the corresponding price that they possess the highest preference to become the owner of the objects. The other potential buyers – failing to bid the highest offer – and the seller himself prefer to spend their bargaining assets otherwise. Based on this general introduction to markets the analysis is now able to present the paradigm of “neo-classical economics”.

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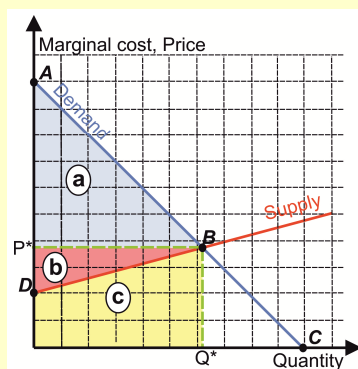
Neo-Classical Economics I: Assumptions

(1) The previous section indicated that the existence of markets, their size and the conditions of transactions are mainly determined by the **level of competition** both sides – **supply** and **demand** – experience in specific transaction constellations. In turn, the **compound variable** “competition” reflects: a) **Scarcity** of the transaction object. On the supply side, scarcity is determined by the **value chain** required to create, replicate and deliver this object. On the demand side, scarcity is influenced by the object's potential contribution to the realization of a **self-determined life concept**. b) The institutional and organizational **setting** of the corresponding market. c) The **information set** and the **skills** the different participants possess in regard to a) and b). Neo-classical economics emerged at the beginning of the 20th century. Inspired by the central insight of A DAM SMITH's “Wealth of Nations” – the outstanding performance of market economies in creating wealth – and the successes of *Antoine A. Cournot* in applying **mathematics** to model economic activities, neo-classical economics focusses on mathematical models to prove Smith's major (verbal) statements about market economies. The corresponding analysis is **narrowed down** to the impact of **scarcity** on market results whereas the other two classes of determinants defining the level of competition in a market are “**assumed away**”: The participants are able to act frictionless in mind and body: They represent perfectly rational players – they possess no differences in skills or gestalt, nobody can claim any information advantage, they can “perfectly” anticipate all certain and probabilistic events and they act with “lightning speed”. In addition, the **other subsystems** – with the exception of the **environment** as a source of natural resources – are **irrelevant** to the performance of the market: For example, culture is unimportant because a) all players are perfectly competent in any activity, b) they can anticipate the plans of all participants in all possible variants and c) they know the preferences of all others.

(4) **Security** is no issue, too. If someone plans a robbery, everybody else is aware of this raid right at the same moment. Because a successful raid sets off a “chain reaction” of criminal activities in this setting, all potential victims will – without any costs of coordination – form an alliance to deter the aggressor. Thus, any violation of property rights will either be settled in favor of the victims or the oppressors – depending on who can bring (literally or in the figurative sense) more cannons to bear. This represents the major insight provided by the famous **Coase theorem** – apart from pointing out that coordination issues cannot only be resolved by governmental intervention, but also by privately organized bargaining between the stakeholders. In addition, it resembles the concept of balance of power as described in K ISSINGERS' “Diplomacy”: “Europe was thrown into balance-of-power politics when its first choice, the medieval dream of universal empire collapsed ... When a group of states so constituted are obliged to deal with one another, there are only two possible outcomes: either one state becomes so strong that it dominates all the others and creates an empire, or no state is ever quite powerful enough to achieve that goal. In the latter case, the pretensions of the most aggressive member of the international community are kept in check by a combination of the others; in other words, by the operation of a balance of power.”

