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ECONOMISTS AND PEACEBUILDING

Jurgen Brauer and Raul Caruso

Introduction

On 7 June 1919, two days after his 36th birthday, John Maynard Keynes resigned from the United Kingdom’s Treasury team at the Paris Peace Conference, who were negotiating what was to become the Treaty of Versailles, signed on 28 June 1919. The details of Keynes’ already lofty intellectual stature and of the political environments in Britain, France, and the United States at the time can be gleaned from Robert Skidelsky’s, and from numerous other, biographies of the man. Upon his resignation, Keynes penned a small book, published in 1920. Called The Economic Consequences of the Peace, he prefaced it as follows:

The writer of this book was temporarily attached to the British Treasury during the war and was their official representative at the Paris Peace Conference up to June 7, 1919; he also sat as deputy for the Chancellor of the Exchequer on the Supreme Economic Council. He resigned from these positions when it became evident that hope could no longer be entertained of substantial modification in the draft Terms of Peace. The grounds of his objection to the Treaty, or rather to the whole policy of the Conference towards the economic problems of Europe, will appear in the following chapters. They are entirely of a public character, and are based on facts known to the whole world.

J.M. KEYNES
KING’S COLLEGE, CAMBRIDGE,
November, 1919

Thereupon, Keynes lay out, in so compelling a fashion that neither his argument nor his evidence have ever seriously been challenged, the case for why the allies’ Terms of Peace to be imposed on Germany were physically and financially impossible to fulfill. The whole of the book can be read in a single, focused three-hour session, but many a reader will do it in less time than that, succumbing to Keynes’ passionate loosening of an avalanche of striking, overwhelming, and eventually mind-numbing specificity: One begins to skip the painful detail of how the victors intend to punish the loser.
Keynes writes (Keynes 1920: 250–251):

If we take the view that for at least a generation to come Germany cannot be trusted with even a modicum of prosperity, that while all our recent Allies are angels of light, all our recent enemies, Germans, Austrians, Hungarians, and the rest, are children of the devil, that year by year Germany must be kept impoverished and her children starved and crippled, and that she must be ringed round by enemies; then we shall reject all the proposals of this chapter, and particularly those which may assist Germany to regain a part of her former material prosperity and find a means of livelihood for the industrial population of her towns. But if this view of nations and of their relation to one another is adopted by the democracies of Western Europe, and is financed by the United States, heaven help us all. If we aim deliberately at the impoverishment of Central Europe, vengeance, I dare predict, will not limp. Nothing can then delay for very long the final civil war between the forces of Reaction and the despairing convulsions of Revolution, before which the horrors of the late German war will fade into nothing, and which will destroy, whoever is victor, the civilisation and the progress of our generation.

Such were ‘the economic consequence of the peace’ indeed: restrictions on world trade hyper-inflation, the depression years in the United States and in Europe, the rise of Hitler, the pogrom that became the Holocaust, and war on such a calamitous scale that ‘the horrors of the late German war will fade into nothing.’ How prescient.

Even though it be true that Keynes’ efforts at sanity failed, one cannot think of a more dramatic demonstration of what good economists have ever done for peace.

Alas, in late 1944, Henry Morgenthau, then-Secretary of the United States Treasury, advocated a ‘harsh peace’ for Germany. His eponymous Morgenthau Plan advocated the partitioning of Germany. He proposed to strip it of its most valuable assets in the West—coal deposits and the iron and steel industry in the Ruhr area—thereby depriving the nation of its industrial prowess. Morgenthau wanted the complete pasteurization of Germany, reducing the people of the geographic heartland of Europe to mere tillers of the land.

Franklin Roosevelt and Winston Churchill agreed to this plan, in modified form, on 16 September 1944. News of the agreement leaked, however, and led to a redoubling of Germany’s albeit already doomed war effort. Following Victory Day, then, Germany remaining factories were dismantled, parts, machinery, and equipment were shipped abroad, patents expropriated, research forbidden, and—in a mad dash—useful engineers and scientists were spirited out of the country just as soon as any of the Allies could lay their hands on them. The German economy duly collapsed and so did Europe’s other postwar economies. It looked as if Keynes’ Economic Consequences of the Peace might be repeated yet again.

