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Vienna Institute for Political Economy Research - VIPER e.V.

25 February 2021

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A different sign-system of global social value waits at the doors

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Version 25-02-2021

In its 500 years of evolution the capitalist mode of production has produced different forms of the most abstract incarnation of what the human species uses as the material carrier of general social value - of money. Social value in disguise permeates all internal models of social agents, from individuals via households and firms to state agencies. In a sense we have arrived at a situation where the largest and most powerful social agents are still a handful of nation states, of self-determined 'global players'. Their respective national value system is partly made comparable by the existence of a military hegemon, the USA and its US Dollar. Less powerful nation states are aligned along the dominance of the US Dollar. To fulfil its manifold tasks, the global Dollar system has developed highly complex features, most of them incorporated in what today is called 'international finance'.

If the victory of a single nation state ('America first') over a democratic global governance system fails, this will also imply a different sign-system for global social value. Not just different geographical location, but also other *dimensions of diversity* will have to be taken into account. In short, the complexity of a new form of world money will rise dramatically. By following the historical and logical evolution of money this contribution sketches some basic features of an upcoming complex global money.

1 – Simple Money

To understand complex money, it is necessary to take a look at *simple money*, more precisely: a look on simple *theories* of money. In mainstream classrooms the narrative starts with two owners owning two different commodities. Each of them wants to own a certain amount of the commodities of the other. They want to exchange a part of what they own. If one of them is powerful enough to take away the other's property, then this will be done by brute force. If this is not the case, then the power difference will still play a role, but nevertheless a bargaining process will start. It might well be the case that the worst relative exchange ratio of one of them is still not acceptable for the other one and both walk away without exchange. But assume that the bargaining process leads to a deal, certain quantities of the two commodities are exchanged.

The simplest theory of money holds that signs on durable physical objects, e.g. coins, can solve the double problem that (1) owner 1 has what owner 2 wants, and (2) owner 2 has what owner 1 wants. With the help of such a durable object the exchange action can be taken apart in space and time. It is possible to accept some coins in one location at a specified time and spend it later at a different location. The whole process has some magic: As already was observed by Aristotle in ancient Greece, (Aristotle, Politea I, 9) the *social value* represented by the coin is not[1] the value of consuming commodity 1, and it is not the value of consuming commodity 2. The value sign points at a new dimension, a third dimension of the exchange process: money is a sign of the social dimension of the exchange process. So even a simple theory of money always is a social theory that has to explain why this third dimension of value, the social value dimension, emerges. The answer to this question is that

[1] In early societies - or in the famous cigarette exchange systems of prisoners of war – one of the two commodities might eventually be at the same time the carrier system of social value, i.e. money. But these cases are rare exceptions.

human individuals have the capacity to maintain sophisticated internal models in their brains, and share them with the help of a common language; money never emerged in the animal kingdom.

The internal models used by human individuals are different, but to a large extent they share the same language elements and language structures. Only due to this commonality it could be learned by children how to build their internal models, how to communicate with others when they are adults. The above mentioned bargaining process builds on this capacity to communicate. Language is a sign system. It needs a physical carrier, be it the air that carries sounds, be it letters on a page that are written and read. Money is a sign system too. A famous saying has it that 'Money speaks, wealth whispers.', pointing at the fact that the sign system of money and the sign system of ordinary language are interwoven in a rather sophisticated way. As Gunnar Heinsohn has argued money serves as well as a quite general signal of the power of a person, which in turn is rooted in the person's property, in the wealth it possesses[2].

