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Introduction

The common attitude among many economists is that the market economy should intrinsically be stable and be stabilizing in case of exogenous chocks. This view is held on a basis of a multitude of tests of theoretical models.

Milton Friedman claimed once that a market economy is a necessary condition for democracy and thus we may perhaps also replace the political system with a pure market economy void of collective interference.

A further example of juxtapositions of economic market theory, i.e. neoclassical theory and political dimension, is the widespread comments from economists but even political scientists and sociologists on Arrow's Impossibility theorem. In later years, the understanding of the paradoxical result has increased but still one hears interpretations that while the market is efficient the democratic system is not so.

The recent past starting at the financial debacle in 2008 and its economic and political aftermath has been characterized by confusion and inconsistency both with respect to market behaviour as well as the economic political behaviour.

One example of what we were told by leading theoretical and policy making economists was that low inflation is a necessary condition for long run growth, while we now see central banks trying to cut inflation rate to increase inflation and thereby growth. In this debate, it is interesting to see a rather curious belief that reversibility which occurs in economic models also is believed to exist as a simple relation, with respect to interest rate and inflation.

Such a belief is obviously built on a very superficial analysis between interest rate and inflation where for example Wicksell's distinction between and analysis of natural rate and market rate is completely forgotten.

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Let us go back to the three examples of outspoken believes in the economic theory, particularly the neoclassical theory, which hovers underneath the pure scientific attitudes.

Is the Market Intrinsically Stable?

The question implies that on one hand we may ask if the market as it occurs is stable/stabilizing irrespective of social, cultural political and economic structures and on the other hand we may ask if economic theory can prove that the market is stable/stabilizing per se, using the neoclassical axiomatic structure.

In everyday life, the word stable/stability has one meaning, but in mathematics it has a quite different meaning. Let us start with the latter. In mathematics stability, a bit loosely means that if we are in a certain let us call it A and the state is somehow perturbed and we are instead experiencing state B, there exists "forces" of such a kind that the system brings us back to A after a convergence process.

Still loosely speaking un-stable/instability means that no such convergence process exists so the system will not return to A. We observe here that while the mathematical view of stable/stability is precise, the concept of non-stable/non-stability lacks precision. Instability contains widely different cases such that the state B is in the neighbourhood but is a stable state. However, it can also mean that the system outside A is oscillating. Furthermore, we can think of a situation where the state, which might be thought of as a growth process for example, is thrown out of A, and it adapts to a completely new growth pattern. However, there are many more possibilities.[1]

[1] In economics, the so called Hopf-bifurcation is an interesting analogy. The very state of equilibrium is un-stable but outside the equilibrium state there is a stable oscillation path which is stable but gives rise to oscillations. One could allude to business cycles which oscillate around some kind of expansion path.

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This is by the way an example of a logical principle that says that while defining A the non-A is just a residual which is not defined other than in the negative sense.

Thus, mathematics has a very precise way to define at least stable/stability, but how about the reality? Can we transpose real stability problems into mathematical modelling?

Let us start with an example:

We know that the axioms of the neoclassical theory imply that we define a Euclidian ordered space where the commodities are the different dimensions of the space and consequently the agents are vectors. To aggregate the agents is thus the simple procedure to aggregate vectors of a linear space. Thus, we can discuss economic growth by letting the upper limit of commodities for some or all the dimensions increase. This is quite possible to calculate mathematically but what happens if growth takes place in form of a change number of dimensions and/or some earlier commodity dimensions cease to exist and are replaced by others which have different social roles? Such a transformation of the commodity space is impossible to even think of within an axiomatically defined commodity space.

To make mathematical operations viable between two spaces is that Brouwer's Dimension Invariance Theorem must hold. It tells us that the dimensionality of the two spaces must be the same.[2]

However, when we watch such processes they seem well-behaved. The gigantesque imputation of the digital technique during the late 1900s and early 2000s has had social effects but it at least seems that many societies can cope with it. Interestingly those who seem to have the most problematic effects are societies which are rather closed and show reluctance to the flow of information.

