

## Goodhart's Law

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In the early 1970s Central Banks increasingly began to adopt monetary targets as an intermediate, and potentially manageable, variable in pursuit of their final objective of controlling inflation. Naturally each country that did so, including the UK, tended to choose that particular monetary aggregate that, up to the date of choosing, appeared to have the most stable relationship with nominal incomes, and hence inflation. By 1975, however, these econometric relationships had in many cases broken down, not only for most demand-for-money or velocity relationships, but particularly so in most countries for *that* aggregate chosen as *the* monetary target. While some decline in (predictive) relationship might have been expected in the light of the disturbances of 1973/74, e.g. the oil shock, sharp rise in inflation, house/property boom/bust, sharply varying interest rates, etc., what was remarkable was that it was in the case of the chosen targets where the breakdowns seemed most extreme. As Governor Bouey of the Bank of Canada is reputed to have said: « *We did not leave the monetary targets; rather they left us* ».

It was that observation that led me, at a Reserve Bank of Australia conference in Sydney in 1975, to the comment that the breakdown of such relationships accorded with « *Goodhart's Law, that any observed statistical regularity will tend to collapse once pressure is placed upon it for control purposes* ». The best source to find this quote now is Goodhart (1984). It was intended as a humorous, throw-away line, and, unlike the Lucas critique, was not based on some deeper underlying analysis, just some limited empirical observation.

That does not mean that Goodhart's Law is just a sub-set of the Lucas Critique, though they do overlap to a large extent. As Chrystal and Mizen (2003) describe, there are several differences. Whereas both are derived from empirical observation – Goodhart's Law from predictive failures in demand-for-money functions and the Lucas Critique from breakdowns in « reduced-form » equations in macro-economic forecasting models – the Lucas Critique has a firm theoretical basis, while Goodhart's Law is more pragmatic and policy-oriented. Above all, the Lucas Critique is aimed at an audience of fellow macro-economic theorists and model-builders, whereas Goodhart's Law

is more of a general warning to policy makers, that there will be « unintended consequences » of changes in policies, especially when unforeseen.

The Lucas Critique focusses almost entirely on the response of the regulated, those affected by the new policy change, to any such new policy measure. The objectives of the authorities themselves remain, in such models, largely unexamined; they are often treated as dummies, or as represented by some fixed reaction function. In contrast, Goodhart's Law, while, of course, largely reflecting the same syndrome, *i.e.* that those subject to new policies and regulations will react in different, and often unexpected ways, also takes cognisance of the fact that, having set a new policy target, the authority involved has some reputational credibility attached to successfully meeting that target, and thus may adjust its own behaviour and procedures to that end. Thus the adoption of a new target may alter not only the behaviour of the regulated but also that of the regulator, an implication which, I would argue, is largely missed in the Lucas Critique.

The Lucas Critique has been enormously successful on its own turf, that is in influencing the way in which macro-economic theory and modelling have been done. Already by the 1980s few macro-economic theory and modelling papers could get into the (best) academic journals unless they were based on micro-economic foundations, such as were supposedly immune to the Lucas Critique. And by the new century most official forecasting models, as run for example by central banks, were similarly run on the same basis, as in the dynamic stochastic general equilibrium (DSGE) models, even though these incorporated certain simplifications, such as representative agents and no default, that excluded, by definition, the existence of financial frictions. While the recent Great Financial Crisis is causing something of a re-think, and there are criticisms of the view that macro-economics must be built on micro-economic foundations (King, 2012), nevertheless the Lucas Critique remains a dominating feature of modern macro-economics.

In contrast in the other Social Sciences there is much less reliance on formal, numerical simultaneous equation models of behaviour. Consequently there is much less space for the Lucas Critique to be relevant. In contrast the more pragmatic, policy-oriented Goodhart's Law, (independent of a formal model-building structure), has more resonance in the Social Sciences outside the narrower bounds of macro-economics. Thus in the broader Social Sciences, at least in the UK, Goodhart's Law is quite widely known and taken seriously, whereas the Lucas Critique is not part of their intellectual armoury. This position reverses in macro-economics where the Lucas Critique is part of the intellectual foundation, whereas Goodhart's Law is merely a qualitative and literary offshoot of that.