The latter idea is empirically rather evident though it runs counter the intention of today's mainstream economics to ban all questions of power relations from the economic discourse. Economics shall lose their ties to the classical *political* economy, as which the discipline was born in Britain 200 years ago. A look at the typical framing of commodity exchange in microeconomic theory shows this clearly: Consider the usual Edgeworth Box description of two entities exchanging two different commodities they possess, e.g. compare (Gravelle and Reese, 1981, pp. 456-502). The idea of possible relative exchange ratios is based entirely on some more or less plausible assumptions about innate utility functions of the two traders. These assumptions allow existence, uniqueness and stability of points of the so-called 'contract curve', a set of points where exchanged quantities are said to be Pareto-optimal. This optimality is a misnomer, since the traders do not enjoy any optimality experience; Pareto-optimality only means that it is impossible to increase one trader's utility without decreasing the other trader's utility. The microeconomic argument stops right there, at the point where power relations would have to be introduced. Imagine that the Edgeworth Box collapses and the two traders are 'bargaining' about the same commodity along a straight line. This is the situation of a pure fight decided by instruments of power, all seemingly 'neutral' rationality implanted with the help of the assumption of specially shaped utility functions evaporates in thin air.

The simple theory of money corresponding to a barter economy consisting of equally powerful owners of commodities circumvents the most vital questions on which its string of arguments is based: How did the traders become owners of commodities? Production processes of commodity producing societies are permeated by power relations[3]. Where does the carrier medium for money come from? Historically it was a state, a city state, e.g. Athens, which provided coins, e.g. the 'silver owl' of Athens[4]. But a state is the political power centre, which transformed tribes into societies, which monopolized coercive power and gave birth to a common framework for communication, building of internal models (ideology) and behavioural rules (law system) of its citizens. It is significant that a defining characteristic of microeconomics is its intended negligence of the state. In doing so it escapes into the mysticism of *microtheology*, compare (Hanappi, 1996, p. 6).

In short: without a theory of *political* economy any theory of money will be completely inadequate. With the advent of macroeconomics initiated by John Maynard Keynes the state was taken back to standard mainstream economic theory. A new attempt to understand what money is seemed to be possible.

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[2] See (Heinsohn, 2013).

[3] Ann Davis has shown the importance of the evolution of property relations for production, see (Davis, 2015).

[4] See (Hanappi et al., 1999, pp. 1-48) for a brief synopsis.

2 – Macroeconomic Money

A glance in macroeconomic textbooks shows that the theory of money there still basically is built on the same foundations as the simple theory of money just criticized. There is a canon of three functions, which money has to fulfil (Parkin, p. 630):

- Medium of exchange,
- Unit of Account,
- Store of Value.

It is rather obvious that 'medium of exchange' refers to the double coincidence of wants mentioned above, 'store of value' only singles out the time dimension mentioned there. The fact of the use of internal models by human individuals is reduced to a trivial side issue: The number of exchange relations an individual might want to remember is reduced by the use of money prices. Instead of the n^2-n relations, needed to keep in mind for the exchange of n commodities, now only n money prices are needed, what might be useful for repeated exchanges. The full range of the implications of the use of money for the human mind is left aside. At best, some neighbouring sciences, like sociology or psychology, are invited by mainstream economics to take care of possible wider implications.

Since macroeconomics aims to explain the behaviour of economic aggregates it still has to deal somehow with the phenomenon of price levels, i.e. with inflation and deflation. The microeconomic framework of mainstream theory had provided the issue that prices – always orderly managed by perfect markets[5] - in the end only reflect the different utility functions (preference orders) of individuals. The absolute price level is irrelevant – any more accurate empirical observation would falsify that – and the relative prices are either fixed by the utility landscape or somewhat distorted by market imperfections, e.g. the emergence of unions. Keynes added some advices on clever economic policy that refined the scarce picture of internal model building: To increase employment the state could increase the credit possibilities, which then would lead to higher prices due to increased demand. With a constant nominal wage, the real wage of workers, due to the implicitly assumed quantity theory of money (see below), would fall. Firm owners having *adequate internal models* would thus be willing to employ more people, while workers only having *stupid internal models* that only look at the nominal wage would be ready to work more for the lower real wage. Both sides are content, employment rises.

