

persistent savings shocks, reflecting precautionary motives or the fact that restrictions to private demand have become more entrenched as the duration of the pandemic increased. Comparison with a model variant without the COVID-specific extensions also demonstrates the gain in terms of model fit.

Our paper is related to Chen et al. (2020), who show that the NY FED's DSGE model augmented by (supply and demand) COVID shocks, interprets the COVID-19 recession as a demand shock to the US economy. Kollmann (2021) argues (for annual data) that in a stylized New Keynesian model an aggregate supply shock is the main driver of the sharp GDP contraction in the EA during the pandemic, whereas both aggregate demand and supply changes matters for the relative stability of inflation.

References

Albonico, A., L. Calais, R. Cardani, O. Croitorov, F. Ferroni, M. Giovannini, S. Hohberger, B. Pataracchia, F. Pericoli, P. Pfeiler, R. Raciborski, M. Ratto, W. Roeger, and L. Vogel (2019). The Global Multi-Country Model (GM): An estimated DSGE model for euro area countries. Working Papers 102, European Economy Discussion Papers.

Barrero, J. M., N. Bloom, and S. J. Davis (2020). Covid-19 is also a reallocation shock. Technical report, National Bureau of Economic Research.

Chen, W., M. D. Negro, S. Goyal, and A. Johnson (2020). the New York Fed DSGE Model Forecast|December 2020. Liberty Street Economics December 23, Federal Reserve Bank of New York.

Guerrieri, V., G. Lorenzoni, L. Straub, and I. Werning (2020). Macroeconomic implications of covid-19: Can negative supply shocks cause demand shortages? Technical report, National Bureau of Economic Research.

Kollmann, R. (2021). The Macroeconomics of Epidemics. ECARES working paper 2021-12, European Center for Advanced Research in Economics and Statistics.

Lenza, M. and G. E. Primiceri (2020). How to estimate a var after March 2020. Technical report, National Bureau of Economic Research.

Beyond the results of models: additional purposes for modelling in the policy process

Melchior A., Utrecht University, Ministry of Economic Affairs and Climate Policy and Ministry of Agriculture, Nature and Food Quality, The Netherlands

Modelling for policy is a challenging process. In order to be effective in the policy environment more than a good scientific method is needed. One of the reasons is that within the policy world other things are valued than in the academic world, as discussed in (1). One of the things that can help modellers is to explicitly think and communicate about model purposes (2) and how these fit within the policy process.

During our work on models with policy developers in the Netherlands we found that we as modellers are limiting ourselves in thinking about the purposes of our models. Often we would be faced with vague questions, such as “how do we structure our thinking about the world in such a way that we can devise a useful policy theory?”, “How do we get a grip on things?” or “what is the question that we as policy developers have to answer?”. These questions have no clear boundaries, definitions or desired outcomes. We found in these cases that the creation of a model in itself is already a concrete result, without looking at the outcomes of a simulation. The model helps policy developers to understand the (level of) complexity, know where to invest more ‘policy development’ resources, ask the right questions and communicate this with others.

This seems to be especially the case when we use Agent Based Modelling (ABM). ABM enables us to model and talk about agents (e.g. people, companies, etc), their interactions and their behaviour in an way that is understandable by non-modellers. When using ABM to support policy developers we saw a lot of value in the process of creating a model and the model as-is instead of focussing on the purpose of the outcomes of the model.

The vagueness of questions is also related to the phase in the policy process where modellers are involved. In early phases of the policy process questions revolved around understanding the societal issue and policy problem whilst finding a direction for possible solutions. One example of this is a recent case study on the transition to electric vehicles in the Netherlands. In this case study we identified various indicators that can indicate the progress of this transition to provide better insights to the policy developers. We explicitly did not find or propose a policy to improve the transition. Finding a (set of) policy(s) that does this is a question for later in the policy process.

Based on these insights we propose a number of additional purposes for modelling in a policy development context:

1. To gain a better understanding of the complexity, a better understanding of the system.
2. To improve alignment in shared world views between stakeholders.
3. To give policy developers clear next steps for the policy process. These steps are explicitly not “enact this and this policy”.

This also leads to a number of principles that an ABM should adhere to in order to serve its purpose in our context of policy development.

1. Acceptance is more important than correctness or validity. Acceptance is needed to have real impact on the policy process. For this one needs to focus on the things that are considered useful for the policy process. Correctness and validity become more important at later stages in the policy process.
2. It is not about finding The answer, it is about finding valuable insights. In earlier phase of the policy process policy developers are looking for valuable insights, for example how the problem domain works and what the important questions are that they need to answer.
3. Stakeholders are taken into account during development.
In (1) we found that the work of Dutch policy developers best fits the Advocacy Coalition Framework (ACF) (3). In ACF stakeholder management and forming coalitions are explicit steps in the policy process. As such, one needs to take the stakeholders and the interaction with them into account for the policy process. This to create things like buy-in and a sense of ownership of the model. This is different from using stakeholders to make sure the model or simulation is correct.
4. Creates value without empirical evidence. Often empirical evidence is lacking or unsuitable for the challenges at hand. So we need to think of ways to provide value without relying on data.
5. Communicated in an understandable way. The phenomena that we create ABM's for are usually big and complex. In order to serve its purpose the ABM needs to be communicated in such a way that policy developers can understand the model and not just the result.

6. Explicitly state what the ABM or other model does and doesn't do. Policy developers are used to receiving academic reports that tell them which policies to pursue or not. So we need to explicitly state that we will not be providing them such insights, together with the things that we will do so they know what to expect.

It is important to also mention some caveats. Within the EU we have various different policy development cultures. As such, when one uses the purposes and principles it is important to take the policy culture into account. For example, in our Dutch policy context the spirit of the "polder model" approach is often used in the policy process.

Another, but related, point is that to be involved in earlier phases of the policy process the relationship between modellers and policy developers needs to be improved. Modellers can generally help policy developers before they themselves realize it. This will most likely require a more pro-active attitude from both sides.

To conclude we reiterate our key point: the results and outcomes of a model are but one useful aspect of modelling. The process of making a model and the structure a model provides are also, if not more, valuable depending on the policy process phase.

References

1. A closer look at dutch policy development. Melchior, Alexander, Dignum, Frank and Ruiz, Marcela. Cham : Springer International Publishing, 2021. *Advances in Social Simulation*. pp. 383-395.
2. Different modelling purposes. Edmonds, B., et al. 2019, *Journal of Artificial Societies and Social Simulation*, Vol. 22(3) 6.
3. Themes and variations: Taking stock of the advocacy coalition framework. Weible, C.M., Sabatier, P.A. and McQueen, K. 2009, *Policy Studies Journal*, Vol. 37(1), pp. 121-140.