BOSTON COLLEGE

Laura Veronika Gati <gati@bc.edu>

averaging across random draws for the shocks

3 messages

Laura Veronika Gati <gati@bc.edu> Thu, Jul 9, 2020 at 12:08 PM
To: Peter Ireland <peter.ireland@bc.edu>

Dear Peter,
I would like to ask if it would be ok for you if I take you up on your offer to meet again this week? There are two things I'd like to talk about. No rush though - if it doesn't work out, we can just talk next week as usual.

1. I've looked up the Smith 1993 article and it claims to present an ***extension/generalization*** of the simulated method of moments, citing two articles (Duffie & Singleton 1988 and Lee & Ingram 1991) as the originators (see all articles attached). I've looked up those two as well, and I don't see what the novelty in Smith 1993 is compared to these. There is also a claim in Smith (p. S71) that his method is not a special case of the simulated method of moments (Hansen 1982), while Lee & Ingram specifically state that their method is (p. 198). What is the crucial bit I'm missing? Let me also add that from these three references, only Smith mentions taking cross-sectional averages, and that also not in the main description of the method (p. S71 and equations (2) and (4)), but in a particular "Monte Carlo study" (p. S73). Despite this, I am more and more convinced that taking cross-sectional averages is exactly what I need to do. It might be one of those things that no one states, because it appears too trivial to everyone (apart from me).

2. Estimation using N random histories of shocks: initial results with N up to 100 suggest that without additional moments (that require that the estimated function be convex), I'm still not getting the right thing. With convexity moments, the estimators seem biased but, hopefully consistent in that there is an indication that they might be converging to the true coefficients as N-> infinity.

Is there a time this afternoon (after 3pm), or tomorrow (morning or after 5pm) that would be a good time to talk? Please, only say yes if you're not stressed out and if some of these times really work for you - I completely understand if you don't have the time and I don't want to burden you more than I absolutely have to.

Laura

3 attachments

lee_ingram1991.pdf
978K

duffie_singleton1990.pdf
3719K

smith1993SMM.pdf
7098K

Peter Ireland <peter.ireland@bc.edu> Thu, Jul 9, 2020 at 1:25 PM
Reply-To: peter.ireland@bc.edu
To: Laura Veronika Gati <gati@bc.edu>

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Laura, thanks for writing.  This helped clarify matters for me, too.  Let's talk at 3pm
today.  In the meantime, just a few quick points.

First, I think what Smith is getting is this.  Consider the special case of a real business
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cycle model. Adopting his notation, let beta be the vector of parameters describing tastes, technologies, and the laws of motion for the structural shocks in the RBC model.

SMM as described by Lee and Ingram computes a vector of moments m(data), say means, standard deviations, and correlations of observable variables like consumption, hours worked, and output using the actual time series data. Then, for a given choice of beta, SMM computes the same moments m(beta) using artificial data from the RBC model. Then, it estimates beta by minimizing a quadratic form representing a weighted sum of the squared deviations m(data)-m(beta) between the moments computed with actual versus artificial data.

EMSM as "invented," let's say, by Smith does something slightly more elaborate. It posits an auxiliary econometric model with parameter vector theta. Then it estimates theta(data) using actual data and theta(beta) using artificial data generated by the RBC model with parameter vector beta. Then, it estimates beta by minizing a quadratic form representing a weighted sum of the squared deviations theta(data)-theta(beta) between the parameters of the auxiliary model estimated with actual versus artificial data.

From this perspective, SMM appears as a special case of EMSM, where the auxiliary econometric model consists of a vector of first and second moments. But, yes, EMSM "generalizes" SMM by allowing for more complicated auxiliary models. I agree there is more than a bit of overselling on Smith's part, but I suppose he's right to say that his method is strictly speaking a generalization as opposed to an application of Lee and Ingram's.

Second, take a look at pages 681-2 in the the attached Handbook paper by Fernandez-Villaverde et al. In their notation, T is the length of the actual data series. lambda T is the size of the artificial data series, generated either by taking one long sample of length lambda T or lambda shorter samples each of length T. Their lambda is your N, implying that you should be able to get better estimates by increasing N, the number of artificial samples of fixed length.

Third, notice their last point, at the end of section 11.2.2 on page 682. When you do the estimation, you want to hold the 100N draws of the shocks fixed as you vary the alphas in order to minimize the estimation criterion.

I have one final point that will be easier to make on Skype. If you're not too busy, let's talk at 3pm today.

Peter
[Quoted text hidden]

Fernandez Villaverde Rubio Ramirez and Schorfheide 2016.pdf
5651K

Laura Veronika Gati <gati@bc.edu> Thu, Jul 9, 2020 at 1:54 PM
To: Peter Ireland <peter.ireland@bc.edu>

Great, let's talk at 3pm! See you then!
Laura

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