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Economic Policy and the Financial Crisis

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1 Bridges to Babylon

Critical economic policy – from Keynesian macroeconomics to evolutionary macroeconomic simulation models

Hardy Hanappi

Comments and explanations of the worldwide social crisis, reaching from economic and political turmoil to a multi-faceted cultural decline, are flooding the information environment. It is not just the sheer quantity that has arrived at an all-time high; it is also the vehemence of the style of contributions, which is impressive. It shows that scientists and the popularizing media across many disciplines are learning that the last five years are turning out to be the prelude to a major reshaping of human society. But unfortunately enough, the core sciences needed to structure the discourse, namely the three social sciences (political science, economics, sociology), proved unable to provide even the basics of a common language able to debate the newly emerging phenomena. The division of labor in scientific work, which dominated the after-war development, has left a completely disjoint field of specialists expressing themselves in a multitude of professional jargons. Moreover, the institutionalized rules for successful academic careers further amplified the tendencies to ever more singular formal and informal styles, producing academic islands and insider schools. Travels between these islands became cumbersome and ruined chances to get tenure at a respectable academic institution. As soon as a unifying event, e.g., the current global crisis, occurs and scientists are asked for explanations it suddenly becomes visible: The tower of Babel erected by scientists is inhabited by tribes whose languages have been confounded – not by an anxious God afraid of losing its omnipotence (as in the ancient legend), but as a joint product of the misunderstood primacy of the methodological principle of steadily increasing specialization and a loss of public support for synthetic theory building. We are confronted with a scientific Babylon, an arcane church built of highly sophisticated pieces of knowledge, which nevertheless remains mute – amidst the white noise of singular comments – with regard to a sensible understanding of contemporary global political economy.

This chapter will only to a limited extent point at the shortcomings of mainstream economics; there already exists an enormous amount of valuable critique, in theoretical investigations as well as with respect to empirical research. In the current political situation what is needed even more is to collect and to synthesize

the existing valid pieces of the knowledge puzzle "political economy." In other words, to build and to rebuild bridges: bridges built of a language enabling mutual understanding between the tribes living on the island of science – Babylon; but also bridges that enable intellectual travel from the ivory tower of knowledge development to the mundane mainland of ordinary inhabitants of the planet – and back. This idea was the motive for stealing the strange title of the chapter from an album of a famous rock and roll band.

As a preparatory device, bridge-building needs the fundament of a set of entities, or pillars, which can be connected to the diverse theoretical continents. What are the elements to which political economy refers to? Figure 1.1 provides the proposal on which all of what follows will be based.

At the lowest level the human species consists of individual members of the species (i), which interact physically in a material environment. To enable their reproduction as species, i.e., beyond the short lives of the individuals, human societies are a cooperating unit with the capability of internal communication. For thousands of years this unit has used a language element, a sign, for the social value of a procedure or the product of a procedure. The material carrier of this sign of social value is called "money" (cf. Hanappi 2013a). The level above the individuals shows the social institutions which are necessary to regulate the primary metabolism of the species: state institutions (eventually divided into Montesquieu's three functions:[1] PLM, LEG and EXE), production units (eventually divided into state-governed and private firms, the latter again distinguished as[2] TNCs and SMEs) and households (eventually divided along the dominant form of income[3]: HHO, HHS, HHB and HHW). To the right of this national setting the fact that nations collide – increasingly are forced to find forms of survival between dominance and cooperation – is summarized by a box labeled "Global environment." In macroeconomics of open economies this box typically

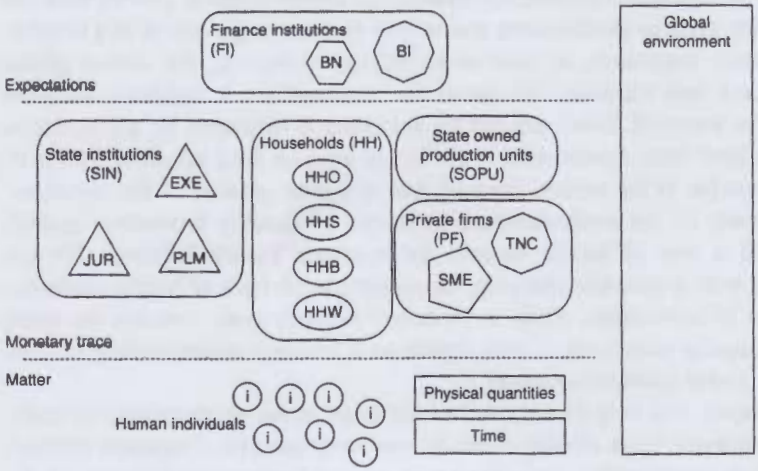

Figure 1.1 The entities of political economy.

would be filled with just another copy of all the entities on the left to depict the two-country case. Note that for each of the two countries a different content of production units, households and state elements can be specified. More on this topic follows in Section 4. Finally, on top of the figure the entities driving the meta-rules of finance are shown (eventually divided into local national players and large, globally acting entities); again Section 4 will elaborate on this issue. The level of granularity of Figure 1.1 has been chosen in a way that should show some major network structures typically used in theory building on this set of entities, while avoiding too much detail.

Equipped with this set of entities, the bridge-building exercise[4] can be started.

1 Macroeconomics (from Walras to Keynes and back)

The last grand attempt for a unified economic approach, linking Keynes' ideas on macroeconomic aggregates with the standard microeconomic optimization framework, was the so-called "neo-classical synthesis" developed[5] from 1947 till the 1970s. Starting with the Walrasian component, a sensible point of departure is to highlight how the marginalist revolution of 1874 (led by Leon Walras, Stanley Jevons and Carl Menger) had been a response to classical political economy, in particular a refusal to its final zenith in the work of Karl Marx. Put in a nutshell, the latter had claimed that aggregation along the lines of class distinctions provides a *theory of exploitation*. In short, the *driving force of capitalism* is the total of *firm owners' activities to maximize profits*, and total profits are the difference between total *revenues* and total *cost*. The limits to *increase revenues* – the product of quantity sold times the (average) price of a unit – are given by production technology, market conditions (competition) and constraints on the demand side (taste and income, and wealth of potential consumers). On the other hand, *total cost* can be *minimized* if the major component of cost, i.e., wage cost, is as small as possible. This can be guaranteed by *permanent unemployment* with which a competitive labor market[6] forces the wages of employees down to a subsistence level, while simultaneously firm owners try to introduce new technologies which allow them to reduce the number of workers needed for a given amount of output. Fewer workers at lower wages results in a lower wage sum, which then subtracted from higher revenues will provide higher profits. The price–wage system sketched in this synopsis is the core of the exploitation theory of classical political economy, not just in Marx's work but across the whole generation of authors.[7]

The authors of the marginalist revolution proposed a completely different theory of prices. This was possible by first narrowing the scope of theory: Consider just the aggregate of all households (HH), and its demand for a given finite set of physical products owned by different firm owners (PF) and focus only on the physical correlates of these two stereotypes.

While the larger picture of Figure 1.1 is dramatically reduced compared to Figure 1.2, there is at the same time a false generalization that takes place. Each household is set equal to a single human individual (i) which can choose to

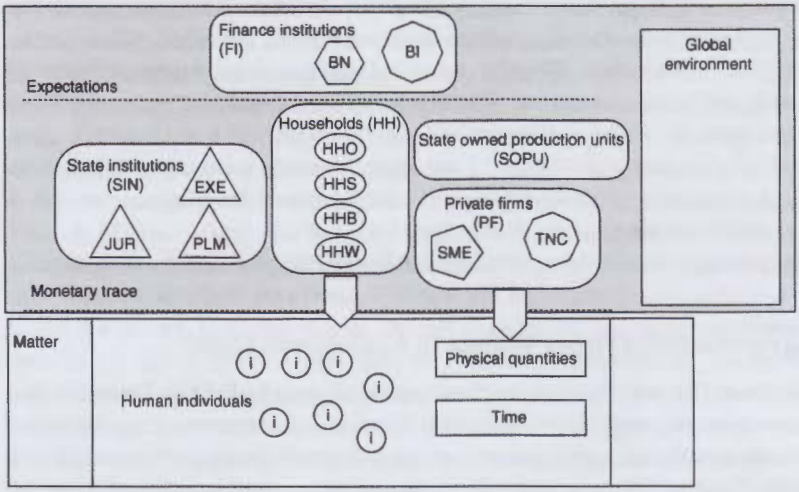

Figure 1.2 Marginalist reduction.

allocate its income to buy from the set of predetermined physical goods also owned by physical individuals (i). This theory of prices thus starts with the assumption that there exists an atomistic material structure of smallest entities (individuals) which possess quantities of goods. To get dynamics into this picture, which then can be interpreted as the emergence of a price structure, an additional innate property has to be ascribed to each atom:[8] a preference order concerning the different goods. If what they possess differs from what atoms would prefer to possess, then algorithms for exchange processes can be specified – see Figure 1.3.

