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Uncertainty and macroeconomics: transmission channels and policy implications

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There has been a strong focus in recent policy debates on the various types of uncertainty surrounding the global economy, from economic policy uncertainty to financial volatility. This Rue de la Banque *presents the key challenges raised by this phenomenon of uncertainty. How to measure uncertainty? Through which channels does uncertainty impact the economy? What are the implications of uncertainty for policy makers? We draw three lessons for policy makers facing increasing uncertainties. First, macroeconomic policies have a direct role to play in stabilising policy-related uncertainty. Second, financial uncertainty should be constrained through financial regulation. Third, the effectiveness of economic stabilisation policies depends on the state of uncertainty and should be adapted accordingly.*

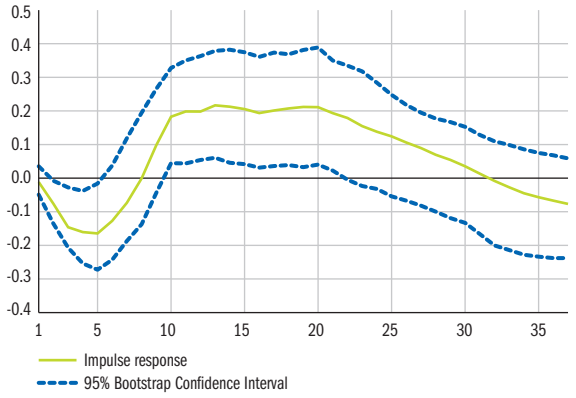
Although global economic activity now appears to be back on track, after years of sluggish growth in the wake of the Global Financial Crisis, various types of uncertainty are clouding economic prospects in the short term (see Obstfeld, 2018). It turns out that there has been a strong focus on uncertainty in recent policy debates, as economic policy decisions have been affected by increasing uncertainties. In a recent speech, Janet Yellen (2017) showed how uncertainties about the economic outlook are related to the state of the economy, to the assessment of the slack in the labour market and to measures for expected inflation and how these expectations weigh in turn on monetary policy decisions, in particular in terms of unwinding unconventional monetary policy measures. At the same time, economic policies have a role to play in reducing the various types of uncertainty by anchoring economic agents' expectations to a transparent and clear commitment. For example, forward guidance used by central banks to signal the future direction of short-term interest rates or multi-year credible fiscal consolidation plans are efficient ways of conducting economic policy while reducing uncertainty.

Measuring uncertainty fluctuations and their consequences

Because uncertainty is by nature an unobservable variable, there are various approaches to its measurement. Compared to ten years ago, research efforts have increasingly focused on providing uncertainty measures (see a review in Ferrara, Lhuissier and Tripier, 2017). For example, the Volatility Index (VIX) has been extensively used as a measure of uncertainty reflecting the volatility in financial markets. The lack of consensus among forecasters surveyed is another widely used measure of uncertainty; it is assumed that there is a direct positive link between uncertainty about the future and the way in which opinion surveys diverge (see for example Istrefi and Mouabbi, 2017). More recently, text-based studies have exploited large databases of newpaper articles to provide new measures of uncertainty. More specifically, they use and count the number of references to uncertainty in newpapers, with the intuition behind this approach being the greater the number of references, the higher the uncertainty. For example, Baker, Bloom and Davis (2016)

Impulse response function of the monthly US industrial production to an uncertainty shock

(x-axis: horizon in months; y-axis: percentage)



Source: R-package provided by Nicholas Bloom to replicate Bloom's paper (2009).

propose measuring economic policy uncertainty for a large set of advanced and emerging countries by counting the number of certain specific words in newspapers (such as "uncertainty", "deficit", etc.). These new measures have been integrated by policy-makers into policy debates, and are shedding light on the concept of uncertainty, which in turn has led to the development of new measures, within a virtuous circle of activity.

In spite of various existing measures of uncertainty, it turns out that there is quite a broad consensus on the adverse effects of a rise in uncertainty on macroeconomic activity. In an important paper, Bloom (2009) highlights the adverse short-term effects of an uncertainty shock on industrial production and employment, followed by a bounce-back in the following months (see Chart), thus amplifying the business cycle. Following the Great Recession, the profession has paid much attention to the role of fluctuations in economic uncertainty as a source of business cycle fluctuations. Both theorists and empiricists have sought to better understand how such fluctuations can influence the economy, by offering numerous mechanisms through which an uncertainty shock is transmitted to the economy.

