

# Cointegrated Vector Autoregressive Processes with Continuous Structural Changes

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Antti Ripatti – Pentti Saikkonen



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In the empirical part of the paper we analyze a data set of four Finnish interest rates. The same data were previously used by Luukkonen, Ripatti and Saikkonen (1999) who found two cointegrating vectors instead of the expected three. Here we show that this unexpected finding can be attributed to a known structural





such that its power series representation converges absolutely in an open disk containing the unit disk. Of the four terms on the right hand side of (2.8) only the

restricted as  $0 < c_1 \leq \gamma \leq c_2 < \infty$  and  $0 < c_3 \leq \tau \leq c_4$



obvious that parametric tests cannot be obtained without suitable assumptions of the sequence  $g_i(\mu)$  or the function  $g(x; \mu)$ . Our assumptions are fairly general and apply in a number of cases including those discussed in section 2. Partition the parameter vector  $\mu$  into three subvectors as  $\mu = [v' \lambda' \gamma']'$  and assume that for some known value of  $\gamma$ , denoted by





The above discussion also makes clear that our test with  $w_t = t/T$  breaks down if the null model is augmented by a linear trend. This is simply because then the additional regressor  $w_t = t/T$  used in the test already appears in the model. Of course this difficulty could be circumvented by using higher powers  $(t/T)^2$ ,  $(t/T)^3$

that  $\beta' = [I_r \ -A]$





where

$$\begin{bmatrix} \phantom{0} \\ \phantom{0} \end{bmatrix} = \begin{bmatrix} - \\ - \\ 0.186 \end{bmatrix}$$

been quite rapid ( $\gamma$



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