

János Kornai on planning and disequilibrium: Theoretical dilemmas and solutions

WLADIMIR ANDREFF^{1,2*} 

¹ Honorary Professor, University Paris 1 Panthéon-Sorbonne, France

² President of the Scientific Council at the Observatory of the Sports Economy, French Ministry for Sports, France

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ABSTRACT

János Kornai has achieved a wide-scope multifaceted theoretical analysis moving from Marx to Walras-Lange, then to post-Keynesian disequilibrium economics, and eventually, to Hayek and economic institutionalism. Such a travel is not without meeting dilemmas that Kornai has had to struggle with and opt to resolve them in some way. Such process is illustrated first with a planner's dilemma. On the one hand, Kornai has elaborated on – together with Tamás Lipták – a mathematically ‘super’ solution to finding the optimal plan through a two-level planning procedure. But once implemented the latter has appeared to be too slow, and Kornai has rejected Lange's ideas for Hayek's criticism against central planning. A second dilemma is about how to analyse a centrally-planned shortage (excess demand) economy in which those industries privileged in the planners' pecking order priorities were producing an excess supply of (useless) goods. Kornai did not find a solution in the current disequilibrium economics but, instead, in a ‘lax’ communist bureaucracy generating a soft budget constraint. The third dilemma is that Kornai's views about disequilibria have not converged with the Post-Keynesian disequilibrium models. The latter were unable to conceive a simultaneous excess demand and excess supply in a same market, due to their so-called shorter-side rule. Instead, Kornai has found a solution that fits with theorising the observed micro (or even infra-micro) disequilibria in a Debreu's book, some years after having published a hard criticism of neo-classical microeconomics. A final question is raised: is Kornai's theory a decisive contribution to the analysis of comparative economic systems – that no one denies – or has he added some value to a more general theory of economic disequilibrium?

* Corresponding author. E-mail: andreff@club-internet.fr

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Commenting on his autobiographical book (Kornai 2005), Gérard Roland (2008) assessed János Kornai as one of the most influential economists of the 20th century. Beyond this first basic reason for admiring Kornai's achievements, I would like to focus on a rather unheeded one: Janos has been the only significant economist of his time attempting to cover and encompass in his approach – over his whole life – all the major trains of thought in economics. Therefore, he self-defined himself in his autobiography as “having one foot in and one foot out of the mainstream”. There was a price to pay for that, and Kornai autobiographically complained of some of his papers being occasionally rejected from publication in the mainstream journals.¹ Whereas the other side of the coin should have been to recognise that Kornai has delivered a fascinating multifaceted theoretical approach.

Though when one adopts such an eclectic route throughout economic theory, as pointed out in Andreff (2014), one is under the threat of encountering some paradoxes (Andreff 2021). This happened to Kornai, and his autobiography makes it clear that he has become aware of such dilemmas and found out some keys to resolve them. This short paper exemplifies my point with three such dilemmas.

1. KORNAI'S MULTIFACETED THEORETICAL APPROACH

As many Central European intellectuals reading Marx, Engels, Lenin right after the second world war, Kornai was impressed by the *Das Kapital's* kind of logic and systemic view. Even though Kornai definitely broke with Marxism in 1955, something was left of it. One still can find, for example, a division of the economy into a Section 1 (means of production) and a Section 2 (means of consumption) in Kornai's masterpiece, *Economics of Shortage* (1980), as well as, Kornai's capacity for critical analysis at any time.

Having lost his job at the Hungarian Academy of Sciences, Kornai worked at the Light Industry Planning Bureau and the Textile Industry Research Institute. Between 1958 and 1967, these jobs left him with sufficient time to study economics, do research and fully immerse himself into the neoclassical general equilibrium theory, namely its Walras-Lange auctioneer model. Regarding the controversy between Hayek (1935) and Lange (1936), at the beginning Kornai was leaning toward the ‘beautiful logic’ of the general equilibrium theory which also fascinated some other economic reformers of the central planning system in Eastern Europe. Work on the general equilibrium theory and on the models of decentralised planning were quite close, often done by the same people (for instance Malinvaud). Cooperating with the Hungarian

¹Now I can reveal that when I have been participating to the nomination process for the Nobel Prize in Economics (1986–1992), I have nominated Janos Kornai – together with Edmond Malinvaud. Neither has got it!



mathematician Tamás Lipták helped Kornai's involvement in – and acquaintance with – neo-classical optimisation under constraints.

