Discussion of Scarring Body and Mind: The Long-Term Belief-Scarring Effects of Covid-19 by Kozlowski, Veldkamp and Venkateswaran

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Navigating the Decade Ahead: Implications for Monetary Policy

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It is a great pleasure to discuss this thought-provoking paper by Kozlowski, Veldkamp and Venkateswaran, which builds on important earlier work by these same authors.[1] The main thesis of their work, including the present paper, is that concern about tail risk can be a big driver of asset prices, and of macroeconomic behavior more generally. The present paper argues that the COVID-19 pandemic has likely heightened fears of future tail events, and could thus impact investment and consumption for years to come. In addition, there can also be long-term effects to the extent that a sustained need for social distancing makes significant parts of the existing capital stock less productive than before. In fact, according to the authors' highly-stylized calibration, the present discounted value of the long-term costs is an order of magnitude greater than the short-term costs.

The work of Kozlowski, Veldkamp and Venkateswaran builds on the pioneering contribution of Barro (2006), who appealed to tail risk to explain the equity premium puzzle. Anyone familiar with the equity premium puzzle literature knows that it is extremely difficult to come up with a coherent model that explains why the rate of return on equities tends to far outstrips the rate of return on safe bonds over long horizons. There are various approaches but directly or indirectly, most boil down to trying to explain what could make people so risk averse that they would consistently accept a much lower return in exchange for the guarantee of a safe(r) return on bonds. There are ways to manipulate the utility function one way or the other, but Barro's approach shortcuts this by arguing that driving force is the underlying nature of uncertainty. Even with normal levels of risk aversion, a small chance of a truly catastrophic collapse in aggregate consumption makes the value of a bond that still pays off in catastrophic states extremely high.

A number of authors have built on Barro's insight. Reinhart, Reinhart and Rogoff (2015), for example, show that if the public's estimate of disaster probability (per annum) rises from 1.7% (Barro's point estimate) to 2.5%, it can cause the equilibrium real interest rate fall by several percent, even turning negative. It is surely the case that public's estimate of tail risk rose substantially after the 2008 global financial crisis. For all the discussion of "secular stagnation" and declining real trend real interest rates, the bulk of the decline this century happened shortly after 2008. The real interest rate has remained low since, consistent with the notion that concern of tail risk rose materially after the crisis.

I should also note that around the same time as Barro advanced his explanation of the equity premium puzzle, the late Harvard economist Marty Weitzman (2007) offered an alternative but related approach that arrives at broadly similar conclusions. Weitzman also argued for the importance of "fat tails" but instead of appealing to rare disasters suggested that allowing for parameter uncertainty could have the same effect. He shows that gradual Bayesian

[1] See, for example, Kozlowski, Veldkamp and Venkateswaran (2020)

updating of priors about parameters inevitably adds a thick tail to posteriors and can explain large equity premia. Weitzman goes on to warn that results are quite sensitive to assumed priors, which might be worth bearing in mind here, as the present paper also incorporates Bayesian updating about disasters.

Kozlowski, Veldkamp and Venkateswaran make a number of valuable contributions to this literature, in some ways combining elements of Barro's canonical general equilibrium model with Weitzman's Bayesian learning. They show that heightened perceptions of risk aversion feed back into investment and output (treated as exogenous in the canonical Barro model, which mainly focused on asset prices.) Their pre-COVID results are striking and suggest that a significant portion of post-crisis slow growth might have been due to lingering effects on expectations and psychology after 2008. This is not trivial given the nonlinearities that tail events introduce into the analysis, and in general requires computational methods.

The pandemic is a very natural application of the KVV framework. It makes tremendous sense to try to model the Bayesian learning that takes place after a crisis. It will take time to fully understand the kind of extraordinary events we have experienced the past twelve years, which have given us the worst global financial crisis in eight decades, and the worst global pandemic in a century.

The idea that rare events might be big drivers of equity prices and interest is, in fact, an old one that pre-dates modern techniques for trying to quantify the effects. Nordhaus (1974), for example, notes that in the years after the Great Depression and World War II, low equity prices (and high subsequent rates of return) might be partly explained by public fear of a recurrence of another Depression. John Kenneth Galbraith claimed that as late 1955, the mere mention that the Great Crash could repeat itself by a prominent economists (such as himself) could send markets into panic.[2] Neither Nordhaus nor Galbraith, of course, had access to the modern tools with which one might attempt to quantify this claim.

I will not attempt to deconstruct the details the authors' quantitative analysis, which is not easy to do given the model's many complex component parts. Aside from a macroeconomic model, the authors also include a pandemic model and a model of Bayesian learning. Their quantitative estimate of the impact on long-term growth is plausible, but I will leave it to other to check where the results are sensitive and where they are not.