In Keynes's story the background for the state's possibility to produce inflation still is another old part of the simple theory of money: The Quantity Theory of Money[6]. It is encapsulated in the following equation:

$$P \cdot Y = M \cdot V$$

Y is the vector consisting of all commodity exchanges and P is the vector of the corresponding prices that were used in these exchanges. The sum over all exchanges $\sum P \cdot Y$ thus is the observed GDP in this year. The velocity of money V takes care of the fact that a coin could be used several times for different exchanges in a year. Finally, M is the number of coins, which is needed to enable all the exchanges on the left hand side of the equation. So if the king in a kingdom of the 18th century would provide M coins to support the exchange for a given velocity of money, V, then all exchanges Y could take place with corresponding prices P. If the king would raise the amount of coins, the money supply, by 10 %, then the given exchanges Y would take place at 10 % higher prices. There would be a 10 % inflation rate. So

[5] As a consequence, economic policy recommendations degenerate to the single advice to install perfect markets.
[6] The systematic treatment of this piece of theory goes back to John Stuart Mill (Mill, 1848) and Simon Newcomb (Newcomb, 1885) who used ideas of David Hume.

far the historical story of the quantity theory of money. It still distorts the internal models of many of today's citizens.

Its place in history is immediately visible: Money are coins of precious metals – usually with the face of the king on one side and a number on the other side. The king is the ultimate financial authority, and with the coins in his own treasure chest he finances the coercive control of his kingdom. Precious metals have to be found, e.g. in the silver mines near Athens, or have to be acquired by wars or by marriages with other queens and kings. Therefore, the extension of the money supply is rather cumbersome and actually historical prices mostly followed the fortunes of more or less good harvests of the almost exclusively agricultural economy of that time.

With the introduction of fiat money on a nationwide scale not only the velocity of money increases, the whole circuit of money starts to be based on expectations. Credit that is given from money owners to feudal governance – often in return to participation in governance – makes the money supply fluid. With fiat money and credit the link between precious metals and the price level breaks down: The quantity theory of money became obsolete.

For John Maynard Keynes it was evident that after World War 1 - and particularly after the Great Depression - the modern capitalist state had to play an important role to secure the stability of a bourgeois market economy. In his analysis the key elements to do economic policy concerned employment, interest and money – as the title of his major book indicates, (Keynes, 1936). In the centre of his argument is the investment decision of firm owners, in formal Keynesian macroeconomic models known as the *investment function*. He assumes that if firms invest, then the increased capital stock will also lead to higher employment. This would help to avoid mass unemployment - the major problem Keynes had just experienced in the Great Depression. But how could firms be induced to invest? Here he implicitly makes a distinction between the banking faction of the ruling class and the firm owner faction. Firm owners can decide to use their profits either to invest in their firm, or to carry them to a bank to receive a certain (market) interest rate. Only if the market interest rate is lower than the *expected* internal rate of return that could be made by the investment, only then firms will invest[7]. Once such an investment process sets in, it will be further accelerated by the *expected* additional demand, which the inter-firm investment demand and additional demand from newly employed workers, will make probable[8]. But how could the market interest rate be lowered to stimulate firms to invest? This is the point where money, more precisely (in Keynes original version) credit comes into play. It is the state, represented by its central bank, which can influence the banking sector to reduce the market interest rate. In a developed institutional setting there are several institutional channels to do so (e.g. open-market operations, minimum reserve requirement, etc.). To find a balance between the firm-owner faction and the banking faction of the ruling class, and at the same time to keep investment, i.e. capital accumulation, high enough to avoid mass unemployment is the art that Keynes assigned to a wise monetary policy. Money in the form of coins of precious metal disappears in Keynes' macroeconomic model. The carrier media that express the achieved compromises concerning the social value ascribed to the involved agents are written down and have to be made serious contracts by an acknowledgement given by representatives of state power. Money has taken a first step to become complex money.