For certain specifications of preference orders, which look plausible as long as no new commodities are introduced, it was possible to show that there exist exchange relations, which can eliminate all possibilities of improving the utility of any one atom without reducing the utility of at least one other atom – such a state of affairs was dubbed the Pareto optimum. Despite the fact that proofs and generalizations (of specifications of functional forms, etc.) of this type of issue took almost 100 years till finally Gerard Debreu and Frank Hahn presented the full model in the late 1960s, which was mainly an enormous mathematical effort, it soon was also used as an ideological weapon to argue for the superiority of "markets" over "planning." To arrive at the concept of a "market," first the emergence of "prices" in the system displayed in Figure 1.3 has to be explained. In this framework the ratio of the quantities of two different goods exchanged by two atoms is called the price of one good in terms of the other good. What had been understood by classical political economy as money, which is provided by a political authority to a society which uses it as a material sign of social value, is no longer part of the metaphor. Instead of being the social value reflected in

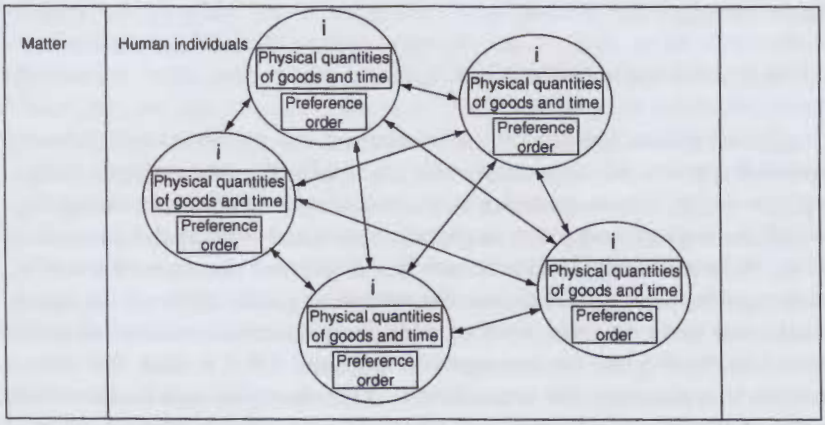

Figure 1.3 Marginalist (false) generalization.

the monetary value of an amount of coins needed to buy a unit of a good, i.e., a price in the sense of classical political economy, now a price is an exchange relation between two commodity owners that is determined by a certain abstract exchange algorithm. The two metaphysical constructs – the innate preference order and the hypothesized exchange mechanism which leads the group of atoms to its Pareto optimum – generate a third metaphysical element: the market. For laymen in economics the interpretation used to hide the involved mysticism usually refers to the idea of an auctioneer helping to figure out all Pareto-improving possible exchanges before any actual exchange takes place. But even more troublesome than the evidently helpless attempt to eliminate ideas of exploitation by reinterpreting prices as the dubious outcome of even more dubious invisible auctioneers was that including labor time as a commodity following the same logic as any other commodity made the theory unable to discuss unemployment and crisis at all.[9]

When in 1929 the Great Depression struck, the Walrasian component of the neoclassical synthesis had to be amended by new elements immediately. Ideological hegemony of the capitalist class was challenged not just by a Stalinist misinterpretation of Marx's classical political economy (reducing it to some emphasis on socialist planning and "socialism in one country" measures), but also was confronted with a Fascist paradigm which laid emphasis on a strong and aggressive influence of state power and command economy features. It was John Maynard Keynes and his Cambridge circle who re-introduced a well-defined dose of state influence and necessary aggregation into the Walrasian framework, which he had learned from his teacher Alfred Marshall. The macroeconomic turn initiated by Keynes actually clarified, or at least laid bare, several of the weak points of the false generalizations of the marginalist approach. The best example is the central system of difference equations,

which determines the "price–wage" vector, p_t, i.e., the vector of relative exchange ratios.

$$p_t = p_{t-1} + mkt((q_t^s(.) - q_t^d(.)), x_t). \tag{1}$$

The suggested market mechanism, here collapsed into algorithm *mkt*(.), has to guarantee that prices converge to a vector that makes the wishes for exchange, here $(q_t^s(.) - q_t^d(.))$, vanish. In such a state of affairs prices would not change any more and the market mechanism would have produced what in the natural sciences had been called equilibrium.[10] Once the "auctioneer" has found this vector, all exchanges between the atoms, i.e., the owners of goods and time, can simultaneously take place. But why does an atom possess a certain amount of goods and time? In the original version captured in Figure 1.2 it is clear that only a short episode in economic life is considered: All households have received their income (without specified source) and now only want to know which goods and services to buy (without specifying how these were made available) from the set of private firms (without specifying why these exist at all). With the false generalization displayed in Figure 1.3, which assumes that this narrow spotlight is the central problem of political economy, it becomes impossible to discuss why then in a general crisis like the Great Depression some atoms, the unemployed, desperately want to exchange their time for goods and cannot do so, while other preconditions like the set of production units start to shrink dramatically. To be able to get such phenomena in the picture again some elements of Figure 1.1 have to be re-introduced. This was Keynes' innovative theoretical idea.

On the demand side of the wishes, $q_t^d(.)$, Keynes extended the atomistic view by adding additional elements which occur at the aggregate level only: demand by state institutions (government expenditure) and intermediate demand by firms (including, in particular, investment demand). The latter enabled a link back to the supply side of exchange wishes, $q_t^s(.)$, since a change in the particular category of goods called "means of production" implied also a change in what the owner could offer as supplied goods. To transport these changes into the world of exchanges between owners of goods and time a new collapsed representation of the production process was needed: the *production function*. It served as an explanatory short-cut for the exchange of time (in that case called labor-time) and goods (in that case called physical output of the production process).

In a subtle way these theoretical innovations had re-introduced an old distinction between the atoms used in the false generalization of the marginalist system: Some smallest entities (atoms) maintain a production function which can augment their utility function, while others do not.[11] And there exists one additional large social entity called the state, which is able to express the wishes of the ruling class by directly interfering in the exchange processes of the system. As a consequence of the observed crisis dynamics this additional entity was needed to achieve a newly visible goal of the system (apart from an automatic convergence to Pareto optimality which obviously was endangered), namely "stability." On an aggregate level the three different types of atoms could then

again be treated like three micro-units: firms, households, state. They could be characterized by some innate properties, like a "socio-psychological" propensity to consume, and their aggregate behavior was thought to be measurable by econometric techniques. Since aggregate flows collected by national statistical offices are just the monetary traces of past decisions on quantities, Keynes' macroeconomics had to become a monetary theory again (see Figure 1.4).

