

Patterns of Sustainable Specialization and Trade: A Comment^{*}

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Arnold Kling argues that the Aggregate-Demand Aggregate-Supply paradigm used in undergraduate textbooks is too broad a brush to be of any use in understanding how a complex economic system deals with the coordination issues that give rise to booms and slumps. A central part of the argument is the idea that slumps occur when the process of re-organization and reallocation forced by technical progress runs into difficulty. Finding the new patterns of exchange and production that are appropriate for changed circumstances requires time, typically involves a lot of mistakes, and often results in an increase in unemployment of workers displaced from declining sectors or from failed attempts to exploit a new technology.

The idea of slumps as periods of reallocation is an old one, as Kling acknowledges. It was central, for example, to the theories of Hayek and Schumpeter. Nor has the idea been forgotten in the modern literature, as evidenced by the writings of Lilien (1982), Davis and Haltiwanger (1992), Aghion and Howitt (1994) and many others. But the idea is not to be found in the most widely used undergraduate macro textbooks. Nor does it have any place in the New Keynesian dynamic stochastic general equilibrium (DSGE) models that guide monetary policy in much of the world today, which focus on aggregate demand rather than on reallocation issues. Kling argues for a new paradigm that would put the focus squarely on reallocation and coordination.

There is much wisdom in this provocative essay. Kling is right to draw our attention to the complexity of the macroeconomic coordination problem posed by technological progress, as I too have tried to do in the past (Howitt, 1994). It is also fair to say that current macroeconomics textbooks and DSGE models give us little guidance in understanding coordination problems in general. But I am not convinced that recessions are always the result of pure reallocation shocks, or that the concept of aggregate demand is of no use at all in understanding and dealing with coordination problems.

Coordination problems were in fact at the heart of Keynes's *General Theory*. He explained, for example, in Chapter 16, that increased saving reduces employment because it replaces an effective demand with an ineffective demand. Implicitly it transfers demand from present consumption goods to future consumption goods, and thus indirectly to the capital goods that would provide the capacity to produce those future consumption goods. But whereas an effective signal to produce fewer consumption goods is received by some producers' failure to sell as much as before, no offsetting signal is sent to any particular producer of future consumption goods, and thus none is sent to any particular producer of current capital goods. By reducing the amount of useful information available to the producers, the saver's increased thrift has complicated the problem of coordinating the plans of producers with those of consumers. They get fewer orders for consumption goods but no more orders for capital goods.

Nor is this coordination problem likely to be solved by a fall in interest rates induced by the increased saving. Although everything would work out nicely if the producers of the appropriate capital goods were to interpret lower interest rates as a signal to raise production enough to provide the capacity to satisfy the still unvoiced future consumption demand, it would only be a lucky guess. Moreover, demand for capital goods of any sort is unlikely to rise by the amount required to keep employment from falling, since the fall in interest rates will induce more hoarding of liquid assets, rather than granting of commercial loans. Indeed, since the initial drop in aggregate demand and reduced creditworthiness of some consumption good producers may make wary financial intermediaries want to hold a more liquid position anyway, there might not even be a drop in interest rates. In effect, the message to produce more capacity (never specific, even when it was first sent), comes to rest in someone's bank account or cash reserves without ever being delivered to a producer who could act on it.

Harrod (1939) added an important dynamical dimension to this coordination problem by showing that it could lead to an unstable long-run growth path. He asked what would ensure enough effective demand that the increased productive potential created by economic growth would be fully utilized, rather than becoming excess capacity and causing unemployment. (Harrod assumed that capital accumulation was the source of the increased potential, but it could just as well have been disembodied technical progress.) As long as the marginal propensity to consume is less than unity, business firms somehow have to see it in their interest to increase their investment outlays each year, and by just the right amount. Harrod rightly perceived that this brought into question the stability of equilibrium. Under his assumptions, any time entrepreneurs underestimated the growth of final sales, they would scale back their collective investment outlays, and the subsequent multiplier effects of this cutback would cause actual sales to fall even more than anticipated. A vicious circle would be created, whereby shortfalls in investment demand would feed on themselves in cumulative fashion.