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Neo-Classical Economics II: The perfect market



(1) The graphic to the left shows the so-called **market cross** illustrating the interactions of demand and supply in a neo-classical market setting. It is assumed the market investigated features **perfect competition**. I.e., **no** player on either side has enough market power – for example, because of the volume they are willing to buy or sell – to influence the **conditions** of transactions beyond their option to strike a deal or refrain from it for any price-quantity-combination. The demand function depicts the respective **maximum price** the demand side – the aggregated number of buyers – is willing to pay for a specific quantity of the **homogeneous** good offered. For the sake of simplicity, a **linear** relationship between price and quantity is assumed. The demand curve starts at point **A**. The latter is called **prohibitive price** because no buyer is willing to pay this price to acquire the good. The **negative slope** of the demand function reflects the impact of **saturation** – refer to GOSSEN's explanation of **diminishing marginal utility**: In general, each additional unit consumed results in a lower **increase** of satisfaction than the previous unit consumed. Thus, the price has to be lowered to induce additional transactions for any given price-quantity-combination that is part of the demand function. However, at **C** even this procedure stops to be successful – the price has dropped to zero and no additional units can be sold because the market is **saturated**. The supply function reflects the **minimum compensation** a supplier is asking for increasing the quantity offered in the market by one additional unit – the latter's **marginal cost**. To simplify the analysis, the existence of **fixed cost** is ignored: The supplier has to incur fixed costs **independently** of the production volume – for example, the rent for the production area and buildings. The supply curve slopes upward to reflect rising opportunity costs of production – refer again to the discussion of the production-possibility-frontier in [XXX].

(3) The search for the market **equilibrium** starts with comparing **A** (the prohibitive price) to **D** (the minimum compensation asked by the supplier of the first unit): As this **hypothetical** transaction would be highly profitable, a market for the **underlying good** is established. But it doesn't stop there. As long as the position of the demand curve remains above the supply curve, a mutually beneficial transaction is possible – additional suppliers enter the market to offer the corresponding quantities and buyers arrive to pay for these offers. Note that this development implies a movement towards Point **B**: As all these hypothetical transactions are calculated at lightning speed, the market has reached its **equilibrium** featuring the price P^* and the quantity Q^* . The last transaction required to establish this equilibrium actually leaves the corresponding buyer and supplier **indifferent** between joining the market and staying out of it. Furthermore, in a **voluntary** setting like the market, no supplier can be found to offer quantities exceeding Q^* because the marginal costs of these units are not covered by the payment preferences the potential buyers are willing to spend at maximum. In conclusion, the combination P^* and Q^* represents an equilibrium because for quantities less than Q^* the participants have the incentive to increase the quantity traded and for quantities greater than Q^* they reduce the quantity in the market to avoid losses. In a neo-classical setting abstracting from socio-economic inequalities, this state also represents Pareto optimality as all potential **benefits** from transactions are **exhausted**. The expenditures spend by the buyers in equilibrium, $P^* \times Q^*$, constitute the suppliers' revenues. The latter fall into two categories: The costs to procure the equilibrium quantity – refer to the area **c** – and the **producer's rent** / producer's surplus exceeding this minimum compensation (refer to area **b**). Finally, the area **a** represents the **consumer's surplus** – the **net benefits** buyers receive from their transactions under the conditions of the equilibrium.

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The Military System of Democracies XIII: 300 Years of Economics – A Wrap-Up Attempt 2

For success, the elements of the firm's strategy and organization must be aligned with one another and must fit the environment in which the firm operates. This need for alignment and fit, combined with the many interdependencies among the elements of the strategy and organizational design, means the strategy and organization really must be developed in tandem, in a holistic fashion. Structure does not follow strategy any more than strategy follows structure. This simultaneity implies that the problem of creating a strategy and an organization that will allow the firm to succeed is immensely complex, because it involves so many dimension that interact with one another ... Changes in one aspect of the organization aimed at effecting one particular change in behavior can alter other aspects of behavior in ways that necessitate further changes on other dimensions of the design. Thus, the usual approach to fixing the problems that arise as organizations evolve – find an intervention whose first-order effect is to solve the problem, take everything else as given, and pull the lever – is fundamentally flawed. It only sets off a potentially unending stream of response, intervention, further unanticipated response, and yet another intervention.