3 – Capital

It was already under the wings of the political governance of the feudal class that the money form of capital had started to develop some key features. Two of these features need special emphasis: A

[7] Of course, a steady development of market interest rates of banks is also at risk. But this risk seemed to be manageable by contracts, leaving only a small risk of complete breakdown of state institutions and law.
[8] In formal models this is the so-called accelerator term in the investment function.

tendency to *ever more abstract forms*, and a tendency to conquer *ever larger territories* - not only geographically, but also with respect to areas of everyday life.

While in the 19th century capital was mostly bound to the direct possession of factories and other material parts of the social production process, the 20th century had seen the rise of more abstract *titles of possession*. Since these titles that assign ownership could be shared much easier between multiple owners, the most prospering projects could quickly amass unprecedented amounts of capital. The notion of being 'prospering', i.e. of having a high expected profit rate, developed into the image of pure maximum acceleration, freeing itself from all links to a specific physical production process. It became a fetish. This fetish is a general scheme to interpret all parts of the observed environment, it is the capitalist algorithm[9].

But while the capitalist algorithm selects the most promising (profit maximizing[10]) direction for action, the envisaged *investment in an activity* also needs a starting condition to materialize. This starting condition evidently is the possession of a sufficient amount of 'money', which in the developed world of post-war capitalism has degenerated into a sufficient amount of credit. In turn, the system of interdependent credits nowadays is almost exclusively based on believes. An increasing share of contemporary investment dreams – of large corporations as well as of small social entities - has its foundation in the believe on a mechanism circumscribed as *self-fulfilling prophecy*.

But while in the poor global South the starting condition of high enough creditworthiness is rarely given, the giants of capital accumulation in the North hardly can find investment possibilities with high enough expected profit rates to put their funds. This is why interest rates are so low since decades, this is why securisation games and the encompassing expectation distortions produced the financial collapse in 2008, this is why credit now is pumped into authoritarian, political regimes, which promise to secure profits by pure, coercive police power.

It is in this context in which the emergence of global value chains can easily be understood[11]. And global value chains *have to be* understood to appreciate the new stage of complexity that money forms have reached in the 21st century. The capitalist algorithm works in the sweatshops of the poor South as well as in the decision centres in New York and London. What links them all on the global level is the exchange rate system. This *system* generates and executes exploitation on a global scale. As part of this system, a national administrative faction of the ruling class can split the firm owners into winners (exporters) and losers (importers) if it can manage a depreciation of the national currency. Ordinary employees, being consumers, will be losers anyway in this case. On an interstate level, which then, of course, includes transnational companies, the overall state of the exchange rate network is the momentous outcome of the power relations between the involved players of the global political economy game. The turn to authoritarian solutions in the government of nation states, which recently can be observed, adds a further dimension to the haze of global exchange rate dynamics. Even seemingly small local wars can signal to the rest of the world that a country could use its military dominance, and thus can induce exchange rate developments, e.g. towards the end of the war in Iraq when the victory became clear (from 2008 - 2012) the exchange rate of the US Dollar vis-à-vis the Euro did rise by 14,5 %; the US could consume 14,5 % more imports from the EU.

Capitalism thus seems to return to older forms of exploitation, using less pretension of seemingly fair market exchange and more of directly coercive measures. In the end this seems to be owed to the mentioned difficulty to sustain high enough profit rates within the existing boundaries of the so-called

[9] See (Hanappi, 2013, p. 262) for a definition of this algorithm.

[10] The stipulated model of the maximization of the utility of a human individual just is an ideological transfer meant to pretend that the capital algorithm is a kind of natural phenomenon.