Kling would be right to point out that the coordination problems pointed out by Keynes and Harrod are just the tip of the iceberg, because adjustment to technological change requires far more than the right level of aggregate demand. As incomes grow, marginal expenditures are devoted to new and different goods. Full adjustment in a multi-good economy requires entrepreneurs to create the sort of productive capacity and the sort of jobs, in many cases to create entirely new goods and markets, that will enable them ultimately to satisfy the yet unknown wants that people will have when their incomes are higher. Until people have that increased income, or at least enough of a prospect of increased income that they are induced to run down their liquid assets even faster, how are they to make their demands effective, especially if technological change has made them unemployed? Entrepreneurs not only have to anticipate demands that have not yet been articulated, they have to anticipate the decisions that other entrepreneurs are making, because paying the setup cost of hiring people and capital and developing a market to produce and sell any particular range of goods will only pay off if that range is compatible with the standards, techniques, and strategies developed by others. And of course these decisions have to be coordinated somehow with those of the unemployed and young workers trying to choose occupations, find sectors, and acquire skills to anticipate the jobs opportunities of the future.

So there are indeed coordination problems that go far beyond the issue of ensuring enough aggregate demand. And the fact that there does appear to be a heightened pace of reallocative activity during recession (Davis and Haltiwanger, 1992) strongly suggests that coordination is indeed particularly difficult during recession. But it does not follow that counter-cyclical demand management policies can do nothing to facilitate adjustment and alleviate unemployment, as both Hayek and Schumpeter argued during the 1930s, and as Kling seems to insinuate. For there is also plenty of reason to think that recessions are a time of particularly low aggregate demand, that this fall in aggregate demand indicates a coordination problem that goes beyond the reallocation implied by technological progress, and that aggregate demand management can do something to facilitate the adjustment to technological change and alleviate the attendant unemployment.

The key observation here is that, in a recession, output and employment tend to fall in all sectors of the economy, not just those where technological change is destroying jobs. It's not just that some new firms wait to increase their hiring while others reduce hiring, as in Kling's displacement scenario; instead, we usually see a fourth kind of scenario: a contraction scenario in which people in all sectors end up producing less and working less.

On the face of it this generalized contraction of economic activity is an indication that something has gone wrong with the mechanism that is supposed to coordinate economic activities.

Unemployed workers who used to be employed are just as willing and able to work as before, the fall in aggregate output that accompanies recession has enhanced the scarcity value of the output that at least some of them could potentially produce if employed, yet the market for their services has somehow shrunk. So the mechanism that had previously allowed them and those with a taste for their output to realize their potential gains from mutually advantageous exchange is no longer allowing them to do this, even though those gains are if anything larger than before. Instead of producing spontaneous order the mechanism is now producing disorder.

Maintaining a high level of aggregate demand can help to restore order by moderating this generalized contraction and alleviating unemployment without necessarily impeding the adjustment process. There is no iron law stating that a person going from one job to another must go through unemployment on the way. On the contrary, under normal circumstances the vast majority of job changes in the US economy do not involve any spell of unemployment. And there are many channels through which a high level of aggregate demand can reduce the amount of unemployment that takes place during the adjustment process. More aggregate demand encourages hiring in the sunshine sectors where the new jobs are to be found, on the part of firms who are likely to share at least some of the rise in demand. In that sense it facilitates adjustment at the same time as it reduces unemployment. It also discourages layoffs in the sunset sectors, by keeping firms solvent for a little longer. Maintaining a high level of aggregate demand can also help the adjustment process by helping to ensure that the slump does not trigger the process of debt deflation that creates massive coordination problems of its own between creditors and debtors and can result in entrepreneurs not getting the finance needed to bring new technologies on line.

The problem with the current state of macroeconomics is not that aggregate demand is unimportant, but that the theory does not help us to understand coordination problems. When you look at the typical DSGE model to see what exactly has gone wrong with the economy's coordination mechanism in an economic contraction, you find that such a mechanism hardly exists. Exchange activities in the canonical model of Woodford (2003) are all intermediated by monopolistically competitive business firms, from whom households buy all their consumption goods and to whom they sell all their labor services. But, there is no account of where these price-setting monopolists come from, how they maintain their monopolies against the threat of entry, how people decide to trade with one set of firms rather than another, how firms manage to coordinate with their suppliers and customers, what happens to the pattern of transactions when one of these intermediaries goes out of business in a recession, and so forth. Instead, all transactors are in continuous touch with each other through the intermediation of these firms, whose continued existence is merely assumed, and who take care of enough details of the transactions process that the other people in the model are connected only through the market prices that they take as given from the firms. As a result there is nothing that can go wrong in the transactions process other than some mistake in price-setting. In essence, these New Keynesian DSGE models are providing the same diagnosis that economists have given from Hume through Marshall; unemployment goes up, and output contracts, because wages and prices are slow to adjust to shifts in demand and supply.

