# Non-technical summary for 'Fast Posterior Sampling in Tightly Identified SVARs Using "Soft" Sign Restrictions'

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#### What did we set out to do?

Macroeconomists often seek to understand the sources of macroeconomic fluctuations by analysing the fundamental 'shocks' that drive them. Examples of such shocks include conflict-driven disruptions to global oil supply and unanticipated changes in the stance of monetary policy.

A commonly used framework for estimating the macroeconomic effects of shocks is the structural vector autoregression (SVAR). This is a type of econometric model that can be used to analyse time series data, like inflation or the unemployment rate. Using SVAR models requires making assumptions about the structure of the economy, known as 'identifying restrictions'. Identifying restrictions are what allow us to draw conclusions about the underlying structure of the economy from the correlations between variables that we observe in the time series data.

Many researchers making use of SVARs employ so-called 'sign restrictions'. An example of a sign restriction is the assumption that an unexpected disruption in oil supply reduces oil production and increases the price of oil. Researchers like using these kinds of assumptions because they tend to be weaker than alternatives, so results obtained under these restrictions are more credible.

However, it can be difficult to estimate models that use sign restrictions – the computational methods that are used in this setting can take a very long time to generate results. This problem arises because standard computational methods for estimating these models involve randomly generating values of the model parameters and then checking whether the parameter values satisfy the imposed sign restrictions. Sometimes the parameter values satisfy the sign restrictions with very low probability, so it takes many attempts to find a sufficiently large number of parameter values satisfying the restrictions. The standard computational methods therefore become burdensome in exactly the situations where they are most useful – that is, when the restrictions are revealing a lot about the underlying structure of the economy.

To address this problem, we propose a new computational method for estimating SVAR models that are identified with sign restrictions.

## What did we learn?

The computational method that we propose can be much faster than standard methods when the SVAR's parameter values satisfy the imposed sign restrictions with low probability. We demonstrate this in a few settings:

- 1. We use two simple examples to illustrate how our method works.
- 2. We consider an empirical application using a rich set of sign restrictions to estimate the effects of shocks in the global oil market.
- 3. We also briefly consider a model of US monetary policy.

## What was our key takeaway?

Our approach is broadly applicable under a wide range of identifying restrictions. Our method significantly enhances the practicality of using SVAR models for research and policy analysis, and may be of interest to academic researchers and researchers at policy institutions.