With the aggregates of $q_i^d(.)$ and $q_i^s(.)$ now transformed in a way that in principle allowed for persistent overshooting of exchange wishes, that is explaining deflation and unemployment without having to return to a theory of exploitation, the immediate cure to this fragility of capitalism was an action of the political sovereign, the state, which implicitly assumed its unbound monetary authority. The state could use the money which it gave authority to – and could produce itself. This was a very irritating consequence of early Keynesian macroeconomics. It opened up the debate on sources and repercussions of finance, indeed a Pandora's Box of new problems. Luckily enough, the assumption that the aggregate household entity only spends a certain, constant share of its income for consumption allowed defining the remaining part as the flow of household savings. Call this, plus the newly injected state money, the total additional money supply, M_i^s; it can be added to the already existing stock of money. On the other hand, the entity "firm," the entity "household" and the entity "state" might also need additional money – though this implies some schizophrenia (or better: disaggregation) of state and household taking credit and saving at the same time. To handle this exchange of money – the material representative of social value – a new kind of entity enters the scene of political economy: *financial intermediaries*, vulgo "*banks*." This new set of entities handles the transfer[12]

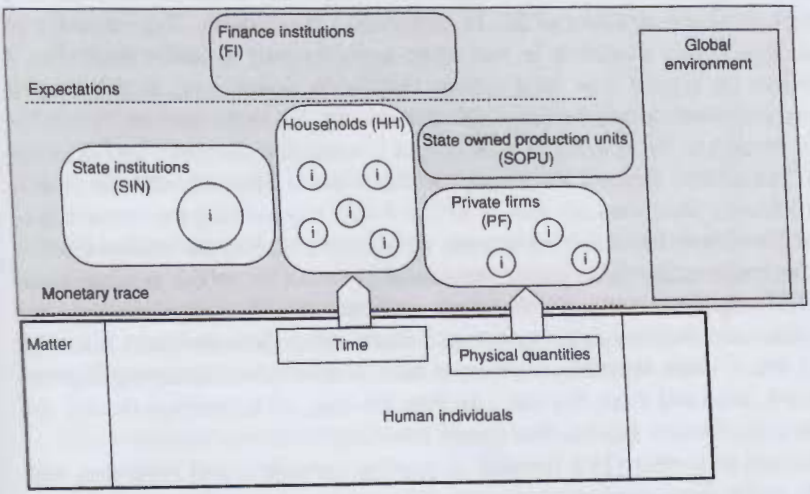

Figure 1.4 Keynes' return to aggregates.

of aggregated total money needed ($\bar{M}_t^d = \bar{M}_{t-1}^d + M_t^d$) and the aggregated total money offered ($\bar{M}_t^s = \bar{M}_{t-1}^s + M_t^s$).

In its simplest version Keynes' model had four behavioral suggestions. The entity HH determines its monetary demand for consumption (equation (2.1)). The entity PF determines its monetary demand for investment goods (equation (2.2). The entity SIN determines its monetary demand for goods and services bought by the state (equation (2.3)). Finally, the new aggregate entity, which it had become necessary to introduce, namely the financial intermediary (FI), also has to be characterized by a behavioral rule. Like the stylized firm owner, this entity has a utility function, which is transformed into a profit-maximizing rule: Pay as little an interest rate as possible for money disposed and ask an interest rate as high as possible for money given as credit. This new entity is of particular theoretical interest because it breaks open Keynes' more static, short-run consideration. Giving credit necessarily involves expectations on future time periods and a well-defined repayment plan agreed upon in the present.[13] But for the simplest model, John Hicks' famous formalization of Keynes' ideas, it was sufficient just to highlight one immediate thought: The more money demand exceeds money supply, the higher all interest rates will be. Taking one interest rate, r_t, as a representative of the whole profile, equation (2.4) shows this behavioral rule of the entity FI. By focusing on this element of the behavior of financial intermediaries, another aspect is completely lost, the difference between interest paid for savings and interest taken for credit, a difference which banks typically try to maximize. Classical political economy had conceptualized this difference as the part of the profit (made by the owner of a firm exploiting workers and other resources) which had to be given to money owners to get the exploitation process pre-financed. Comparing the interest rate for credit with the profit rate (the ratio between profits and the stock of capital employed) would measure the relative strength of the two fractions of the ruling class, financial intermediaries and firm owners (see Hanappi 2012a, appendix 1 for details). This reminder on exploitation theory evidently is lost when applying only equation (2.4). But it remains to be argued how total money demand is determined. In this respect Keynes proposes two influences: (1) the usually assumed proportionality of money needed to the amount of total output (transaction demand), and (2) a so-called "speculative demand for money" which is based on a trade-off that owners of firms face: If they use their money to buy bonds representing the ownership of another firm, then they hold less money, and vice versa. Keynes' tricky shortcut then is to assume that these bonds provide an interest rate, which is again equal to r_t. The aggregate entity FI therefore consists of hybrid members who are partly not only bankers but owners of private firms (shareholders) too. The interest rate r_t – this mysterious construct needed to consolidate the equilibrium framework inherited from Walras – is thus the crux of Keynesian theory, the variable behind which exploitation theory is hidden.

Returning to system (1) it remains to explain variable x_t and algorithm *mkt*. Variable x_t simply can be used to catch all processes not endogenously determined. This sounds trivial but is rather revealing if one considers that the most

significant developments of the last 300 years fall under this category of "exogenous trajectories not explained by the model" e.g., technical progress, introduction of new commodities, demographic changes and population growth, institutional developments, development of communication and information, etc. Variable x_t therefore should be seen as the ignored territory that a new theory of political economy should start to explore.

The key to the connection between the two components of the neoclassical synthesis is the algorithm *mkt* in system (1). This algorithm has to be constructed in a way that guarantees convergence of the price–wage vector for every admissible starting value of this vector. A typical specification thus would reduce the absolute value of the difference between the actual value of a certain price p_i^j and its equilibrium value $p^{j,*}$ with every step of the iteration. Whatever specification is chosen – be it a tâtonnement process steered by an auctioneer, or be it some bargaining in the communication sphere – as long as it leads to the equilibrium price–wage vector it qualifies as a central ingredient of the neoclassical synthesis. In this case this algorithm is given the name "the market" and is treated like an independent entity, which has just one goal, namely to produce the equilibrium vector. Since actual exchange is assumed to take place only after the equilibrium vector has been found, it is evident that grand harmony is modeled as long as only the actual trajectory of exchanges is considered. Exchange always only occurs at terms formerly agreed upon; no room for involuntary enforcements is left.[14] In fact, the choice of the precise mechanism *mkt* can even be omitted (assuming that economic interpretation will always find a plausible market mechanism) and system (1) will only deal with situations where prices and wages are at their equilibrium levels. In that sense the price–wage system does not play a crucial role any more and all variables can be considered to be measured in "real" terms.

Recall now that (2.1)–(2.3) determine aggregate demand as follows:

$$\text{(Consumption) } C = C(c,Y), \frac{\partial C}{\partial Y} > 0\,, \tag{2.1}$$

with c being a socio-psychological constant, and Y being total income.

$$\text{(Investment demand) } I = I(Y^*,r), \frac{\partial I}{\partial Y^*} > 0, \frac{\partial I}{\partial r} < 0\,, \tag{2.2}$$

with Y^* being total demand expected by the entity firm, and r the interest rate on bonds (see the discussion above). Investment demand of the aggregate entity firm will move in the same direction as their expectation of future total demand, though it remains open how it does the actual forecasting. On the other hand, investments financed by credit will be reduced if the interest rate for credit rises.[15]

$$\text{(Government expenditure) } G = G(T), \frac{\partial G}{\partial T} > 0\,, \tag{2.3}$$

which is assumed to be the exogenously chosen variable of fiscal policy. What is chosen to be expended can always be financed as tax income, T, of the state.

External finance by increasing government debt is not considered, but higher taxes will only be possible with higher total income (Y).

$$\text{(Interest rate setting)}\ \frac{m^S}{P} = M^S = M^D(Y^*, r)\ \text{with}\ \frac{\partial M^D}{\partial Y^*} > 0, \frac{\partial M^D}{\partial r} < 0 \tag{2.4}$$

What in macroeconomic textbooks is usually considered to be an equilibrium condition for the money market has to be re-interpreted as a description of the behavior of entity FI: For any given expected output Y^* the financial intermediaries will react to a difference between money supply M^S and money demand M^D by raising or lowering interest rates appropriately.

