

The theoretical bases of economic policy: the Schumpeterian perspective¹

W. F. Stolper

The University of Michigan, Ann Arbor, MI 48109, USA

Abstract. The central role of economic policy in an evolutionary environment is stressed. Based on a Schumpeterian view the theoretical foundations of such a policy are discussed. This investigation leads to the result that not general rules satisfying and maintaining equilibrium are required but a constant watchfulness, reaction, and, if possible, anticipation of what happens in the economy.

Preliminary remarks

The title of this contribution requires a short explanation. I will not discuss the aims of economic policy which are to a considerable extent beyond scientific discussion. I assume that one wants to improve the life of the poorest, insisting, however, that an income redistribution policy alone is not an adequate, and may even be a dangerous, means to achieve this goal, that a better life may best be achieved through economic development. This in no way claims that a better life and economic well-being are the same (although the praise of poverty comes mostly from the rich). It only states that the ability to produce efficiently allows a wider use of resources including more leisure or cultural activities. I also believe that in normal circumstances there is no conflict between equity and growth.

The emphasis on development explains the subtitle of the paper: the Schumpeterian perspective. Schumpeter's central contribution to economics is his evolutionary perspective, a contribution which is increasingly seen as the cardinal step forward which it was. In this paper I want to concentrate on some implications for economic policy which seem to me to follow from the Schumpeterian analysis and its further development in recent years.

¹ Revised and extended version of a lecture given at the Universities of Augsburg and Munich in the spring of 1990. I want to thank Professor Karl W. Roskamp, for a critical reading of an earlier draft. My special thanks are due to my colleague Carl Simon, Professor of Mathematics and Economics at The University of Michigan, who helped me in an essential way with my understanding of what the latest developments in the analysis of dynamic systems are all about.

From Schumpeter I have learned that economic theory deals with the analysis of economic institutions, how these institutions work – of course, under the usual simplifying assumptions – and, because Schumpeter is a theorist of evolution, how these institutions change out of the logic of their own nature. From Schumpeter I have also learned that a theory is not so much right or wrong – given that there are no logical mistakes – but more or less useful to deal with reality.² Or as Alfred Marshall put it, theory is a machine to organize facts.

From Tinbergen, on the other hand, I have learned that theory and policy are mirror images of each other, with the theorist assuming as given what the policy maker wishes to change and vice versa. This simplistic formulation of brilliant ideas must suffice to indicate why the question after the theoretical bases of economic policy is not irrelevant. It *does* make a difference how good the analytical understanding of institutions is, whose behavior one wants to influence, which one may wish to change or even newly create – in Tinbergen's terminology, how one sees the instrument variables and the behavioral equations.³

Economic policy must, of course, be specific. Historically given facts cannot be arbitrarily assumed and this includes a consideration of how the present is rooted in the past. In this paper I can only deal with general observations though I will give some specific examples. The first point to be made is that the analytic basis for policy should be as broad as possible; one always has to make some *ceteris paribus* assumptions, but one should be careful not to assume the problem away. The core of my argument is perhaps that economic policy has no logical place in an equilibrium system of pure competition, but that it is an essential part in an evolutionary system.

Examples of theoretically based economic policies

I start with a few economic policy examples. There was, of course, the liberating idea of *laissez-faire* which was directed against the stifling effect of Government-created and -privileged monopolies. There is the idea of a governmentally imposed planned economy which tried to discard the supposedly anarchic market in full ignorance of how a market really works. With the collapse of the *soi-disant* socialism, and of the really anarchic planned economies, one hardly has to say anything more about it.⁴

Since the end of the Second World War we have had essentially three types of theoretically based economic policy. The Freiburg school has concentrated primarily on defining the institutional basis necessary to allow the market to work properly. It is only a slight exaggeration to say that the theoretical schema underlying its policy is the Walrasian system. The basic idea is perhaps that a market which works properly and in a carefully specified institutional and legal framework will also have desirable social consequences. Of course, there are differences in the treatment of the basic problems by different authors, which cannot be further pursued here.

² Shionoya (1990a).

³ This does not exclude that different theoretical bases may for a considerable time come to the same policy conclusions.

⁴ It is, however, useful to state that Schumpeter's definition of socialism and capitalism does not depend on the use or non-use of the price mechanism, and that he never admitted that Russian bolshevism had anything to do with socialism.

An important consequence of this approach is that the State is mainly considered to be a disturbing element – which de facto it undoubtedly is – and that it is given primarily the function to establish the framework within which the market can work as it theoretically should.

In the more recent past, Keynesianism and monetarism have fought it out for preeminence. Keynesian economic policy concentrates essentially to produce the “correct” aggregate demand in the economy – certainly an important aim.⁵ For the monetarists, the primary concern is to avoid inflation and deflation and to maintain price stability. This, too, is an important aim. The aims of the two approaches are not dissimilar and their explanations also amount in many, but not all, cases to the same thing, e.g., in the explanation of “demand-pull” inflation. The monetarists are somewhat agnostic about what makes an economy grow. It suffices that if one lets the amount of money grow by the same percentage one probably has done everything possible to avoid misfortunes. The Great Depression and later some smaller though still important declines are traced back to faulty monetary policies.⁶

The impetus of Keynesian policy also came from the Great Depression, where the insufficient aggregate demand had its origin in insufficient investment activity. During the Great Depression there was much talk of secular stagnation, etc. which to Schumpeter seemed a total misreading of capitalist reality. Most recently⁷ there was a report that some of the governors of the Federal Reserve System advocated a “Wicksellian” policy of equating the “money” and the “natural” rate of interest, assuming the money rate to be measured by the Federal Funds Rate, and the “natural” rate by the yield of Ten Year Treasury Bonds.

