THE INSTABILITY OF MARKET ECONOMIES[1]

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The modern approach to macroeconomic fluctuations considers that the economy is fundamentally stable, and fluctuates around a stationary state because of exogenous shocks. This article presents some thoughts and avenues of research for a different approach in which the decentralised market economy may prove to be fundamentally unstable and thus fluctuates both endogenously and exogenously. This has implications for the conduct of macroeconomic stabilisation policies.

Keywords: cyclical fluctuations, endogenous cycle, non-linearity

A common narrative of recent macroeconomic history considers that from the mid-1980s onwards, OECD economies entered a period of "great moderation" during which macroeconomic volatility was significantly reduced (Cecchetti, Flores-Lagunes & Krause [2005]). This great moderation would be partly due to smaller shocks and partly to better policies, particularly monetary ones. According to the same narrative, the belief in the "end of economic history" would have been called into question by the 2007 crisis, which would have brought up to date the financial dimension of economies, as generating shocks and amplifying fluctuations. Another reading is possible, according to which the economy has not undergone any major change in its fluctuations since the end of the 1970s.

Before presenting this alternative view, let's ask ourselves how macroeconomic theory intends to explain fluctuations? One can identify two alternative approaches. According to the first, the economy is

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1. This article takes up considerations developed in my work with Paul Beaudry and Dana Galizia.

inherently stable, and market forces tend to place it along a relatively smooth growth path that fluctuates with technological, demographic and "societal" changes (such as the emergence of digital technologies, higher life expectancy or female participation to the labour market). Provided that the conditions for the proper functioning of markets are guaranteed, if necessary through "structural" policies, stabilisation policies are essentially useless. Under the second approach, market economies are fundamentally unstable, moving from expansions to crises, from periods of overheating to persistent episodes of high unemployment. Economic regulation is therefore essential to correct markets failures in the cycle.

1. The Modern Macro-Economic Approach to Fluctuations

Where do we place the modern macroeconomic approach, as exemplified by Smets and Wouter (2007) for its pre-financial crisis incarnation and Christiano, Eichenbaum and Trabant (2015) for its post-financial crisis one, on a line which goes from "laissez-faire" to the imperative need to regulate naturally unstable markets? Not surprisingly, somewhere in between. But we believe that these models, developed in universities and used by central banks and budgetary authorities are by nature closer to the former view than to the later. Indeed, these models are essentially based on the idea that a decentralised economy is stable and that market forces by themselves do not create expansions and recessions. If cycles are observed, it is because external forces, "shocks", destabilise a system whose natural tendency is the return to equilibrium. Why is such an approach dominant in contemporary macroeconomic thinking? For three main reasons. The first is that when we zoom out and look at market economies over a long period (say the last 100 years), the striking feature we observe is steady growth in real per capita income, not instability, as illustrated in Chart 1(a). If we exclude the two world wars, we certainly observe fluctuations around the growth path, but these appear relatively minor. The economy appears to be broadly stable. As Prescott (1999) writes,

> "*The Marxian view is that capitalistic economies are inherently unstable and that excessive accumulation of capital will lead to increasingly severe economic crises. Growth theory, which has proved to be empirically successful, says this is not true. The capitalistic economy is stable, and absent some change in technology or the rules of the economic game, the economy converges to a constant growth path with the standard of living doubling every 40 years.*"

We defend below the idea that there is a third interpretation, according to which the economy is globally stable but locally unstable.

