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The Measurement and Impact of Uncertainty

Introduction

The study of policy uncertainty has increased exponentially across the economics and finance profession as of late, with papers across sub-disciplines finding uniformly that uncertainty has a negative effect on country growth paths. However, the somewhat nebulous term “uncertainty”, and why such uncertainty is of relevance right now, has been only explored at a facile conceptual (if in-depth methodological) level. The purpose of this brief paper is to introduce some conceptual and definitional clarity to the idea of “uncertainty”, spelling out clearly what different facets it entails and how these facets may influence economic variables. Focusing in particular on economic policy and institutional uncertainty, this paper is meant to serve as an introduction to the field but also serve as a call for future research.

1. What is Uncertainty?

The explosion of research on uncertainty, spearheaded by the methodological innovation of Baker et al. [2016], has illuminated how fragile information channels and relationships within modern capitalist economies can be. Indeed, with governments scrambling for policy innovation in the wake of the global financial crisis, and ever-more-bizarre monetary and fiscal schemes proposed, a sense that “the old rules do not apply” has pervaded market sentiment. Coupled with political changes that were unthinkable just five years ago, the sense of security in developed market economies has been breached and businesses and policymakers find themselves in a much more uncertain world.

In order to understand the phenomenon of uncertainty in an economic sense, it is first of crucial importance that we define it correctly as, in reality, there are multiple layers of uncertainty which can affect an economy. In particular, three separate types of uncertainty have the ability to derail economic progress, albeit at differing levels of severity and through different channels of influence.

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The first layer of uncertainty is one that is familiar to students of political science and international business, and that is the concept of geopolitical uncertainty. Typified in the overall international environment in which an economy operates, geopolitical uncertainty can be characterized by fears over large-scale systemic breakdowns (revolution or civil war) or territorial instability (war or invasion). Seen from an economic standpoint, the threat of war or revolution has specific forms of disruption to an economy, including a cessation of or massive dislocation occurring to trade flows [Balcilar et al., 2017], impacts along a sectoral or company's value chain [Al Fayad, 2016], and/or difficulties in finding finance [Damar, 2007] or labor (due to conscription, crisis, or closed borders). Often these uncertainties are captured in risk premia for certain countries or regions, making the cost of doing business much higher than in a country or region with little geopolitical uncertainty.

The second form of uncertainty, more explicitly concerned with economic channels and the focus of much research of the past five years, is economic policy uncertainty. Less catastrophic than geopolitical uncertainty, economic policy uncertainty is of a similar but different stripe. Whereas geopolitical uncertainty may be the direct result of governmental action (e.g. Russia invading Ukraine), more often than not it comes about from normal diplomacy and international relations and is unpredictable in its origin. On the other hand, economic policy uncertainty is directly linked to governments and is centered on "uncertainty about *who* will make economic policy decisions, *what* economic policy actions will be undertaken and *when*, and the economic effects of policy actions (or inaction)" [Baker et al., 2016].

Uncertainty in this vein is often a second- or third-order effect from political events such as elections or referenda and can occur when there is a divided society and no clear mandate for a particular economic policy course. Following from the insights of the public choice literature, uncertainty can also occur if hard choices are needed in policy (for example, extreme public expenditure cuts to avoid economic catastrophe) but politicians do not want to sacrifice their own careers to make these unpopular decisions [Weaver, 1986].

The final area of uncertainty has been less-explored but perhaps has the most relevance for economies in the longer-term, and that is institutional uncertainty. An issue which came to the fore during the transition process in Central and Eastern Europe and the former Soviet Union, shifts in major institutions necessary for a market economy, including an independent judiciary and property rights, can have major reverberations across all levels of an economy. Given the semi-permanence of institutions,

institutional uncertainty tends to occur only after the largest political changes and so-called “black swan” events (Brexit, the election of US President Barack Obama and the subsequent election of Donald Trump, and the rise of Viktor Orban in Hungary represent such events); alternately, institutions can be eroded over a much longer period of time, with a critical mass of deterioration coming after a particular event but the institutional rot already established.

While the transition process represented a shift towards better property rights and judicial independence, the post-global financial crisis world has seen a rollback of these protections across the world (including in these very same transition economies [Hartwell, 2013]). Such institutional volatility, as a threat to the very “rule of the game,” has substantial implications for long-term growth paths of an economy. In particular, deterioration in fundamental institutions can create financial sector volatility [Hartwell, 2017] or harm the real economy [Brunetti, Weder, 1998] via changes in investment and consumption. While economic policy uncertainty may have short-term consequences, even if policy uncertainty persists over time, institutional uncertainty can alter the fundamental macroeconomic and microeconomic relations within a society, creating dislocations more severe than mere changes in policy.