Equilibrium and development

All the mentioned economic policies are based on non-evolutionary pictures of reality. They are either built upon an equilibrium system – whether in the Walrasian, Austrian or English version is here irrelevant – or on “stationary” states based upon dynamic systems.⁸

Thus, the Walrasian system makes several important assumptions, among which the most important for the present context are that no producer has any influence on price and that all parameters stay the same or are changed only by shocks from outside the system. In this system the State has no place and no function. In fact, in none of the equilibrium systems mentioned is there a State. The State is felt to be an imperfection, albeit sometimes an inescapable one, as in the case of defence or the judicial system. Indeed Schumpeter wrote that Walras

⁵ In the foreword to the Hebrew translation of *Capitalism* Schumpeter explicitly agrees with this “Keynesian” aim of the American Full Employment Act of 1945, adding that one may favor a particular policy without necessarily sharing the analytic basis which has served as its justification. (This footnote is based on a manuscript found in the Archives of Harvard University.)

⁶ Here, too, Schumpeter explicitly agreed: it was what turned a retreat into a rout. But Schumpeter nevertheless added that the idea that monetary policy could do very much was ludicrously exaggerated.

⁷ See, for example *The Economist*, April 28, 1990.

⁸ Static and dynamics are here defined strictly by whether there are time-interrelationships or not. But in either case the basic parameters of the system remain constant. For the understanding of Schumpeter it must be remembered that by his definitions dynamic systems may be stationary or static systems evolutionary.

had told him that pure theory would never be able to explain more than processes of adaptation of an economy to changes in parameters coming from outside the system. The optimal properties of the system moreover depend on the assumption of pure competition.⁹

I emphasize this because on the one hand the Walrasian system makes certain assumptions about the nature of the institutions which it formalizes, while on the other hand the Freiburg school and related attempts investigate how institutions have to be shaped to allow the advantages of the market system to develop.

The lack of understanding in Anglo-Saxon countries for the publications of the Freiburg school is, I believe, explicable mainly by the fact that in America, for example, it was taken for granted what in Germany, with its different experience of the Nazis and earlier with its strong socialist parties, had to be said. What in Germany had an important historic function was not so relevant in the United States. The United States had a Sherman Anti-Trust Act already in the 19th century and restraints of trade were under common law prosecuted as criminal offences while such practices enjoyed legal protection and enforcement in Germany.

The Keynesian system is more aggregative. It rests on the assumptions of the possibility of an underdevelopment equilibrium and of the drying up of investment possibilities, that is, also on specific institutional assumptions whose common characteristic is the constancy of the assumed parameters.¹⁰ Changes in parameters may, of course, come about as the result of shocks from outside the system but essentially the Keynesian system, too, analyses only how the economy adapts to shocks to the system.

When parameters remain constant, something else happens. Time may be introduced formally and thus the system may be “dynamized”. This theoretical time is reversible, unlike historic time which goes only in one direction and which is never reversible. Evolution is not the same as dynamics.

Evolutionary theory – Schumpeter’s *Theory of Economic Development* – knows no equilibrium. It knows a market, but this market has no particular normative properties. It has to do with efficiency and it is in a stationary equilibrium

so ziemlich ganz von den Verschiedenheiten der einzelnen Kultur- und Lebensformen unabhängig.¹¹

⁹ When I was a student in Berlin, it was usual to be told that all problems came from “interventionism” and that a market without “intervention” would do just fine. Now in fact, most government policy most of the time is just awful, so the empirical evidence for the proposition that “interventionism” is bad is quite overwhelming. Unfortunately it proves less than it seems, because the results reached on the basis of assumptions of pure competition do not automatically transfer to less perfect situations. Unfortunately, also, Adam did eat the apple and to wish that he had not does not make the results of an analysis based upon the assumption that he did not generally applicable.

¹⁰ Actually, it was already argued early in the development of Keynesian theory that the long-run consumption function would shift upward. But this is an essentially “Schumpeterian” concession to the stationary nature of the Keynesian assumptions.

¹¹ *Theorie der wirtschaftlichen Entwicklung*, first German edition, 1912, p. 86. Second and later German editions, 1925 and later, p. 74. This passage is omitted in the English translation. Translation: “pretty much entirely independent of the specific forms of culture and life.” It might be added that this approach in particular made Schumpeter’s views anathema to all those economists who insisted that economics was a “Geisteswissenschaft” and not a “Naturwissenschaft”.

