Twisting shadows: structural breaks of B&H's shadow economy index

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1. Conext and motivation: *Labor markets in context of Shadow economy*
2. Methodology MIMIC -SEM
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4. Index of shadow economy, structural breaks...

Section 1

Conext and motivation: *Labor markets in context of Shadow economy*

Why this topic?

- Measurement issue in economy: If things cannot be measured directly that we can approach them indirectly.
- What happens with shadow part of the economy during turbulent times? –it stays in total darkness
- What is exactly the intuition in MIMIC?
- The holistic approach is maybe main argument for examining shadow part of the economy.

By spotting structural brakes of shadow economy index two question are coming in the center of the analysis:

1. How reliable MIMIC methodology is for the case of B&H is?
2. Can comparison of structural brakes of shadow economy index and official GDP offer

a. Questions about shadow economy index and/or;
b. Answers about underground economy's reaction on catastrophic events;

Literature review

Schneider and Medina summarize the last 20 years of work related to the shadow economy (2018).

Debate over final identification of the model is not concluded.

- Is GDP or variable related to electricity consumption optimal choice as indicator?
- Can final results be reported as percentage of GDP defined underground economy?

The empty space in literature is conditioned by complexity inside SEM?

Section 2

Methodology MIMIC -SEM

Methodology MIMIC -SEM

For this methodological approach I have used R package lavaan (Rosseel 2012).

1. Defining latent variable by indirect measurement procedure which assumes using the set of directly measurable variable
2. Setting theoretically based structure between variables that are measured directly
3. Defining index related to the first order latent

Final set of variables that can be used as indicators for latent variable measurement procedure is a result of :

1. Assumptions derived from theoretical background related to the issue
2. Parsimonious approach in model evolution
3. Every phase results with a certain model that can be improved up to the optimal one.

Section 3

Model identification

Model identification: measurement and causal part

Casual part of the model for B&H assumes following regressors:

- employment (eBH)
- GDP (GDP)
- taxes (txBH)

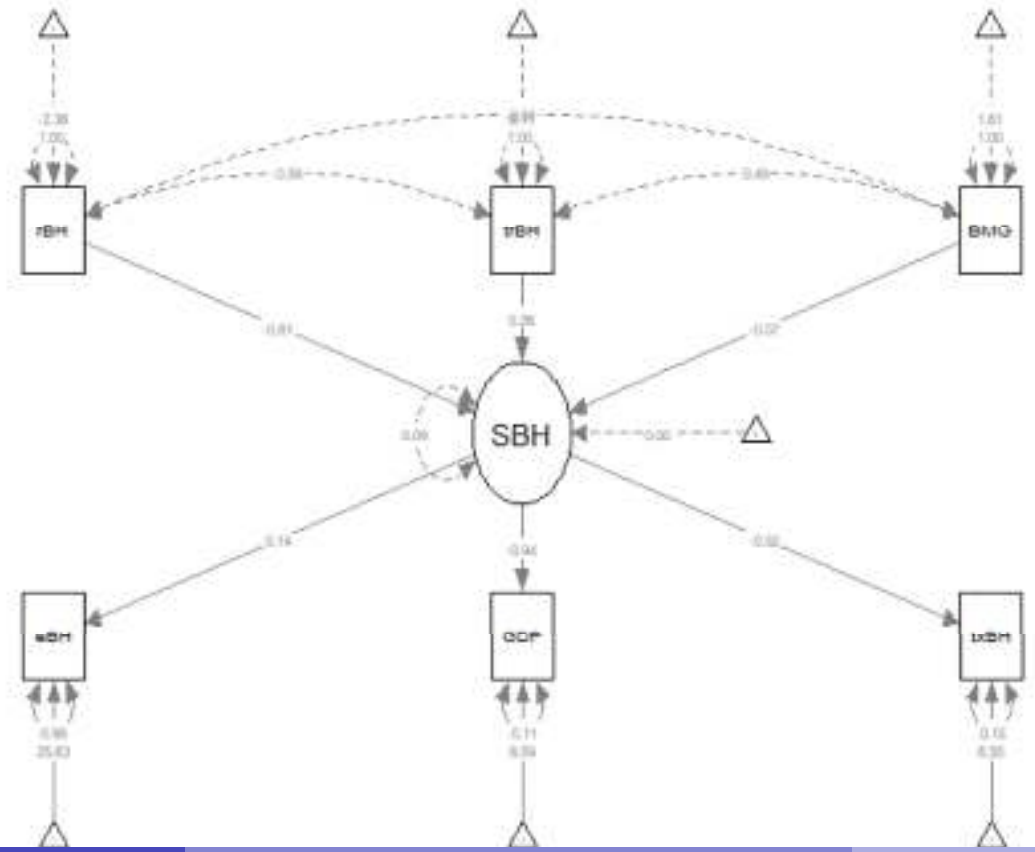
Measurement part of the model for B&H includes following indicators:

- index of rule of government (rBH)
- trade (trBH)
- broad money growth (BMG)

Data are from World Bank Data Base for period 1995-2018.