[11] See (Suwandi, 2019).

welfare states of the post-war era. So far brutal exploitation has been exported mostly to the global South, the middle income working classes in the North could be tranquilized by providing them a small share of the surplus made with the help of the power-based exchange rate system. But since 2008 the fragility of this construct cannot be concealed from the general public. The years of the presidency of Donald Trump, the master of the US Dollar during that time, have added further doubts on the adequacy of this currency as a forerunner of a global sign system of global social value. This presidency, and to a lesser extent the erratic behaviour of Boris Johnson, were signs of an upcoming taste for strong man attitudes in larger parts of society. The nameless fear to be finally deprived of the remaining welfare gains relative to the poorest parts of the world now meets the claims of nationalist leaders everywhere promising a renaissance of past national pride. A competing sign system of national social value, of imagined national pride, turns into national aggressions[12].

In such a milieu the complexity of credits based on expectations falters into myriads of short-run, local speculations. For the large funds this is no solution, they remain idle while the mentioned global contradictions keep on growing.

4 – Complex Money

The development of the capitalist credit networks based mainly on unfounded believes that are amplified by loud and incompetent mass media now runs into a sequence of dead ends, of global crises in different domains: Financial crises, climate crises, migration crises, health crises, and so on. By stimulating global communication under the premise of the capitalist algorithm as the dominating interpretation scheme, enlightenment might only come into being the hard way. It will not happen by the texts of knowledgeable wise scholars only, there might first come a new dark age, a time when the environment itself helped by chaotically initiated wars, reduces the needs of people to a basic level.

But even if the worst can be prevented: Since capitalism let the Gini out of the bottle, namely a complex sign system of social value (complex money), it will have to be redesigned, freed from the money form of the capitalist algorithm. Actions of agents on all levels will have to follow a set of different interpretation schemes than capitalist accumulation. The ultimate orientation of social value needs to be *social value for the whole species*, though this is a notion that has to be filled with content. An early truth about political economy from the 19th century had it that all economics in the end boils down to economics of time. And lifetimes of individuals are finite. Participating in the lifetime of the species – which is substantially longer – is a goal that splits human individuals as well as larger social entities into two parts: the individual social entity and the member identity of the species. Both are distinguishable but highly interdependent. Their full interdependence is too complicated to be completely understood by smaller social entities; this is the point where the ***new money form*** of ***'complex money'*** will have to enter. This money form will have to *assign amounts of time of certain activities to social entities* to make them contribute to the reproduction of the species. The goal is not blind growth of the species, i.e. accumulation of the sum of individual life times, but a *democratically* decided improvement of life circumstances. The respective hardness of work activities will have to be used as weight of the time spent, of course. The *weighted time then can be used to exchange it for amounts of commodities and services* that exceed the basic needs[13]. Since division of labour still will exist, products and services still will be commodities. Well-specified market mechanisms used as additional indicators for allocations

[12] In (Hanappi, 2019) the development from integrated capitalism to aggressive, disintegrating capitalism is described in detail.

[13] A first overall goal certainly will be to satisfy basic needs for all human individuals. If this is achieved, then the level of basic needs can be raised.

of commodities can play a role[14]. Proposing new products and processes, of course, is a valued work activity. Evidently a plethora of tailored democratic mechanisms[15] as well as some adopted market mechanisms to collect wants of social entities will be needed to link the social entities' time with the social entities' needs. This can be interpreted as what Hegel had in mind when he talked about the double meaning of the German word 'Aufhebung'.

As described elsewhere, (Hanappi, 2020a), the notion of complexity is itself built on the one hand on the special property of humans to maintain internal models, and on the other hand on their primordial existence as groups. It turns out that in this perspective all modes of human societies have to be considered as complex. In the hopefully emerging new mode of production that follows capitalism complexity will reach a new stage. Replacing the imperative to accumulate 'dead labour', i.e. capital, by the art of reproducing living labour, i.e. mankind's pleasures, will be expressed by the signal system of a money form called complex money. Some contours of this type of money for are sketched below.

Like all money forms, complex money will be embedded in an institutional framework that channels decision-making as well as demand expressions. The key to conflict solution is fast upward and downward communication through as many layers of institutions as possible – and necessary. This is the opposite of a hierarchical top-down command structure. E.g. in capitalism the most powerful decision-making entities sit in the centre and have most capital (creditworthiness) at their disposal. They decide according to the principle of maximal accumulation and their orders were then transmitted downstream.

