From Golden Age to Great Recession: Academic Macroeconomics and the Policy Toolkit

Christopher Swords

Senior Sophister

Since the financial crisis, macroeconomic policy has come under increased scrutiny for its role in achieving economic stability. In this paper, Christopher Swords examines how academic macroeconomics has developed over the last century and applies it to pivotal events in recent times. His discussion of the challenges facing macroeconomic analysis contributes to our understanding of policy makers' decisions and offers an insight into important considerations for macroeconomic stability in the future.

Introduction

In the same way that the oil shocks marked the end of the Golden Age of Capitalism in 1973, the 2008 Financial Crisis was the culmination of the preceding economic period referred to as the Great Moderation. Sufficient time has now passed to allow for the compilation of historical accounts and analyses of this period. The purpose of this paper is twofold. Firstly, it is to provide a summarized account of academic developments witnessed in the field of macroeconomics over the Great Moderation period. It aims to apply the basic theory to topics at the frontier of policy-relevant macroeconomic research. The second purpose of this paper is to illustrate the interaction between academic macroeconomic research and the most important economic phenomena of recent times, applying this theory to the 2008 financial crisis and the subsequent period of secular stagnation. We shall see that the contemporary macroeconomic paradigm was ill-equipped to deal with either.

A Brief History of Macroeconomics

Following the challenges posed to the Keynesian model by the collapse of the Phillips curve relation in the 1960s, the academic economic landscape came to be dominated by the Chicago school and its hard form of free market ideology. The Lucas critique – that rules derived from aggregated historical macroeconomic data should not be considered structurally invariant with respect to changes in government policy (Lucas, 1976) – was the final nail in the coffin of the post WWII Keynesian synthesis, and heralded in an era of macroeconomic modelling based on microeconomic foundations. Robert Lucas' line of thought eventually led him to the infamous and popularly villainised rational

expectations assumption, which necessitated that economic decision-makers (you and I) should optimally predict the value of economic variables that are relevant to them (say, the direction of property values, for anyone thinking of taking out a mortgage), given the available information set (Lucas, 1972).

A corollary to the assumption of rational expectations is that economic agents should be able to foresee the effects of any proposed monetary or fiscal expansion, and adapt wage and price expectations accordingly. This logic was the basis of Sargent and Wallace's (1975) policy-ineffectiveness proposition, which postulated monetary and fiscal authorities had absolutely no capacity to influence the output of the economy in the short-run – heresy to a traditional Keynesian.

Concurrently, Eugene Fama (1970) was developing his efficient-market hypothesis (EMH). Formally, the EMH states that no information about an asset (a stock, bond, house, derivative, etc.) available in the present or the past should influence the price of that asset in the future. The overarching practical implication of the hypothesis is that no investor nor asset manager should have the capacity to consistently earn a higher return than a market index on a risk-adjusted basis, and that the market price of a financial asset represents the best estimate of that asset's true value.

Rational expectations, policy-ineffectiveness and efficient markets became the pillars of the next major school of economic thought – New Classicism. The tenets of the New Classical synthesis served as the basis for the derivation of the real business cycle (RBC) model of economic fluctuations. Pioneered by Kydland and Prescott (1982), the RBC model proposed that business cycles[1] are caused exclusively by random exogenous, real technology shocks, to which individuals and firms respond optimally. The model was celebrated for its micro-foundations, as well as for its simplicity – shocks are conceptualized as the result of one exogenous factor (technology), and are related to the business cycle by a limited number of parameters (the rates of interest, depreciation and discount, labour's share of income, and the fraction of time that people spend at work). Crucially, monetary and fiscal policy had no role to play in this model of the short-run economy. As Prescott reportedly taught his graduate students at the University of Minnesota: "postal economics is more central to understanding the economy than monetary economics" (Romer, 2016: 4).