Chart 1. GDP per capita and unemployment rates in four major developed economies

(a) GDP per capita	(b) Unemployment rates
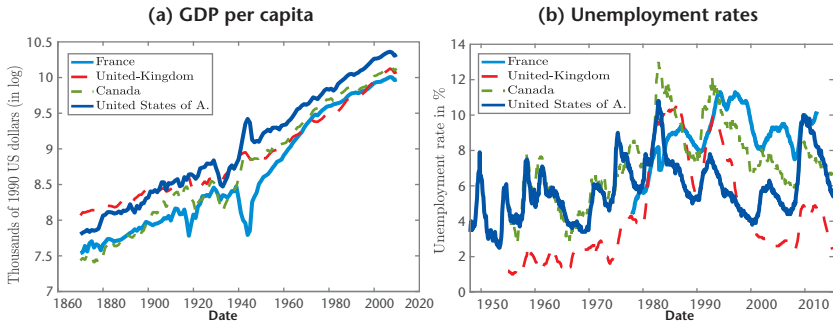
Sources: (a) Bolt et van Zanden (2014) and (b) FRED, Federal Reserve Bank of St. Louis.

The second reason to believe that economies are stable is that in general equilibrium, under certain regularity conditions that are generally verified by macroeconomic models, market forces tend to favour convergence (often monotonous) towards a stationary path (turnpike theorem). Finally, the third, more practical reason is that a view of the economy as stable and perturbed by shocks is compatible with linear dynamic modelling, which greatly facilitates the resolution and estimation of such models, especially when they are stochastic and with rational expectations. As Blanchard (2014) summarises,

"*We in the field [of macroeconomics] did think of the economy as roughly linear, constantly subject to different shocks, constantly fluctuating, but naturally returning to its steady state over time.*"

2. Towards a Richer Cycle Modelling

To begin with, it seems to us that focusing on the evolution of real per capita income can be misleading when one considers cyclical fluctuations. Indeed, one must eliminate the trend to observe fluctuations, and there is not a indisputable statistical method to separate cycle and trend. If growth (the trend) is the place where factors of production (physical capital, knowledge, human capital, population) accumulate, the cycle is that of variations in the intensity of the use of these factors. Since Keynes, it is the possibility of under-utilisation of factors (under-utilisation of capital and unemployment) that distinguishes cyclical

fluctuations from growth. It seems therefore more relevant to consider the evolution of the employment rate, the capacity utilisation rate or the unemployment rate to understand the cycles. One advantage of such an approach is that we are then dealing with series that do not grow, which makes it possible to circumvent the difficulties inherent to the trend-cycle decomposition. This is what we do in Chart 1(b) by showing the evolution of the unemployment rate in Canada, the United States, France and the United Kingdom. What are we seeing? Two essential things.

First observation, economies alternate expansions and recessions, periods of low unemployment and periods of high unemployment in a quite regular way. We do not clearly see a great moderation from the 1980s onwards, and we do not see such an unprecedented recession from 2007 onwards. Thus, there is a great regularity in the alternation of expansion and recession phases, with a cycle length circa ten years. In a series of recent studies (Beaudry, Galizia and Portier, 2016a, 2016b), we have shown that this regular cycle statistically translates, for many developed economies, into a peak in the spectral density of unemployment and in the rate of capital utilisation. This strong cyclicality contrasts with the conventional wisdom since Granger (1969), according to which there are no peaks in the spectral density of the main macroeconomic aggregates. This absence of marked cyclicality observed by Granger lead Sargent (1987) to define cyclical fluctuations not as a cycle but as a set of co-movements between macroeconomic aggregates. One could rightly say that there are no cycles in the modern approach to business cycles; no cycles in the sense of no peak in spectral density, therefore no alternating phases of expansions and recessions explained by the same propagation mechanism, and independently of the shocks that may affect the economy. In contrast, a cyclical economy would indeed be an economy in which phases of expansion and recession are linked, caused by each other in the sense that recession is the bedrock of future expansion. As Schumpeter writes, "the only cause of depression is prosperity". There is an ancient tradition of endogenous cycle modelling (Kalecki, 1937; Kaldor, 1940; Hicks, 1950; Goodwin, 1951), but it is not found in contemporary macroeconomic models. The reason for this absence is most certainly related to the following second observation regarding Chart 1 (b).

