



# The Analysis of the Determinants of Exchange Rate via Conditional and Partial Granger Causality Test



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## Objective

The relationships among the macroeconomic variables (exchange rate, deposit rate, gold prices, BIST100 Istanbul stock market index) of Turkey in the 2010. 08 – 2015.12 period were investigated by conditional and partial Granger causality tests. First, the theoretical information about conditional and partial G-causality tests is given. Then, these causality tests were applied to the data using the R software program. The results of the conditional and partial G-causality tests showed significant G-causalities: positive G-causality relationship from the exchange rate to the deposit rate, and a negative mutual G-causality between BIST100 and the deposit rate.

## Methodology

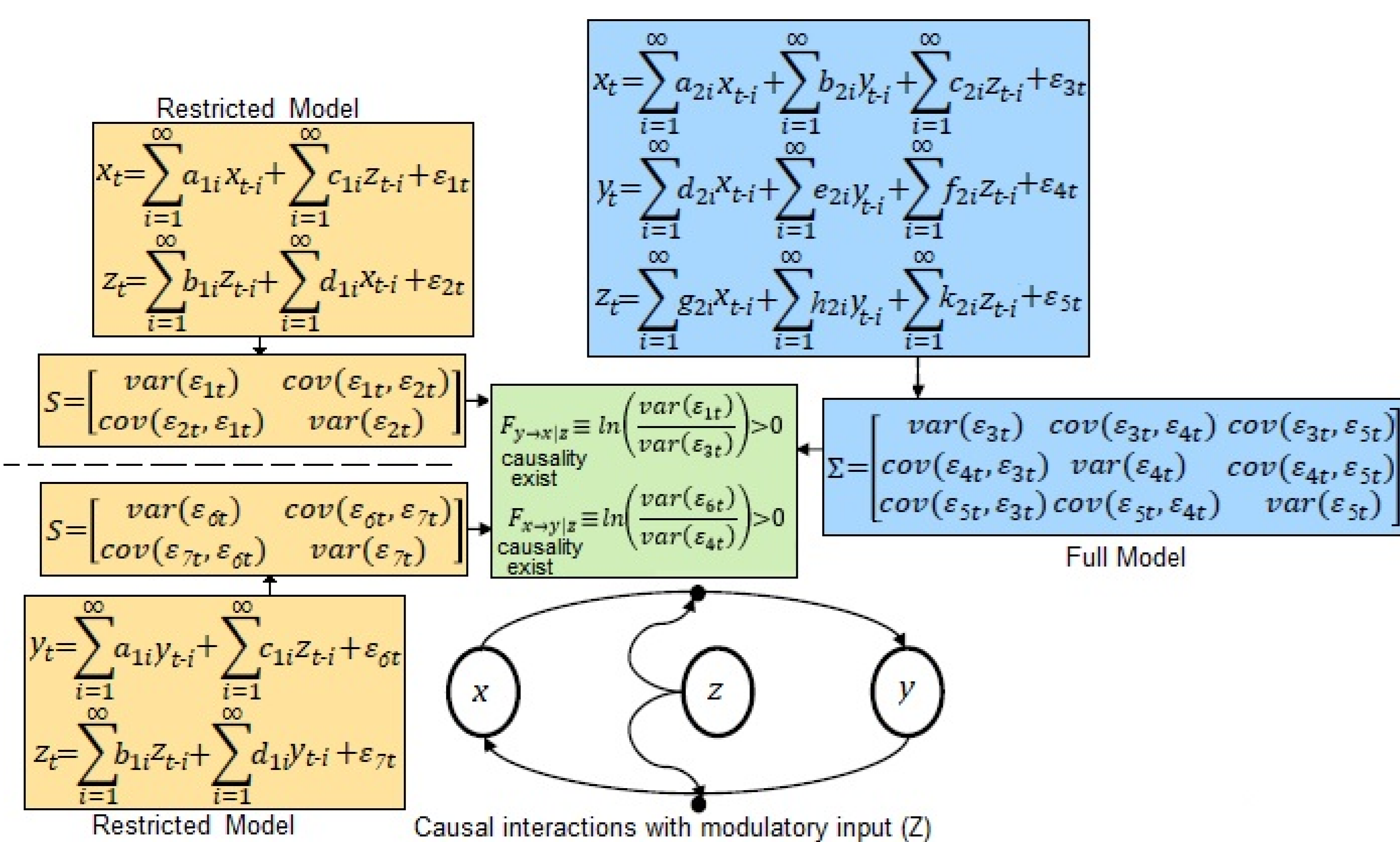
### A. Data

Turkey's economy: 2006.06 - 2015.12

Variables: Exchange rate (USD/TRY); gold price (USD per ounce); BIST100 stock index (2003=100); deposit rate (%). 115 monthly observations.