It's not that the assumption of wage-price stickiness is factually incorrect; on the contrary, it is one of the most well documented phenomena in macroeconomics. Instead the problem is that there is no good reason to think that wage-price stickiness causes slumps. As Leijonhufvud (1968) forcefully pointed out, the experience of the Great Depression in the United States shows clearly that the downturn that started in 1929 did not come to an end until wages and prices started to rise, until the reflation that was clearly a deliberate policy move on the part of the Roosevelt administration started to take place. If lack of wage and price flexibility had caused the downturn

then it would have taken deflation, not reflation, to cure the unemployment problem. Moreover, as Keynes argued in Chapter 19 of the *General Theory*, and as Fisher had already argued in his debt deflation theory of depressions, there are many reasons for believing that wage and price flexibility would actually make fluctuations in unemployment larger rather than smaller.

So when an economy undergoes a typical contraction, something has gone wrong with the process by which economic transactions are organized—something beyond the mere stickiness of wages and prices. And the problem with mainstream macro theory is that it does not admit the possibility of any such problems. On this point I agree completely with Kling. We need a new paradigm to understand what goes wrong with the coordination process in the typical recession. Why does this process become so disorderly from time to time?

Of course to understand what has gone wrong with a mechanism we need to start with some understanding of how it is supposed to work when it isn't broken. We need to specify the mechanism that generates, at least under some idealized circumstances, a coherent pattern of trading relationships in a truly decentralized economy, and we need to provide some account of how that mechanism works. Only once we have such an account can we understand under what circumstances economic transactions are not likely to be well coordinated, what goes wrong with the coordination mechanism under such circumstances, what kinds of collective interventions are need to keep it working well or to get it back on track when it starts to fail, and so forth.

Here we run into a problem that goes beyond any particular flavor of macroeconomic theory. Nowhere in conventional economic theory can any clear account be found of how a decentralized economy can produce a globally coherent pattern of production, trade and exchange in the absence of a central coordinator. General equilibrium theory requires the mysterious Walrasian auctioneer to achieve equilibrium. In rational expectations macro models, everyone is provided with a pre-coordinated set of beliefs by some unspecified mechanism, which, like the auctioneer, uses no resources. In such theories an economy is not actually self-organizing; it produces non-spontaneous order, by an act of God. When coordination problems arise we can only blame Her.

In the absence of some such account of a decentralized coordination mechanism, we do not have the alternative paradigm that Kling calls for. We can recognize and point out, as Kling does so eloquently, that there is much more to macroeconomic coordination than can be found in the existing paradigm. We can give a title to a hypothetical alternative paradigm, as Kling does. But that doesn't mean that we have such a paradigm. In case this sounds overly critical, I observe that Kling is in good company here. Keynes, too, failed to provide the kind of paradigm suggested by his discussion of the way saving interferes with coordination, despite his suggestive remarks concerning wage and price flexibility. Nothing in the *General Theory* provided a clear account of the mechanism by which transactions are arranged and coordinated, what logistical problems are solved by this mechanism, how it might sometimes work without any central guidance, and what can go wrong with it other than having the wrong prices.

So how should we go about constructing this elusive alternative paradigm? I would start with the observation that economic exchange is not a do-it-yourself affair, of the sort portrayed by monetary search models where people wishing to trade go looking for others at random in hopes of encountering someone with a coincidence of wants, someone who is unlikely ever to be encountered again. Instead, the vast majority of economic transactions that take place involve, on at least one side of the market, some enterprise that specializes in undertaking such transactions as a matter of routine. When hungry, instead of searching aimlessly for someone with surplus food we

go to a restaurant or a grocery store. When looking for clothing we go to a tailor or clothing store. When arranging long-distance travel we go to a travel agent, and so forth.