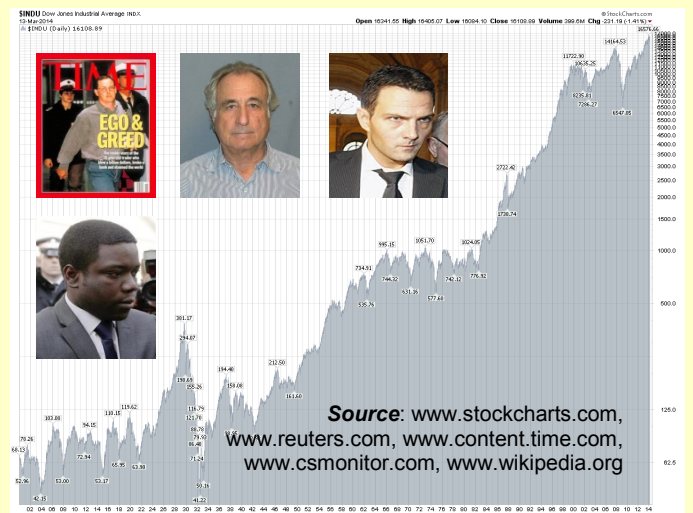
John Roberts (2004, pp. 281)

Neo-Classical Economics (continued)

Neo-Classical Economics III: Relevance to the Military System



(1) When the campaign against SADDAM HUSSEIN's regime gained momentum in 2002, many of its critics thought that their criticism was convincingly condensed in the political slogan "No blood for oil." However, the economic perspective developed since A DAM SMITH can show that this slogan is not helpful in **realistic** settings: It is hard to deny that the HUSSEIN regime – responsible for the death of several 100.000 people – was a **substantial threat** to the Iraqi population and the neighboring countries. Consequently, a regime change was **morally justified**. Economics shows that in a world where most people are substantially motivated by **self-interest** it cannot be expected that they risk their lives to save others on a regular basis without being compensated accordingly. Thus, not the fact that the Western coalition pursued geo-strategic interests like securing its oil supply represents a **condemnable** issue. The main problem of the Iraq invasion lies in the question if the Iraqi population – similar to the mutual benefits of supply and demand in markets – has been able to benefit from this decision since 2003 – in particular, by Iraq's development to a social market democracy. In regard to this challenge the occupation and its poorly planned as well as implemented aftermath – as pointed out by RAJIV CHANDRASEKARAN and others – deserve to be heavily criticized.



(2) The previous sections showed that the players put great **effort** into their **market** activities because they seek to realize net improvements of welfare as buyers or sellers. They also try hard to avoid losses because they often have to bear the corresponding costs of failures. In particular, stock markets are characterized by the attempts of million traders to assess the impact of **new information** – for example, a financial forecast about the profits a specific company will make by its business operations – on the corresponding stock prices. Consequently, textbooks in corporate finance stress the fact that it is very rare for single players – if they are not engaged in illegal activities like insider trading – to beat the market on a regular basis. Promises of **super profits** – in comparison to the average yields offered by capital markets – should only arouse **suspicion**. Still, traders like NICK LEESON, BERNARD L. MADOFF, JÉRÔME KERVIEL or KWEKU M. ADOBOLI either find victims believing their grossly exaggerated announcements or succumb to the hubris of being able to outperform the markets – in particular, because – if everything goes well – they gain the status of "capital market gods" and – if their overambitious projects go awry – the employing bank must cover their losses. Why is this insight **relevant to military decision makers**? First, social psychologists point out how military operations like the German offensive through the Ardennes in 1944, the Bay of Pigs invasion in 1961 or the attempt to free the hostages in Iran in 1980 ("Operation Eagle Claw") had been based – when compared to previous operations – on **unrealistic expectations** about the own performance capabilities. Second, a private contractor who outbids the competition by a significant margin to win a contract of the armed forces may only be able to do so because of biased / over-optimistic assumptions ("The **winner's curse**").