If the idea that the Fed and the Treasury have no capacity to influence the direction of the US economy seems counterintuitive to some readers, rest assured some highly regarded economists felt the same way. Romer (2016) cites the Volcker deflation episode as evidence of an inconsistency. Figure 1 illustrates quite clearly that in raising the Fed Funds rate in the years after his appointment as Fed chairman in 1979, Volcker permanently raised the real interest rate and induced two recessions, over the course of which unemployment rose from 6.3% to a peak of 10.8%. Larry Summers (1986: 25) was particularly scathing of what he referred to as the "price-free economic analysis" that characterized RBC theory. He collated most of his peers' issues with the

RBC model in this same paper, questioning firstly what these exogenous "technology shocks" actually were in reality, secondly the ex-post nature of the model's calibration and its sample specificity, thirdly its parameter identification, and finally the notion that all unemployment above the natural rate is the result of intertemporal substitution and voluntary changes to labour supplied. Indeed, it would seem absurd to rationalize an event such as the Great Depression as a mass collective decision to take an extended vacation.
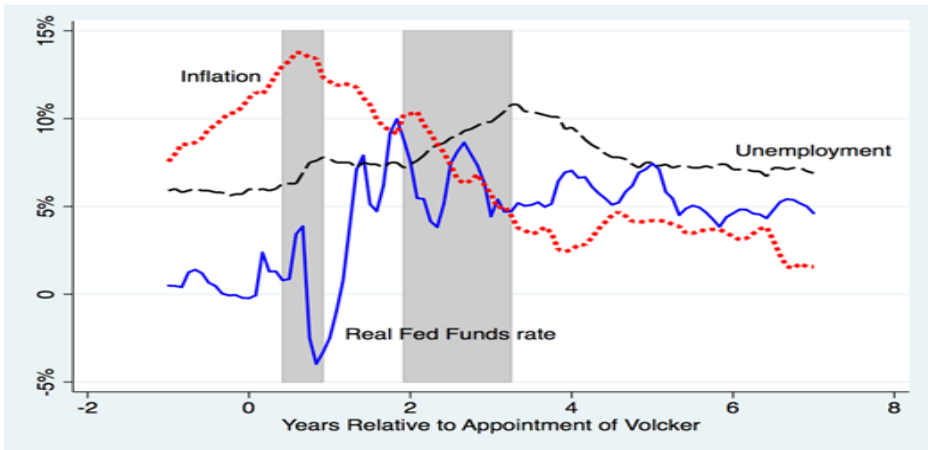

Figure 1: Volcker deflation (Romer, 2016)

Summers (1986), Mankiw (1985), Blanchard (1987) and others suggested that short-run fluctuations in unemployment and output beneath trend are more likely the result of exchange mechanism failure – firms have output that they want to sell and individuals have labour that they are willing to exchange for it, but some system failure prevents the exchange from occurring. This line of thought yielded the introduction of nominal rigidities in prices and wages to mainstream macroeconomic modelling, and heralded the emergence of New Keynesian thought.

By allowing for nominal frictions, the overarching implications of the New Keynesian synthesis are that rational expectations-based equilibria need not be unique, that the economy may not naturally attain full employment, and that monetary and fiscal policy do in fact have the capacity to influence the real economy in the short-run. In light of this, policy rules returned to academic relevance. Taylor (1993) pivoted away from Friedman's constant money growth rule in asserting that central banks should adjust interest rates in response to deviations in inflation (π_t) and output (y_t), so as to maintain credibility in inflation targeting. Roberts (1995) derived the New Keynesian Phillips curve, based on the dynamic Calvo model of pricing. It says that this period's inflation depends on current output and expectations of next period's inflation.

The combination of the Taylor rule, the dynamic household Euler equation and the New Keynesian Phillips curve yields the three-equation New Keynesian model, which typically takes something along the lines of the following form:

$$i_t = \pi_t + r_t^* + a_\pi (\pi_t + \pi_t^*) + a_y (y_t - \overline{y}_t)$$

$$C_{t+1} = (1 + R_t - \delta) \beta C_t$$

$$\pi_t = \beta E_t (\pi_{t+1}) + \lambda (\sigma + \varphi) \overline{y}_t$$

The New Keynesian model provides the bone structure of the dynamic stochastic general equilibrium (DSGE) model that central bankers were using to model the economy and set interest rates, up to and beyond the financial crash of 2008 (Blanchard, 2016).