[2] P^n is Homeomorphic to P^m if and only if n = m

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Consequently, it is not a far-fetched suspicion that the smoothness of introduction of new commodity dimensions is affected by social, cultural and political structures.

If this suspicion should be of some relevance, then we leave the realm of the neoclassical theory and must involve the entire dimensionality of the society.To model that seems from a mathematical point of view a bit troublesome.

In economic theory, the commodities are always seen as atomic variables implying that the single commodity is demanded as a physical item independent of any societal structures. From a mathematical point of view this has a rather amusing effect.

A correlate to the neoclassical axiomatic structure is that for any binary choice the preference order is independent of the rest of the commodities in the basket. This means, if we go back to the dimensionality question, that if we have two commodities α and β in a n-dimensional basket, the preference order of α and β is independent of the number of commodity dimensions. This means that we can choose any commodity as a representative commodity and use it as a measure of inflation and/or growth. Thus, we get rid of the dimensionality problem.

Looking at modern consumer theories at the microscopic level they usually starts from Becker's *household production theory* which contradicts the neoclassical axiomatic structure in terms (Becker, 1976; Becker, 1981).

When it concerns the intrinsic stability of the theoretical versus the empirical economy we can say that they are of fundamental different characters. The theoretical picture which is expressed in the neoclassical theory has no stability whatsoever since it is *nowhere dense*.With this we mean that either we are in a prevailing general equilibrium, then the axioms hold, or not. If so any chock which will affect the price-vector will throw the system into a permanent disequilibrium since exchange can only occur in general equilibrium. That the general equilibrium

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is nowhere dense thus implies that it has no neighbourhood.A simple mathematical example is the expression $y = \frac{1}{x}$ where x may converge to 0 but if so from the negative side we approach negative infinity while from the positive side we approach the positive infinitive. Consequently 0 is not a part of any neighbourhood.

The general equilibrium has no neighbourhood, either you are permanently in it or it does not exist. That is so for all axiomatic structures in mathematics. Either they hold or not, no approximations.

The general equilibrium concerns commodities which are completely independent of each other;thus, they can never be part of any commodity structure. This follows from the fact that the axioms define a Euclidian space where the commodities are independent dimensions of the space. If a set of commodities should be transformed to a fixed structure, meaning that the agent bought a structure z such that $z = f(x_i - x_j)$, i,j – 1---n the dimensionality would be reduced to x_1, ---, z, --- x_m, $m < n$.

Consequently, the commodities are demanded only as physical entities. Substitutions are only triggered by price differences. The different preference functions are defined on commodities which are defined in one and only one way. This is the only way that a commodity space could be transformed to a Euclidian space. The commodities are atomistically defined.

In real world, most, not to say all, commodities are dependent on the specific context of the agents. That means that commodities are part of specific consumption structures; Amartya Sen uses the word *menus*.But that also means that the commodities per se are not preferred by the consumers but as parts of wider consumption structures and in that case the same commodity may appear in different such structures. That will also imply that there will be no unique price-vector for the single commodity and a sort of average price will not do.

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It is obvious that if we have a sufficient inertia we may work with single markets per the neoclassical postulates as some kind of proxy but with respect to all kind of aggregation and studies of aggregate levels we are lost.

That means among other things that our measures of inflation must be reconsidered. I will come back to this later.

Thus, we can draw the conclusion that if the empirical economy somehow is stable, such a stability must be defined in a different way than we do in mathematics and furthermore that the causes of such a stability must emanate from the complex of social, cultural and political structures.

This conclusion, which is elaborated in my book from September last year, is also hinted many years ago by *Arrow's Impossibility Theorem* or sometimes *Arrow's paradox*. (Ekstedt, 1915).

The paradoxical result has been discussed even outside the realm of economics by political scientists and even sociologists. Many explanations and interpretations have appeared. All this has certainly been useful at least as intellectual exercises, but the Theorem basically shows an anomaly in the axiomatic structure of the neoclassical theory.

What happens is that Arrow,based on the axioms of the individuals, constructs axioms for the society which keep the basic structure of the axioms concerning the individuals. This means that:

> Pro primo:The individuals are unable to choose in a real meaning but given the preference structure the one controlling the price vector does the very choice (invisible hand perhaps).
>
> Pro secondo: The individuals are unaware/independent of other agents' choice.