Besides

Economic activity may have any motive, even a spiritual one, but its meaning is always the satisfaction of wants.¹²

It is only a slight exaggeration to say that an economy in a stationary equilibrium runs itself and needs no special motivations. An evolutionary economy needs particular men and motivations.¹³ It does not run itself. It needs economic policy which permits, rewards and protects the right kind of irreversible change.¹⁴

The Schumpeterian theory of economic development and the so-called chaos theory

In the present context the most important characteristic of the Schumpeterian theory of economic development is that all parameters of the system change from inside the system. An evolutionary system knows no equilibrium. If an equilibrium or its neighborhood is reached it is as a reaction against development, not because of it.¹⁵

It is well known – in fact so well known that it has almost become a caricature of Schumpeter's ideas – that the instrument of Schumpeter's development is the innovation which the entrepreneur realizes. An innovation is any change in the parameters of the system, any change or introduction of new equations into the system. The entrepreneur is initially a terminus technicus for someone who *does* something new, whose motivation is more akin to that of an artist than of a mere manager.¹⁶

The result of the innovations are wave-like movements in the economy; I deliberately avoid the word "cycles". These wave-like movements are inherent to the evolutionary economy and *cannot be eliminated without eliminating evolution itself*, and there are in principle any number of cycles. This is an essential difference to most if not all non-evolutionary business cycle theories. The market and the price system remain, of course, essential as reasonable methods of adaptation, but they can never explain development.

¹² *Theory*, 1934, p. 10.

¹³ See on these points most recently Shionoya (1990 b).

¹⁴ The following quotation is found in the first German edition (*Theorie*, 1912, p. 124, footnote 1): "In einer statischen Wirtschaft geht die Wirtschaft prinzipiell automatisch und führerlos vor sich. Wo Neues entstehen soll, da kann die Masse der Menschen der Führung im eigentlichen Sinn nicht entbehren."

¹⁵ Schumpeter already in 1912 insisted "daß es kein dynamisches Gleichgewicht gibt. Die Entwicklung ist ihrem innersten Wesen nach eine Störung des bestehenden Gleichgewichts ohne jede Tendenz diesem oder überhaupt irgend einem Gleichgewichtszustand wieder zuzustreben. Tritt dann wieder ein Gleichgewichtszustand ein, so geschieht das nicht durch die Triebfedern der Entwicklung selbst, sondern eben durch eine Reaktion gegen dieselbe." (*Theorie*, 1912, p. 189).

¹⁶ Schumpeter has, of course, written lovingly of the real entrepreneurial type, whom Alfred Marshall even compared to a medieval knight on a quest. But in Schumpeter this must be seen in his total picture of capitalist reality which includes sociological and historical considerations. In his *Capitalism, Socialism and Democracy*, for example, Schumpeter points out that the environment might become so hostile to entrepreneurial action, that it just ceases to be worthwhile to fight against the environment. In the present context, all that is required is that someone (and it always must be *someone*, it can never be a *something*) carries out innovations. To the extent to which this function becomes routinized or bureaucratized, it is a movement away from pure capitalism to a transitional economy which makes it ripe for socialism – as Schumpeter defines it, not as Mises/Hayek do.

How can all this be expressed in a formal theory? Jürg Niehans stated that it was Schumpeter's tragedy that he never succeeded in formulating his theory precisely, i.e., mathematically.¹⁷ Schumpeter probably would have agreed. But since Schumpeter wrote originally, the situation has changed dramatically. There have in fact been a number of models of major parts of the Schumpeterian system – though never of the whole all-encompassing vision – with which Schumpeter agreed.¹⁸ And it should be stressed that Schumpeter was delighted about any progress of economics as an exact science even when it might have made his own thinking obsolete.¹⁹

It is, however, hopeless to try to mathematize Schumpeter's ideas with differential calculus. Differential calculus is ideal for the modelling of equilibrium states of catabolisms²⁰ and the processes of adaptation to small deviations from that equilibrium. Much of *Das Wesen und der Hauptinhalt* is a discussion of this point.

Before referring briefly to two models which are not based on differential calculus, i.e., on equilibrating processes of adaptations, two comments need to be made which are relevant for the subject matter of economic policy. First, Schumpeter insists expressis verbis that the essential wave-like movements would hardly be noticed by ordinary people. The really serious economic catastrophes like the Great Depression are results of wrong economic policies and not inherent to the capitalist process.

Secondly, when economists speak of a "regular" cycle of 8 to 11 years, i.e., with variations in length of about 33%, they evidently do not mean it literally – although Schumpeter has been accused of not explaining why there was this great "regularity".

Schumpeter was, of course, quite aware of what has since become known as the chaotic or turbulent nature of reality and tried to come to grips with it by means of his three-cycle scheme. We have now direct evidence that this is the case: In an 8-page letter to Wesley Mitchell, Schumpeter explains that:

on principle I admit an infinite number of fluctuations in the material which are due to a great variety of causes of a very different nature and which all interfere with each other in the most complicated ways. What is called my theory of

¹⁷ Niehans (1981).

¹⁸ This is explicitly true about Frisch's famous model about which a few words will be said further on.

¹⁹ Compare the following letter from Schumpeter to Talljin Koopmans, dated May 26, 1941. "I am so great an admirer of Professor Tinbergen's work and I hope so much from the line of advance he has opened up that I am truly grieved to find that as yet I cannot get over certain objections on general logical grounds. I have a feeling that these objections are really antiquated and that the success of Tinbergen's work should require us to reconstruct our statistical theory rather than to condemn him on the basis of it. You will therefore understand how grateful I am for any attempt which competently espouses his cause as yours does." Letter in the Schumpeter papers in the Harvard University Archives, quoted by permission. This letter should also lay to rest any ideas that Schumpeter's review of Keynes' *General Theory* had anything to do with jealousy of Keynes' success. Jealousy was not in Schumpeter's emotional make-up.