. In this research some of the arguments for using some regressors and those two indicators as proposed by Almenar, Sánchez & Sapena

Model identification



Section 4

Index of shadow economy, structural breaks...

Index of shadow economy

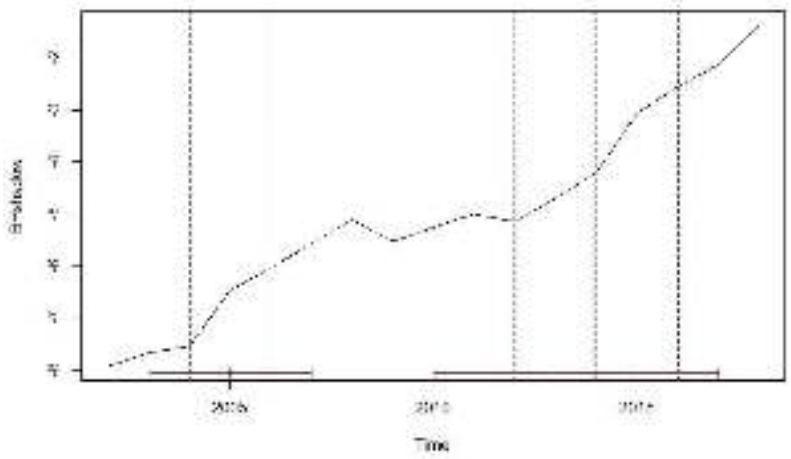
Index summarizes co-movements of variables that have direct and indirect relation to latent variable.

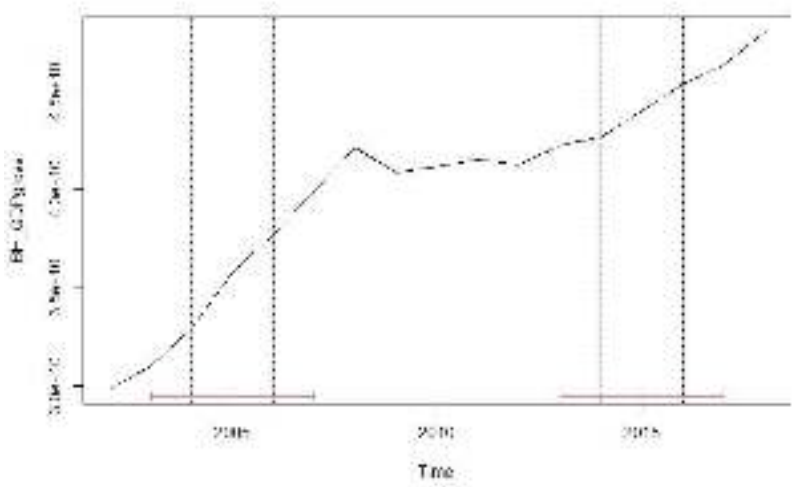
Mainstream literature that uses MIMC literature does not gives a lot attention to the all steps proposed by SEM procedure that is inside MIMIC model.

It is clear that labor market will shrink, but for the case of B&H (and many others), it is rational to expect that one part of official labor force goes underground if there is long run catastrophic occurrence

. Maybe this is the reason why shadow economy is not flat in 2014-2016 period and official PPP GDP is?

Index of shadow economy for B&H with structural breakes & PPP GDP with structural brakes for period 2002-2018





Concluding remarks

1. eyeball test opens doubt that shadow economy rises after catastrophic event,
2. imprecision of shadow economy index does not allow us to upgrade this doubt in the claim,
3. imprecision can be observed from the perspective of structural brakes allocation,
4. can further improvement of model calibration provide more precision stays an open question.

Network setting of nacional economy and SEM as methodology are perfectly compatible.

Further work

Using shadow economy index puts us in lot of troubles, but also has potentials that are not enough exploited in mainstream literature.

Yes, the conection wiht labour market is important and shold be examined.

But, which sector is crucial for employement?

SMEs! In B&H and a huge part of emerginig country $S \rightarrow$ *micro* and $M \rightarrow$ *small*

Additionally, whole sector bellogns to the part of network that has a lot of shadow (dark) interconections

As in the case of Shadow ecnomy index - GDP as important indicator

How to include SMEs in the game

What if SMEs infrastructure can be measured with

- University-Industry Collaboration
- Research and Development as the percentage of GDP
- Human Development Index
- Number of Patent Application

What kind of relation can be expected between shadow part of economy and latent varaible measured this way?

What if employment comes in the model?