Second obervation, if there is a regularity in the cycle, we are far from a deterministic cycle. A rich modelling of the cycle should there-

fore take into account the marked regularity of the cycle (as in the endogenous cycle approaches), but also its unpredictability. It was undoubtedly the deterministic nature of the cycle in the first generation of endogenous cycle models, and thus their complete predictability, that limited their appeal for quantitative macroeconomy. But combining strong endogenous cyclical forces with shocks, it is possible to propose an alternative view of the macro-economy of fluctuations. In this alternative view, the economy is inherently unstable, but probably not explosive, and hit by shocks that are responsible not for the cycles as such but rather for their unpredictability. This raises the following question: which market interactions are responsible for instability? Before discussing this issue, let us spend some time on a more technical but relevant question, namely the relationship between stability and instability in linear and non-linear models.

3. Stability, Instability and Non-Linearity

In this section, we present the concepts needed to understand instability in a non-linear world (see Beaudry, Galizia and Portier [2016b] for a rigorous discussion). It is convenient to think of macroeconomic modelling as a relationship between the present, the past and expectations of the future. Mathematically, let us write that an endogenous macroeconomic variable X_t, to fix ideas the hours worked per person, is determined by the equation:

$$X_t = E_t\left[F\left(X_{t-1}, X_{t+1}, \theta_t\right)\right], \tag{1}$$

where θ represents an exogenous stochastic variable, E_t is the operator of mathematical expectation and F summarises all the mechanisms of the model. The stationary state of the economy is defined as the value X that satisfies equation (1) when the exogenous variable is constant at the level θ, in other words in the absence of shocks – i.e. $\overline{X} = F(\overline{X}, \overline{X}, \overline{\theta})$. The steady state is stable if the economy tends to return to $\overline{X}$ when it is taken away from it (deterministic version of stability) or if when the economy is hit by recurrent shocks, it tends to remain in a neighbourhood of $\overline{X}$ (stochastic version of stability). In a linear world, that is, a world in which the function F is linear, these two concepts of stability are equivalent. To the extent that we do not observe explosive cycles in the data (see Chart 1 (b)), the estimation of a linear model such as (1) will lead to the conclusion that the stationary state is stable. However, the economy can be quasi-cyclical in a linear

world if, following on single shock, it returns to its stationary state with oscillations, creating periods of expansion followed by periods of recession. These oscillations will dampen with time, so that it will take a repetition of shocks to create fluctuations. The fluctuations will not be self-sustained, but they can be largely endogenous if the rate of convergence is slow. However, this is not what estimated macroeconomic models predict. For example, in Smets and Wouters (2017) model, convergence to the stationary state is essentially without oscillations. Why is that? Because these models do not have strong mechanisms linking expansions and recessions. A recession only follows an expansion when negative shocks hit the economy. But the fact that the economy is expanding today doesn't mean it has a higher probability of going into a recession tomorrow. There is no causal relationship between today's expansion and tomorrow's recession.

When strong cyclical mechanisms are introduced (as explained in the next section) and when the model is allowed to be non-linear, it is possible that the economy is found locally unstable, in the sense that it does not return to its stationary state, but globally stable, in the sense that it remains at finite distance from its stationary state. In such a configuration, which is the one we obtain in our estimates, there exists a limit cycle, so that the economy, even without shocks, can oscillate between phases of expansions and recessions. Without shocks, these oscillations would be perfectly predictable, and thus not very relevant to model actual economies. However, in this non-linear environment, shocks will cause variations in the phase and amplitude of the cycle, so that it will not be fully predictable. We now discuss which model structure is likely to generate such stochastic limit cycles.