2. Why Does Uncertainty Matter?

All of these facets of uncertainty are likely to have some impact on the functioning of a nation’s economy, although the channels are differentiated by type of uncertainty and the severity of this impact (as already noted) is also dependent upon which uncertainty is being examined. For the purposes of this paper, I will concentrate on economic policy and institutional uncertainty, as these are most relevant for examining economic effects. Whichever facet of uncertainty is under scrutiny, however, there are at least two common channels in which uncertainty may affect an economy:

- Markets thrive on predictability

Goods, services, and financial markets need not only a sound and predictable institutional framework in which to operate, but also predictable conditions surrounding their operation. When these routines and the overall environment is threatened, distortions such as information asymmetries or transaction costs may accrue or emerge for the first time. Investment, in particular, as a longer-term decision, requires economic and political stability; all of the facets of uncertainty noted above can disrupt this process and create the unpredictability which markets loathe. While one-off uncertainty may merely shift the timing of investment decisions [Stokey, 2016], prolonged uncertainty can have a much more negative impact as needed

investment is continuously delayed [Gulen, Ion, 2016]. This effect would be much more pronounced for small and medium-sized firms, who do not have the internal resources to survive either long bouts of instability or knock-on effects with firm financing [Kang et al., 2014].

This does not mean that, absent economic or institutional uncertainty, markets would remain placid. Of course, volatility and price changes are part and parcel of all markets and especially financial ones, as they provide optimal responses to exogenous shocks and change valuations accordingly. Indeed, every change of economic conditions is a buying opportunity for someone, and thus low levels of volatility are to be expected in any market. However, abnormal volatility, that created artificially by politics rather than by underlying fundamentals, can substantially upset firm planning for the longer-term and or create self-fulfilling prophecies of economic doom and gloom; one need only think of a widely-held perception of economic downturn which leads to low levels of investment, which in turn leads to slower growth in following periods. Uncertainty could be the channel in which such an underdevelopment trap begins.

- Policies can threaten profitability or worse

Beyond the longer-term effect on investment, sudden and abrupt changes in economic policies can create conditions that are inimical to firm profitability in the short- and medium-term. As just noted, uncertainty may curtail lending by financial institutions, thus reducing credit to firms just as it is needed most. Additionally, there is a direct correlation between higher uncertainty and lower returns in capital markets: as Brogaard and Detzel [2015] note, economic policy uncertainty is an important risk factor for US equities, while Arouri et al. [2016] showed that US stock returns are depressed by uncertainty and depressed substantially during substantial policy volatility. These immediate effects of uncertainty may have longer-term ramifications in regard to investment, but they also unnaturally increase turnover and firm exit in the short run, quashing promising business models before they begin.

There also may be a psychological component to uncertainty in the short run; much as was just noted in regard to longer-term underdevelopment traps, in the short-term, increased uncertainty can create irrational responses to each additional piece of macroeconomic or policy news. A large literature exists on market responses to news events, with a near-unanimous agreement on the asymmetric effects of bad news (i.e. bad news generate more volatility and worse results than good news dampens volatility and generates good results). McQueen and Roley [1993] and Garcia [2013] (among others) also note that how news is received is dependent upon prevailing economic conditions; bad news is likely to hurt even more in a recession,

while good news is discounted heavily. In an environment of uncertainty, it is likely that news will be received similarly as in a recession, meaning that news which confirms pessimism will have a greater effect. Depressed consumer sentiment or perception of the economy cannot be helpful for firms or markets.

Finally, in addition to these two common threads, there is another channel via which uncertainty can affect an economy, and that is escalation. In particular, the persistence of economic policy uncertainty, especially when coupled with actual negative macroeconomic news, may have greater consequences than current period uncertainty; more tellingly, economic policy uncertainty may be a harbinger of institutional change, shifting an economy from worries about current policies to the viability of current institutions. Put another way, continued economic policy uncertainty may point to a substantial overhaul of existing institutions; it may also create frustration with the status quo, making a society more willing to take a chance on political and economic leaders who promise radical change. These changes likely would include replacing or threatening existing institutions, not satisfied with their functions or performance.

3. Quantifying Uncertainty

In order to understand the precise effects of the various types of uncertainty, we need to be able to quantify them with some precision. It is in this area that the profession has really excelled in recent years, with various indexes and econometric methods being utilized to proxy for uncertainty. But, as in understanding their effects, there are different quantitative measures to capture the various facets of uncertainty, each with their own strengths and weaknesses.