The sum of the demand components represents aggregate demand (measured in money): $q^d = C + I + G$. Contrary to aggregate demand, which comes from three sources (all kinds of households, firms and state institutions), aggregate supply is offered only by firms (goods) and physical human individuals (time). Moreover, both formats (physical quantity and labor time) are transformed into items with monetary values only after having been processed by a special algorithm organized by the special atomic agents constituting the macro-entity "firm." This algorithm is the defining characteristic possessed by these agents and is called *production function*, call it *pfct*. In a first stage this algorithm (the production function) is thought to work on a physical level, organizing the time-spending activities of employees and material inputs in a way that leads to new physical output quantities. In the second stage the output (goods and services) is priced and offered as q^s. The process of pricing takes place in an environment which firms perceive and use to determine their profit-maximizing price strategies. Let the algorithm *cmcd* (a mnemonic abbreviation for "consider market conditions") describe this second stage of pricing. Then these assumptions can be expressed as follows:

$$\text{(Production function)}\ q^s = q^s(cmcd(pfct(material, time))). \tag{3}$$

It is revealing to reconsider at this point of the argument how the Walrasian component of the neoclassical synthesis working with the help of the assumed algorithm *mkt*(.) treats the labor market. As (1) shows, for any given x_t only those situations are further considered in which $q^d(.) = q^s(.)$. And it is most remarkable that this singling out of relevant equilibrium positions occurs on the level of the monetary traces of physical processes (see Figure 1.1). But to be able to fulfill this task of equalization, the macro-atoms on this level have to set actions which profoundly change the situation on the physical level. In particular, the firm entity might not be able to influence *cmcd* strongly enough to adjust to the demand side and therefore will try to modify *pfct*. This can either result in technical progress or – in particular for falling demand – falling capacity utilization and firing of employees. On the other hand changes in *pfct* also can be expected with any new investment, a process described in (2.2). By

recognizing these consequences of Keynes' theoretical innovations, and incorporating them into an enlarged general equilibrium model of Walrasian type, the neoclassical synthesis started its way back to marginalist theory. The famous result that the marginal productivity of a *pfct*, rewritten in terms of money, has to be equal to the ("real") wage paid for one unit of labor time input ignores all consequences for physical human individuals. And these consequences do not reappear on the demand side either, as long as the macro-entity "household" is just a conglomerate of different social characters crudely lumped together. The technical assumption of general equilibrium in the world of voluntary monetary exchanges does *not* provide a *wrong* picture of possibly emerging disequilibria in the world of physical quantities – it simply provides no picture at all!

In Figure 1.5 the possible connections mentioned in passing in Keynes' texts are included only as broken lines. The mainstream interpretation first formalized by John Hicks centers on the determination of a static equilibrium brought about by endogenous changes of income Y and interest rate r. An explanation of economic crisis in this framework therefore comes only in sight if some variables are driven (by exogenous forces) to levels which make the assumed behavioral rules implausible. From a formal point of view this is plausible: If only linear dynamics are used, then the model-builder only has the choice of modeling convergence or some special types of divergence. If convergence is chosen, then a crisis can only be understood as exogenous shock. Indeed this property bedevils equilibrium models till today.

Despite these mostly ignored shortcomings, which the incorporation of Keynesian ideas into the Walrasian equilibrium framework brought about, it nevertheless opened up a rather important debate on refinements of monetary economic theory.[16] Moreover, the emerging difficulties concerning the aggregation of single-firm and single-household behavior into the physiognomy of a

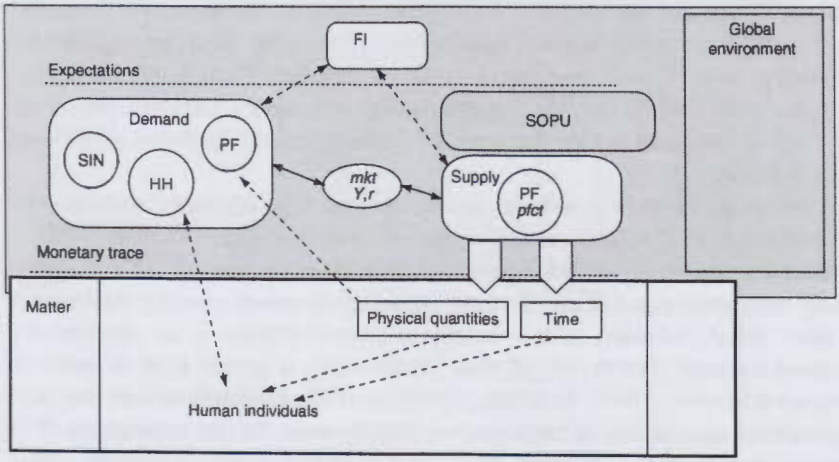

Figure 1.5 Keynes' macroeconomic dynamics.

macro-entity produced a large amount of interesting theory, though in the end the task of a microfoundation of macroeconomics has never been achieved. It thus seems to be fair to assess this last grand effort of a neo-classical synthesis[17] as an interesting but *failed* approach to get rid of the original tenets of classical political economy.

2 Change of techniques (from Marx to Schumpeter and back)

One of the reasons why the renaissance of macroeconomic reasoning vindicated by Keynes and the proponents of the neoclassical synthesis got stuck was the self-imposed restriction to reduce its significance to short-run issues. On the one hand the assumed short time horizon facilitated the formulation of a macroeconomic framework that could consider many slower-changing variables as constants. But on the other hand the focus on a momentous spotlight completely misses the long-run characteristics of the capitalist mode of production. This deficiency was quickly discovered by the macroeconomists of the first generation after Keynes, who soon proposed macroeconomic growth models.

Based on Robert Solow's archetypical model the longer run was conceptualized as equilibrium growth (Solow 1956). By letting investment flows change the way material inputs and labor time can be transformed into output (the intermediating concept was called "capital stock") finally a "Golden Rule of Accumulation" was derived which claimed that the propensity to consume could be thought of as being adapted to maximize the equilibrium growth path of the consumption of the macro-entity household (Phelps 1966). How this change of a (short-run) socio-psychological constant can be brought about opened up the economists' views to consider political science questions concerning taxes and psychological questions concerning consumption incentives. Moreover, the effect of technical progress was timidly introduced as a permanent and automatic shift of the production function, which – according to the respective properties of this shift – would modify the equilibrium growth path. In an analogous way, constant growth of labor time supply could be included. Though there is a lot of valuable mathematical detail in this standard growth theory literature, the qualitative status remained within the spell of the neoclassical synthesis as summarized in Figure 1.5.

A more serious attempt to break this spell came from Richard Goodwin, who generalized Roy Harrod's model of growth instability (see Harrod 1939) to produce a model of an oscillating share of investment (in output) and a simultaneously oscillating share of employment (in an exogenously growing total supply of labor time). Included in this combined growth regime is an exogenously assumed constant growth rate of labor productivity, a special type of technical progress (Goodwin 1967). In a later extension of his model, Goodwin was able to substitute oscillations of labor productivity increase for the assumption of its constant growth, thus mimicking long-run Kondratieff cycles (Goodwin 1990). It is remarkable that Goodwin and his followers had to start to build *non-linear*

dynamic models – with a toolset borrowed from the natural sciences – to achieve their goals.

As shown in Figure 1.6, the non-linear dynamics (a Lotka–Volterra system) produces oscillations in the two variables u (the share of output of firm owners) and v (the share of labor supply actually employed). Firm owners use all their profits for investment and there is a steady exogenous increase of labor productivity. The unemployment rate fluctuates as the exogenously assumed growth of labor time supply encounters oscillating employment rates determined by firm owners.

This widens the scope of traditional Keynesianism considerably and indeed throws an interesting spotlight on the nature of persistent business cycles. What is even more important is the relationship which Goodwin introduced to make a feedback of unemployment rates on the real wage level plausible. A *political process* (namely wage bargaining based on *bargaining power*) influencing current unemployment rates is brought into play: The higher the unemployment rate, the less bargaining power a union has and the lower the real wage will be. What is implicitly emerging in this dynamic is also a fluctuation of consumption possibilities of physical individuals. Despite its monetary roots – Goodwin was a collaborator of Schumpeter *and* Keynes – this model therefore has implications for the material side of workers' lives, both with respect to time and with respect to available physical goods. One drawback of the highly stylized formulation – it consists of only seven equations – is that the class of exploiting firm owners is only included as one simple behavioral rule: immediately invest all profit.[18] The cycle that is produced is a metaphor for the omnipresence of oscillations in an environment of continuously growing labor productivity.

With respect to an explanation of a deep global crisis, the model nevertheless is not very illuminating. In that respect Harrod's early knife-edge growth model

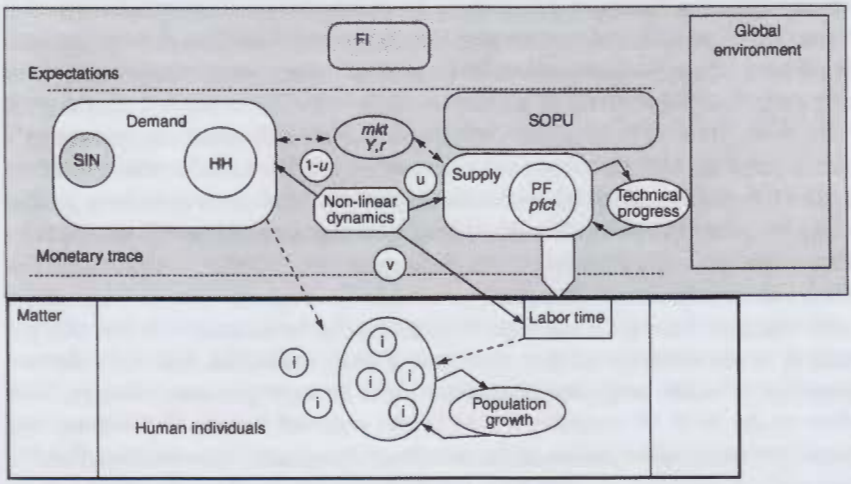

Figure 1.6 Goodwin's surrogate class struggle.

might even be a more telling contribution: In that model any small deviation from the equilibrium path (the knife edge) is amplified and necessarily leads to disaster.