4. A Macroeconomic Framework with Endogenous Cycles

In Beaudry, Galizia and Portier (2014, 2016b), we develop a theory that generates stochastic endogenous fluctuations. The basic mechanism is that there are incentives for economic agents to coordinate their decisions, that is to do the same thing at the same time. In particular, in an economy where consumers face an uninsurable unemployment risk, one has an incentive to spend more when the others are spending more, because higher aggregate spending reduces unemployment, thus reducing one's own risk of losing its jobs. When the others spend more, one can reduce its precautionary savings (or go deeper into debt) and spends more. In short, one spends more when

the others spend more. This mechanism, also recently modelled by Chamley (2014) and Challe and Ragot (2016), can generate cyclical instability when coupled with a decision to accumulate durable and real estate assets. The endogenous cycle comes from individually rational but socially costly behaviour, which justifies public stabilisation policy. The sequence of expansions and recessions is as follows: at the end of a recession, the stock of real estate and durable goods is depreciated, so that some agents decide to replete it (replace an old car, buy a larger or better located apartment), even if the risk of unemployment is still high. In doing so, increased spending tend to increase output, employment and thus tend to reduce the risk of unemployment, so that some other agents are encouraged to reduce their precautionary savings and spend more, thus creating a cumulative upward effect. This expansion does not stop when the socially optimal level of housing and durable goods is reached, because each economic agent has incentives to spend more, even if everyone rationally predict that the end of expansion is all the more likely when the aggregate stock of housing and durable goods is large. But when households eventually decide to slow down their accumulation by reducing their spending, they create an increase in unemployment that increases risk and further reduces spending. The economy then appears to be in demand deficient regime, and it slips into recession, until assets stocks are reduced enough to bring the recession to an end. The economy then enters again in an expansionary phase. The cycle can exist without shocks, and then be totally predictable. But it is likely that the economy is also affected by events such as changes in perceptions, expectations, technological change, *etc.*, so that the length and amplitude of the cycle vary in an unpredictable way. This stochastic limit cycle mechanism is not a simple theoretical curiosity, and we show in Beaudry, Galizia and Portier (2017) that estimation of such a model places it in a configuration where such limit cycles exist. Shocks are needed not to create fluctuations, but to make them less predictable.

5. Implications for Economic Policy

Such a modelling sheds a new light on what should be the best stabilisation policies in recession phases. Because expansion phases tend to be too long, the economy almost necessarily finds itself in a situation of over-accumulation (of capital, houses, durables) at the end of an expansion. There is therefore some truth in the Hayekian view

that recessions are needed to "liquidate" the excess capital in the economy. According to Hayek, supporting aggregate demand in recessions is inefficient, as it only delays the recovery. In support of that view, no one will argue that in 2008 it was necessary to support demand in the construction sector in Spain, when almost 30% of the 3.5 million houses built since 2001 were vacant. However, there is no guarantee that the pace of liquidation determined by market forces will be socially optimal. In the economy described in the previous section, it can be formally shown that recessions are inefficiently too severe, because the effect on unemployment of individual spending decisions is not internalised. Even if the decrease in expenditure must take place, the decentralized economy over-reacts, and places itself in a regime of deficient aggregate demand. A Keynesian policy that supports aggregate demand is desirable. While it will slow the liquidation and prolong the recession, its benefit will be to reduce unemployment on the way to the recovery. There is a trade-off between the length and severity of the recession and there is no evidence that the market is choosing the right balance between the two.

Such mechanisms, in a non-linear model, also contribute to the debate on "secular stagnation" launched by Summers in 2013. Decentralized economies work well when they are well below their balanced growth path: the capital stock (productive capital, housing and sustainable) is low relative to the level of technology, unemployment is low, the economy is growing. But when the economy becomes prosperous and fluctuates around its stationary growth path, needs are largely satisfied (not in absolute terms, but relative to the level of technology) and the economy then evolves in a very different area of high unemployment, hence insufficient demand and endogenous cycles. It is in a way the fate of prosperous economies to oscillate endogenously and be chronically in deficit of demand.

If the pace of technology decreases, the economy finds itself in excess of capital (relative to this new technology path), and thus by the mechanism previously described, in a situation of structural demand deficit. This structural demand deficit cannot however be absorbed by a policy that supports aggregate demand, since it is precisely the past level of demand and the large accumulation of assets that is the cause the recession: supporting demand means increasing accumulation, and thus ultimately aggravating the causes of the demand deficit.

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