COORDINATION FAILURES

by

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Coordination Failures

During a depression economic activities are badly coordinated. Firms allow plant and equipment to fall idle despite increasing numbers of able-bodied people willing to operate it in exchange for less than the value of their marginal product. Savers continue as before to make provision for extra future consumption while production of the new capital needed to produce more consumer goods is reduced. Stocks of consumer goods pile up unsold even though the desire to consume them is, if anything, intensified by rising poverty. Farmers are forced off their land while others go hungry.

Many economists therefore think of depression as being a state of coordination failure; a state in which market forces have failed to coordinate the millions of transactors that interact daily through a web of interconnected markets. What Smith called the 'invisible hand,' or Mummery and Hobson (disparagingly) called the 'automatic machinery of commerce,' has not guided them to a state in which markets clear. Instead, people are somehow led to act at cross purposes, failing collectively to take full advantage of potential gains from trade. As Keynes put it, the system is not 'self-adjusting.'

The first step in understanding how a mechanism can fail is to understand how it works. Although contemporary economic theory is rather vague on how market forces work, the beginning student is left in little doubt that they operate mainly through the adjustment of prices. According to all undergraduate textbooks, a free market will quickly reach a coordinated (market-clearing) state, because prices rise when there is an excess demand and fall when there is an excess supply. Analytical accounts of coordination failure therefore focus on why something might go wrong with the process of price adjustment.

The classical tradition from Thornton through Marshall was to blame prolonged unemployment on impediments to price-adjustment, particularly impediments to adjusting the price of labor. This was also the approach of mainstream Keynesianism, which from Modigliani through Fischer was based on the assumption of sticky wages. But Keynes himself believed that coordination failure had a deeper reason, namely that wage and price adjustment, which classical theory pictured as corrective forces, are actually destabilizing. If given full rein they would lead an economy even further into depression, because a general decrease in wages and prices would produce 'debt deflation' (to use Fisher's term, which Keynes did not), destabilizing expectations of further price decreases, and adverse distributional effects.

Patinkin (1948) elaborated on Keynes's account of coordination failure by portraying the process of wage and price adjustment as a dynamical system that fails to converge to its (full-employment) equilibrium. Clower (1965) pointed out another possible reason for non-convergence, namely that transactors will respond not just to the price-signals of classical theory but also to quantity signals they receive when their attempts to trade are frustrated by existing imbalances between supply and demand. Thus excess supply in one market can lead frustrated sellers to curtail their demands in other markets, causing the excess supply to spread. As Leijonhufvud (1968) later elaborated, the cumulative decline in effective demand resulting from this process will tend to amplify deviations from full employment equilibrium rather than dampening them.

The approach taken by these writers, of analyzing coordination failure in terms of disequilibrium price adjustment, gained support from the demonstration by Scarf (1960) that price-adjustment in a Walrasian general-equilibrium setting does not always converge to a general equilibrium; in effect, adjustments in one market may be continually thwarted by

independent adjustments in other related markets. However, work on disequilibrium dynamics fell out of fashion in the 1970s, largely because its proponents offered no conceptually coherent account of the many logistical problems that arise when expectations are mutually inconsistent and markets are not clearing, or of the institutions (firms, shops, money, markets, etc.) that deal with these logistical problems in real life. The final blow was dealt by Lucas (1972) who showed that one can provide a conceptually coherent account of at least transitory coordination problems within a framework of rational expectations with clearly specified informational imperfections, a framework in which none the awkward problems of disequilibrium theory are visible.

After a decade of relative neglect, the theory of coordination failure re-emerged in the 1980s, when various authors found a way to model it using the rational-expectations-equilibrium approach which by that time had become de rigueur in macroeconomic theory. Since then, the term "coordination failure" has taken on a different meaning, with no reference to disequilibrium dynamics. Specifically, as elaborated by Cooper and John (1988) and later by Cooper (1999), it now means the existence of multiple equilibria, often Pareto-ranked, of the kind that exist in games with strategic complementarity.