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> Pro tertio: The individuals are unaware of the additive aggregation process and cannot affect it.

This is chosen as a norm for the analysis. Then Arrow substitutes these agents constructed by the axioms with agents who are aware of other agents' choice and are aware of the aggregate results and furthermore they can choose among alternatives based on the expected aggregate result.

When we have made this substitution of agents we will have a quite different outcome of the market process which most probably implies that the society will not achieve a Pareto optimum.

Thus, Arrow's Impossibility Theorem is achieved since he analyses agents who do not fulfil the neoclassical axioms.The neoclassical agents are formed by the transformation of the market space to a Euclidian space, where agents are vectors just represented by numbers with no other characteristics. Then we obviously achieve a different result of the market process when these kinds of agents are substituted by agents not fulfilling the axioms.

I mentioned Friedman's claim that free markets are a necessary condition for democracy. I think that I can agree with that if and only if the free markets are not defined as they are formed by the neoclassical axiomatic structure. Thus, we must switch our focus to a non-equilibrium economy where at best local and temporal equilibria may occur but these are dissipative.

In my book from last year I formulate two theorems, one for a barter economy like the neoclassical one and one for a money economy.

For a Barter Economy defined as by the neoclassical axioms we have:

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Proposition I:

> *Assume a system A* consisting of a finite number of subsystems, which are to be regarded as proper classes, s_1 --- s_n. If then we have a measure allowing us to define an optimizing rule both on A* as well as s_1 --- s_n; optimization of the global system A* must imply that at least one of the subsystems s_i must sub-optimize.*
>
> *If on the other hand all the subsystems, s_1 --- s_n are optimized according to the same optimizing process the global system A* must sub-optimize* (Ekstedt, 2015, p.79).

However, when we pass over to analyse a money economy we implicitly reject the general equilibrium theory and money prices become only relevant as measures locally and temporally. In such a state, *with respect to barter economy*, there does not exist anything but at best local and temporal equilibria and these are dependent on social and cultural inertia.

But with respect to a money economy where commodities are valued in money prices, Proposition I has no logical meaning. It is shown in Ekstedt (2015, ch.3):

Proposition II:

With respect to a real analysis equivalent to barter, the Proposition I hold.

When we pass over to a non-equilibrium analysis where goals and restrictions are formulated in monetary terms we lose all logical relations to the real economy and consequently Proposition I has no meaning (Ekstedt, 2015, p.141).

The reason why we get these two results is intrinsic to the very logical character of real commodities and money.

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As we have discussed above we find that the neoclassical axioms transform the commodity space to a Euclidian space and consequently a point in this space is empty of any content except for its numerical value. Following Cantor's unaccountability theorem however we get that any numerical point defined on a real space has the Lebesque value Zero. Thus, the commodities become atomic variables and thus lack any relation to each other.

When we come to money however these are in fact also defined as atomic variables. Any value is defined by the numerical value of money which is a measure.

Consequently, when we for a barter economy rejects the axiomatic structure on the very ground that commodities are structurally defined by the consumer, the demand side will be at variance with the supply side. Consequently, from the producers point of view the commodity is defined as just a physical item, but from the consumers point of view the commodity is defined by its structural components in the current context.[3] We thus transform the commodity to complexes by rejecting the neoclassical axiomatic structure.[4]

However, doing so we also throw out the possibility of a general equilibrium. But money, as we know it in daily use, which has no meaning in a general equilibrium will now become possible to use as a measure. But this measure holds only in a non-equilibrium economy where only at best local and temporal equilibria exist

[3]As a matter of fact, is that the only ranking economist who has observed this is Gerard Debreu who in his book claims that commodities should be indexed locally and temporally and difference in the index implied different commodity. Thus, the only sensible way to interpret Debreu is that a general equilibrium per axiomatic structure is only local and temporal.

[4] We should remind of that Keynes' was one of the more prominent discussants in analytical philosophy of the problem of atomic facts versus complexes, so he was aware of the principle problems we are discussing here.