For different reasons (see Section 2 below), Kornai was fully aware that the reality of economic planning was very far away from the neoclassical theory of perfect planning. He started up criticising the general equilibrium theory (Kornai 1971), read Keynes and Hirschman and, moved on into the direction of the post-Keynesian disequilibrium models. On the top of this, Kornai (1980) wrote *Economics of Shortage* which presents a quite unusual variant of disequilibrium.

Eventually, when Kornai (1992) wrote *The Socialist System* that he conceived as 'a genuine political economy textbook', he completed the whole institutional dimension that was missing in *Economics of Shortage*. At this point – and in a context of the starting transition from centrally-planned to market economy in Hungary and the post-Soviet countries – references to Hayek became a must as well as to various vintages of economic institutionalism.

At the end of the day, patchworking no less than four basic economic theories appeared to be a titanic task so that, after splitting from Marx, Kornai dropped Lange and the neoclassical equilibrium, then the post-Keynesians down the road in view of circumventing or resolving some dilemmas of mutual incompatibility.

2. THE PLANNER'S DILEMMA

Kornai's PhD dissertation (1959) contained observations about the incentive effects of planning indicators: the perverse effects of quantity indicators, the neglect of costs, bargaining for lower plan targets, the ratchet effect (avoidance of too large plan overfulfillment), shortage and irregularity of production, and many of the typical characteristics of the centrally planned economy.

With the new mood of economic reforms in Eastern Europe and the Soviet Union in the 1960s, the so-called decentralised planning came to the fore. In line with Oskar Lange's model, and using the newly invented linear programming algorithms formalised by Kantorovich (1965) and Dantzig – Wolfe (1961), many central planners and economists involved in planning procedures started to advocate some kind of plan decentralisation, at least at the stage of elaborating the five-year plan. In Hungary, Kornai happened to cooperate with the Computing Centre of the Academy of Sciences and the Institute of Central Planning, and to closely work with Tamás Lipták. The Dantzig-Wolfe algorithm was converging toward an optimal plan through an exchange of information between a central planning office and decentralised sectors (ministries, state enterprises) after a finite number of iterations. Fortunately! But the convergence process was slow. In the face of this issue, two solutions were envisaged.

The first solution consisted in improving the planning procedure with relying on the most recent theorem of the general equilibrium theory due to Arrow and Hurwicz (1960). This was the path that led Malinvaud (1967) to mathematically generalise the Dantzig-Wolfe algorithm. A further analytical development by Bessières (1967) enabled to decompose the Dantzig-Wolfe algorithm in such a way that the number of requested iterations for reaching the optimal plan is reduced to one. No longer any convergence issue.

The other solution was found by Kornai – Lipták (1965). Assessed by Malinvaud, an incumbent member of *Econometrica*'s editorial board at that time, as a mathematically 'superb' finding, they elaborated on the most sophisticated decentralised planning algorithm ever



conceived in line with Lange's model of market socialism (two markets for goods and labour, allocation of the means of production by a central planner). A two-level linear programme (one level with the central planner's programme and a second level with several sectoral programmes) was based on a marvellous idea – that Kornai recognised being Lipták's – consisting in the reformulation of the planning programme into a game theory model. To make a long (mathematical) story short, in this superb solution the planning programme was treated as a polyhedral game wherein the player on one side is the Central Planning Bureau and on the other side the team of sectors. All sectors jointly optimise a single common objective function. Each sector separately assesses resource allocation and output objectives sent by the central planner. Then, each sector returns to the planner shadow prices and recommendations regarding revised resource allocation and output objectives at the next iteration, so on and so forth.

The mathematical solution was implemented in Hungary with operationalising a system of models – one central and 18 sectoral models – decomposed into three levels: the central planner, 7 major industries, and 46 sub-industry sectors with 491 product groups (Kornai 1969). When running it with the computers available at that time, this system proved to be too slow and too much data-demanding for reaching an acceptable timely proxy for the optimal plan. The Hungarian planners were facing a trade-off between circulating a mass of information with a mass of iterations or living with a mass of unresolved disequilibria (shortages) until the plan implementation.