Eventually, saner heads prevailed. In the waning moments of the European war the American presidency changed hands. Roosevelt died, and Truman assumed the Presidency on 12 April 1945. Morgenthau’s term as Secretary of the Treasury ended on 22 July 1945. Even as the deindustrialization of Germany proceeded; planned, in a famous speech delivered in Stuttgart on 6 September 1946, Truman
new Secretary of State, James Byrnes, took a dismal view of the effects. So did former
president Herbert Hoover, in a series of reports penned in 1947. As Germans scraped
by on starvation diets, Stalin’s Soviet Union was a rising power. Already it held eastern
Germany and, as from 24 June 1948, it was to blockade the Western allies’ rail and road
access to the partitioned Berlin, prompting them to fly in relief supplies and sharply
escalate the incipient Cold War. The writing on the wall seemed clear: an economically
strengthened, resurgent Germany could either be part of a new Western alliance or else
be incorporated into a Soviet one. As in the 1920s, it was feared that hungry mouths
would flee to those who promised to feed them.

In July 1947, Truman thus came to abolish the punitive measures imposed on
Germany, and his new Secretary of State, General George C. Marshall (Byrnes had
resigned his post in January that year) formulated what would become the eponymous
Marshall Plan, in effect from 1948 to 1952. Not blind to its political purpose, a strange
kind of peace economics had been crafted, for which Marshall would be awarded the
Nobel Peace Prize in 1953.

So there we have the peace economist, in the person of Keynes, and peace economics,
or at least non-war economics, in the person of Marshall. This sets the stage for two
strands one might investigate: one concerning a flurry of books by prominent
economists on the problem of peace, the other, a flurry of activity by bureaucrats and
politicians to secure it. Among the former are such famed names—among economists
at least—as Arthur Pigou, Kenneth Boulding, and Lionel Robbins, Englishmen all, each
penning one or more books detailing their thoughts on the matter. Among today’s
luminaries, economics Nobel Laureate Joseph Stiglitz, together with co-author Linda
Bilmes, is probably the outstanding voice regarding the cost of war, at least US-related
wars. Indeed, about a dozen economics Nobel Laureates, Stiglitz among them, grace
the board of Economists for Peace and Security in the United States. As happened to
Keynes, politics mostly ignores them. But, again as with Keynes, this does not render
their views false.

On the bureaucratic-political side of things, the single most often told story is
that of Jean Monnet and Robert Schuman. Like Keynes, Monnet participated in
the Paris Peace Conference in 1919, in Monnet’s case as an assistant to the French
dlegation. Like Keynes, he envisioned a pan-European economic cooperation zone.
Like Keynes, he would be disappointed. Despite this, the French appreciated his good
efforts and awarded him with the post of Deputy Secretary-General of the newly-
founded League of Nations, Monnet was but 31 years old. He resigned four years
later to devote himself to international business and finance in a private capacity
but resurfaced during the early World War II years in positions of high influence in
France, Britain, and the United States, urging Roosevelt to get on with an industrial
armaments plan, the success of which led Keynes to credit him with shortening the
war by a year. Together with Robert Schuman—the Franco-German-Luxembourgian
statesman, French Minister of Finance, of Foreign Affairs and two-time Prime
Minister of France—plans were crafted and introduced for what with many a twist
and turn would become today’s European Union. These plans were wholly based on
a vision of a pan-European economic union, so intricately interconnected, so tightly
woven, so strongly bound, that European war would no longer be thinkable, nor
indeed feasible.
Figure 11.1 Inflation and purchasing power parity-adjusted per capita GDP, Botswana and Zimbabwe (US$; base year = 2005).

Source: Extracted from Heston, Summers, and Aten (2011)

Defense, conflict, and security economics

As an academic discipline, what has economics ever done for peace? Plenty, it turns out even if the modern-day economics profession, certain luminaries notwithstanding, do not seem much interested in the topic. But just one comparative chart illustrates why the profession, and others, should care: perpetual peace pays; perpetual violence costs (Figure 11.1).

It is not that Botswana has been free of economic troubles, but that its peaceful politics do not impede its economic advancement. The same of course cannot be said about its neighbor, Zimbabwe.