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The importance of information to allocation problems

There is no "market miracle" as neo-classical economics suggests: A working price mechanism requires that most of the relevant **information** is available to the players **before** transactions take place. The price **signal** itself features only a **limited** capability to **transmit** information. Example: A buyer must put **trust** into the seller's **promises** about many **characteristics** of the transaction object because their "true" quality will only be revealed after a while. This problem of "**experience goods**" was already known to ancient Romans: "Caveat emptor." In addition, **neo-classical economics** faces a serious **problem**: If markets were such superior coordination mechanisms, why are coordination mechanisms like hierarchies used in the private economy as well as in public economy? When these two aspects of coordination design, the importance of information and the institutional / organizational variety in the reality of economies, are merged, a new approach becomes visible: The **economics of information**. Traditionally, Eol focusses on the impact of **information asymmetries** on allocation results: One party, the **agent**, still know the "true" parameter value of economic variables determining the conditions of the transaction. In contrast, the other party, the **principal**, is only aware that the "true" parameter value belongs to a range of values.

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The coordination problems of adverse selection and moral hazard I: Adverse selection

(1) Eol distinguishes between two **basic constellations** of information asymmetry: **Adverse selection** occurs before a transaction contract is signed ("**ex ante**"). **Moral hazard** arises after the agreement has been settled ("**ex post**"). The problem of adverse selection is usually illustrated by the trade of **used goods**: These goods often come in **varying qualities** because of different production lots, employment and maintenance conditions and age. Because of these differences in the qualities of used goods, sellers will often enjoy an information advantage over potential buyers.

(2) I.e., while sellers know the **exact** quality, buyers may only be able to determine the **average** quality of all goods offered ("hidden characteristics"). When this occurs in one-shot games – sellers then cannot be held liable for their claims – every seller has the incentive to claim that their objects are of highest quality. Confronted with these exaggerations, the (risk neutral) buyers will **limit** their offers to the **expected** ("**average**") value. In many situations, this maximum price will **discourage** a share of sellers who actually possess goods of premium quality.

(3) They then **retire** from the market because they prefer to continue using the item for themselves instead of selling it for this "meager price". When the buyers anticipate this move, they will adjust their price offer to reflect the new range of quality. In turn, this may lead to additional sellers retiring from the market and so forth. Due to these adjustments, only the sellers of goods featuring the lowest quality may finally remain in the market: The "**lemons**" drive out the good.

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The coordination problems of adverse selection and moral hazard II: Moral hazard

(1) Moral hazard focuses on coordination issues after an **agent** has signed a cooperation contract with a **principal**: I.e., the agent is hired to perform a task on behalf of the principal. The **compensation scheme** for this service is an implicit or explicit part of the agreement. It can represent a **fixed** payment, a compensation based on **effort**, on **results** of the agent's actions or on a mixture of these three categories. The agent's status as a specialist implies an information advantage resulting in the problem of "**hidden action**". The agent may **shirk** on the effort level, he can choose an **undertreatment** / **overtreatment** or he may even select an action the principal would **object** right from the start. It can also be difficult to hold the agent **liable** for his attempts to exploit his superior knowledge. The reason: The results are often not only determined by the agent's effort and choice. They also are exposed to **random** events.

(2) Randomness offers the agent an excuse for unsatisfying results. In turn, this explains the significance of the **incentive-insurance trade-off** for the design of compensation schemes: The **voluntary** character of the contract implies that the agent cannot be **forced** to act optimally. Thus, to induce **optimal** performance, agents should earn **all** the benefits – for example, by paying the principal an upfront royalty. Otherwise, agents may **shirk** because effort creates a **disutility** that is only borne by themselves while the benefits must be **shared** with the principal – ex. g., the French reluctance to start an offensive in World War 2: "Mourir pour Danzig?" However, often this type of performance contract cannot be employed, because the influence of **random** events on the outcome is too strong: Risk-averse agents will **refrain** from performance schemes and prefer contracts offering **fixed** salaries. Not surprisingly, the latter offer no motivation to exert effort. That's why in many situations a sort of "middle road" is taken – contracts featuring fixed and variable components.