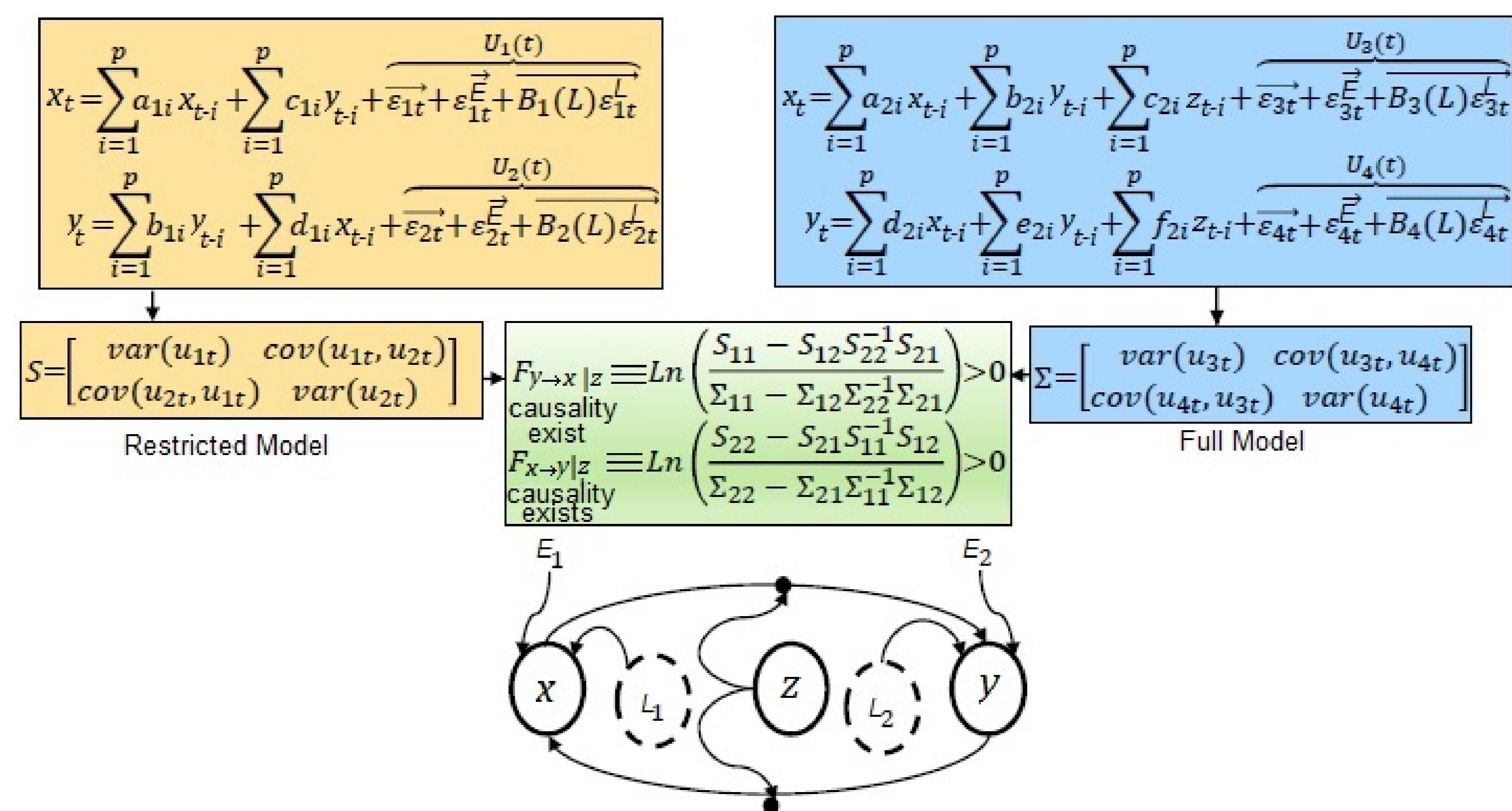
### B. Causality Measures

#### B1. Conditional G-Causality



(developed from (Youssofzadeh, 2013))