Understanding the transmission channels of uncertainty fluctuations

Although no strong consensus has been reached, the efforts made by economists to propose improved theories, and to examine new data, have resulted in a growing body of knowledge on the macroeconomics of uncertainty. Below we describe the three main channels of transmission to aggregate activity put forward in the literature: irreversible business investment, households' precautionary savings and financial market frictions.

The first and best-known framework for studying how uncertainty fluctuations affect the economy is irreversible investment, as discussed in the seminal contributions of Bernanke (1983) and Pindyck (1991). The basic idea is that, when investment projects are irreversible – i.e., they cannot be "cancelled" or "modified" without very high costs – investors face a trade-off between additional returns from the immediate launch of an investment project, and the benefits of waiting to gather more information in the future. The value of waiting is described in the literature as *real-option value*. At times, it may be preferable to postpone new investment projects, and at other times, it may not. In such an environment, a rise in uncertainty would clearly tilt the balance in favour of a wait and see behaviour. Indeed, by pausing their investment plans and hiring, investors will obtain more information about the future, which will increase the likelihood of their making a good decision, and thus having a better understanding of long-term project returns. In the influential paper by Bloom (2009), the author highlights that "increased uncertainty is depressing investment by fostering an increasingly widespread wait and see attitude about undertaking new investment expenditures".

Precautionary savings are also a well-known channel through which uncertainty is transmitted to the economy, and is defined by Leland (1968) as "the extra saving caused by future income being random rather than determinate". Many economists have documented that heightened uncertainty during the Great Recession was accompanied by a surge in savings rates, suggesting that uncertainty can influence households' consumption decisions. For example, Mody, Ohnsorge and Sandri (2012) use a panel of OECD countries and establish a close and positive relationship between savings rates and labour income uncertainty between 2007 and 2009. The reason for this relationship is straightforward: when faced with a higher risk of bad outcomes, households seek to protect themselves by saving more. These precautionary savings result in a further reduction in consumption and an excess of desired savings. The authors show that more than two-fifths of the rise in household savings rates between 2007 and 2009 is a response to a precautionary savings motive. In addition, Challe et al. (2017) develop a DSGE[1] model with incomplete insurance and heterogeneous economic agents and show that a shift in uncertainty about unemployment generates an increase in precautionary savings, which in turn leads to a drop in aggregate demand.

1 *Dynamic stochastic general equilibrium model.*

Lastly, financial intermediaries play an important role in propagating uncertainty fluctuations. When risk rises, they tend to protect themselves against default risk by charging a premium to cover the costs of a default. Arellano, Bai and Kehoe (2012) and Christiano, Motto and Rostagno (2014) were the first to use a general equilibrium framework to model the interaction between financial markets and uncertainty fluctuations. Unsurprisingly, the Great Recession of 2008-09 motivated the establishment of such a relationship via explicit theoretical models.

To better understand why financial conditions are an important channel through which uncertainty fluctuations are transmitted to the economy, Christiano, Motto and Rostagno (2014) augment the financial accelerator model developed initially by Bernanke, Gertler and Gilchrist (1999) to account for the presence of uncertainty shocks (described by the authors as "risk shocks"). Entrepreneurs borrow externally to purchase raw capital (e.g. metal, glass, and plastic). Sometimes the allocation of this capital to the productive process is a success, sometimes it is not. In the model, the productivity level is decided on independently by each entrepreneur. When the cross-sectional dispersion of productivities among entrepreneurs increases, the average productivity of entrepreneurs remains unchanged but more extreme high and low productivity values are observed. As a consequence, financial intermediaries charge a higher premium to protect themselves since more entrepreneurs choose low levels of productivity and are then unable to repay their debts. This positive risk shock increases both the risk of default and the cost of external funds. This leads to a fall in the economic activity of entrepreneurs, and, in turn, to a slowdown in aggregate activity

Lessons from the literature and potential policy implications

Achieving a better understanding of whether and how fluctuations in uncertainty affect the real economy is essential not only for academic economists but also for policymakers. Indeed, as explained previously, the recent literature tends to suggest that a uncertainty-induced disruption is an important driver of economic fluctuations. Thus, policy measures aimed at eliminating or mitigating periods of long-lasting volatility fluctuations and setting up defenses against the threat of future uncertainty fluctuations are appropriate. In this respect, the traditional design of stabilisation policies needs to be extended to take account of fluctuations in uncertainty. The corollary to this is that uncertainty needs to be monitored in real time using the various available measures. Based on our own reading of the literature and our experience in this field, we suggest the following three policy implications.