(3) In general, a payment scheme trying to "**nudge**" an agent in the direction of optimal effort levels in the face of information asymmetries and significant randomness has to make the agent at least **indifferent** between "cheating" and "trustful behavior": Because specific aspects of the agent's action like the actual effort level cannot be observed, the payment has to be linked to an "auxiliary variable" **correlating** with the agent's choice of action. For example, paying a lecturer on hourly basis induces the teacher to overtreatment – the lessons may then even include the most irrelevant details. When she instead receives an upfront payment, the incentive is to shorten the lessons to the minimum. A possible solution to solve this problem may consist in offering a fixed payment and a bonus depending on the feedback of the participants. However, this leads to another lesson: Fighting one coordination issue by incorporating a corresponding contract element creates **another incentive problem**: When the payment depends on the feedback of the participants, the teacher may become most lenient in test design and evaluation.

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Economics of Information – concluding remarks

(1) Eol replaces the single-sided perspective of neo-classical economics by a more balanced view capable to explain the diversity of coordination mechanisms in reality: Coordination implies producing a satisficing consensus about the determinants of transactions. Because the information available ex ante differs from situation to situation and because coordination mechanisms differ in their "transmitter capability", **different mechanisms** are required to reach this consensus. That is why design elements like a) a **common understanding** due to the actors' same education background, b) variants of **competition** to disclose information rents, c) "**hostages**" like collaterals or d) linking the current transaction to future benefits by **reputation** are incorporated into various mechanisms like hierarchies, markets or **hybrids** (ex. g.: franchise agreements).

(2) Incorporating **bounded rationality** and **insights** from social psychology explains phenomena like the **winner's curse** or **herd behavior**. The latter is caused by the dominance of social rules of thumb in many situations. **Intrinsic** motivation often plays a vital part for a significant share of the population. However, the economic reforms in China illustrate how the performance of economies is linked to mechanisms able to motivate the "average" member to perform in line with the constitutional principles even in nearly **anonymous settings**. Finally, Eol offers a **warning** to "technocrats of coordination design" – as social constructs economic designs are under a permanent "attack" because of a changing environment or new insights. Detailed insights beyond **trends** are not feasible – optimal contracts are an illusion.

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Economics of Information (continued)

The **pentagon** of **coordination** in military affairs and the **procurement** of military hardware – the perspective of the economics of information

(1) The military represents an organization that has to perform in situations of **life or death**. Consequently, its hierarchal system features significant **differences** to the structure of **private** or other **public** organizations – in turn, the latter allow their members higher levels of freedom. This alone **prevents** a general **transfer** of successful concepts from the civilian sector and vice versa. Still, the EoI can be applied to the military as a tool of analysis. To illustrate this statement, the investigation focuses on the problem of “**rent seeking**” in the context of **procurement** of military hardware.

(2) Rent seeking represents **unjustified attempts** by a special interest group to exploit information asymmetries to advance its welfare at the expense of the general population. In general, claims for a **governmental intervention** have to be justified by referring to the two constitutional principles or to the guidelines of social market economies derived from these two principles.

Bureaucracy: Incentive to pursue an inefficient **budget-maximizing strategy** because a greater budget correlates with importance and responsibility. It also offers the opportunity to enjoy more **fringe benefits**.

Politicians: Wars devastate whole generations while others may be fully exempted from this nightmarish experience. Consequently, politicians face the temptation to use the military budget as a “**quarry**” to finance other projects that promise to be more popular in the short-run. This approach may increase the probability of getting **reelected**.