3.1. Geopolitical uncertainty

Geopolitical uncertainty may be a type of risk that is removed from normal economic decisions, but it also has been captured in the literature by a broad range of standard macroeconomic indicators. In fact, geopolitical uncertainty, including country-specific risk, likely has the longest pedigree in quantification, with measures such as interest rates and interest rate spreads, exchange rates and degrees of over/undervaluation [Balcilar et al., 2017], and stock market volatility indices (such as the VIX) used to capture these risks; alternately, a combination of these metrics can be used to create a more holistic picture of geopolitical risk, as typified in the political risk rating created by the PRS Group and marketed under the International Country Risk Guide (ICRG).

Beyond these country-specific measures, other more general metrics may be used to attempt to capture global geopolitical uncertainty, including oil

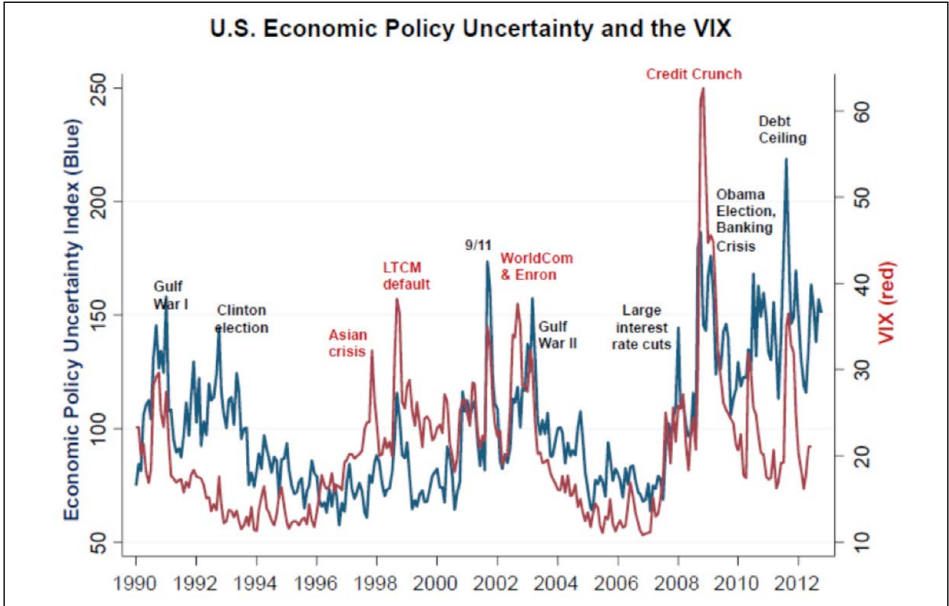
price volatility or other commodity prices (gold being commonly utilized for this purpose, see Starr and Tran [2008]). Finally, news-based indices, more common for economic policy (see next section) have also been crafted for geopolitical risk, with Caldara and Iacoviello [2017] furnishing the most recent example. While it may be difficult to separate geopolitical uncertainty and economic policy uncertainty from macroeconomic variables, targeted news-based indices can help to disentangle one from the other.

3.2. Economic policy uncertainty

Along these lines, the use of news-based indices [Baker et al., 2016] and understanding market reactions to news can show the powerful effects of economic policy uncertainty. The Baker et al., 2016 index, created in 2012 but only published in a peer-reviewed journal in 2016, has become the gold standard of measurement of such uncertainty; using text-search algorithms double-checked by humans, the EPU index attempts to quantify uncertainty via the appearance of keywords in the media. As Baker et al. [2016] note, their index does show correlation with other commonly-utilized metrics for uncertainty (such as the VIX, see Figure 1), but it differentiates itself by focusing on news which specifically relates to economic policy, rather than geopolitics.

Prior to the EPU Index, policy uncertainty tended to be captured in similar macroeconomic indicators as used for geopolitical uncertainty, including interest rate spreads or a composite index put together under the ICRG heading called the “economic risk rating,” which aggregated several macroeconomic variables together. These indicators suffered from being outcome variable-based, however, rather than observing inputs, which, to some extent, the EPU index does. Finally, another still-used approach to policy uncertainty utilizes surveys to understand from market participants themselves the extent of uncertainty, basing uncertainty metrics on forecasts of macroeconomic variables and the divergence amongst these forecasts [Kenyon, Naoi, 2010; Ulrich, 2012]. Unfortunately, as Rich and Tracy [2010] show in relation to inflation forecasts, disagreement does not always proxy well for uncertainty, and thus it perhaps is best to rely on a phalanx of proxies in order to attempt to capture actual uncertainty.

Figure 1. The EPU Index and the VIX



Source: [www.policyuncertainty.com].