Some ways of describing relationships catch on, whereas others do not. Although I had never expected my semi-jocular statement about Goodhart's Law to become regularly used, and moreover used seriously, it was taken on in a broad range of cases, mainly in the social sciences and mainly in the UK, as an explanation why the translation of prior statistical relationships into control targets so often led to the breakdown of the prior relationship.

Anyhow, the common validity of the concept was clear, and the presentation of Goodhart's Law seemed simpler than that of the Lucas Critique, and so was widely taken on, and became elevated, again by others (not by me), into a serious component of the social sciences, particularly in the UK. It was dignified, for example, in the paper by Chrystal and Mizen (2003) on « Goodhart's Law: its origins, meaning and implications for monetary policy », and has been extended into other social sciences. Thus, Keith Hoskin (1996) has illustrated its broader applicability; also see Strathern (1997) who restated the same concept as, « *When a measure becomes a target, it ceases to be a good measure* ».

Let me conclude with a recent example, relating, once again, to the money supply and to the monetary policy of central banks. The standard, textbook, way of describing the determination of the supply of money was based on a relationship known as the « money multiplier ». This was actually based on two identities. The money supply was defined as:

$$\begin{array}{ccccccc} M & = & D & + & C & & \\ \text{(Money Supply)} & & \text{(Bank deposits)} & & \text{(Currency outstanding)} & & \text{(i)} \end{array}$$

And the high-powered monetary base was defined as:

$$\begin{array}{ccccccc} H & = & R & + & C & & \\ \text{(Monetary base)} & & \text{(Bank reserves)} & & \text{(Currency outstanding)} & & \text{(ii)} \end{array}$$

If you then manipulate these two identities, dividing (ii) into (i), you reach a third identity, whereby:

$$M = H \frac{(1 + C/D)}{(R/D + C/D)} \quad \text{(iii)}$$

Thus the money stock is shown to be (identically) related to the monetary base and two, quite simple, ratios, the currency/deposit and the bank reserve/deposit ratio. While this *must* be true by definition, it was widely translated, not least by M. Friedman and A. Schwartz (1963), into a hypothesis that the money stock was primarily determined by policy-induced variations in the monetary base (H), with the two relevant ratios (C/D and R/D) remaining fairly stable and being themselves functionally related to a few, understandable, variables.

I have, throughout my working life, been a severe critic of the money multiplier (see Goodhart, 1975, Chapter VI), on the grounds that it reverses the direction of causality. For historical and institutional reasons central banks have always wanted to control a short-term, official interest rate (Bank rate in the UK). If the central bank wants to set such a rate, it has to provide the commercial banks with the reserve base that such banks want, at that official rate, and given such factors as reserve requirements, demand for credit, risk aversion, etc. Normally, with the interest rate payable by the central bank on reserves held with them by commercial banks kept at a low

level, commercial banks wanted to hold only a small buffer above the required minimum. With such requirements usually kept constant, the reserve ratio (R/D) remained fairly stable year after year. With the currency deposit ratio (C/D) primarily dependent on the technological (and tax avoidance/evasion) advantages of using currency rather than deposits for payments transactions, it too remained quite stable/predictable over time. So, variations in the broader money stock (M) were indeed largely mirrored by variations in the high-powered monetary base (H).

