

学位請求論文要旨

ESSAYS ON TESTING FOR STATIONARITY POSSIBLY WITH SEASONALITY AND A STRUCTURAL CHANGE

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The main purpose of this doctoral dissertation is to derive the test statistic for the null hypothesis of stationarity against a unit root and to investigate its asymptotic properties. Since many economic time series are often observed quarterly and then have seasonal patterns, and sometimes a structural change of the series is detected, we should carefully construct the testing procedures taking such properties of the series into account. The construction of the dissertation is as follows:

Chapter 1. Introduction: Brief Reviews of Testing for Seasonal Unit Roots, Testing for a Periodic Unit Root, and Testing for a Unit Root against Stationarity with a Break.

Chapter 2. The Limiting Properties of Seasonal and/or Non-Seasonal Unit Roots Tests.

Chapter 3. Testing for Periodic Stationarity.

Chapter 4. Testing for Stationarity with a Break.

Chapter 1 briefly reviews three testing problems: Testing for seasonal unit roots, testing for a periodic unit root, and testing for a unit root with a trend break. We will suppose in later chapters the null hypothesis in reversed direction compared with the above problems, that is, we will fundamentally assume the null of stationarity. Since our tests in later chapters and the above three tests compliment each other, it is necessary to understand the above three testing problems.

In Chapter 2, we investigate unit roots tests with the quarterly seasonal model, extending the model of Kwiatkowski, Phillips, Schmidt and Shin (1992). We derive the LM test statistic, which is slightly different from that of Canova and Hansen (1995) and Caner (1998), for the null hypothesis of stationarity against the alternative hypothesis of nonstationarity with seasonal and/or non-seasonal unit roots. We develop the asymptotic theory of this statistic under both the null and the alternative. We also investigate the test against the alternative of nonstationarity, not specifying particular unit roots.

In Chapter 3, we investigate the test for the null hypothesis of periodic stationarity

against the alternative hypothesis of periodic integration. We derive the limiting distribution of the test statistic and its characteristic function, which is used to tabulate the percent points of the limiting distribution by numerical integration. We find that some parameters, which we have to assume under the alternative, have an important role on the limiting power and we should carefully choose such parameters. The Monte Carlo simulation reveals that the test has the reasonable power but also is affected by the lag truncation parameter which is used for the nuisance parameter correction.

In Chapter 4, we investigate the test for the null hypothesis of stationarity with a structural change against a unit root. We derive the limiting distribution of the LM test statistic and its characteristic function under a sequence of local alternatives. We also propose the test statistic which does not depend on the fraction of a break date to the sample size. Applying our tests to the Nelson-Plosser data, we find that for some macroeconomic time series, for which the tests proposed by Perron (1997) and Zivot and Andrews (1992) reject the null of a unit root, our tests accept the null of stationarity with a break.