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and there are no unique price vectors. We can then quote Jean-Baptiste Say (1834[1803], p.247):

> When I am told that the great pyramid of Ghaize is 656 feet square at the base, I can measure a space of 656 feet square at Paris or elsewhere, and form an exact notion of the space the pyramid will cover; but when I am told that a camel is at Cairo worth 50 sequins, that is to say, about 90 ounces of silver, or 100 dollars in coin, I can form no precise notion of the value of the camel; because, although I may have every reason to believe that 100 dollars are worth less at Paris than at Cairo, I can not tell what may be the difference of value.
>
> Thus, we do not know what money measures except the very transactions we are currently involved in.

But having said this we arrive at Proposition II. If we use money as a global measure of values which have appeared in market transactions, we can in fact arrive at a general equilibrium, since we now have transformed the commodities implicitly by using money values as if these were set per the neoclassical axioms. *This is the fundamental theoretical contradiction in economic theory.* It is a trap in which also Keynesians often fall.

The serious effect is mostly concerninflation measurement. Using a mixture of norm baskets built on Laspeyre and Paasche principles will juxtapose the effects caused changes in relative prices and the changes in the dimensionality of the commodity space. Thus, we will have a juxtaposition between inflation and growth. In a very strict anti-inflation regime this might have disastrous long run effects. In Ekstedt (2015: ch.3) such effects are analysed.

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Economics and Ethics

Adam Smith made a very unlucky reference to ethics when he said that the butcher would not sell because of his good heart but because he receives incomes from selling. This has influenced neoclassical economists to make claims that the market principle is an ethical corrective and indeed it is when we analyse the neoclassical axiomatic structure.

As said above the axioms are the same as to construct a Euclidian normed and directed space,the commodities are dimensions and the agents are vectors. Thus, an agent is a point in the interior of the space. But then the agent is also fully represented by its numerical vector value and as such with the Lebesque value zero and completely independent of other points/agents. We also mentioned that the axioms reject any form of commodity structures since the agents are just vectors in the interior space. Consequently, the agents are also denied to form any structures, contrary to what John Donne says in his poem "Every man is an island".

This means that all agents are totally independent of each other except from the very market action. This makes the "neoclassical society" a bit strange from an ethical point of view. We can think of two kinds of examples which in the end are close to each other since both are examples of Nash-equilibrium and imply that everyone has an individual veto concerning all kinds of societal problems. One example of such a society is where we have total chaos. Chaos is a form of equilibrium where we have no ordered changes/developments. The interesting thing about this from a philosophical point of view is that time as a social and/or individual concept disappears. From an economic point of view ordered changes imply conscious actions towards a goal. You can meet this type of society among people deprived of economic and/or social means to change their situation. Noble actions from people of authorities directed to these people without their control is as random as spending the night in jail or be mistreated physically or finding a suitcase with 100 000 euro. Good or bad events are completely out of their control. That means that stealing and robbing is as natural as helping and crying for a

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friend. You cannot speak about moral with a person deprived of any control over her/his own life. So, if we think of legal sanctions, punishment of an individual and a warning to others, it simply does not work since the individual is deprived of any internal possibilities to strive towards a goal.

The other interpretation is the Kantian categorical imperative:*act in such a way that your action could be raised to a common law*.

We can interpret this like all individuals, given budgets, act with the preference functions of all other individuals as restrictions for the choice. This is another formulation of Nash-equilibrium and it partly explains why the idea of market, in its neoclassical formulation, should appear as a corrective.

The weakness of this link between the function of the market and ethics is obvious. First it implies that differences in the contextual apprehension can never occur; there is one and only one right perspective of what is happening and that is the objectively right one. This is the Platonic root. Second the dimensionality of the space of choice must either be constant or perfectly symmetric for all agents. Third, the goals of the individual must never concern any collective/aggregate matters since it is given once and for all. Forth, all possible alternatives are strictly positive and desired by all. Thus, there are no intrinsic conflicts in the choice space.

Fifth, the first four points imply a strictly deterministic universe of the Laplacian kind. This means that we rule out all causal chains and the thought of human being as a subject and a final cause. I remind of the fact that if we have determinism we thus deny cause – effect matters since that implies complexities thus leading us into probability structures.