²⁰ This term is used by Schumpeter in 1908, who gives Bishop Whately credit for it. It has since been revived by Mises in 1949 (*Human Action*). Strangely enough, the word is not found in the *Oxford English Dictionary*, or in any American dictionaries I have consulted or in *Langenscheidt's Enzyklopädisches Lexikon*. There is, however, an entry under this word in *The New Palgrave*. The term was coined by Bishop Whately (see also *The New Palgrave*) who wished to rescue economics from the accusation of being materialistic. The word means the science of exchange, thus starting a path towards the subjective theory of value.

fluctuations is really simple to the point of triteness: for it recognizes the action on the economic system of a very great number of factors external to it which are either small or independent in the probability sense, and the presence of a process of change internal to the system which also produces fluctuations of a great variety of periods and amplitudes. . . . I strongly feel that we must get thoroughly rid of the prejudice that our phenomena are simple and can be directly handled by simple methods either theoretical or statistical. . . . But I must repeat again, lest misunderstanding should arise, that I file no theoretical claims for the three cycle scheme. It is primarily a descriptive device which I have found useful. All I claim is, first, that historical analysis readily assigns meaning in terms of definite economic reasons to each of those three cycles and that theoretically there is no reason whatsoever to expect in our material any simple cyclical movement, but every reason to expect a multiplicity of them.²¹

But the central point is really that only recently has the beginning of a mathematical analysis been made which promises to allow an analysis of evolutionary processes, although the ideas go back about a hundred years to Henri Poincaré.

The systems of non-linear equations which are now being developed with increasing thoroughness have characteristics which reflect what Schumpeter saw as the characteristic of capitalist reality: an unending change coming from inside the system influenced also by outside events, a change which never repeats itself exactly and which cannot be precisely predicted.

In this view the precise future is in principle not foreseeable. It is nevertheless structured and in a way determined, but not in a unique way. One might say that there is a deterministic chaos. This is just a paradoxical way of saying that what appears as chaos to the untutored mind has nevertheless some structure to it. Non-linearities permit in principle multiple solutions, i.e., multiple possibilities of real developments.

To see this, it is enough to remember that already quadratic equations have two solutions – if they have a solution at all – and that the chosen solution depends on assumptions outside the system. The mathematician and logician Gödel has also shown that for certain systems there are always questions which cannot be answered from inside the system. And equations of fifth and higher degrees have no general solutions at all which can be expressed in a specific formula.²²

The following aspects of “chaotic” mathematics seem to be of interest for the modelling of Schumpeter’s theory:

1. The exact numerical assumptions are important. To give a complete description of a trajectory, one must, strictly speaking, specify the initial conditions to an infinite number of decimal places. Schumpeter always insisted that theory had

²¹ Letter to Wesley C. Mitchell, dated May 6, 1937. The letter was written in response to Mitchell’s request for Schumpeter’s cyclical datings. Schumpeter, however, also wanted criticism. “In order to enable you to form a judgement and to make it possible for me to benefit fully from it, it is necessary to explain at some length the way in which the question puts itself to me and the purpose which guided me.” The letter is found in the Schumpeter papers in the Harvard University Archive, and quoted by permission.

²² This contrasts very much with our usual approach to count equations and unknowns and be happy when they match. Schumpeter wanted to write a book on logic. This like many other projects of his fertile mind was never even started. I want to thank in this place my colleague Professor Carl Simon for making sure that my mathematical notions are defensible.

- to be not merely quantitative but numerical. It was also this aspect of Tinbergen's work which Schumpeter found extremely significant.
2. There are no exact periodicities. This means that the system never repeats exactly, that there is no equilibrium, and that theory deals with historic time which is not reversible.
 3. The fact that the system has multiple equilibria and extreme sensitivity to initial conditions means not only that one can speak paradoxically of a deterministic chaos, but that there is room, and indeed a need, for human activities (which is a characteristic stressed by Schumpeter for evolution as distinct from the "automatic" equilibrium processes).
 4. Although the system has no stable equilibria and although it never repeats exactly (if it did evolution would stop) and although it is very sensitive to initial conditions, it nevertheless has a certain stability which shows in the so-called "strange attractors" around which the system develops.
 5. Instead of cycles there are oscillations which are "self-similar" but never identical and which may have different lengths and amplitudes. That is, they have all the properties which Schumpeter tried to analyze by means of his three-cycle scheme.

In a "chaotic" system with its feedbacks and irreversibilities, the feedbacks may set the system on a development path which is known not to be optimal but which nevertheless can not be undone. Examples are the video-recorder or the typewriter keyboard which would be just too costly to replace.²³

All this is presumably suitable to deal with Schumpeter's analysis of economic development. Of course, only an actual application can show whether and to what extent, these ideas are applicable to economic data as shown in historic reality, whether reality is indeed chaotic.²⁴

These mathematical developments have unexpected consequences of which I can name only a few. The first is that small differences or changes in the starting situation may have eventual big effects. The meteorologists who apparently were the first to notice this phenomenon, refer to it picturesquely as the butterfly effect; and the more careful of them believe it therefore impossible to make weather forecasts more than five days in the future.