A similar idea can be found 100 years earlier in Karl Marx's work. In his communist manifesto, written in 1848, Marx praises the productivity increases that capitalism, in particular "big industry," is bringing about. He assures that capitalism is a necessary stage – a mode of production – of the development of human society exactly because these productivity increases are its historical mission. But at the same time the very success of this mission generates new contradictions: crises along different dimensions, class dynamics and class struggles. In the end these increasing difficulties and incompatibilities will start to dominate – the capitalist mode of production will be fundamentally revolutionized. This story reads somewhat similar to Harrod's knife-edge model, which due to its unstable growth path sooner or later is doomed to diverge to a system breakdown. Marx's central idea – actually derived from Marx's Hegelian philosophical background – that contradictory developments (welfare-enhancing productivity increase and welfare-destroying class struggles and alienation dynamics) are parallel and interwoven social processes had been completely lost since classical political economy was erased by the marginalist doctrine in the late nineteenth century. Even so-called "Marxist-Leninist circles" and neo-Ricardian interpreters of Marx did not pay too much attention to Marx's (Hegelian) methodological background. Keynes used to ignore Marx's contribution completely, calling him just a "minor neo-Ricardian."

It was Keynes' greatest contemporary rival, Joseph Schumpeter, who was one of the few economists that understood the deep methodological truths hidden for such a long time in Marx's approach. Schumpeter's theory of innovation, including social innovation, is a radical turn to the disequilibrium approach: There is a process running parallel to equilibrating forces of market dynamics[19] which accumulates new ideas and solutions to the many unforeseen contradictory consequences of prevailing developments that in the end leads to a sudden "swarming of innovations" – a revolution in the moment when interdependent problems culminate in a global crisis. With respect to the time that is needed till the great crisis ends, the accelerating divergent (as historical mission even "necessary") growth process, Schumpeter was as oblique as Karl Marx. Both only insisted on the general pattern of social evolution-revolution. Modern evolutionary economists, with the help of recently developed mathematical tools and a new simulation paradigm, are already on their way to further improving this Marx–Schumpeter line of thought.

Using again Figure 1.1 (changed to Figure 1.7), the focus in this line of argument is on the interplay of two divergent growth tendencies linked by the two processes of exploitation and innovation. The first process, *exploitation*, takes place on the level of monetary traces by the repeated excess of revenues over wages, which is called profits of the owners of the means of production. But this process is rooted and secured by a political process governed by state institutions, which guarantee (by a monopoly on the use of coercive force) that the

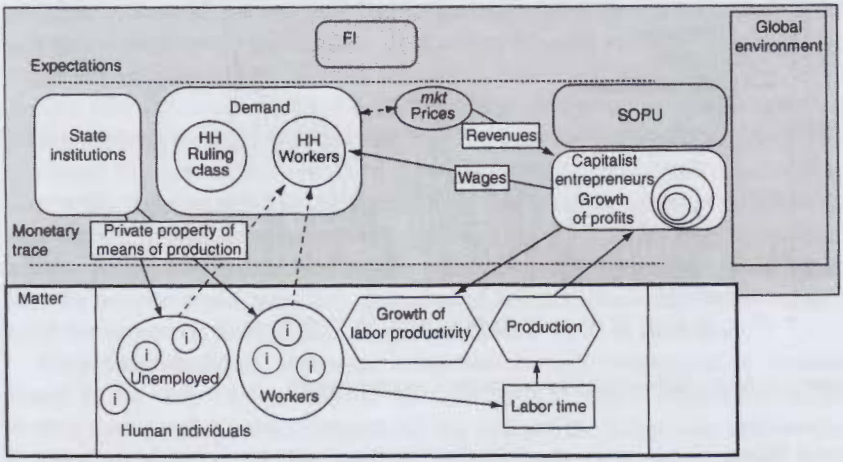

Figure 1.7 Marx–Schumpeter dynamics in political economy.

private property of the means of production remains intact. Politics is back in the picture.[20] Since the "reserve army of unemployed workers" (Marx) helps to keep wages low, a continuous surplus of profits will be the rule. A class of exploiters can be distinguished from a class of exploited. But as can be seen in Figure 1.7, this also has implications for the material level: Human individuals, which are unemployed, nevertheless need material inputs for their daily reproduction. The monetary mechanism thus influences the class structure of the human species on a material level: it divides the species into antagonistic classes, which reduces welfare. Parallel to this process some owners of means of production will be forced by competition to introduce new methods of production, eventually providing new commodities and services. This is the process of *innovation*, which is by and large welfare increasing.[21] Note that technical progress takes place on the material level, and therefore allows for being kept alive even if alternative arrangements on the monetary level are institutionalized.

The essence of this dynamic can also be sketched by a simple dynamic model linking profit rate evolution and labor productivity levels (see Figure 1.8). Here, the two are linked by a simple logistic function (factor in the area of period doubling, see note 22). If one adds an index for the stability of this system, which approximates the level of class struggle mainly by using the variance of experienced distributional changes, then it becomes visible how increased labor productivity (right-hand scale) will lead to the instability of this mode of production; e.g., by assuming that an index of instability higher than 3 (right-hand scale) will imply general revolt.

Neither Marx nor Schumpeter had much to say about what might happen as soon as the system becomes unstable. In principle both referred to the same period of time in history, namely the second half of the nineteenth century until

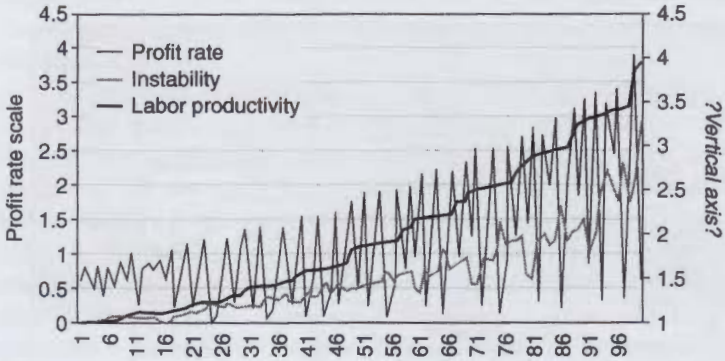

Figure 1.8 Marx–Schumpeter dynamics as a logistic system.

World War I. Their major contribution certainly can be found in the general methodological intuition: Historical eras proceed by combining countervailing forces to enhance net welfare for a limited number of decades. Then they break down under the weight of their own success.[22]

3 Expectations using models (from von Neumann to Sargent and back)

That there are crucial differences between the physical phenomena studied by the natural sciences and phenomena involving living entities has been recognized since ancient times. But in the interwar period the breathtaking successes of theoretical physics lead several of the most advanced pioneers in the natural sciences to reformulate the fundamental question "What is Life?" Erwin Schrödinger wrote an extremely influential book with this title and John von Neumann set out to construct a new formal language to be able to study the strategic interaction between social entities.[23] The crucial point in John von Neumann's approach was his insight that social atoms – either physical human individuals or larger social entities – are able to base their decisions on internal model building, which includes anticipation of the model-building activities of other social atoms.

For a social scientist this complicates his own scientific model building enormously: For an adequate picture of the object of investigation (the model-building social entity) many more assumptions are needed, e.g., to limit the infinite regress of using models including models, in turn including models.... Specifying the limits of information processing capacities of social entities and at the same time explaining how these models are generated and maintained is a task which is still far from being accomplished today. The social sciences, in particular economic theory and political economy, do not have the necessary theory of communication and information they should be based on.

John von Neumann and Oskar Morgenstern were aware of this deficiency and as a first step proposed a framework for the much simpler world of parlor games.