We may therefore conclude that the ethical content of the neoclassical market theory is built on strict determinism which we earlier saw is the essential part of the axiomatic structure. Determinism also rules out all kind of ethics since ethics is only a relevant concept when there are asymmetric apprehensions of the choice

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space due to a mixture of external and internal factors of the individual, which is then seen as a subject and a final cause.

We have so far dealt with the neoclassical approach. How about Keynesians and Keynes? Keynesians are a rather heterogenous group ranging from those who more or less buy Hicks' approach in the 1937-paper "Mr. Keynes and the Classics", where Keynes' thoughts could be a short run variant of the neoclassical theory which holds in the long-run, to institutional and evolutionary theories. I will therefore avoid commenting on Keynesian approaches (Hicks, 1937). Keynes however is of utmost interest since he wrote his master thesis on philosophy on ethics and more precise on Moore's paradox. G.E. Moore was in Cambridge at the time of Keynes and finished "Principia Ethica" published 1903 (Hicks, 1980-1981).

Moore formulated two versions of his so-called paradox; the strong and the weak form. The weak form technically expressed is:

WF: $a \wedge f(\neg a)$ read a and "I believe non-a"

It is raining but I don't believe it is raining.

The strong form is subsequently:

SF: $a \wedge \neg a$ read a and non-a

Moore's paradox both in its weak and strong form is obviously nonsense when we deal with atomic variables and this was the first real attack on the problem of atomic versus complex variables in logic. Keynes tried to solve this with ordinary logic but his effort was, rather brutally, rejected by Alfred Whitehead, who together with Russell wrote "Principia Mathematica". Whitehead's criticism was that ordinary logics dealt with atomic variables and not complexes. Keynes however took care of the critique and came back with perhaps his most fruitful

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work "Treatise on Probability" where he criticised the probability theory on the bases of the distinction between atomic and complex variables. His main point was that the real scientific problem occurred in the very transformation of a complex variable into an atomic one which can be handled by the probability theory. Since there are no standardised rules for this transformation it is up to the pleasure of the individual scientist who then is the fundamental source of analytical errors. He was supported by Wittgenstein, who in Tractatus Logico Philosophicus formulated the following proposition (Wittgenstein, 1974[1921], p. 65):

> In real life a mathematical proposition is never what we want. Rather, we make use of mathematical propositions only in inferences from propositions that do not belong to mathematics to others that likewise do not belong to mathematics. (In philosophy the question, 'What do we actually use this word or this proposition for?' repeatedly leads to valuable insight.

Anyway, Keynes' philosophical works led him to his famous criticism of Tinbergen in a letter to Roy Harrod, 10th of July 1938 (Keynes Collected Works).

> My point against Tinbergen is a different one. In chemistry and physics and other natural sciences the object of experiment is to fill in the actual values of the various quantities and factors appearing in an equation or a formula; and the work when done is once and for all. In economics that is not the case, and to convert a model into a quantitative formula is to destroy its usefulness as an instrument of thought. Tinbergen endeavours to work out the variable quantities in a particular case, or perhaps in the average of several particular cases, and he then suggests that the quantitative formula so obtained has general validity. Yet in fact, by filling in figures, which one can be quite sure will not apply next time, so far from increasing the value of his instrument, he has destroyed it. All the statisticians tend that way. Colin, for example, has recently persuaded himself that the propensity to consume in terms of money is constant at all phases of the credit cycle. He works out a figure for it and proposes to predict by using the result, regardless of the fact

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> that his own investigations clearly show that it is not constant, in addition to the strong a priori reasons for regarding it as most unlikely that it can be so.

Keynes' philosophical works are of utmost importance since it clearly draws the borderline between natural and social research. It is not concerning mathematics per se or using analogies from natural sciences. The fundamental difference between natural and social sciences is the realization and acceptance of the fact that human beings are subjects and consequently final causes and that implies that they do not react upon the world as given by the physics per se but they reach upon the appearance of the world given by the epistemology and the perspective of the individual. This is also basically what Moore's paradox is about.