As for Bayesian learning, it is time to admit that we have entered a difficult period for macroeconomics, with rare events shaking up our priors about what the underlying parameters of our models must be. In my 2009 book with Carmen Reinhart, This Time is Different, we argued that it simply impossible to understand the effects of 100 year floods by looking at a quarter century of data, especially if confined to one country or a very small number of countries. We argued that to understand debt and financial crises, one needed to look at a broad number of countries over a long time period, in order to establish patterns in the macroeconomic data. Whereas this approach has proved extremely useful – particularly given the failure of virtually all conventional quantitative models in predicting the aftermath of the crisis, it would still be

[2] See Reinhart, Reinhart and Rogoff (2015).

enormously helpful to have better structural models for interpretation and policy analysis. The present paper is an important step.

One small qualm: Although I completely believe that awareness of tail risks has become more important over the past 12 years, it is not necessarily all that easy to pull this out of market data. The authors appeal to a skewness measure here and in their (2020) paper as a market measure of tail risk. But it is not clear that this quite captures disaster risk, since skewness incorporates expectations of both positive and negative outliers and is actually negatively correlated with VIX (see Figure 1). Barro and Liao (2020) is the only paper I am aware of that attempts to use market options data to tease out one-sided disaster risk. They find that disaster risk spiked for a sustained period after the 2008 financial crisis but had calmed down in the runup to COVID-19, before spiking again. More work is needed, however, especially as options data mainly captures relatively short-term risks, whereas the tail risks that Kozlowski et al worry about are mainly longer term, especially as they effect long-term investment and savings decisions, so the market data may not be adequate. Indeed, it is hard to imagine that perceptions of tail risk did not rise both after the financial crisis and then more after the pandemic.

Tail risk is an important idea that needs to be integrated more fully into the work of central banks. Papers like this one provide an important step forward.

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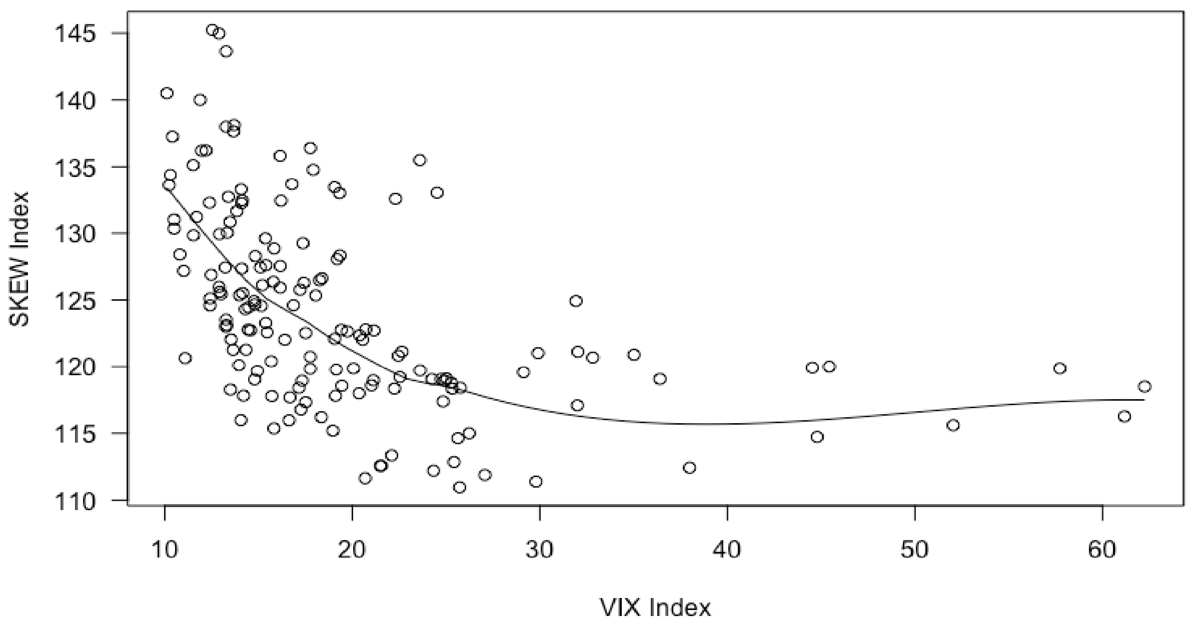
Relationship between SKEW index (3rd moment) and VIX (2nd moment)

Monthly data, January 2007 to June 2020



Source: Bloomberg