The difficult problem of information transmission – not to talk about enterprises and ministries cheating on the data conveyed to the central planner – pointed out by Malinvaud with regards to his own model was practically experimented in the centrally planned economies, Hungary included. Kornai may have been disappointed by the practical failure of the 'superb' solution and he has confessed in 2005 that mathematical planning was alien to the traditional bureaucratic planning. By 1969, he lost his faith in planning as a tool for resource allocation at a time when the New Economic Mechanism started to decrease the importance of planning in Hungary.

So, this was the solution. But what about the dilemma? In a matter of a few years Kornai was praised for having materialised the best technical solution of decentralised planning but, himself, he gave up Lange's model and joined Hayek's criticisms against planning. From the late 1960s on, he supported a transition toward a fully-fledged market economy instead of any kind of economic reform inspired by market socialism and Lange's ideas. This theoretical position reached its climax in his pamphlet about shifting from the socialist system in Hungary (Kornai 1990).

3. THE SHORTAGE DILEMMA

Economics of Shortage is known to be the most complete positive theory of the centrally planned socialist economy that has been produced to date and it is quite likely that this is how it will be perceived in the history of economic thoughts. From his PhD dissertation, Kornai correctly focused on the major recurrent shortcomings of the Soviet-type planned economy: excess demand (supply shortages) that materialises in any and every state-owned enterprise and consumer queuing for deliveries. However, there is a double dilemma in there.



First, while excess demand was plaguing all non-prioritised industries, those industries first ranked in the planners' pecking order of priorities were in excess supply. Too many machine guns, not enough personal laptops. To some extent, Kornai mentioned this kind of excess supply in his 1980's book though precisely formalising only the excess demand (shortage) side of the economy.

Second, a noticeable origin of shortages was not planning *proprement dit*, but the industrial ministries' and enterprises' soft budget constraint, the latter being referred by Kornai to the socialist bureaucracy and its 'lax' decision making when facing unfulfilled plans and enterprises deficits.

The dilemma is, on the one hand, that Kornai's underlying disequilibrium model is unbalanced with focusing on excess demand in all markets. That is a post-Keynesian rather than a Ricardian (classical) view of disequilibrium in both the markets for goods and labour (Benassy 1982). On the other hand, in an overall shortage economy, indeed some markets may well be in excess supply as it has been the case in the centrally planned economies. The solution of this second dilemma is suggested in Kornai's debate with post-Keynesian disequilibrium economists (see below) about the accurate level of aggregation in the disequilibrium theories.

The solution brought to the first dilemma was found later when, with two co-authors, Kornai generalised the soft budget constraint (SBC) syndrome as a potential feature of many markets in different institutional contexts, not only in the centrally planned economies (Kornai et al. 2003). A new dilemma is that the SBC cannot be considered any longer as the typical cornerstone in a theory of a socialist system, and it is practically so in Kornai (1992), in spite of Kornai (2005) still pushing the SCB forward as a 40% ingredient of his overall theory.

4. THE SHORTER-SIDE RULE DILEMMA

Close to the end of the planning story, most economists previously involved in 'planometrics' (plan calculation), such as Kornai and Malinvaud, joined the disequilibrium school initiated by Clower, then followed by the post-Keynesian macroeconomic disequilibrium models (Leijonhufvud, Barro-Grossman, Malinvaud, Benassy). In this theoretical framework, a repressed inflation regime is characterised by a double excess demand on the market for goods and the market for labour. This may look like the disequilibrium of former Soviet-type planned economies. Roland (2008) correctly stresses that Kornai uses micro-foundations, instead of macroeconomic disequilibrium, to analyse how the different forms of adjustment to shortage in the economy contribute to avoid chaos and too large disequilibria. And there comes a dilemma.