A brief history: in the post-World War II era, defense economics might be dated with the arrival of Robert McNamara in the Pentagon as US Secretary of Defense. Defense economics deals with economic aspects of managing the defense sector and includes topics such as military R&D, procurement, and the defense industry (e.g., Gansh 1980; 1989), military manpower and the debate over moving from conscription to all-volunteer force (e.g., Ash, Hosek, and Warner 2007; Poulsen and Wagener 200). The use of game theory to understand the implications and to devise strategies to manage the then-ongoing nuclear arms race between the United States and the Soviet Union (e.g., Schelling 1960), and alliance theory, the theory of how alliances arise and function (Olson and Zeckhauser, 1966). The key idea is that defense economics deals with aspects internal to the defense establishment. However, this soon gave rise to extensions, such as debates over whether military R&D leads to civilian sector 'spin-offs' (e.g., Rut 2005), whether military spending stimulates otherwise underperforming developing economies (Benoit 1973), and studies on the economic effects of military expenditure national economies even in economically advanced countries. For instance, military bases and arms manufacturers are unevenly distributed across the geography of the United States so that taxes raised in some states benefit other states. Geographically une
military expenditure, in turn, can skew recruitment of military-related construction, engineering, scientific, consulting, and other work and therefore affect local and regional labor markets. Defense economics thus soon attracted independent, academic economists studying the wider beneficial or adverse local, regional, or economy-wide effects of military expenditure per se. The field might well be said to have broadened into military economics (e.g., Smith 2009).

With the ending of the Cold War in the late 1980s, a series of brutal civil wars broke out during the 1990s, not only but especially in Africa, and led to an increased interest in conflict economics. Inasmuch as investments by international financial institutions such as the World Bank Group and the International Monetary Fund were placed at risk, conflict economics, based on academic work by Jack Hirshleifer in particular, became a catchall and a euphemism. As a catchall, it broadened the scope of academic work to consider any type of conflict between and among diverging interests. As such, conflict includes conflict within families, between firms and employees, firms and their suppliers, firms and their customers, conflict between vested interests for public sector largesse, and so on. Hirshleifer applied a 'contest success function', a mathematical description of the likelihood of succeeding in a contest, or conflict. Anderson and Carter’s (2009) Principles of Conflict Economics textbook is a reflection of this, as is The Oxford Handbook on the Economics of Peace and Conflict, edited by Garfinkel and Skaperdas (2012). Yet, conflict economics is also a euphemism as, in practice, much of what conflict researchers address is highly violent, shockingly brutal, endemically entrenched, and sometimes genocidal. Violence economics would be a better term. The much-cited article by Paul Collier (1999) understates matters; the cost of violence is far more than the 2.2 percent growth reduction per conflict year he estimated at the time. As World Bank Group president Robert Zoellick notes in his foreword to the World Development Report 2011, 'Not one low-income country coping with these problems [of weak governance, poverty, and violence] has yet achieved a single Millennium Development Goal'?

Although there already existed a long-standing literature on the economics of terrorism, in the wake of the attacks of 11 September 2001 in the United States, economists paid increasing attention to forms of politically motivated violence other than war and civil war and, with it, to the cost of security beyond traditionally understood defense. Security economics (Brück 2005) emerged and then further branched to encompass aspects such as high-seas piracy and virtually any security-related cost borne by firms and private households in consequence of violence or the threat thereof. Thus, security economics has begun to sidle up to the economics of crime, a well-established field of study. But huge outlays on security in the private and public sectors are also the result of defensive, deflective, or avoidance behavior, that is, prevention. Security amounts to risk management. Security becomes insurance. And yet, although insurance may bring some peace of mind, security is not peace, and security economics is not peace economics.

**Peace economics**

The primary distinguishing characteristic of peace economics lies in its normative aspect (Caruso 2010): how should the world look like, and what can be done to bring about a progressively more stable, peaceful state of the world? We thus define our subject matter as follows: peace economics concerns the economic study and design of political,
economic, and cultural institutions, their interrelations, and their policies to prevent, mitigate, or resolve any type of latent or actual violence or other destructive conflict within and between societies. This normative character has been emphasized, among others, by Isard (1994), Arrow (1995), and Coulomb, Hartley, and Intriligator (2008). Peace economics is ecumenical in welcoming a variety of intellectual approaches. For example, within the orthodox domain of rational choice theory, one might study the conditions under which individuals choose to allocate time and other resources to constructive or destructive ends and attempt to determine just which switch in degree or kind would call forth a corresponding switch in behavior. For example, it is well established that individuals may fall into violent behavior because of poor or unjust economic conditions. An economist might then be concerned with the natural, political, economic, and cultural conditions that shape an individual’s motivation and means to engage in violent or otherwise destructive behavior. This example is positive—it describes the ‘What is’ state of affairs—and is filed under the rubric of conflict or security economics. What pushes the example into peace economics is the normative aspect: to design institutions and policies that prevent, mitigate or resolve actual and potential violence or other destructive conflict by influencing individuals’ choice behavior in favor of peace-creating habits. Peace economics thus embraces the view that behind the veil of positivism there lies a distinct normative view of the world.