The 2008 Financial Crisis

From the middle of the 1980s, a happy consensus emerged in macroeconomics (Summers, 2014), during which refinement of the DSGE modelling procedure dominated activity in the field. Simultaneously, the American economy entered what came to be referred to as the Great Moderation. Up until 2008, business cycle volatility appeared dramatically dampened (see Figure 2). Some commentators concluded that they were witnessing the end of the business cycle (Economist, 1997). As complacency set in, the academic free-market idolatry propagated by the likes of Lucas, Fama, Prescott and Sargent, and the conceptualization of the economy as one unified self-correcting system, gradually spilled over into practical financial and policymaking spheres. This allowed for the emergence and perpetuation of two pernicious economic trends that facilitated a gradual destabilisation of the US economy – deregulation and cheap credit.
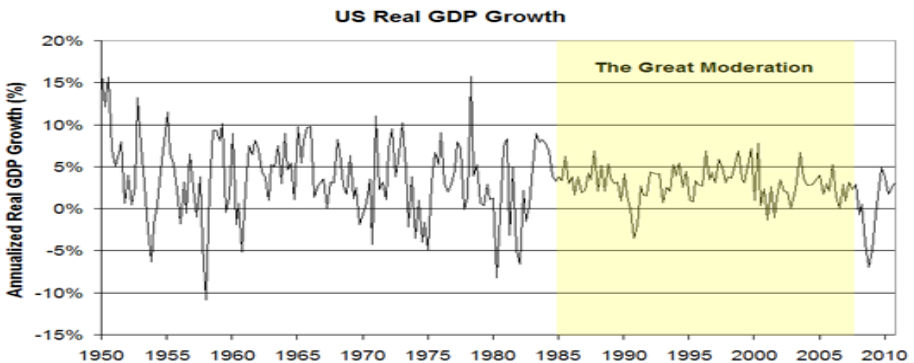

Figure 2: US real GDP growth (Federal Reserve Economic Database)

Three policy decisions that have come to characterize the period from a regulatory perspective will now be discussed. Firstly, in 2004, the Bank for International Settlements decreed in the Basel II regulatory accord that banks would be permitted to determine their own capital ratios[2], using internal value-at-risk (VaR) models. VaR models use past financial data in order to plot a probability distribution of the amount of losses on its assets that a bank could possibly suffer over a particular period. The problem was that by calibrating their VaR models with data from the low-volatility Great Moderation, banks dramatically underestimated the probability of a cataclysmic "tail-risk" event, like the crash witnessed in 2008.

Secondly, beginning in the 1990s and formalized in 2006, banks were instructed by regulators to implement "mark-to-market" accounting, whereby assets on a bank's balance sheet are valued at the rate at which they are traded at on the market (Cassidy, 2009). The move was a recognition on the part of regulators of the efficient market hypothesis – if markets are the most efficient aggregators of price information, then it follows that this is how they should be valued in official accounts. Subjecting long-term valuations to daily price volatility in such a way greatly accentuated the cyclicality of the system.

Finally, the market for derivative products was left without any special form of regulation. "Naked trading" – buying or selling of derivatives outside of the purposes of hedging – proliferated and financial markets became a venue for gambling on the outcome of different events. When one firm sells another a derivative, notional assets and liabilities are created but no new capital is created, levering the system and increasing systemic risk. Overall, the regulatory landscape came to be characterized by the belief that markets and financial institutions should be free to regulate themselves, in accordance with the academic notions of rational agents and policy ineffectiveness.

In November 2002, in the aftermath of the dot-com bubble, the nominal interest rate set by the Fed stooped as low as 1.25%. Rates were by then 2% below those implied by the Taylor rule (Taylor, 2009). With the Fed funds rate below 2.5% from 2001 up until the beginning of 2005, prime lending rates, corporate bond rates and, crucially, mortgage rates were all kept low, facilitating a borrowing binge[3]. Cheap access to credit on the part of consumers interacted with the perverse incentive structure on the part of mortgage lenders (caused by the move away from an originate-to-hold model and towards an originate-to-distribute model) to motivate an appalling deterioration of mortgage lending standards. In bubble areas such as Los Angeles, San Francisco and Miami, house prices rose by 265.5%, 226.6% and 213.1%, respectively, between 1996 and 2006 (Global Property Guide, 2016).