The new form of complex money also contradicts the famous 'subsidiarity principle', i.e. everything should be solved at the level that can solve it best. As Europe's migration problem in 2015 showed, the 'best' level is neither single EU member state, nor the centre in Brussels[16]. The future solution will have to be rapid communication processes forward and backward through all concerned levels. This is just what the central nervous system in the human body does; in a social context it will be mediated by advanced information technology handled by larger 'sensor' groups in human society[17].

Complex money therefore can be interpreted as a reconciliation device positioned at the borderline between a social entity's subjective abilities and wants and the abilities and wants of each other social entity. It is a two-sided reflector at each of the many links in the network of social entities. On one side it mirrors the essentials of the overall situation (including a self-portrait, i.e. consciousness) back into the internal model of the entity; on the other side it answers the surrounding world that calls for abilities and wants. This two-sided mirror is itself neither an ability nor a want, just as any modern money form of commodity producing societies never could be directly eaten or used as a production tool.

In the internal models of a social entity this abstract Janus face 'money' will still evoke pain (having to spend time on unpleasant work to acquire it) and lust (being able to get socially produced commodities and services). The thrill between these poles cannot and should not disappear. In the end it produces the incentive to gain more lust with less pain.

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[14] The misleading dichotomy between 'the market' and 'the state' can be forgotten, it is obsolete. It will be the mode of production that overcomes capitalism, which will make clear what benefits can be derived from some case-specific, tailored and well-specified market *mechanisms*.

[15] Compare (Scholz-Wäckerle, 2021).

[16] A helpful formalisation of many such difficulties is the game-theoretic 'prisoners' dilemma', see (Rapoport, 1970, pp. 45 - 169). For the described problems a layered structure of such dilemmas will be needed.

[17] These 'sensor' groups are related to what Antonio Gramsci called organic intellectuals, compare (Hanappi, 2020b).

From the point of view of an outside consideration of the network of the species the complex money algorithms and their institutionalized materializations are the glue that keeps the elements together. This glue has to be strong enough to enable social units to maintain and develop their own (necessarily) scaled-down internal models, but it also has to be malleable enough to allow for creativity and innovation of social entities. The latter property has to be specially emphasized. Creativity and innovation are the answer of social entities to pain as well as to lust, they can be born out of need and at the same time indicate that muse has inspired their creator. They emerge as singularities at the level of the respective social entity and might either be a success, e.g. being imitated, or a failure, e.g. vanish and being soon forgotten. It is straightforward to assume that this freedom of being creative and innovative is the 'emotional' (if this adjective can be applied to larger social entities at all) driver for an increase in leisure time, i.e. the reduction of unpleasant work time. Complex money thus is aiming at increasing this kind of leisure time; a stark contrast to the imperative of capital accumulation that has no room for leisure time[18].

5 - Afterthoughts

The development of commodity producing societies and their respective money forms has made a long way. The tendency to an ever more enhanced carrier system for the signal system is obvious: From commodity money like salt, to precious metals, to fiat money, to electronic blinks on a screen. What is less obvious is the abstraction process that *the money forms* experienced in the social practices they invoked. Only in the capitalist mode of production this became very visible, the capital algorithm was an intangible algorithm not directly linked any more to certain amounts of tokens possessed by a demiurge. The network of credits became a pure belief system, going through ups and downs along the lines of amplifying and imploding expectations[19]. Keynes' macroeconomic theory took the first steps towards an understanding of the importance of expectations with respect to money forms. But like Marx – though with less scientific depth – he remained mostly on the level of a single nation state. What has happened in the decades since the end of World War 2 left pivotal marks in the working of capitalism, i.e. in the money form, as well as in the internal models used by the human individuals living in this (now definitively global) mode of production.