It follows that one cannot automatically assume that small deviations from an assumed norm will somehow average out à la Gauss. They may; but then again they may not. They may lead to serious irregular oscillations with unknown lags. The classical equilibrium approach, on the other hand, implies that small changes in the starting situation will not have serious consequences.

Schumpeter's evolutionary approach tries to show that reality is "turbulent". The question about how innovations can have important consequences even though they are small compared with the size of the American or German econ-

²³ See, e.g., W. Brian Arthur (1990). Another example of a non-optimal development is the different railway gauges in Western Europe, Spain and Russia, which would be just too expensive to standardize.

²⁴ This important point is explicitly raised in the survey article by W. J. Baumol and Jess Benhabib (1989). See specifically the last section on "Empirical Evidence on the Presence of Chaos", pp. 100 ff. There is evidence that reality is "chaotic". Newspaper reports say that ecologists now believe that nature left to itself will not necessarily reach an equilibrium where, for example, predators and prey nicely balance. (Stevens, 1990).

omy has here an answer: small changes can have big effects. Schumpeter claimed for innovations only an “igniting” function.

Here lies also the possibility to model business cycles.²⁵ The first (and non-chaotic) models of this kind – Ragnar Frisch’s or Paul A. Samuelson’s – are based on simple assumptions with but few equations and only a few intertemporal relationships.²⁶ Neither Frisch nor Samuelson make specific empirical assumptions and, of course, Samuelson does not present the interaction-model as a business cycle theory. But both show the dependence of the possible different realities on the specific size of the parameters. Samuelson’s model in particular shows graphically how the same general theory produces entirely different consequences depending on the specific numerical assumptions.

Like Schumpeter, Frisch postulates that possible innovations exist all the time. There is always something happening in the “turbulent” economy. Slutsky²⁷ has shown that under certain assumptions random changes will cumulate to cyclical phenomena. Schumpeter’s innovations may cumulate also in this fashion. Frisch explains the situation slightly differently, apparently at the prodding of Schumpeter and to the latter’s satisfaction.²⁸ The point is really that the possibility of potential innovations becoming actual innovations increases in what Schumpeter called the neighborhood of equilibrium and decreases the further the system moves away from *an* (not *the*) equilibrium. The equilibria themselves are always different, never repeat themselves and the oscillations may have different length and amplitudes. Instead of such concepts as equilibrium or steady state there are now concepts like “strange attractors”²⁹ and instead of regularity we have now “self-similarity”. And quite possibly instead of the traditional decomposition of time series we now come to terms with the non-linearities of a high degree of economic reality in a new manner.

“Chaos” and economic prognoses

How can we look at economic prognoses as a basis for successful economic policy? I start with a quotation.

On the one hand [Poincaré] shows us models which are exact but incapable of prediction, and, on the other hand, models which predict the impossible with certainty. In this way he paves the way for a new type of model, which will

²⁵ J. M. Grandmont (1985). I owe this reference to Professor Carl Simon.

²⁶ There is no space to discuss Tinbergen’s seminal work in this context, or its subsequent developments. See Ragnar Frisch (1933), Paul A. Samuelson (1966).

²⁷ The Slutsky reference is found in Frisch, *op. cit.*

²⁸ Frisch states that Schumpeter agreed that he, Frisch, had modelled Schumpeter’s theory fairly. Frisch gave a mechanical analogy. He said that it was easy to formulate the approach mathematically, but he did not do so (more’s the pity, for no one else seems to have so far to have done so). As stated in my brief account of Frisch’s model given at the founding meeting of the International Joseph A. Schumpeter Society in Augsburg (Stolper, 1988), the model could not account for an upward trend. However, this might be easily remedied. Suppose the pendulum hangs from a structure on a raft swimming in a basin. The water released by Frisch’s gadget which triggers the swings of the pendulum flows into the basin so that the pendulum swings at ever higher levels. Professor Simon suggested that the ripples of the water themselves might suffice to generate further swings.

²⁹ Professor Carl Simon has suggested the following further references: Brock (1986); Brock and Sayers (unpublished manuscript).

indicate what possibilities the future holds in store without predicting which one will be chosen. Such qualitative models are as different from quantitative ones as drawing is from a computation. (Ekeland, 1988, p. 40).

Mankind has always wanted to divine the future, whether by viewing the innards of animals and flights of birds, or by means of computer models. But there is a difference: men can act and thus influence the course of events – to a certain extent, of course.³⁰ Thus the discussion of “rational expectations” suggests, for example, that fiscal policy cannot be successful if the economic subjects interpret it correctly and adapt to it. But this makes the rather strong institutional assumptions (a) that everybody has the same idea of rationality (a criticism made by Gottfried Haberler) and (b) that he is in fact able to act on his knowledge.

To show what is the issue here I should like to describe briefly the Michigan model. It was born in 1953 with about 20 equations. It is the original Klein-Goldberger model which led to the Nobel prize for Lawrence Klein. All large-scale models are descendents of this model. The model has now grown to more than 220 equations which are continuously modified; and new equations are introduced as the economy changes, new ideas arise, new data become available, or a new understanding is achieved. All this becomes possible because of the computer.