#### B2. Partial G-Causality

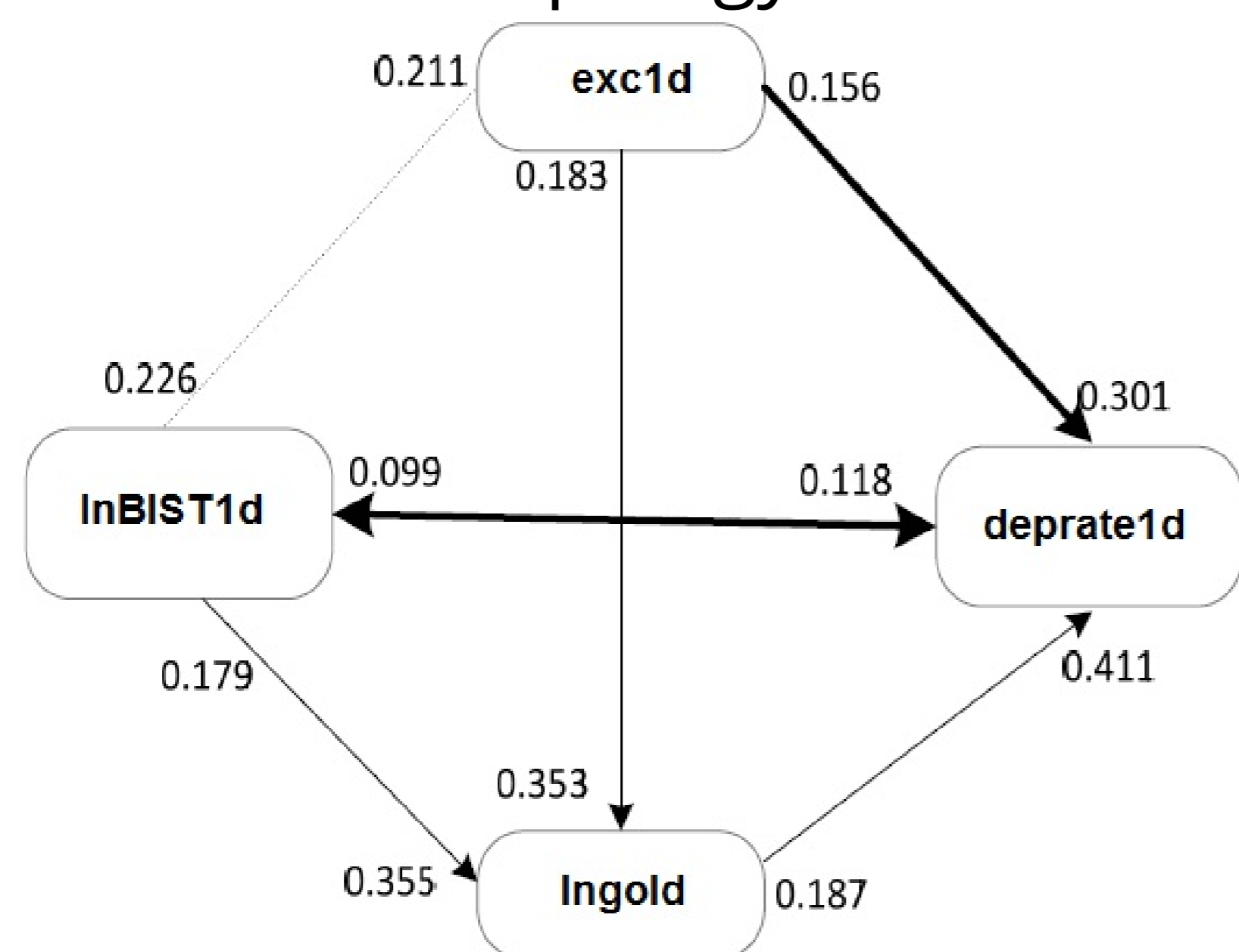


Causal interactions with exogenous (E) and endogenous (modulatory(z), latent variables (L)) inputs.