In this world the players, the rules of the game, the available information, the possible actions of players and finally success and failure are all well-defined and understood by all participants. It is surprising and exciting that despite this extreme narrowing down of what actually occurs in social settings, and despite the fact that von Neumann tried his best to limit the formal toolset he used to the well-known mathematical apparatus, they nevertheless arrived at a theory which produced fundamentally new results. Unfortunately, their work occurred at a time when the rising tide of the neoclassical synthesis swept away all competing approaches. Moreover, soon a new generation of very apt – though barely innovative – young mathematicians eagerly started to integrate parts of game theory into the neoclassical framework. In the early 1970s game theory as an important topic for economic theory had disappeared behind a veil of ignorance.

Expectation-building processes using models only reappeared in economic theory in the early 1980s, when the so-called New Classical Macroeconomics of Robert Lucas and Thomas Sargent set out to fight the Keynesian insistence on the importance of state intervention.[24] Interestingly, this counterstrike did not work with a return to the times of model-less, blind reaction, but instead with the introduction of extremely correct model-building processes of all participants. What later was dubbed "hyper-rationality" is the assumption that all atomic agents in a Walrasian economy are equipped with the same true model of all the features of the economy. This includes the assumption that there exists such a true model and immediately implies that any learning process is excluded since it is not necessary. Furthermore, this approach restricts its own use to experiments with exogenous shocks coming from unexplained outside sources. The notorious technical difficulties that can arise with such experiments are solely based on the properties of the different stochastic terms added to the equations in the hyper-rational model.[25]

With respect to old-style Keynesian models this approach doubtless was successful. For example, Keynes' argument that workers would accept lower real wages brought about by an inflationary process initiated by monetary policy rests on the assumption that workers cannot distinguish between nominal and real wages, whereas firm owners can. Assuming that all agents use the same true model makes such an argument impossible. For most other active policies of the state an analogous encounter could be formulated. In short, the assumption of hyper-rationality was equivalent to the proposal that an institution-free Walrasian economy was stable and optimal! All that policy makers should do is to guarantee the free and unconstrained interplay of market forces.[26] Figure 1.9 provides a summary.

The central role is played by the one and only true model. It contains all the information displayed in the Walrasian framework in the lower part of Figure 1.9, and all entities use it to determine simultaneously and in advance their equilibrium choices. This model resides in the upper (expectations displaying) part of the figure and is distributed (black arrows) over all entities. It therefore constitutes *equilibrium in expectations*; all forecasts produced with this model necessarily will be correct.

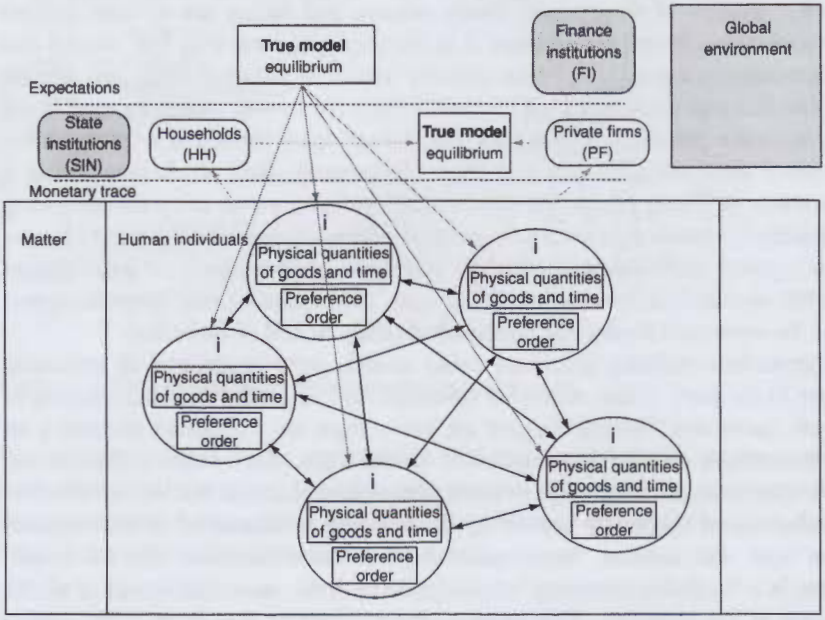

Figure 1.9 Introducing rational expectations.

Moreover – with some strong assumptions on the functional forms of production functions and other behavioral functions[27] – it is also possible to construct (dotted arrows) an aggregate agent "private firm," an aggregate agent "household" and money and bond market mechanisms which allow this true model actually to stay in *equilibrium in the real world* of monetary traces. The upshot of these complicated arguments is that, like in the original Walrasian approach, the innate preference orders of the set of all human individuals together with the exogenously given constraints on production techniques will lead to satisfaction of all participants (equilibrium in expectations as well as equilibrium in exchange wishes in the real world) as long as only free and voluntary market exchange is guaranteed. In other words, no class structure dynamics and their consequence of institutional evolution exist since all differences between the smallest atoms of society, the individuals, are assumed to be innate and have never-changing preference orders.

The school of new classical macroeconomics in essence thus just restates the main argument of the authors of the marginalist school:[28] Walras, Jevons and Menger. But it nevertheless adds an important new ingredient, namely the suggestion that agents use internal models of the economy to determine their actions. It is only the very specific way they specify these internal model-building processes which lets them fall back into a secular micro-theology of an eternal general equilibrium inhabited by omniscient individuals. This treacherous fatalism not

only reveals the hidden policy agenda of new classical macroeconomics; it also leads to the general impotence of this approach to deal with accumulation or crisis.

As a consequence, a re-orientation of macroeconomic theory towards older traditions became unavoidable as soon as the deep crisis of 2008 struck.[29] The progressive element in the "rational expectations" approach – namely to introduce the use of internal models – was taken over by a new generation of economists and was enriched by adding ideas from the almost forgotten theory of strategic games of Neumann and Morgenstern. The models built by heterogeneous agents, agents at several levels of social institutions, could be specified differently and studied in detail by the use of sophisticated computer simulation.[30] Game theory, which started as a new mathematical treatment used for parlor games, is now a helpful complement to simulation wherever some modeled strategic conflicts allow for the shortcut of an analytical treatment. And in reverse this new field of evolutionary economics, which makes extensive use of simulations, often inspires new research in game theory. The whole new branch of evolutionary game theory seems to be a good candidate for a methodological pillar of the new theory of political economy, which is needed to guide us through this deep global crisis – and beyond.

How internally generated, maintained and updated models govern the behavior of different types of heterogeneous social agents is at the center of the renaissance of a theory of political economy which is currently in the making. The new classical macroeconomics had the omnipresence of truth as the beginning and end of their theory. This resembles the first step of the philosopher Hegel's famous dialectics where it is stated that the truth must appear.[31] But Hegel then, as step two, added an antithesis to further develop the overall process, to describe its dynamics by introducing countervailing forces (i.e., "negation"). Here, not a single social agent possesses a true model and it is not even clear how such a thing can exist. Nevertheless, agents try to improve their internal models, to modify them into more adequate tools (Hegel's third step of a "synthesis," necessary to return to a better understanding of the original thesis in step one). This procedure, of course, just describes the ordinary process of scientific accumulation of knowledge for given limitations of perception and information-processing capacity. It is exactly that part of the evolution of living systems which characterizes the human species. By returning to the game theoretic research program of Neumann and Morgenstern's game theory – now enhanced by newer techniques and tailored to investigate political economy – the step from (religious) belief systems toward (scientific) knowledge-improvement systems is reiterated.

An evolutionary political economy characterized in this way is promising not only to reunite micro-, meso- and macroeconomics, but also will have to synthesize the many different areas of the social sciences, which in the name of necessary division of scientific labor have become isolated islands of little-known professional jargon. Figure 1.10 sketches these high aspirations of evolutionary political economy.