The “solution” of this large system, i.e., its success in making correct predictions, does not depend only on the quality of the equations and the “hardness” of the data fed into it, but also on the skill and intelligence of the predictor. A “purely scientific” prediction – or so people like myself have been educated to believe – would be that one makes the best possible assumptions, i.e., here that one determines the starting point as correctly as possible, and then just lets the computer find the answer(s) without trying to influence further the results of the calculations which the computer makes.

But this is just what does not happen and it cannot happen. Non-linear equations of high degree may have multiple solutions. This means that there must all the time be decisions concerning the algorithm one wants the computer to follow. With more than 200 equations with their feedbacks and intertemporal connections the degree of non-linearity is no longer obvious, and in addition new information becomes continuously available, e.g., new information about GNP, prices, consumption and investments, employment, quantity of money (however defined) or expected fiscal policies which it would be foolish to ignore. The new information including the estimates of some future (short-term) development are constantly fed into the computer.

All this influences what the computer predicts. It is obvious that this leaves the door wide open for all kinds of charlatans. But it is just as obvious that one cannot do without such activities, to use a neutral word, in a complicated world with innumerable lags, feedbacks, non-linearities of uncertain degree, and in principle unpredictable future developments.

³⁰ A beautiful example of how the course of events may be influenced at one time but later becomes impossible to influence, is Knut Borchardt's discussion of “Zwangslagen” in the German economy. Decisions which in 1927 were possible and would have prevented much misery later, became in 1931 and 1932 all but impossible. The cost of the Reagan economic policy also become only gradually visible, e.g., in the budget stalemate of 1990, or the Savings and Loan debacle. This is a different view from the inevitability of fate of the Greek tragedy: The tragic hero, by trying to avoid his fate brings it about. Oedipus kills his father and marries his mother in the end.

Development and economic policy

I now come at last to the role of economic policy in an evolutionary economy. The first point is negative. There is little sense in developing detailed perspective plans as soviet planning theory demanded. The Michigan model – which is a forecasting, not a planning model – is revised at least every two months, as new and revised data become available or new problems arise.

Of course, we cannot avoid being concerned with the more distant future. From a developmental standpoint the fact that the future cannot be foreseen with sufficient precision to make specific plans implies that the major aim of policy must be essentially an “environmental” policy which allows a stream of innovations.³¹ This in turn means increases in productivity, which in turn means an increasing availability of resources for all purposes. The achievement of this aim requires the creation of sufficient reserves to deal with any sudden demands whether they be opportunities arising or dangers to be combatted.³²

With international integration, such reserves include, of course, sufficient foreign exchange, but primarily a policy that does not put too much strain on the balance of payments; and domestically a careful policy that allows resources to be made available for productive investments at a later date. This includes also the need to be prepared for counter-cyclical policy. This again requires a careful supervision of how money is spent – Florida land booms or Saving and Loan crises are not inherent in capitalist development but caused by failures of economic policies.

In other words, one cannot reasonably assume that everything will go just fine, whether this is in the form of “tight” planning in LDCs or unrealistic budget forecasts in the United States. The lack of sufficient reserves makes it almost impossible in the United States to make a counter-cyclical policy – surely tax increases and public expenditures cuts are not called for in a recession, yet have become inevitable because of past policies. And a policy which has produced high savings rates allows the Federal Republic of Germany to deal – not without pain to be sure – with the enormous demands on resources which re-unification presents.

The issue is not deficit financing or counter-cyclical tax and expenditure policies but, in Schumpeter’s words, the conflict between the present and the future, between adequate savings and higher present standards of living.

Economic policy must, of course, always be more specific than can be dealt with here. I start with budgetary and monetary policy. In the next section I will comment on the need for social policy.

To start with, economics deals with more-or-less, not with either-or problems. The usefulness of general rules is limited. The question is not merely whether you want regulation or not, but always how much or how long and precisely in what form. Similarly, a rational price system is absolutely essential, but taken for itself it will not produce the stability so often ascribed to it. I can do not better than to

³¹ This is consistent with the views of the Freiburg school.

³² In another context I have characterized this general aim as ensuring that in the course of time ever better decisions can be made. You know that in five years – five year plans have been a favorite sport – you will have to make new decisions under circumstances which cannot be foreseen. Present decisions must not be such that it becomes doubtful whether five years hence sufficient resources will be available for the execution of further plans. See Stolper (1966).

quote Schumpeter to make clear that I do not refer to the possibility of an under-employment equilibrium:

- (2) The proof that competitive equilibrium is stable, does not admit of extension to the case of limited competition. And all deviations from an unrealizable ideal state of competition may be so many causes of instability and disturbance.
- (3) Even a perfectly competitive state of things would be exceedingly sensitive to disturbances from outside. Such disturbances which obviously are plentiful at present [i.e. during the Great Depression] must primarily be looked to, if we are to understand the instabilities and troubles of the day. Among them we must not forget to glance at the general humor of the social environment which, quite apart from specific measures resulting from it, may injure the efficiency of the capitalist machinery in a thousand ways by a general hostility to the forms of life and methods of business with which capitalist society works.³³

In order to deal with these problems effectively, there must be a productive economy. Only an economy which can produce can deal with all the other desirable aims. For that purpose high savings and investment rates are needed; how high at any one moment depends on the real rate of interest, which itself is an evolutionary phenomenon. The first objective of economic policy must be to safeguard the resources needed for development.

