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# Latent variable models for time series: A frequency domain approach with an application to the permanent income hypothesis ☆

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### Abstract

The theory of estimation and inference in a very general class of latent variable models for time series is developed by showing that the distribution theory for the finite Fourier transform of the observable variables in latent variable models for time series is isomorphic to that for the observable variables themselves in classical latent variable models. This implies that analytic work on classical latent variable models can be adapted to latent variable models for time series, an implication which is illustrated here in the context of a general canonical form. To provide an empirical example a latent

variable model for permanent income is developed, its parameters are shown to be identified, and a variety of restrictions on these parameters implied by the permanent income hypothesis are tested.

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## References (22)

R.E. Lucas

[Expectations and the neutrality of money](#)

Journal of Economic Theory (1972)

T.W. Anderson

The use of factor analysis in the statistical analysis of multiple time series

Psychometrika (1963)

C. Attfield

Estimation of a model containing unobserved variables using grouped observations

Journal of Econometrics (1977)

J.W. Cooley *et al.*

An algorithm for the machine calculation of Fourier series

Mathematical Computations (1965)

I. Fisher

The theory of interest

(1930)

G. Fishman

Spectral methods in econometrics

(1969)

M. Friedman

A theory of the consumption function

(1957)

J.F. Geweke

Employment turnover and wage dynamics in U.S. manufacturing

J.F. Geweke

The dynamic factor analysis of economic time series models

A.S. Goldberger

## Structural equation methods in the social sciences

Econometrica (1972)



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Cited by (11)

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### Structural econometric modeling and time series analysis

1986, Applied Mathematics and Computation

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1983, Journal of Economic Dynamics and Control

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