The crash itself illustrated the limitations of contemporary methods of economic modelling, those that characterized models such as VaR and the DSGE. A particularly unhelpful characteristic of DSGE models at the time – such as in Smets and Wouters' (2007) popular point of reference – is that they are log-linearised around

equilibrium. They allow only for analysis of small additive stochastic disturbances in the neighbourhood of the deterministic steady state (Buiters, 2009). In the midst of the crash however, mark-to-market accounting, margin calls, high leverage ratios, contagion and a rapidly disintegrating property market made for a series of self-defeating positive feedback loops.
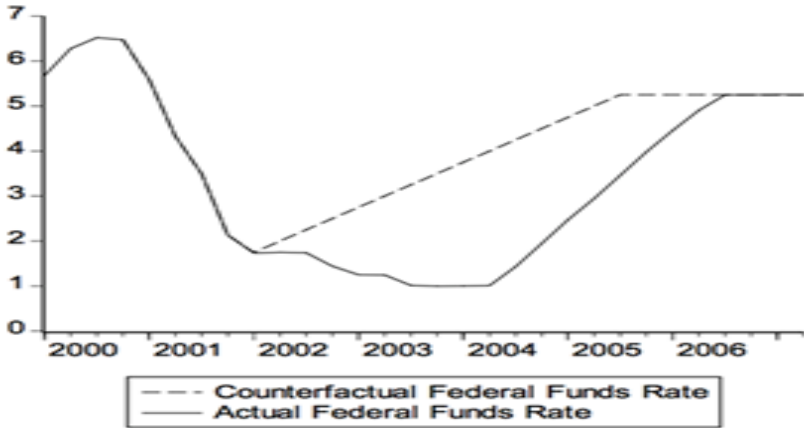

Figure 3: Federal funds rate (Taylor, 2009)

There was nothing additive about the highly non-linear liquidity crisis that resulted. It was neither a random real technology shock nor a result of stickiness in prices or wages. But it was enough to initiate the most severe global recession since the Great Depression. Academic free-market ideology had facilitated the foundation of a macroeconomic environment characterized by cheap credit and a regulatory framework predicated on a commitment to allowing markets to regulate themselves. The result was a system that was highly leveraged and highly pro-cyclical. This application of misguided ideas set the economy on a trajectory that ultimately brought about the Great Recession.

Secular Stagnation

Characteristic of the New Classical and New Keynesian traditions is a myopic focus on the second moment (variance) of output and unemployment (Summers, 2014). Technical tools such as the Hodrick-Prescott filter were used to determine trend output in past data, which is then extrapolated into the future, largely assuming away any issues surrounding the first moment (mean). The implication is that DSGE models allowed only for self-equilibrating V-shaped recessions in which output and employment return to equilibrium in an orderly fashion (Buiters, 2009).

This, however, was not observed in the aftermath of the crash. Instead, what we witnessed was an L-shaped recession and a permanent loss in potential output – potential GDP in the US and the Eurozone have been revised sharply downwards in the years since

the crash (8% and 10%, respectively, as in Figure 4). This phenomenon has since been labelled secular stagnation, and it is the theme that characterizes developed economies today. The most popular explanation of the economic dynamics underlying secular stagnation, articulated by Summers (2014), posits that the failure of output to recover to potential is due to a divergence in the full-employment real interest rate (FERIR) away from the actual real interest rate. With the real interest rate too high, aggregate demand is dampened, and output remains below potential.
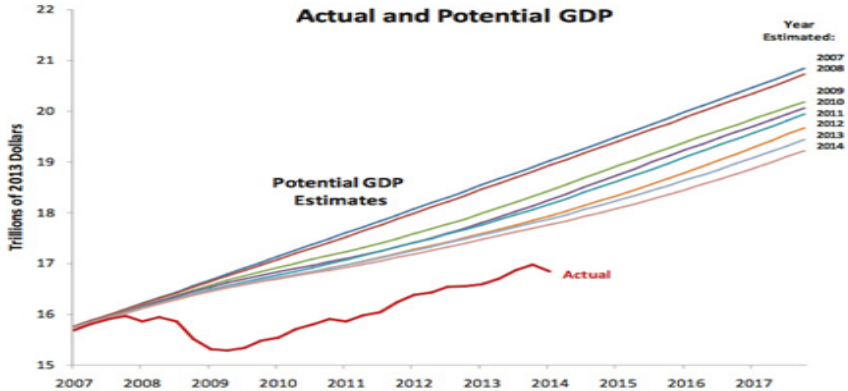