Monetary and fiscal policy are interrelated and in part substitutes for each other. From an evolutionary standpoint they have distinct roles. The major role of monetary policy must be to allow resources to be channeled into developmental channels at as low interest rates as possible. The major function of fiscal policy is not only so much to provide a balance wheel to control total expenditures in the economy on an aggregative level, but to produce a tax structure which favors savings and growth and prevents crowding out.

The extent of the desirable budget deficit is given by the question whether there is crowding out or not, i.e., by the real rate of interest. Personally, I would defend as structure of taxes which relied much more on general sales taxes – which can be made very social by exempting food and medicines – and on personal income taxes, but reduces corporation income taxes which I do not consider good taxes from the developmental standpoint. I add that this is precisely what Schumpeter proposed. In numerous letters he reaffirmed his strong belief in the virtues of sales taxes and simultaneously considered any sizeable cuts in expenditures an illusion which hurt most the very people who advocated them most.

It should also be added that Schumpeter strongly agreed with the aims of the Full Employment Bill. This is what he had to say on this issue in the Foreword to the Hebrew translation of *Capitalism*.³⁴

In order to appreciate this plan and to approve it – as I personally do – it is not necessary to accept the economic theory behind it. The sponsors of the bill and their advisers seem to me to place an undue amount of confidence into the mere mechanics of expenditures and particularly in the efficacy of governmental

³³ Clemence (1951) pp. 123/124. Or *Reconstruction*, pp. 175/176. This was written in 1934, decades before the development of chaos theory.

³⁴ I quote from the typewritten manuscript found in the Schumpeter papers in the Harvard University Archive, dated Cambridge, Mass, May 1945. Schumpeter's comments actually refer to the Full Employment Bill before it became law. The printed version is not available to me.

deficit expenditure. But all that really matters is that the bill, if passed, would create machinery for coordinating and rationalizing the unwieldy mass of private and public decisions that produce subsequent business situations, and for prompt preventive and remedial action.

The issue becomes here that government expenditures should take a form that can be quickly stopped, or even better, that stop automatically when no longer needed. Of course, government has to provide roads and schools, and no doubt to some extent these public works can be used for counter-cyclical policy.³⁵ But the use for this purpose is and should be limited: you need schools when there are children to be educated, not when a depression hits. On the other hand, unemployment relief meets this criterion. Schumpeter advocated that any measure of deficit financing should also provide for its cessation as soon as the need for it has disappeared. And so would, to some extent, Milton Friedman's negative income tax.

“Environmental factors”

I now come to the environmental factors to which Schumpeter refers. The first of these, the need for savings, has already been discussed. The decisive difference between the Keynes of the *General Theory* and Schumpeter is that Keynes believed that technological progress itself was subject to diminishing returns, something Schumpeter considered illogical, if not absurd. But the consequence of this view is not merely a pessimism about the necessary investments forthcoming, but a policy which is actively hostile to savings. The real problem with deficit financing is that it all too easily creates a policy in which consumption interests swamp the needs of investments³⁶, and, as chaos theory suggests, situations which can be reversed only with great difficulty if at all.

The second point is to discuss social policy in the context of development. Here too, the problem is of a more-or-less rather than an either-or nature. There is no doubt that social policy may be the danger for development, a point stressed by the political right and also stressed by Schumpeter already in 1918. But there are two aspects which make social policy in my opinion a logical complement of development.

To start off, development means change, and change means that someone gets hurt. It is necessary to stress that present virtue will be rewarded later. But it is not sufficient to argue that on the average everybody will be better off. It is the

³⁵ To some extent the market will see to that. Very low interest rates during a depression make borrowing by municipalities and other government authorities for public works easier as well as more attractive.

³⁶ Schumpeter thought that, although Keynes did not create the hostility to savings in the United States, the fact that it already existed there accounted for much of his success: it seemed to give a rationale for what people wanted to do anyway. But Schumpeter was also very pleased with Keynes' plan on how to finance the war which stressed savings. In the public discussion of “supply siders” one finds continuously that any reduction of consumption would reduce investment incentives – which is the same old hostility to savings noted by Schumpeter. On the other hand, the so-called “liberal” economists who are all supposed to be big spenders and “Keynesians” stress the need for increased savings at the present time so as to reduce the real rates of interest and stimulate investments – which is precisely Schumpeter's point. Things evidently are not always what they seem.

individual who counts. People age, the workers displaced by technical change may not find alternative jobs without great loss of wages etc. Social policy is a requirement of social justice, of today's social environment.

But there is no sense in trying to preserve specific jobs, and indeed there is great danger in that because it is a policy not to facilitate adaptations but to prevent change, a policy that necessarily must fail, but which in the process of failure involves high and unnecessary cost.