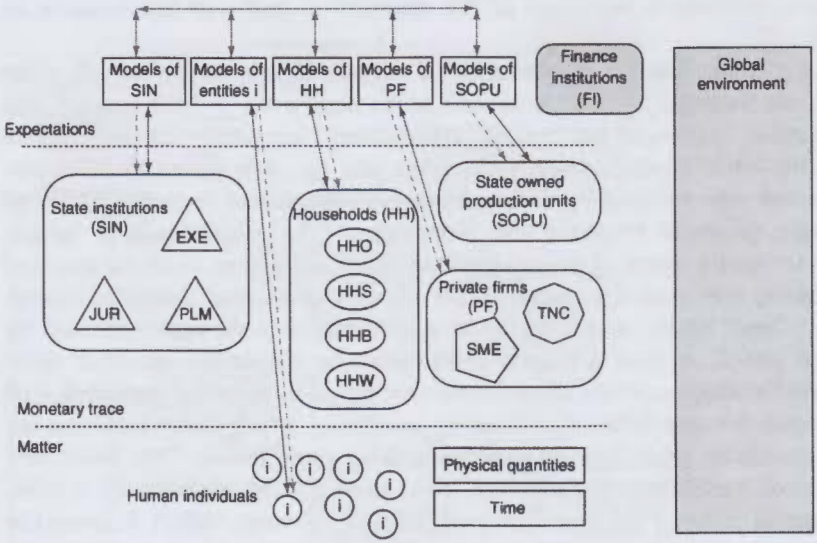

Figure 1.10 Aspirations of evolutionary political economy.

The solid arrows pointing in both directions shall indicate that all conscious entities maintain internal models to explain the past and forecast the future. They use them to determine their actions at a specific point in time (dashed arrows). Moreover, all social agents *communicate*: All models are generated and modified (indicated by the grey arrows on top) by the interaction of the social agents in the communication sphere. The latter thus is a constitutive element of political economy.[32]

Needless to say, the just-sketched research program of evolutionary political economy – including the necessary model of the communication sphere – has only just started to be worked on.

4 Structural breaks and the emergence of larger entities

What remains to be explored to cover all elements introduced in Figure 1.1 are just two closely related items: international finance and the global environment. At first sight it might be surprising that they are related, but they are so because they both point at the same missing concept in the argumentation given so far: *the emergence of novelty*.

To begin with, the end of Section 2 of this text is a possible trigger. There, some emphasis was laid on the importance of studying systems with diverging essential variables, which after a finite time will break down. This type of dynamic, it was argued, is the archetype of living social systems. But as the history of life on earth vividly shows, this usually is not the end of the story. The

breakdown of a certain regime is not necessarily a full stop (as in the case of the dinosaur); it might be followed by a rather quick but nevertheless fundamental change in the direction of evolution – and these fast "revolutionary dynamics"[33] might give birth to a novel, again longer-enduring, regime. As shown in Figure 1.11, revolutionary dynamics are fast and intermittent episodes between the major long-term stages of evolution.[34] They are characterized by the creation of new entities, the destruction of some old entities, the establishment of new relations between them, the fixing of new (institutional) compromises (institutions) and a set of new goals and visions guiding the new system. If the revolution succeeds, i.e., the species survives its transformation into a novel form, then this new form often is *larger* – with respect to space as well as with respect to the number of constituting elements (members and their tools).

In political economy the size of the relevant social entity developed from small wandering tribes to village communities, to city states and to nations. Just recently nation states started to form continental units and slowly a global political economy comes into sight.

The parallel process in the communication sphere often is described as the stepwise emergence of consciousness. Even in the biography of a single human individual the traces of this stepwise enlargement can be found: member of a family, member of a city community, member of a national community, member of a continental community and, finally, member of mankind. Each of these steps is contingent on certain and rather sudden additional links appearing in the communication sphere.[35] Some authors of the French Enlightenment had anticipated these jumps in social consciousness as general humanism. Karl Marx, thinking in Hegelian categories of creation by antagonistic forces, saw the emergence of class consciousness of the progressive class as the intermediating carrier of global consciousness of the human species. If indeed countervailing forces are the sources of an implementation of a new, more humanitarian global solution for the species, then they will have to materialize in a global compromise with dominantly progressive – i.e., global welfare enhancing – policy. Currently one of the best candidates[36] with the worst reputation for this splendid task is an institution with only a vague material correlate:[37] international finance. There appears the novelty needed – and not just needed to complete Figure 1.1.

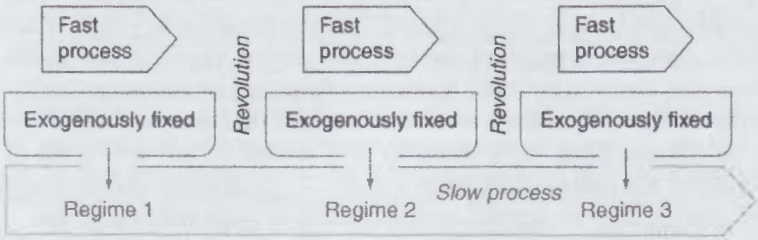

Figure 1.11 Typical profile of life dynamics (source: Hanappi, 2013d).

The second fundamental novelty involved has been labeled "global environment." In the simple world of national macroeconomic models the sub-species of open-economy macro-models was introduced by adding a copy of the first model and linking both with the help of a trade function.[38] Later, more complicated models allowed for more channels of interaction; if these models concentrated more on the real side of the economy (Figure 1.3 and the lower part in Figure 1.1) they contributed to the branch of a "pure theory of economic trade," if they were based more on the monetary traces (Figure 1.5) they belonged to "balance of payment theory." In the first case again, given preferences and technologies were thought to determine a general equilibrium toward which a flexible exchange rate would lead the convergence process.[39] In the second case more variety produced by the instruments of monetary policy – now including, e.g., interference in foreign exchange markets – can be mimicked. But as the events since 2008 showed, even in this second case major questions of global coordination and the emergence of international institutions and their possible instruments were clearly out of reach of the standard formulations of these models. The global economic and monetary environment still needs to be conceptualized.[40]

It is clear that for this global concept several pressing environmental problems will also have to be taken on board. In this area a lot of model building has developed more recently, though little influence on the standard models of mainstream economics can yet be seen.[41] The new approach of evolutionary political economy proposed above should contrast this ignorance by carefully looking for cooperation. As with the case of monetary open-economy macroeconomics, a shift in focus toward the modeling of antagonistic forces, conflicts and possible (sometimes institutionalized) temporary compromises is needed.

In other words, there is a lot of future theoretical work hiding behind the two semi-blind spots of "finance institutions" and "global environment." The hope is that the current crisis speeds up development and makes breakthroughs easier – though it is certainly more risky to determine in which direction they lead.

5 Conclusion

The selection of building blocks of political economy presented above surely is missing many refinements that proponents of any of these streams of thought would have liked to include. But the general line of argument, namely that many different schools have built on many different – often disconnected – parts of the tower of Babel, this line of argument can hardly be denied. Opening this Pandora's Box there also seems to be hope: As the new languages of computer simulation, game theory, network analysis and fractal analysis (to name only a few) are advancing and recombining, there seems to be a chance to arrive at a set of models that match the vision displayed in Figure 1.1 – a dynamic mirror image of the set of globally relevant entities, which can help to guide political action.

Once this research program has its first successes, many of the models briefly hinted at in this text will look as minor accomplishments; sometimes even

producing more confusion than clarification. But like it or not, progress moves on by pulsation – in theory-building too. In times of revolutionary dynamics an outbreak of diversity, a diversity of hypothesis and proposals occurs, which ranges from proposals to return to antediluvian regimes to completely utopian plans. Out of this wide-ranging field (in quantity and quality), solutions will have to be picked, and picked soon. The better we know the rooms and vistas in the tower of Babel, the map of Babylon, the better we will be equipped to make wise decisions. This text on the bridges to Babylon is meant to help a bit.

Notes

1 That is: (1) the legislative force of "parliament," PLM; (2) the jurisdiction, LEG, and (3) the executive force, EXE. Using algorithmic terms rather than political science jargon, these refer to rule-set makers, rule-set surveyors and rule executors.

2 For the distinction between transnational corporations, TNCs, and small- and medium-sized enterprises, SMEs, in Europe, see Hanappi (2012, appendix 4).

3 Households with dominant income coming from firm owners, HHO, have to be distinguished from households of workers, HHW, as already pointed out by Kaldor's proposal for consumption functions with different propensities to consume (Kaldor 1966). Today two other large groups of dominant income have to be distinguished: households of state employees, HHS, and households of those employed in banking and finance, HHB.

4 As will be noted, the arguments will mainly follow the discourse led in economic theory, and will touch upon parallel debates in sociology and political science only sporadically.

5 As a starting point for the work on a "neoclassical synthesis" Paul Samuelson's PhD thesis can be considered (Samuelson 1947).