Due to several severe global crises the primacy of the group, more precisely the primacy of the species has become an *understandable* strategic element in many citizens' internal models. In the 21st century it might become a *guiding* principle, it always was one of explaining the outstanding characteristics of the human species. In that sense global complex money might emerge as the nerve cord that the central nervous system of humanity needs to reproduce after capitalism is overcome.

References

Davis A. E., 2015, **The Evolution of the Property Relation**, Understanding Paradigms, Debates, and Prospects, Palgrave Macmillan, New York.

[18] The topic of innovation therefore always was an anomaly in neoclassical economics. The 'footnote economist' Schumpeter tried to introduce it as the historical mission of capitalism: Only firm owners that innovate are allowed to call themselves entrepreneurs, (Schumpeter, 1934). This implied the death of capitalism as soon as innovation runs dry, a prophecy hard to swallow for mainstream microtheology. Schumpeter remained a maverick in 20th century economics, a 'footnote economist'.

[19] The system of national government debts is the latest example of a made-up antique drama that turns out to be just a network of more or less credible believes based on the power relations of big global agents. It is almost funny that economists of the so-called 'Modern Monetary Theory' (MMT) now discover that the very old premises some 19th century economists are invalid.

Gravelle H. and Rees R., 1981, **Microeconomics**, Longman Group, Essex (UK).

Hanappi H., 1994, **Evolutionary Economics**. The Evolutionary Revolution in the Social Sciences, Edward Elgar, Avebury Publishers, Aldershot (UK).

Hanappi H. at al., 1999, **Die Zukunft des Geldes**, Wiener Studien zur Politischen Ökonomie, Band 13. On the web: https://legacy.econ.tuwien.ac.at/hanappi/wispo/wispo_13.pdf

Hanappi H., 2013, **Money, Credit, Capital, and the State**, On the evolution of money and institutions, in: Buenstorf G. et al. (eds.), 'The Two Sides of Innovation. Economic Complexity and Evolution', Springer. On the web: http://mpra.ub.uni-muenchen.de/47166/1/MPRA_paper_47166.pdf

Hanappi H., 2019, **From Integrated Capitalism to Disintegrating Capitalism**. Scenarios of a Third World War, American Review of Political Economy Volume 14, Number 1 (2019).

Hanappi H., 2020a, **Perplexing Complexity**. Human Modelling and Primacy of the Group as Essence of Complexity, Review of Evolutionary Political Economy.

Hanappi H., 2020b, **A Global Revolutionary Class will ride the Tiger of Alienation**, Journal for a Global Sustainable Information Society, vol. 18, No.1.

Heinsohn G., 2013, **Ownership Economics: On the Foundations of Interest, Money, Markets, Business Cycles and Economic Development**, Routledge, London.

Keynes J. M., 1936, **The General Theory of Employment, Interest and Money**, Palgrave Macmillan, London.

Mill, J. S., 1848, **Principles of Political Economy with Some of Their Applications to Social Philosophy**, C. C. Little & J. Brown, London.

Newcomb, S., 1885, **Principles of Political Economy**, Harper & Brothers, New York.

Parkin M. 2003, **Economics**, Pearson Education Inc.

Rapoport A., 1970, **N-Person Game Theory**, Ann Arbor Universityof Michigan Press.

Scholz-Wäckerle M. 2021, **Designing the political economy of complex evolving economies**, in 'Handbook of Complexity Economics', edited by Ping Chen, Wolfram Elsner, and Andreas Pyka, forthcoming with Routledge.

Schumpeter J., 1934 (1911), **The Theory of Economic Development**: an inquiry into profits, capital, credit, interest, and the business cycle. New Brunswick, New Jersey: Transaction Books. Original in German: 'Theorie der wirtschaftlichen Entwicklung', 1911.

Suwandi I. 2019, **Value Chains**. The New Economic Imperialism, Monthly Review Press, New York.