On the other hand, there is a great deal of economic sense in trying to maintain incomes. Any successful innovation eventually leads to an increase in available goods and a deflationary pressure as new goods come on the market, and loans are repaid and old producers are driven out of business. Such a downward movement is a part of the cycle which, to some extent, must occur, but which must not be allowed to get out of hand: In Schumpeterian terminology, a recession is needed, a depression is logically unnecessary. Social policy becomes also a method of preventing an unnecessary deflation. In this context only a few hints must suffice on Schumpeter's view of the function of money in an evolutionary capitalist economy.

In a stationary equilibrium economy, money provides simply the numéraire which allows relative prices to be translated into money prices. As Schumpeter noticed (with some pride at this discovery, it might be added) there must be one good which is not demanded for its own sake. The institution of money is a logical part of an equilibrium system, and not dependent on such reasoning as that it makes transactions more convenient. And that, i.e., the determination of money prices, is all that the quantity theory of money can satisfactorily explain.

In an evolutionary capitalist economy, the factors of production needed to introduce innovations must be bought, typically, "though not of logical necessity", with newly created credit. (I consider here only Schumpeter's first approximation.) In non-capitalist societies, the same shift of factors or production into innovative channels is achieved through a command, be it that of central socialist planners or of a feudal lord.

There is every sense to mitigate the inevitable deflationary process through a social policy which adapts consumption levels to the new productive capacity and to prevent the quantity of money from falling so as to plunge the economy into a depression which, in Schumpeter's analysis, has no economic function. Social policy which maintains incomes fulfils also this function without hurting the necessary future savings activities.³⁷

Thus I come to the conclusion that social policy becomes necessary precisely in an evolutionary economy in which its major function is to maintain incomes, but not specific jobs.

³⁷ There is here a certain parallelism to monetarist prescriptions of maintaining the growth of the amount of money – the exact definition is not at issue here. Schumpeter also agrees with the monetarists that one cannot really trust Government to do even otherwise desirable things right. But there are also important differences. In principle, all policy prescriptions of Schumpeter rest on a real basis and allow a rather more active role for policy. But in this connection it is only fair to add that Milton Friedman is not only the dean of monetarists but also the father of the negative income tax whose purpose is precisely to maintain incomes. But as I quoted Schumpeter before, one may well agree with policies without agreeing on the theoretical basis underlying the prescriptions. And one may also accept some analyses while putting them into a different context or interpreting them differently. Yet sooner or later will come the point where different theories imply different actions.

Concluding remarks

In many respects the prescriptions of evolutionary and other economic policies agree. This should not be surprising. It nevertheless seems to me important to stress the central role of economic policy in an evolutionary environment. Evolution demands economic policy. Equilibrium can do without it. Evolution demands constant watchfulness and reaction and, if possible, anticipation of what happens in the economy. Equilibrium can be satisfied with general rules – and what is true for equilibrium is also true for “steady states” or “proportional development”.

Evolutionary economic policy also must always ask the question of how a particular situation has come about. The discussion of the American budgetary problems or the reform problems in, say, the former GDR are beautiful examples. In the US the current budgetary discussion suffers from the fact that it is politically apparently unacceptable to stress that the present difficulties have been created by policies which go back at least a decade, and that there can be no quick fix. In fact, as the result of the de facto anti-savings policy of the past few years, a situation has been created in which there is no “right” policy to avoid a recession, only a least bad one.

A similar lack of historic perspective is visible in the former GDR and the other communist countries whose economies have collapsed – as experts like Abram Bergson have foreseen for some time. There are two aspects involved: the first is that generally time lags are underestimated which must elapse until a (good or bad) policy becomes effective. So if someone warns that a particular policy will lead to trouble, there is disbelief and lack of still possible counteraction if this trouble does not appear immediately.

The second is that one cannot simply undo the past. History moves only in one direction. It is impossible to achieve a state of affairs which, with a different starting point, would have been reached. There is much loose talk particularly in the former communist East about the “social achievements” of the system which now must be sacrificed on the altar of the market system, and about attempts to find a middle way.

What is overlooked is that the collapse came about precisely because past policies were unsustainable without adequate increases in productivity and that the losses of social security are not the consequence of a shift to a new market system but of past policies. Talk about preserving a middle way are mostly nothing but wishes to make history stand still, to avoid the necessary changes which will make the future better. This phenomenon is, of course, familiar to anyone who ever has worked in an LDC. And an American has to be somewhat charitable in judging other countries, since in his country the same phenomenon can be seen in the insistence that the past good years were the achievement of the President while the enormous deficits (and in the private sector, the Savings and Loan debacle or the junk bond excesses) which were among the root causes of that very prosperity are blamed upon Congress. Only a totally un-evolutionary view can have it both ways.

There is a final point. The results of an equilibrium economy are peace and quiet – and poverty and a firm social structure. Yet, if reality is “turbulent”, this peace and quiet cannot last: it is impossible to lock in a desirable structure without constant change.

The result of an evolutionary economy is change, social unrest, increased welfare of all, particularly of the poor, but at great temporary cost. It is not

surprising that every-one wants the results of evolution without being willing to pay the price. It is not surprising that the wish for simple utopian solutions never ceases. It is a function of economic policy in a stationary economy to leave everything alone. It is the function of economic (including social) policy in an evolutionary economy to facilitate changes but to mitigate their cost. This is its ultimate contribution to the stability of the social system which allows economic development.

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