Peace economics is not unlike engineering. The point is not merely to describe why bridges collapse or remain standing. Rather, the point is to derive and then apply principles such that only bridges will be built whose likelihood of collapse is near zero. Bridges are constructed in varying environments and to varying specifications. These include the type of soil in which a bridge is anchored, the wind velocities it is subject to, and the traffic it is expected to bear. Likewise, societies large and small operate in varying and constantly changing environments. To fulfill their economic purpose—the assurance of the livelihood of their population—they need to be built to varying specifications. Among these are the construction of institutions and policies that prevent, or at least minimize, unproductive (that is, wastefully destructive) contest.

Post-World War II, Kenneth Boulding put matters succinctly: ‘The economic problem of reconstruction is that of rebuilding the capital of society ... Reconstruction is merely a special case of economic progress. If we are to understand its problems thoroughly, we must examine what is meant by economic progress and try to discover how it comes about’ (our emphases). By ‘capital’ Boulding means assets, things that in time yield income based on these assets. Human capital, of which formal education is an example, is one such asset. During periods of violence, its accumulation is delayed and its stock is depreciated or destroyed. Human capital needs to be rebuilt. Physical and financial capital are other forms of assets that need to be (re)constructed. Thus, peace economics becomes the centerpiece of development economics, and—as Boulding maintains—of all of economics, for which society does not wish to progress further? For Boulding all economics is peace economics and all economists are peace economists. Without development, there is no stable peace; without stable peace, there is no long-term progress. Prosperity is a necessary (but not sufficient) condition for peace, and peace is a necessary (but not sufficient) condition for prosperity.

Following from the previous point one issue, among others, pertains to the concept of stability. Like an engineer who wants to build a stable bridge, peace economists want
to establish stable, peaceful social systems. Boulding (1978) differentiates among stable (continuous) war, unstable war (war punctuated by occasional peace), unstable peace (peace punctuated by occasional war), and stable (continuous) peace. In medieval Genoa, for example, a strategy of mutual deterrence adopted by rival cities continuously generated mutual increases in military might. But in the long term, their arms race equilibrium became unstable, leading Genoa first to social unrest and then to civil war (Greif 2006). As in game theory, peace economics is concerned with the conditions that underpin the existence, uniqueness, and stability of social systems. Evidently, social systems are unstable, or else they would not oscillate between war and peace. Hence, the virtuous cycle of peace and prosperity is vulnerable to breakdown, to reversal, and one objective of peace economics is to identify and to mend vulnerabilities in the system.

Peace economics takes the positive approach as its starting point—one does need to describe, ‘What is’—but then pushes into the normative arena. Rather than standing aloof from application to policy, peace economics invests in application to policy. One example comes from the debate on the ‘democratic peace’ versus the ‘capitalist peace’ in which the statistical evidence by now appears to favor the latter. A normative implication is to let matters of political governance take care of themselves and instead attend to promote economic freedoms: a people who trade and prosper fight more rarely, regardless of the political arrangements of their societies.14

Peace economics for the twenty-first century

Conceptual framework

In a recent article, two researchers write that ‘peace agreements are fragile’ (Bove and Smith 2011: 257). Indeed, depending on how one measures, between one-quarter to one-half of all recent civil wars that ended in peace flared up again within a few years’ time as war. Like engineering bridges, peace economics is not primarily about the prevention of failure (in the sense of ‘keeping the lid on a boiling pot of water’) but about the creation of stable structures of peace. It is about invulnerability, irreversibility, and about the foolproof, unconditional viability of peaceful social systems.

