

Central banks and ambiguity

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Received 8 August 2003; received in revised form 24 January 2006; accepted 3 April 2006
Available online 9 August 2006

Abstract

The purpose of this paper is to discuss the effects of ambiguity (or ‘non-calculable risk’) on the public’s expectations about inflation and its impact on central bank policy. The effects of ambiguity are addressed in a textbook setting with a short run aggregate supply curve.

Ambiguity about monetary policy can be characterised as a loss of central bank credibility. When the public is pessimistically inclined, its consequences are excessive inflation expectations and a national income below its natural rate. This result is obtained both in the context of ‘discretion’ and of ‘inflation targeting’, although the impact of ambiguity is less pronounced in the latter case. If the public is optimistic with respect to the monetary policy of the central bank, loss of credibility has no impact.

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JEL classification: D81; E52; E58

Keywords: Ambiguity; Choquet Expected Utility; Central bank; Monetary Policy; Robust control

1. Introduction

What does it take to establish confidence in a central bank? This question is of major importance for monetary policy makers. But answering it is tedious. Firstly, confidence is in the mind of the beholder. It is determined by cognitive processes that are difficult to reconcile with the established paradigms of economic decision making. Worse, it is not clear what the precise meaning of ‘confidence’ is in this setting.

There are models that provide precise interpretations of ‘reputation’ in the context of incomplete information: they rely on the inability of the public to learn the ‘true’ preferences and objectives of the central bank. Depending on its ‘true’ preferences, the central bank may be tempted to deceive the public, by pretending to have different preferences. When considering a finite time horizon, the central bank eventually shows its true face. Meanwhile, the longer it keeps up appearances, the more likely it seems to the public that the pretended preferences are its true preferences and the better its reputation is.¹

But this hardly is the mechanism that determines the confidence in present-day central banks. The actual decision processes in the leading central banks make it impossible to hide their true preferences for a sustained period of time. We

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¹ For such Bayesian reputation models see e.g. Kydland and Prescott (1977), Barro and Gordon (1983a,b), Backus and Drifill (1985) and Barro (1986).

must therefore consider different ways to conceptualise the meaning of ‘confidence’ in central banks. This paper follows the approach to understanding confidence by studying situations in which it is absent, as taken in Spanjers (1998/2005).

We consider the presence of ambiguity to be the main characteristic of situations in which there is a lack of confidence. This leads us to analyse the impact of ambiguity on the choice and effectiveness of monetary policy.

We distinguish between ‘calculable’ and ‘non-calculable’ risk and refer to the latter as ambiguity.² Knight (1921) considers entrepreneurs to be specialists in dealing with situations of ambiguity, i.e. situations for which there is no relevant experience to guide decision making. Keynes (1937) considers ambiguity to be one of the most characteristic features of decision making under uncertainty.³

[...][A]t any given time facts and expectations were assumed to be given in a definite and calculable form; and risks, of which, though admitted, not much notice was taken, were supposed to be capable of an exact actuarial computation. The calculus of probability [...] was supposed to be capable of reducing uncertainty to the same calculable status as that of certainty itself [...]. Actually, however, we have, as a rule, only the vaguest idea of any but the most direct consequences of our acts. Sometimes we are not much concerned with their remoter consequences, even though time and change may make much of them. But sometimes we are intensely concerned with them, more so, occasionally, than with the immediate consequences. [...]

[...] By ‘uncertain’ knowledge, let me explain, I do not mean merely to distinguish what is known for certain from what is only probable. The game of roulette is not subject, in this sense, to uncertainty [...]. The sense in which I am using the term is that in which the prospect of a European war is uncertain, or the price of copper and the rate of interest twenty years hence, or the obsolescence of a new invention, or the position of private wealth owners in the social system in 1970. About these matters there is no scientific basis on which to form any calculable probability whatever. We simply do not know.

Keynes continues:⁴

Now a practical theory of the future [...] has certain marked characteristics. In particular, being based on so flimsy a foundation, it is subject to sudden and violent changes. The practice of calmness and immobility, of certainty and security, suddenly breaks down. New fears and hopes will, without warning, take charge of human conduct. The forces of disillusion may suddenly impose a new conventional basis of valuation. All these pretty, polite techniques, made for a well-panelled board room and a nicely regulated market, are liable to collapse. At all times vague panic fears and equally vague and unreasoned hopes are not really lulled, and lie but a little way below the surface.

Modern examples of ambiguity include global warming, the BSE-crisis, bird-flu, the Gulf War, the South–East Asian crisis, New Economy technologies and the impact of 9/11. Risk may fail to be calculable for two basic reasons. Firstly, it may not be possible to assign a unique (subjective) probability distribution to different scenarios for the future. Secondly, it may be difficult to associate a unique outcome to each scenario. In either case there is ambiguity.

The next question is how decisions are made in the face of ambiguity. As already indicated in the quotation from Keynes, decisions will depend on the decision-maker’s attitude with respect to it. Optimists will hope for the best, pessimists will fear the worst. If one insists on referring to subjective probabilities, it represents a situation in which the decision-maker’s probability assessment depends in a specific way on his choice of action.⁵

The first piece of evidence that decisions under ambiguity may fail to be compatible with the subjective expected utility approach was provided by the famous thought-experiment in Ellsberg (1961). Schmeidler (1982/89) and Gilboa (1987) provide an axiomatic foundation for decision making under ambiguity that can match that of subjective expected utility theory as provided by Savage (1954) and Anscombe and Aumann (1963). After this breakthrough, economists started to modify their standard analytical tools to deal with ambiguity.⁶

² This distinction goes back to Knight (1921). He uses a different terminology but refers to the same concepts.

³ Keynes (1937, pp. 113–114).

⁴ Keynes (1937, pp. 114–115).

⁵ See Spanjers (1999, Chapter 7).

⁶ Further developments include the *unification* of the approaches of Schmeidler (1982/89) and Gilboa (1987) (Sarin & Wakker, 1992), *applications* to portfolio choice (Dow & Werlang, 1992), and game theory (Dow & Werlang, 1994), and the *ambiguity attitude* (Ghirardato, Maccheroni & Marinacci, 2004).

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