The Challenge: All these groups of actors enjoy information advantages when it comes to specific aspects of national security. **How to secure the efficient level of national security in this setting?**

Arms industry: Seeking to secure the position of a monopolistic supplier in order to gain super-profits. Because of the **longevity** of weapon systems, suppliers need a) “**assurance**” that investments in this branch pay off. b) They often face **only serious competition** when a new system will be procured. c) Contracts for **upgrading, maintenance** and **training** offer additional profits, d) Suppliers use **civilian** markets to “**hedge their bet**.”

(3) **Example**: It can be argued that arms industries have to be owned by the government because of their importance to national security. The challenge lies in reaching a **consensus in society** whether such claims are justified or not. Military organizations and their environment are prone to rent seeking because **war** represents the state of highest **uncertainty** to societies: **Secrecy** and **top-notch systems** redefining the state of art increase the probability of establishing battlefield superiority.

Intelligence agencies / Military: Incentives similar to bureaucrats. Ex. g., the military may **exaggerate** the **number** of units required to counter a threat or ask for the most advanced weapons while **neglecting** the corresponding costs. Analogously, agencies may **exaggerate** a threat to legitimate their existence. In addition, they may offer services traditionally thought to be in the responsibility of police / military forces.

Tax payer: During peace times, the tax payer may **downplay** the importance of national security to reduce their tax load. In times of conflict, the incentive exists to **understate** the personal suitability for military service. Particularly in times of military campaigns in foreign countries, the tax payer in democratic societies prefers **professional armies** to minimize their share of the defense burden.

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Why a general **model of actions** is necessary

(1) Pedagogues like PETER BALTES developed the insight that all human beings are characterized by a **mix of rational acting** and “**irrational**” behavior due to the fundamental restriction. Irrational behavior has its origin in mental malfunctions and in the genetic code of self-interest. In the second case it is particularly suited for situations of emergency where speed is more important than strategic thinking – e.g., because an animal must “**simply**” run for its life.

(2) Merging this insight of pedagogy with JOHN C. HARSANYI's game-theoretic concept of Bayesian updating – capable to analyze constellations where different player types play the same game – enables modern economics to describe human actions in more **realistic ways** – in comparison to the concept of “full rationality always and everywhere”, the famous “**homo oeconomicus**”. For example, estimates of the probability that a certain player type will be encountered in specific situations can be determined by **experiments** or in **field studies**: Already during the American Civil War, battlefield findings revealed that a significant share of soldiers reloaded their muskets or rifles several times without actually firing a single shot. Psychology explains these observations by **combat stress** or the **moral reluctance** to kill other human beings – for a devastating portrayal of this experience in literature, refer to AMBROSE BIERCE's short story “A horseman in the Sky”.

(3) Still, **rational actions** should remain the **main focus** in social sciences: Nearly all human activities profit from rationality because it allows for purpose-driven activities, efficient coordination and moral justification – capable to overcome internal as well as external resistance in the face of scarce resources. In contrast, irrationality must primarily be studied to develop counterstrategies against its **distorting impact** on actions – resulting in phenomena like **herd behavior**. This agenda calls for a **general model of actions** as a foundation. The following section presents a corresponding model that represents a synthesis based on previous proposals developed in decision theory, strategic management (in particular, MICHAEL E. PORTER's value chain) or microeconomics (e.g., the determinants of transactions by OLIVER E. WILLIAMSON). It encompasses two parts: a) The **microstructure** identifies the six interrelated steps of each action with each step serving a specific function to ensure the success of the action. the “**docking points**” in economic activities for coordination purposes – Each action consists of. b) The **macrostructure** – labeled **transaction pyramid** – describes the general features of transactions by **combining** the action sequences of each participant relevant to the transaction with the main motive behind the transaction: The **transaction object**.