Though sympathetic to the post-Keynesian view of excess demand, Kornai (1980) criticized the shorter-side rule found in all aforementioned works starting from Clower (1965). All these models take on board the shorter-side rule assuming that "on each market, it is the short side which decides the amount of the transaction, and the long side which is rationed" (Malinvaud 1977). Consequently, if there is one rationed purchaser on the market, there cannot be one rationed seller on the same market, and vice versa. This shorter-side rule is too much macroeconomic (namely, for Kornai) in the sense that it aggregates all micro disequilibria in a given market and keeps only the net balance of disequilibria.

In 1980, Kornai based his disequilibrium approach on the practical experiences of shortages in producer and consumer goods markets and the slack revealed in the overmanning of



enterprises' workforces in the centrally planned economies. He did not accept analysing the consumer good market as a macroeconomic aggregate. In the post-Keynesian disequilibrium models, excess demand and excess supply cannot coexist simultaneously on a same market. On the contrary, Kornai considered that shortages and excess supplies must be accounted for separately at microeconomic level.

Economics of Shortage presented a disaggregated approach to disequilibria because shortages could not be captured correctly with aggregate indexes in the socialist centrally planned economies. The latter were plagued simultaneously with shortages of various consumer goods and stockpiling excess (unsold) goods, and unused production capacities were continuous sources of waste. Thus, Kornai rejected the shorter-side rule that commensurates aggregated instantaneous purchases (effective demand) with aggregated instantaneous sales (effective supply) on a given market.

Moreover, Kornai identified correctly that the origins of shortages were not to be found in the consumer good market, but were generated upwards in input 'markets' of centrally planned inter-enterprise supplies and deliveries – a non-existing market in the standard disequilibrium models. Consequently, Kornai did not exactly model a repressed inflation regime à la Malinvaud – Benassy because the hard core of his model consists in disequilibria in the market for inputs that are key determinants of the whole shortage planned economy.

While disequilibrium economics was – at best – looking for the microeconomic foundations (at the level of individual agent's behaviour) of macroeconomic disequilibrium, Kornai rooted shortages in the infra-microeconomic foundations at the level of each specific decision made by each individual at each time t (Andreff 1986). That point is related to and consistent with disaggregating the analysis of demand and supply down to each good and to the practical instantaneous decisions made by individual agents. In Kornai (1980), the theoretical unit of disaggregation is not the individual agent but each of his/her instantaneous, and sometimes simultaneous, decisions as a buyer, as a producer, and as a seller adjusting him/herself to current shortages at any moment. Each individual agent is "disaggregated" according to his/her different buying, producing and selling functions and decisions.

Therefore, Kornai's approach is much more microeconomic in *Economics of Shortage* than in all of the disequilibrium models published up to that time. The explanation provided by Kornai (1980: 143) in itself is a dilemma: "Debreu's description can be considered as strictly located at an infra-microeconomic level, since prices are separately marked according to the date and place of a given good". Here, Kornai is far from his earlier criticism of neoclassical general equilibrium microeconomics since Debreu's book (1959) is the pillar of the axiomatic neoclassical theory. Since reconciling the post-Keynesian disequilibrium regimes with the neo-classical general equilibrium does not seem to be feasible, Kornai has left this debate and returned back to Hayek. Muddling through Hayekian and other institutional economics fitted well with the urgently needed tasks of the post-communist transition to a capitalist fully-fledged market economy.

5. CONCLUSION: A SYSTEMIC DILEMMA?

Finally, Kornai still opposed socialism (planning, shortage economy) to capitalism (market, surplus economy) in his last published book (Kornai 2014). Thus, he definitely deserves Gérard Roland's congratulations for being the best theoretician of the socialist system. Should we extend



the praise up to his analysis of the capitalist system? And conclude in any case that Kornai's contribution is for ever a major pillar in analysing the comparative economic systems. Would it be enough?

What if the more decisive Kornaian breakthrough were to be the analysis of economic disequilibria at the level of each decision made by each economic agent, at the level coined as infra-microeconomic?

And what if the soft budget constraint syndrome is not confined to socialism and can emerge in capitalism either (Kornai et al. 2003), in other words, if the SBC can emerge in various industries of any of the two economic systems.

So what?

The background dilemma is to know whether Kornai's analysis is part of a specific theory about comparative economic systems, as suggested above, or part of general disequilibrium economics. I would lean toward the second option.

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