3.3. Institutional uncertainty

The last and potentially most severe type of uncertainty, institutional uncertainty, is also the least-explored of the three facets in terms of quantification. This too has begun to change in recent years, with a proliferation of both “subjective” indicators, i.e. those created by expert opinion, and “objective” indicators, i.e. outcome variables based on the after-effects of institutional working [Voigt, 2013]. Subjective indicators are perhaps the most widely-used when approaching the question of quantifying institutions, with indices of economic freedom (Heritage Foundation or Fraser Institute), the aforementioned ICRG indicators of rule of law or property rights, the EBRD transition indicators, and Freedom House’s rankings. Objective indicators are more difficult to find, especially in relation to institutions such as judicial independence, but there are some commonly-accepted metrics such as “contract-intensive money” as a measure for property rights; proposed by Clague et al. [1996], contract-intensive money measures the amount of money held within the formal financial system as a percentage of all money, with higher percentages signifying higher property rights.

Finding measures of institutional uncertainty has been a bit more arduous of a task than the mere quantification of institutions, however. The news-based approach of Baker et al. [2016] is less likely to be effective

in capturing changes in institutions than it is for policies; from a practical standpoint, given the semi-permanent nature of institutions, it is difficult to tell when an institution is actually changing, and one is even less likely to find news which separates the institutional change from the policy that creates it). Thus, to meet the challenge, papers such as Brunetti and Weder [1998], Berggren et al. [2012], and Hartwell [2017] have proposed volatility metrics fashioned from the institutional indicators noted above, using coefficients of variance, standard deviations, or other common volatility measures to capture changes in institutions. As with other outcome-based measures, such institutional volatility may not necessarily capture perceptions of uncertainty, nor may it necessarily correlate with uncertainty *per se* (that is, institutional deterioration may be a certainty, not an unknown). But for the moment, these metrics remain an important way for researchers to think about institutional uncertainty and to use it in empirical analyses.

4. (Not a) Conclusion: A Starting Point for Discussion

The challenge facing economists, and the challenge taken up in some form by the papers in this volume, is to understand that there may be differential effects coming from the various forms of uncertainty noted above. Of the various types of uncertainty, including economic policy uncertainty or institutional uncertainty, which is most harmful? I have ventured a tentative hierarchy in this paper, with institutional uncertainty being more harmful than economic policy uncertainty, but much depends upon the time-frame in question. Similarly, does uncertainty accumulate, or are there time-varying effects of uncertainty? These questions, while crucial for our understanding of uncertainty, are not meant to be answered in this modest paper but instead represents a fruitful research agenda for economists for years to come.

The second important question, one that appears to be true but has not yet undergone careful and methodologically rigorous scrutiny, is, is the world in a “high uncertainty” equilibrium that is set to continue? Larry Summers, in an article for the “Financial Times” in 2013, famously called the low-growth circumstances of the post-global financial world a “new normal.” Part of this world in the era of quantitative easing and zero interest rates has been high levels of economic policy uncertainty, so should we expect more of the same? The interdependence of the two (low growth and high uncertainty) cannot be understated, as uncertainty leads to sub-optimal growth paths, which then engenders its own policy uncertainty. Only a radical event, a dramatic societal shift, or some form of exogenous shock can appear to shake the system from this equilibrium and reduce uncertainty. Is this event on the horizon?

Finally, if we are living in a time of high uncertainty, what could its effect on financial markets worldwide? Efficient markets are very good at pricing in risk and information, reflected in premia and interest rates; is there a conceivable future where financial markets can also price in uncertainty? Preliminary indications of such a future are encouraging, as Kelly et al. [2016] show how options markets tend to accurately price in political events. Uncertainty could also create short-term buying opportunities and better velocity of capital, which may also help in the longer run. However, this approach focuses on the short-term (Kelly et al. [2016] even note that options markets are good for understanding pricing precisely because of their short-term nature), neglecting that longer-term uncertainty would be very hard to incorporate, especially if unexpected. Over longer time horizons, the confidence bounds in the presence of sustained uncertainty would certainly converge to infinity.

In conclusion, the aftermath of the global financial crisis has left policymakers scrambling for new and innovative solutions, but their experimentation may be worse for the patient than the underlying condition, mainly due to the uncertainty that persists. Given the questions mooted here, it is crucial that the economics profession continues its research into the deleterious effects of uncertainty and, importantly, how such uncertainty can be resolved.

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Summary

The study of policy uncertainty has increased exponentially across the economics and finance profession as of late, with papers across sub-disciplines finding uniformly that uncertainty has a negative effect on country growth paths. However, the somewhat nebulous term "uncertainty", and why such uncertainty is of relevance right now, has been only explored at a facile conceptual (if in-depth methodological) level. The purpose of this brief paper is to introduce some conceptual and definitional clarity to the idea of "uncertainty", spelling out clearly what different facets it entails and how these facets may influence economic variables. Focusing in particular on economic policy and institutional uncertainty, this paper is meant to serve as an introduction to the field but also serve as a call for future research.