It's not just the case that a specialist trading enterprise is always on at least one side of all transactions. These enterprises create the infrastructure that makes organized trade possible, by being open at advertised locations at predictable times, by holding finished-goods inventories that a buyer can inspect before deciding to purchase, by offering advice as to the relative merits of alternative goods and as to their functionality and general quality, by acting as a reliable source of spare parts and other complementary products, by arranging for delivery of goods, by posting prices or otherwise making arrangements for an orderly and expeditious determination of the terms of exchange, by managing supply chains so as to make available goods that match consumers' preferences at reasonable prices, by allowing their own inventories to absorb discrepancies between demand and supply so that others can continue to execute their trading plans even when they are not mutually compatible, by creating and maintaining the shops and web-sites that facilitate exchange, and so on. In short, the markets through which we actually trade, far from being the pure abstractions that go by that name in conventional theory, where a market is just a collection of demand and supply functions, are concrete facilities and institutions created and managed by business enterprises. Without these facilities, we could never undertake the complex trading arrangements needed to support even an 18th Century standard of living, let alone a 21st Century standard. Faced with the alternative of do-it-yourself trade we would mostly still be in autarky.

Indeed, Wallis and North (1986) make the case that most of what business firms do in a modern economy like that of the United States is to produce transactions services, which they interpret as services that would be of no use to a Robinson Crusoe with no trading partners. According to the BEA accounts, the value added by firms in finance, insurance, and retail and wholesale trade has been more than fifty percent larger than that of the entire manufacturing sector in every year for the past decade. Moreover, much of the input used by firms in the manufacturing services is best construed as being used up in the course of providing transactions services that help people realize gains from trade rather than being used up in transforming inanimate objects. I have in mind the inputs of lawyers, sales people, and those engaged in personnel, marketing and advertising and so forth, all of whom are undertaking activities whose main purpose is to facilitate and coordinate transactions. In short, business firms are, to use a phrase from Robert Clower, the visible fingers of the invisible hand.

I conclude from these considerations that if we want to know how a coherent pattern of specialization and exchange can emerge from a decentralized economy, we need a conceptual framework in which transactions take place through facilities that are created and operated by profit-seeking business firms. In order to avoid having a central coordinator in the framework, these firms must act without the benefit of rational expectations; i.e. they must deal with true Knightian uncertainty. Since no one in such a framework will have the information needed to make objectively rational calculations we need to model their behavior in a more adaptive or satisficing manner than in conventional theory.

In order for the economy depicted in this conceptual framework to be truly self-organizing, the framework must include some account of the forces of innovation and entrepreneurship that create firms, rather than simply taking as given a fixed array of firms, and, hence, a fixed array of markets. And in order to examine the way in which the system's ability to generate a coherent pattern of transactions depends upon various circumstances, the framework needs to specify in considerable detail how these firms organize their trading facilities, how people decide which facilities to patronize, how inventories of finished goods are managed given the excess supplies and

demands in various markets, and a host of other logistical details associated with the trading process. These details can easily be ignored in conventional equilibrium models, but we cannot ignore them if we want to study what happens when there is no central coordinator to guide people towards an equilibrium.

This at least sums up what has been my own strategy, in a research program I have been pursuing for some time now with several co-authors. (See Howitt and Clower, 2000; Howitt, 2006; Ashraf and Howitt, 2008; Ashraf, Gershman and Howitt, 2011.) We have been building simple, stylized models of economies in which, instead of behaving according to the conventional rules of rational behavior, people follow simple myopic but adaptive rules using little information, and in which they trade, in and out of equilibrium, in markets that are created and operated by a self-organizing network of profit-seeking business firms. To deal with the analytically intractable complications that arise from the intermarket spillovers from disequilibrium trading, which doomed the school of disequilibrium macro that started with the insights of Clower and Patinkin and reached its zenith with Barro and Grossman (1976), we resort to computer simulation. In effect we are following the strategy of Agent-Based Computational Economics (ACE), the approach that treats an economy like a human anthill, in which globally coherent patterns can emerge from local interactions between people possessing little or no global information or understanding of the overall working of the macro system.

There is no space here to describe this research program in any detail. Nor do I claim that this program constitutes a new paradigm. At best it indicates one possible route to follow in search of a paradigm. Here I will just make a few observations that arise out of our research concerning a decentralized economy's coordination mechanism, observations that I think are obscured rather than illuminated by currently popular approaches to macroeconomics.