We can now outline our conceptual framework, and the role of peace economics within it, as follows. We define any community of any size as a social system. It consists of natural, political, economic, and cultural domains. Violence is one way by which any domain and the social system as a whole can be threatened. We apply Galtung’s distinction between negative and positive peace (Galtung and Jacobsen 2000). The former refers to the absence of direct violence, the latter to the absence of indirect or structural violence, that is, the presence of conditions that eliminate the causes of violence and establish enduring peace. With low levels of negative peace in any domain (that is, with high levels of violence), the system can become infected, vulnerable, and ‘tip’ into becoming unsustainable. To be sustainable, the system must be designed to be less vulnerable. Now define positive peace as social system sustainability (positive peace = social system sustainability). Characterized by immunity to threat, sustainability requires a threshold level of inoculation where threat atrophies to mere nuisance.15 In principle, sustainability and its threshold can be measured with positive peace or wellbeing indicators of which there are very many, even if not universally agreed upon as yet. It is true that successful
efforts at building positive peace will be measured by lowered levels of violence, but the focus of positive peace does not lie with suppression of that which is destructive; rather, it lies with the upliftment of that which is constructive. The reason for this is that negative peace may result from mere repression of violence (which itself can be violent), leaving underlying causes of violence unaddressed. In contrast, positive peace redresses latent causes of violence to make violence superfluous and even unthinkable.

Negative peace, positive peace, and social system sustainability thus are linked within a common conceptual framework. The objective is to obtain hysteresis—a ratchet-effect—at each stage of successful institution and policy building so that there is no going back. At each stage, achievements are locked in. They become irreversible. System performance variability is reduced, an ever-higher degree of stability is achieved, until a threshold is crossed and an invulnerable end-state of a stable, peaceful social system is obtained. Peace economics enters this framework because of the definition we gave it. It concerns the economic study and design of political, economic, and cultural institutions, their interrelations, and their policies to prevent, mitigate, or resolve any type of latent or actual violence or other destructive conflict within and between societies.

Challenges

Here, we delineate three challenges for peace economics. First, peace economics must provide better measures of positive peace. Second, peace economics must re-engage in the discussion about what counts as economic progress. Third, peace economics must recover and reclaim its own visibility within economics!

Measurement of a phenomenon depends upon the definition of the phenomenon itself. Thus definitions of peace range from cease-fires to the establishment of just societies. Some definitions emphasize the negation of a status (especially of war); others highlight positive components of a peaceful environment. With Galtung, we refer to the first as negative peace and to the latter as positive peace. Both need to be measured, but the measures needed are different. Measurement of negative peace and its effects can refer to a counterfactual state of the world wherein violence or other destructive conflict did not take place. For example, negative peace is, for now, the conceptual basis of the Global Peace Index (GPI), developed by the Institute for Economics and Peace (IEP), in Sydney, Australia. Presently, the GPI is a combined score consisting of measurements of 23 indicators mostly related to the absence of or threat to peace. This includes, for example, factors such as levels of violent crime, military expenditure, and weapons availability. But the ultimate goal is to develop a comprehensive and coherent set of positive peace (social sustainability) measures. Once an initial set of such measures exists, the operational key will be scalability. If indicators are overly community-specific, it is unlikely that they can be generalized across all communities. But if they are too general, they may not speak to local perceptions of and needs for peace. A way around this is to start with top-level indicators, common to all communities, and then scale down to community-specifics by way of ‘satellite’ measures that may only be partially comparable across communities. Because of their training related to data and data analysis, peace economists can make a useful contribution here.

A second issue relates to Boulding’s warning about ‘what is meant by economic progress’, as some varieties of progress can lead to the very chaos and violence that
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Genuine economic progress is meant to prevent. As the International Monetary Fund has belatedly learned, economic growth at all cost will not do. For example, questions about equity of progress invariably enter the picture. At any given point in time, the state of a social system is the outcome of past interactions among natural, political, economic, and cultural domains. It follows that the economic study of institutions and policies has to take things into account that exceed the usual, narrow boundaries of economics. This makes peace economics a branch of economics enriched by contributions from many fields of study such as philosophy, politics, mathematics, psychology, sociology, and ecology. Unlike orthodox economics, peace economics is not obsessed with narrowly applying rational choice theory and its tools. Peace economics neither denies that orthodoxy can be relevant and useful, but nor does it view orthodoxy as the only way forward. Interdisciplinarity makes peace economics part of a broader peace science (Isard 1988).