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The **microstructure**

The six steps of actions

(1) Determining the goals of the action

(2) Analyzing the current situation

(3) Planning / Decision Phase

(4) Preparatory phase

(5) Implementation phase

(6) Evaluation

Primary function of the three sequences

Developing a “virtual prototype” / „mental blueprint” of the specific action

Decision criteria

- **Efficacy**: Will the goal be met when the corresponding action technology is applied?
- **Efficiency**: The selected action technology achieves the goal at minimum costs.
- **Personal utility**: Does the action represent an “optimal” part of the players' life concepts?
- **Moral Justification**: Is the action compatible to the constitutional guidelines” of a democratic society?

Focus on building **mental models** of reality and on sharing these blueprints by **communication**

Primary Function

The action aims for a **target state** to be defined by ...

- a) **single players** (in accordance with their life concept),
- b) an **organization** (in line with its corporate vision),
- c) a **society** (based on its constitutional order and its policy).

Primary Functions

- Identifying the **variables** that must be influenced to achieve the targeted outcome.
- Determining the **specification** of the variables in the current state.
- Identifying the **technologies** available to influence the variables to achieve the targeted result.

Primary Functions

- Selecting the **optimal** action technology („virtual prototype”) capable to generate the targeted outcome in accordance with the decision criteria.
- **Informing** the individuals involved or even the stakeholders about the choice.

Real dimension of the action

Primary Functions

- Acquiring the **property rights** necessary to implement the chosen technology in accordance the society's system of ownership.
- **Concentrating** the required resources (labor, capital and land) to achieve action readiness.

Primary Function

Execution of the „virtual prototype” by deploying the resources provided during the preparatory phase.

Mental dimension and communication

Primary Functions

- **Assessing** the outcome achieved by referring to the target state formulated as the goal of the action.
- Is it possible to **improve** the virtual prototype?
- Can the virtual prototype of the action even serve as an **institutional arrangement**?

Organizational design elements and key actors in multi-person actions

Key players: Civilian and / or military leaders and staff

Planning and Orders Production

Logistics

Key players: Back office and transport

Interaction / Combat

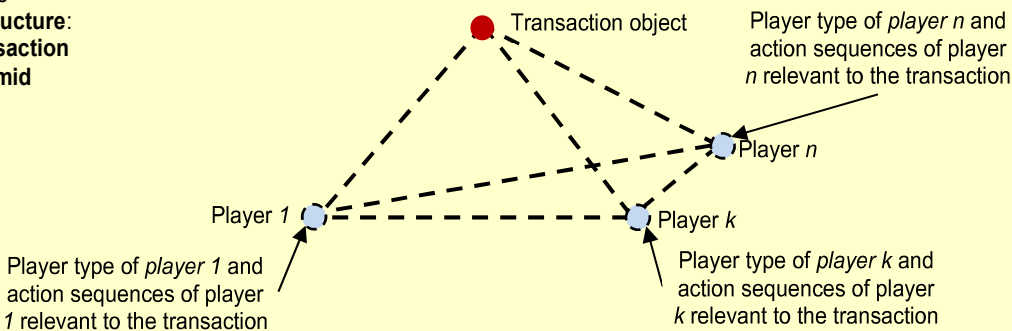
Key players: Front office or rank and file

Auditing

Key players: External & internal revision teams

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The **macrostructure**: The **transaction pyramid**



(1) The “**ideal**” information set: The dashed lines of the pyramid represent the information set players can possess in regard to a) their “**player type**” – opportunistic, Kantian player or even altruistic? – and the mix of rationality and irrationality they display in their actions in general or in specific situations. b) Their **activities** relevant to the transaction and structured by the **six steps** of actions. c) The **type** and the relevant **activities** of **other players**. d) The features of the **transaction object**.

(2) The transaction pyramid offers several **insights**. a) It explains why different transaction conditions require different coordination mechanisms – e.g., it can highlight the training requirements to implement mission-type tactics. b) Its structure helps to determine the coordination costs required to perform a specific transaction. c) It also explains why WILLIAMSON's three determinants – asset specificity, uncertainty and frequency – are not able to provide full-fledged recommendations in coordination design.

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