Figure 4: Actual and potential GDP in the US (Summers, 2014)

The implication of this theoretical analysis is that the standard macroeconomic policy toolkit is insufficient to tackle secular stagnation. The New Classical synthesis would have it that policymakers need not react at all – the economy will naturally revert to trend growth. The data illustrates quite clearly that this is not happening. New Keynesian analysis suggests that policymakers fine-tune the nominal interest rate, in accordance with the Taylor rule, in order to mitigate the pernicious effects of nominal rigidities on aggregate demand. The present issue however is that the FERIR is thought to lie beneath the zero-lower bound (ZLB) of nominal interest rates (Summers, 2014). Combined with low inflation, this makes it difficult or impossible to equate the FERIR and real interest rate by manipulating the nominal rate. Central bankers resorted to more unconventional methods when they initiated programs for buying a variety of financial assets from commercial banks and other financial institutions, termed quantitative easing (QE).

The core thesis was the same however – increase the money supply in order to stimulate demand (Bullard, 2010) – and the effect of pumping money in markets has been ambiguous. With equity valuations having reached all time highs and bond yields all-time lows (Tsaklanos, 2016), a pension funding crisis has emerged in developed economies – the public pension shortfall in the US is estimated to be as large as $3.4tn (Authers, 2016). Under such conditions, consumers and firms should be expected to consume and invest

less, in order to save more, countering the original purpose of QE. Furthermore, those that benefit most from inflated equity prices are the wealthy[4], accentuating inequality and concentrating wealth in the hands of those least likely to spend it.

With the standard policy prescription having failed to return the US economy to pre-crash trend growth, there is little consensus amongst macroeconomists as to how to tackle secular stagnation. Summers (2014) is an advocate of increasing demand and returning to (albeit somewhat lower) potential output, not by attempting to further reduce the real interest rate, but by increasing fiscal investment, reducing barriers to private investment, and reducing inequality. Gordon (2016) is more pessimistic and asserts that a combination of economic headwinds – rising inequality, diminishing returns to education, unfavourable demographic trends, and sovereign debt burdens – have conspired to severely reduce potential output. His analysis suggests that US GDP per capita growth will be as low as 0.8% for the next 25 years. Eichengreen (2014) on the other hand, outwardly disagrees with both Summers and Gordon, positing instead that any stagnation in the US is the result of under-investment in infrastructure, education and training. These disparate views on one of the presently most important macroeconomic themes are evidence of the fact that we are, in actuality, a long way from a standard, consensus macroeconomic model.

Concluding Remarks

We have seen that the free market ideology propagated by academic concepts such as rational expectations, policy ineffectiveness and efficient markets were malignant on two dimensions. They provided the intellectual rationale for the financial deregulation and cheap access to credit that were important characteristics of the US economy throughout the Great Moderation, and were a part of the process that left it vulnerable to a shock on the scale of that observed in 2007-2008. The policy toolkit endowed upon us by New Classical and New Keynesian economics has proven insufficient to overcome the challenges posed by secular stagnation.

The crash itself in 2008 illuminated the limited capacity for contemporary modelling techniques to account for such events. The RBC model was celebrated for its simplicity, but the system it was designed to describe is immeasurably complex – social systems like an economy do not follow deterministic processes in the same way that physical systems do; in fact, economic systems are the product of processes that are liable to change over time. This idea suggests that in the future macroeconomic discourse, it may be necessary to move away from holistic theories and the pursuit of general laws. Blanchard (2016) for example is of the opinion that DSGE modelling must become less insular. He cites behavioural economics and big data empirics as examples of fields from which macroeconomics can draw more from in the future, offering guidance to prospective researchers as well as to students of economics.

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Notes

1. The term used to describe cyclical deviations in GDP growth from its long-term trend (or average) rate; booms and recessions are interpreted as the peaks and troughs of these cycles.
2. The bank's ratio of equity capital to liabilities – if a bank' assets suffer a percentage write-down in value greater than its capital ratio, the bank is considered insolvent.
3. The amount of outstanding mortgage debt in the US economy rose from $2.76tn at the beginning of 1987, to $13.8tn by the beginning of 2007 (data from federalreserve.gov).
4. See, for example, Ait-Sahalia, Parker and Yogo (2004).