Suppose for example that there is a strategic complementarity that works through "thin-market externalities" in the process of search and matching. (See Diamond, 1982 and Howitt, 1985.) That is, when people on one side of a market put more effort into the matching process, this makes it more worthwhile for those on the other side to do the same thing, because it makes transacting less costly for them. Then the general expectation on the part of firms that it will be difficult to find customers can be self-fulfilling. It leads firms to cut back their hiring effort, which leads to a fall in job vacancies, which makes it harder for unemployed workers to find jobs. As a result unemployment rises, and the consequent fall in incomes makes people generally

less willing to buy goods. This completes the vicious circle by confirming the original expectation that it will be harder for firms to find customers.

On the other hand, the same chain of reasoning can often be applied to show that the expectation that customers will be easy to find would also be self-fulfilling. Thus there are multiple equilibria, some with optimistic expectations, high income and low unemployment, and others with pessimistic expectations, low income and high unemployment. The latter might be interpreted as depressions. They persist because they are non-Walrasian equilibria in which people are interacting not just through prices but also through such non-price variables as the difficulty of finding customers, or the difficulty of finding a vacancy in the labor market. In a low-level equilibrium it would be pointless for firms to try lowering their prices since their problem is not that they have overpriced their goods but that the cost of marketing products is too high; similarly it would be pointless for workers to offer to work for lower wages since their problem is not that they are asking too much but that they can't find a potential employer with an opening.

Such low-level equilibria imply a coordination failure, in the sense that if only everyone would get together and raise their expectations in coordinated fashion, they could potentially reach a high-level equilibrium where everyone is better off. They remain in a depression because no mechanism exists for bringing about such a coordinated change in beliefs. Thus, according to this approach, the process of price adjustment fails to coordinate activities because it fails to deal with the root problem, namely that of pessimistic expectations with respect to non-price variables.

The contemporary notion of coordination failure as multiple non-Walrasian equilibrium thus shows the need to go beyond wage and price adjustment if we are to achieve a deeper

understanding of depressions. There are however two important, related problems with this notion. The first is that although, as explained above, multiple-equilibrium models do illustrate a kind of coordination failure they evade the task of analyzing the coordination process. A rational-expectations equilibrium is by definition a highly coordinated state of affairs, in which each transactor has managed somehow to anticipate, as fully as possible given informational constraints, the actions of others. By focusing exclusively on such equilibria, the modern coordination-failure literature thus presumes that coordination is managed costlessly by some unspecified mechanism. This begs the question of how people can achieve such precise coordination and yet fail in the seemingly simpler task of agreeing that the equilibrium they coordinate on should be a good one.

The second problem is that any model of multiple equilibrium without some mechanism for describing which if any equilibrium the economy will be led to lacks empirical content. Indeed the problem is greater than it might seem at first glance, because the model will have not just a high-level equilibrium and a low-level equilibrium but also a large number of other equilibria, in which people randomize between the high-level and low-level equilibrium in correlated fashion, according to the realization of some extraneous random variable. Because of this second problem, standard comparative-statics analysis applied to the model cannot predict, even qualitatively, how the economy will respond to variations in exogenous variables or policy instruments that impinges on the economy, because the system might respond by changing from one equilibrium to another.

In short, the rational-expectations-equilibrium theory of coordination failures is incomplete without an account of the disequilibrium dynamics that the older literature sought to provide. For it is only by studying what happens out of equilibrium that one can understand

which equilibrium will be arrived at, if any, by what route, and with what time delays. Howitt and McAfee (1992) show how one might add such an account in a highly stylized example, in which Bayesian learning can lead people to oscillate between a high-level and low-level equilibrium on the basis of an extraneous random variable that they interpret as "animal spirits."

Finally, none of the above-mentioned contributions attempts to identify and analyze the agents that perform the role of coordinating markets in actual economies. A tradition going back at least to J.B. Say identifies them as commercial enterprises – retailers, wholesalers, brokers, jobbers, etc. These "shops" are the visible counterparts of Smith's invisible hand. Howitt and Clower (2000) show how a coherent network of shops can emerge from competitive evolution. In their analysis no one has any understanding of the whole economy, yet the adaptive adjustments made by shops seeking to profit by serving their individual markets often combine to guide the whole system to a fully coordinated state. Ongoing theoretical research into the dynamics of such a self-organizing network may provide further clues as to how coordination normally works in a decentralized free-market economy, and why it occasionally fails.

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