Lesson 1: Macroeconomic policies have a direct role to play in stabilising policy-related uncertainty

Stabilisation policies are traditionally defined as monetary and fiscal policies implemented in response to supply or demand shocks to reduce the gap between the current level of economic activity, or inflation, and its long-term (or natural) level. Alongside the traditional supply and demand shocks, uncertainty fluctuations also need to be taken into account by public authorities which may be directly responsible for them. Indeed, large fluctuations in the policy-based uncertainty measures may be interpreted in some cases as inefficient public management. Public authorities may be at the root of policy uncertainty, for example by making too frequent changes to fiscal policy as suggested by Fernández-Villaverde et al. (2015). They may also amplify uncertainty through a lack of efficient national and international coordination in highly uncertain periods, like in the case the concurrence in 2013 of the US fiscal cliff and the European crisis. Thus, when implementing policies, public authorities should also take account of their possible effects on the degree of uncertainty. This issue has been discussed intensively in the context of monetary policy; we can refer to the recent debates on the stance of monetary policy in all advanced economies. However, this issue also concerns fiscal policy, as suggested by Auerbach (2014) who focuses on the long-term projections of the US federal budget, and by Alesina et al. (2015) who show that the output costs of fiscal consolidation plans are magnified when they consist of stop-and-go changes to taxes and spending.

Lesson 2: Financial uncertainty should be contained trough financial regulations

However, policy-related uncertainty is only one among several sources of uncertainty fluctuations. The bulk of the evidence provided previously highlights the key role of financial markets as both the source of uncertainty and as a mechanism that amplifies uncertainty. This suggests a new role for financial regulation: reducing the instability of financial markets which feed uncertainty into the economy as a whole. A set of new institutions were set up following the Great Recession to avoid a repetition of such financial turbulence. For example, in Europe, the purpose of the European Systemic Risk Board is precisely to monitor and assess financial stability risks. Notably, it is of potential interest to regulate cross-border capital flows as they represent a channel through which uncertainty can be transmitted and amplified across economies.

The institutional view expressed by the International Monetary Fund (2012) gives, in certain circumstances, a prominent role to the management of capital flows in accordance with proper macroeconomic policies so as to protect economies from the macroeconomic and financial stability risks associated with disruptive surges in inflows and outflows.

Lesson 3: The effectiveness of economic stabilisation policies depends on the state of uncertainty and should then be adapted accordingly

The macroeconomic impact of stabilisation policies is likely to be diminished by uncertainty. In periods of high uncertainty, fiscal and monetary policies are less effective, and economic players (households, firms, and investors) become less inclined to respond to policy impulses. Aastveit, Natvik and Sola (2017) provide strong empirical evidence to support this intuition. Estimating vector autoregressive models (VAR) for the United States, the authors show that, in periods of high uncertainty, the effects of monetary policy on macroeconomic aggregates are much weaker, almost halved. This result suggests a stronger monetary policy reaction during periods of heightened uncertainty. In addition, Caggiano, Castelnuovo and Pellegrino (2017) show that the contractionary effects of uncertainty shocks are significantly larger when the zero lower bound is binding, which justifies the use of unconventional monetary policy tools such as forward guidance or large-scale asset purchase programmes since the onset of the Great Recession. Bloom et al. (2016) investigate the effectiveness of policies in a "really uncertain business cycle" model with heterogeneous firms and factor adjustment costs. They show that the stimulating effect of a wage subsidy policy on output declines by over two-thirds when the level of uncertainty in the economy is high. As a result, policymakers should take into account the degree of economic uncertainty in their policy responses.

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