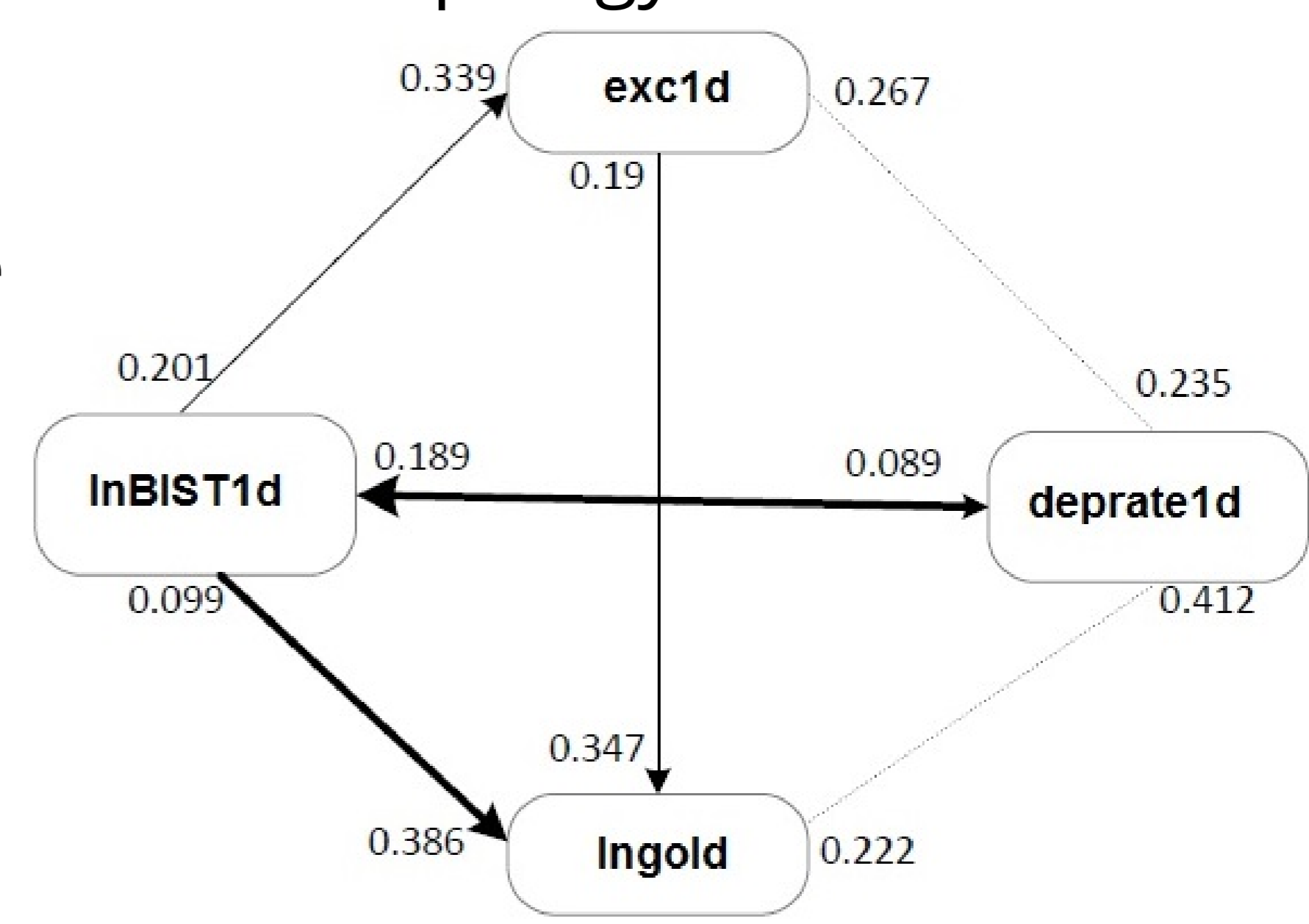
(from (Youssofzadeh, 2013))

## Results

Conditional GC Network Topology of the 4-variable System



Partial GC Network Topology of the 4-variable System



- p values were tabulated
- 1d: 1st differenced variable
- ln: natural logged variable

## Conclusions

The results of the conditional and partial G-causality tests:

- There exist significant G-causalities:
  - positive G-causality relationship from the exchange rate to the deposit rate, and
  - a negative mutual G-causality between BIST100 and the deposit rate.

Access to details: <https://zenodo.org/record/322576#.WU17UTLyjDd> page:105-160

## References

Guo, S., Seth A.K., Kendrick K.M. et al. (2008). Partial granger causality: eliminating exogenous inputs and latent variables. *Journal of Neuroscience Methods*, 172, 79-93. <http://www.sciencedirect.com/science/article/pii/S0165027008002379>

Youssofzadeh, V., Prasad G., Naeem M. et al. (2013). Partial Granger causality analysis for brain connectivity based on event related potentials. 6th INCF Congress of Neuroinformatics, Karolinska Institutet, Stockholm, Sweden. [http://www.frontiersin.org/10.3389/conf.fninf.2013.09.00114/event\\_abstract](http://www.frontiersin.org/10.3389/conf.fninf.2013.09.00114/event_abstract)