First, entrepreneurship is the most important ingredient in the coordination mechanism. If people are not free to start new business firms, new markets are not created and new technologies do not become widely available. Even in the absence of technological change, entrepreneurship is needed to deal with changing patterns of tastes and demographics, and to replace the markets that are continually being destroyed by the exit of older businesses. The more barriers there are to the entry of new firms, the bigger the discrepancy will be between what an economy does produce and what it is capable of producing. This is not just a matter of short-run fluctuations. We find that economies with a very low rate of new business formation perform much worse, in terms of average rates of unemployment and average level of GDP, than economies with much higher entry rates, even over periods as long as 40 years. Djankov et al. (2002) support these theoretical results by their finding that the cost of starting up a new business is highly negatively correlated with long-run levels of economic development across countries. In this respect, considerations of economic coordination strongly reinforce the message of innovation-based endogenous growth theory (Aghion and Howitt, 1998).

Second, a recession can be created by the coincidental failure of a large number of firms, or even the failure of a small number of very large firms; from the macroeconomic perspective, business failure is cumulative. The failure of one firm can start a cascade of failures, because those people who were counting on the first firm to buy their specialized labor services may remain unemployed until a successful entrepreneur replaces the firm or the person manages to locate another firm interested in hiring that kind of labor service. Meanwhile the loss of income on the part of the unemployed will lead them to curtail expenditures with other firms, thus raising the likelihood of further failures, and so forth. When such a cascade takes place there will be a cumulative contraction of economic activity. Eventually, as a coherent pattern of trading facilities

emerges, this will come to an end, but the process of competitive entrepreneurship is a messy one. With many new businesses fighting to dominate a market that has been vacated by the failure of an incumbent, that market will undergo a disorderly shakeout period. Not all of the contenders will survive, and when contenders do fail there is a heightened risk of a secondary cascade. Meanwhile, intensified price competition in the markets undergoing shakeout will reduce the profitability of firms in competing markets, putting firms there at greater risk of failure.

The economic contraction that can be created by business failures on a large scale is not the kind of downturn that is depicted by conventional theory, because it cannot be cured by having more or less wage and/or price flexibility. The problem that needs to be resolved when there is a cascade of failures is not that someone has made a pricing mistake but rather that some organizational capital has been destroyed, in the form of transaction facilities, and there is no way of replacing that capital other than allowing the disorderly process of entrepreneurial competition to continue until a new coherent pattern of facilities eventually emerges. This is not to say that the best policy is to wait it out, as Hayek and Schumpeter argued, for the reasons that I sketched earlier. Rather it argues in favor of maintaining aggregate demand and pursuing a quasi-mercantilist policy aimed at helping large business firms survive the economic downturn.

A third observation I am led to is that even a modest rate of inflation can result in a substantial deterioration of macroeconomic performance, even if it is fully anticipated. This is because inflation interferes with the ability of business firms to manage their markets, and results a poorly coordinated pattern of transactions. The problem here is the well-known tendency of inflation to introduce noise into the price system. There is no central coordinator to make every firm's prices and wages rise simultaneously at the same exponential rate. Instead, firms will adjust their prices at various points in time, depending on local conditions. The higher the rate of inflation the bigger will be the dispersion of relative prices that arises simply because some firms have adjusted their price more recently than others. This extra noise in prices leads to a higher variance of profitability across firms, putting more firms in the lower tail of the profit distribution where they are most likely to fail. The likelihood of a downturn caused by a cascade of shop failures thus increases. Simulations in a model calibrated to the US economy indicate that economic performance deteriorates sharply once the annual trend rate of inflation rises above three or four percent per year. This is very different from the rather modest costs of expected inflation coming from conventional approaches to macroeconomics that ignore the role of business firms in the coordination process.

My final observation is that financial development is not just good for long-run performance but also helps to stabilize the macro economy. The financial crisis and great contraction have led macroeconomists to resurrect the "financial accelerator" of Williamson (1987) and Bernanke and Gertler (1989), according to which financial intermediaries amplify the business cycle. But in the approach I am advocating, banks tend to dampen recessions. When the economy goes into a downturn, for whatever reason, the downturn is amplified by cumulative business failures, as described above. The negative effects of those failures on macro performance will last until new entry replaces the organizational capital that has been destroyed. And the speed with which new entry will respond to the problem depends crucially on the availability of finance. The less financially repressed the economy, the easier it is for entrepreneurs to come to the rescue of those deprived of trading opportunities, and hence the sooner the contraction will come to an end. Finance thus provides us with not just an accelerator but also a stabilizer. This is something that is easy to lose sight of when so much of our current economic woe clearly originated in the financial sector. But it is important to bear in mind that if, in the process of tightening regulations on

financial intermediaries we impair their ability to operate in the risky business of financing entrepreneurship, we may be doing more to destabilize the economy than to stabilize it.

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