But simply because M varied with H did *not* mean that policy induced variations in the monetary base had been the main driving force determining the money stock. In 2009 (earlier in Japan) in most developed countries interest rates hit the zero lower bound. When that happened central banks consciously changed their policy. With official interest rates stuck, just above zero, central banks began to target the monetary base, by quantitative easing (QE) at the Fed, Bank of England and Bank of Japan, and long-term refinancing operations (LTRO) at the ECB. The monetary base (H) in these countries generally tripled in size, and the reserve base (R) available for the commercial banks rose by even more (often by a factor of nearly 10 times). Yet the overall volume of deposits, and bank credit, barely grew at all. The money multiplier had crashed and burnt; the prior, fairly stable, relationship between changes in H (and R) and in M (and D) just disappeared once the central banks shifted their policy instrument from control of short-term interest rates to acting on the monetary base.

What happened was that the massive injection of central bank money (liquidity) brought the net return, adjusted for risk and other regulatory, *e.g.* capital, requirements on other assets that banks might hold, down to a level commensurate with the net returns that banks could get just from holding deposits at the central bank. The banks found themselves in a, Keynesian, liquidity trap. This was made worse in the case of the USA by a decision to start paying interest on such bank deposits held at the Fed at precisely the worst possible moment for that, in Autumn 2008.

There were several possible answers, (i) to reduce the return on such reserves, though this need only be done at the margin if there was concern about bank profitability, (ii) to raise the return on (additional) lending by banks, *e.g.* through schemes such as the Funding for Lending Scheme (FLS) in the UK, or (iii) to rejig the methods of liquidity injection so that less of the effect becomes sterilised in a massive build-up of bank reserves, though quite how the latter might best be done has not received sufficient careful thought. But none of these were fully exploited.

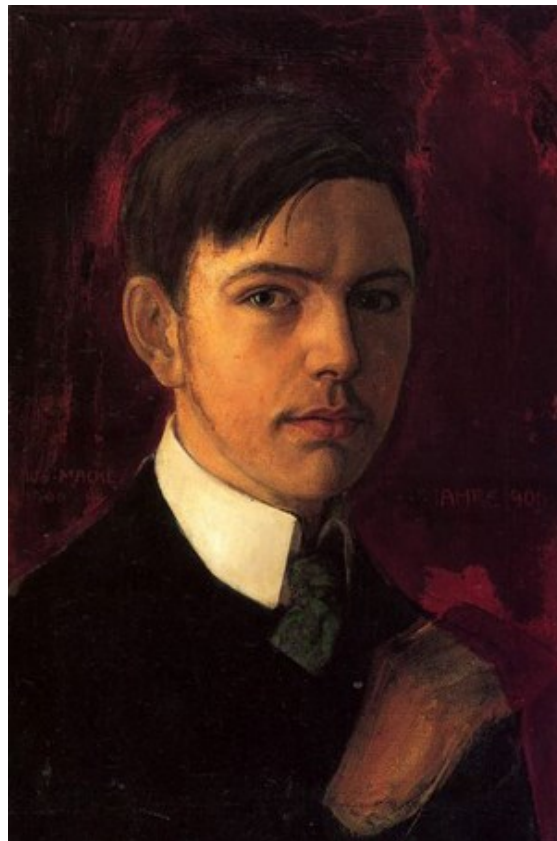
Instead, the almost total failure of a massive increase in the monetary base to stimulate any equivalent rise in broad money and bank credit expansion has occurred without much discussion or analysis. Perhaps central banks are just too embarrassed to draw attention to it. Rather, the argument goes that the main purpose of QE was not so much monetary expansion as portfolio substitution, driving asset prices up, and yields down, in other asset markets. The idea is that the increase in wealth, and reduction in yields, thus generated

will lead to a trickle-down effect on the real economy, though at the cost of severe distortions, including distortions to foreign exchange rates.

Overall it has been a remarkable example of Goodhart's Law in action. One could argue that the changed response of bankers to their new environment was equally an example of the Lucas Critique, but the macro-models that have been spawned by the application of this approach, *i.e.* the need for micro-foundations, typically have had no role within them for banks.

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*Autoportrait,*  
*August Macke (1906)*