6 Note that the assumption of the feasibility of permanent unemployment implicitly includes the assumption of a state fraction of the ruling capitalist class, which guarantees the existence of the rules of private property of means of production as a necessary ingredient of a "competitive" labor market. It is this fraction of the ruling class which is allowed to use coercive force to secure the rules of the market. This feature of classical political economy is responsible for the adjective "political" and distinguishes it from the later-emerging discipline of "economics."

7 Different earlier authors focused on different aspects of exploitation: Adam Smith investigated why some nations, like England, were able to exploit other nations – and found a reason in outstanding technological progress by advanced division of labor in factories. David Ricardo put emphasis on division of labor by international trade and added the importance of getting rid of "unproductive," non-capitalist classes of rentiers.

8 In Walras' time this preference order was still insufficiently specified. It followed some intuitive ideas best formulated by Stanley Jevons, who suggested the existence of some psychologically rooted laws of human behavior. Only with the work of John von Neumann and Oskar Morgenstern was a consistent formal theory of utility constructed (Neumann and Morgenstern 1944).

9 In Fadda and Tridico (2013) an interesting collection of contributions tackling the special role of labor markets from a non-neoclassical perspective can be found.

10 More on the methodological side of this procedure can be found in Hanappi (2013c).

11 How this difference between entities came about in the first place – what was called "primary distribution" in classical political economy – can remain out of focus for Keynes because he explicitly restricts his analysis to the short-run difficulties of a given primary distribution. It is this limiting of the time scale which in the sequel

ensures that all questions of ownership and exploitation, which were so important in classical political economy, can safely be ignored again.

12 Note that both aggregates are *stock* variables of utmost significance for the political economy of a society; they reflect not only the current relation between new credit and new savings, but indeed incorporate the entire history of surplus and debt.

13 More on this issue can be found in Sections 3 and 4.

14 With respect to wages, Keynes personally felt uneasy with the consequence that unemployment is explained as a voluntary choice of workers. Nevertheless, this conclusion is straightforward for the authors combining the two components of the neoclassical synthesis.

15 Here, Keynes seems to acknowledge the conflict between the two fractions of the ruling class. If the average interest rate received by just possessing a bond of (any) firm is rising, then firm owners might use their profits to jump on this bandwagon rather than investing in their own firm – with a risky expected internal rate of return. In other words, the firm owners' fraction of the ruling class loses members and power.

16 The standard formal representation of Keynes' macroeconomic dynamics, Hicks' IS-LM model, is kept in equilibrium by endogenous adjustment of two variables: total income Y and the interest rate r. The latter variable is a catch-all notion indicating the importance of purely financial dynamics. During the Great Depression Keynes had experienced that deteriorating financial dynamics were the trigger event signaling the overall disaster. Despite this farsighted intuition, Keynes own treatment of financial dynamics remained rather eclectic.

17 In popular journalism the adjective "neoliberal" has recently often been used to summarize some economic policies implicitly recommended by the neoclassical synthesis. *This should be avoided* since the word combines two positively connoted words – "neo" and "liberal" – bearing no relationship to the actual background of the concerned policies. "Neo" is just proclaiming to be fashionable and "liberal" refers to anti-feudal attitudes, which since the end of World War I have been an outdated moralist relict. The actual importance, advantages and disadvantages of the neoclassical synthesis, is lost by renaming its political content as "neoliberal."

18 Apart from this, the model is completely void with respect to financial processes. Since (following his teacher Keynes) Goodwin assumes all variables to be real values, there seems to be a hidden Walrasian equilibrium image in the background (see Figure 1.6).

19 Schumpeter's early book influenced by his teacher von Wieser is devoted to the praise of the Walrasian approach (Schumpeter 1908). Only after 1910 did he discover the force of disequilibrium arguments. When he first used them he personified them in the allegoric personality of the "entrepreneur." Later in life he became more and more influenced by reading Marx – despite the evident fact that he politically usually proposed conservative policies (see Catephores 1994).

20 As has often been noted, Schumpeter was very well aware that capitalism is mainly endangered on a political level. Contrary to Keynes, he thought that economic stability is *not* the main problem of this mode of production. Keynes considered capitalism's political instability only as a consequence of some economic adjustments that could be overcome.

21 An unhappy side-effect of innovation usually is the additional technological unemployment it might entail.

22 If the threshold of instability greater than 3 is used for system breakdown, then this system grows from period 1 to period 99. It is characterized by a logistic equation for profit rates, $\pi_t = 3.51 \cdot \pi_{t-1} \cdot (L_t - \pi_{t-1})$, where there exists a feedback on the limiting productivity level, $L_t - L_{t-1} + \tau_t \cdot (\pi_t - \pi_{t-1})$. The labor productivity level is not allowed to fall and innovative force τ_t – measuring how efficient firm owners are able to translate profit growth into technical progress – follows an exogenously given pulsation

circling every seven periods between 1 per cent and 16 per cent. The latter assumption reflects Schumpeter's idea of swarming of innovations. No empirical foundation is used; the example just shows the possible qualitative features of this simple set of assumptions.

23 Compare Schrödinger (1944), Neumann and Morgenstern (1944) and Hanappi (2013b).

24 The coincidence of fashions in economic theory and the prevailing policy in major capitalist countries is no surprise. The conservative roll-back that started with Margret Thatcher, Helmut Kohl and Ronald Reagan was in need of theories justifying their privatization policies – and found and funded them.

25 The mandatory use of rational expectations (RE) for several decades worked as an entry barrier to major US journals in economic theory. The difficulty of mastering stochastic modeling of this kind usually hid the rather trivial content of the proposed models.

26 From this perspective it is extraordinarily cynical that Thomas Sargent received the Nobel Prize in economics in 2011, after three years of deepest crisis had shown how disastrous his approach to macroeconomics had been.

27 See Sargent (1980) for details.

28 Therefore the name "new classical macroeconomics" is a misnomer. This school indeed is contradicting almost all major issues of classical political economy, a school, which easily could be – but should not be – confused with what was somehow obscurely labeled "classical macroeconomics" in this context.

29 Post-Keynesianism added new elements to the standard interpretation of Keynes to tackle the new crisis. Indeed, Keynes' original texts prove to be a steady source of original – though often eclectic – ideas.

30 See Hanappi (2013c) for more details on these developments.

31 "Das Wahre muß erscheinen," wrote Hegel. Of course, the truth now is assumed to be the structure of the set of preference orders and Hegel's belief in God now is the belief in an infinitely fast (automatic) market mechanism.

32 In Hanappi (2003) two spheres were distinguished: the communication sphere (here "expectations") and the material sphere (here "matter" and "monetary traces"). The second describes the primary metabolism of the human species, while the former describes its secondary metabolism.

33 See Hanappi (2013d) for some details on this idea.

34 The many fast processes occurring during a certain regime are usually kept in line by the authoritative institutions of this regime; the coercive forms of a regime are thus "exogenously fixed" by the need to keep it on track. Nevertheless, there is a slowly ascending countervailing force of diverging essential variables, which in the end leads to the breakdown. The sequence of regimes follows a much slower historical dynamic.

35 At this point of the argument a second thought on the importance of the internet and the widespread availability of mobile phones might be appropriate – and can lead to original new policy proposals.

36 Of course, the search for a new and global revolutionary class – the material counterpart to global consciousness – is high on the agenda of social researchers working in the Hegel–Marx–Schumpeter–Gramsci tradition (see Hanappi and Hanappi-Egger 2012, 2013).

37 This is the reason why in Figure 1.1 "finance institutions" are put in the upper layer of entities based on expectations. They indeed operate completely on the basis of beliefs in certain internal models and the forecasts they produce. Global consciousness will need global finance to realize innovative reproduction of the species.

38 Early prototypes can be found in many macroeconomic textbooks (e.g., Denburg and McDougall 1968). This type of trivial extension usually spreads policy effects over both countries, weakening the original impact observed in a closed economy.

39 With "Rational Expectations" this convergence process then again can be assumed to take place in advance in the brains of all agents only, so all actually observed economies are always in equilibrium.
40 Referring again to Hanappi (2003), this concerns the "global primary metabolism," whereas "international finance" refers to the "global secondary metabolism."
41 Some pivotal contributions were already provided by Herman Daly (1996) and Georgescu-Roegen (1999) more than ten years ago – without much influence on standard economic theory. As an example of an interesting, more recent contribution, see Heinberg (2011).

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