It is with this very realization and acceptance, that the fundamental importance of ethics starts, and that the humans themselves are the very roots of uncertainty and instability.

I will not go into discussions of ethical systems and behavioral rules but link ethics to the earlier comments on the neoclassical theory and our two rather disturbing theorems.

With respect to Proposition I it occurs because we reject the transformation of commodities and agents into atomic facts at the macroscopic level. We then have a fundamental rift between the microscopic and the macroscopic level implying that the individuals may well behave per some ethical system but that has no automatic effect of their behavior as a group/collective/society. Thus, a global ethics must explicitly contain the problem of aggregation of ethics. In Roman time, there was an expression *fides punica,* which means that those who belonged to the Roman civilization were separate and different from an ethical perspective. We must revive this expression in our days and ask ourselves of similarities and if we find similar patterns what they imply.

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The second problem to handle with respect to the rift between the microscopic and the macroscopic level is the concept of loyalty. The French minister of foreign affairs during Napoleon and later during the restauration Talleyrand said once "I have always been loyal to France but not so to her rulers".

With respect to Proposition II the conclusions are of a partly different kind. The proposition concerns the different logical character of money and real commodities. The very difference is displayed in Russell's paradox which goes (Weissein, 2000):

Let Pbe the set of all sets which are not members of themselves. Then Pis neither a member of itself nor not a member of itself. Symbolically, let $P = \{x : x \notin x\}$. *Then* $P \in P$ *iff* $P \notin P$.

Thus, we can define two types of sets one type that we call proper sets, where the universal set does not belong to itself. An example is the universal set of brands of cars which is not a brand of a car.

The other type, that we call it non-proper sets, where the universal set belongs to itself. All kinds of numbers, natural, rational, real are such that the universal set obviously belongs to itself. Consequently, all matters which can be simply transformed to atomic variables belong to a non-proper set. Although money is used in different ways it is a kind of measure even if it's just a local and temporal measure but it functions as belonging to non-proper classes.Assume that we have coins of different values, then a set of three coins of value 1 and five coins of value 5 and one of value 2 is equal to one coin of value 10. Thus, we have additive aggregation. As we see this is what we also obtain with respect to commodities and agents by the neoclassical axiomatic structure but this is not possible when the matters we are dealing with are complexes. Russell's paradox can therefore be used to prove both proposition I and II.

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Consequently, from a scientifically point of view this is where methodological ethics becomes important exactly in the way Keynes spells out in his letter to Harrod.

From a macroscopic point of view however we see that proposition II implies that apart from locally and temporally inert situations macroeconomic monetary manipulations with the economy will have distributional and allocational effects on the microeconomic level which are not measurable at the macroeconomic level. Thus, welfare effects as well as growth effects would most probably be asymmetric and would thus also have effects of social, cultural and political character.

We have earlier mentioned the problem of separating growth from inflation when we have a changing dimensionality of the commodity space. Such effects might be dismissed in the short run but repeating a certain policy as the strict anti-inflationary policy in Europe will certainly have social effects.

Another question which might be of utmost importance is the problem of debts, state debts and private debts. Due to changes in the international financial system, banks are refinancing lending at the bond-market thus the value of debt is spread among the actors at the financial markets even households outside the control of the central banks. Thus, state debt and other debts will occur more directly as an asset in the wealth of the households and other market actors. The banks are in fact only to see as mediators. Inflation will then be a threat to the value of the wealth. But then we must ask: What is the value of an asset issued in monetary terms?

Relating to the methods of measuring inflation the value must be measured with respect to a real basket of commodities. So, the future value of a paper asset must be measured in a future commodity basket. If we now maintain a strict austerity policy to protect the value of money debts at the price of growth of welfare and employment, what is then the value of the future commodity basket?

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We have arrived at a pretty nasty question for economic policy which in the end is of pure ethical character: Are we to protect the future value of paper assets and liabilities at the expense of real growth? If we answer Yes to that question we must ask what and who we protect. We perhaps can say that we protect a financial wealth at the price of a shrinking production system and we then also create a process of unlimited concentration of economic wealth. Whether this is socially/culturally/ethically sustainable others than me may answer.

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