Third, peace economics needs to recover and reclaim its standing within economics itself. In this regard, it is helpful to list an alphabetized sample of great economists who have devoted considerable effort to think and write about the economics of peace, often in book-length treatments. It includes Kenneth Arrow, Kenneth Boulding, F.Y. Edgeworth, John Kenneth Galbraith, John Harsanyi, Michael Intriligator, Walter Isard, John Maynard Keynes, Lawrence Klein, Wassily Leontief, Friedrich List, Karl Marx, Roger Myerson, Douglass North, Mancur Olson, Vilfredo Pareto, A.C. Pigou, David Ricardo, Lionel Robbins, Thomas Schelling, Joseph A. Schumpeter, Adam Smith, Werner Sombart, Joseph Stiglitz, Jan Tinbergen, Thorstein Veblen, Léon Walras, and Knut Wicksell—a surprisingly diverse assembly (at least to those steeped in the field). Nonetheless, workaday economists today do not appear much concerned with questions of peace. A charitable interpretation is that perhaps they really do believe, as Boulding implied, that all economics is peace economics. Still, if the relevance of a subfield in economics is attested to by inclusion in the Journal of Economic Literature (JEL) classification scheme, then something is amiss. Work related to peace economics is captured mainly in subject codes D74 (conflict; conflict resolution; alliances), D78 (positive analysis of policymaking and implementation), and H56 (national security and war). As yet, there is no descriptor for peace economics as we have defined it. Nevertheless, peace economists today can count on a growing number of specialized outlets that consider their work, including the Journal of Conflict Resolution (since 1956), the Journal of Peace Research (since 1964), Conflict Management and Peace Science (since 1973), Defence and Peace Economics (since 1990), Peace Economics, Peace Science, and Public Policy (since 1993), the Economics of Peace and Security Journal (since 2006), and the International Journal of Development and Conflict (since 2011). A number of Handbooks are available, and textbooks will follow soon. Peace economics is a growing field of study.

Summary

In sum, we assert that while founded on positive precepts, peace economics is particularly distinct for its normative character. Its focus lies on an economic understanding and putting in place political, economic, and cultural structures that would prevent any type of violent conflict and its adverse consequences. In a nutshell, peace economics is about the contribution of economic science to peacebuilding.
Notes

1 Skidelsky (1983).
2 Keynes (1920); also see Keynes (1922).
3 The story goes that when Soviet and US warplanes met in the skies over Korea, during the Korean war, the pilots were mutually perplexed by the similarity of the aircraft, the MIG15 and the F86. It appears both jets were designed, in no small part, by postwar access to German documents as well as post-Nazi scientific, engineering, and design refugees/migrants, one part having gone West, the other East. Ample documentation is available on the internet but see, e.g., the illustration in Budiansky (2004, p. 372). Much the same was true of rocketry and nuclear engineering; see Rhodes (1995) or search for "Operation Paperclip" and "Operation Osavaikhim," respectively.
4 Pigou (1921); Boulding (1945); Robbins (1950). See Coulomb (2004) for a history of economic thought on war and peace.
5 Stiglitz and Bilmes (2008).
6 Although routinely described as "an economist," Monnet received no economics training, nor in fact any post-secondary formal education at all.
8 See, e.g., the essays in Hirshleifer (2001).
9 Relatedly, only in 2009 did the United Nations General Assembly (UNGA) see fit to acknowledge that the Millennium Development Goals are impossible to fulfill in the absence of peace. To quote: “Although the linkage between armed violence and development is not explicit in the Millennium Development Goals, they offer entry points for development agencies to consider. Objectives such as reducing poverty, ensuring maternal health and promoting education are all associated with effective armed violence prevention and reduction initiatives. Nevertheless ... there is no Millennium Development Goal that specifically deals with conflict, violence and insecurity” (UN General Assembly, 5 August 2009, item #33, p. 11, A/64/228).
10 A classic reference is Gurr (1970).
11 On productive and unproductive entrepreneurship, see Baumol (1990). On the economics of destruction see, e.g., Vahabi (2011).
12 Boulding (1945, pp. 4, 73).
13 Interestingly, Léon Walras nominated himself for the 1906 Nobel Peace Prize. He was convinced that the study of economics was a means to promote the peaceful fraternity of states.
15 Note our choice of "inoculation" and "immunity" over the more common term "resilience." Resilience is a biological term that refers for instance to an ecosystem’s ability to bounce back and recover after collapse. In psychology, resilience likewise refers to a post-traumatic "come back." But one does not want individuals and societies to collapse in the first place; one wants immunity to collapse so that resilience will not be necessary.
16 Hysteresis is the dependence of a system state on its own history.
17 See, e.g., Del Castillo (2008); Brauer and Dunne (2012).

References


