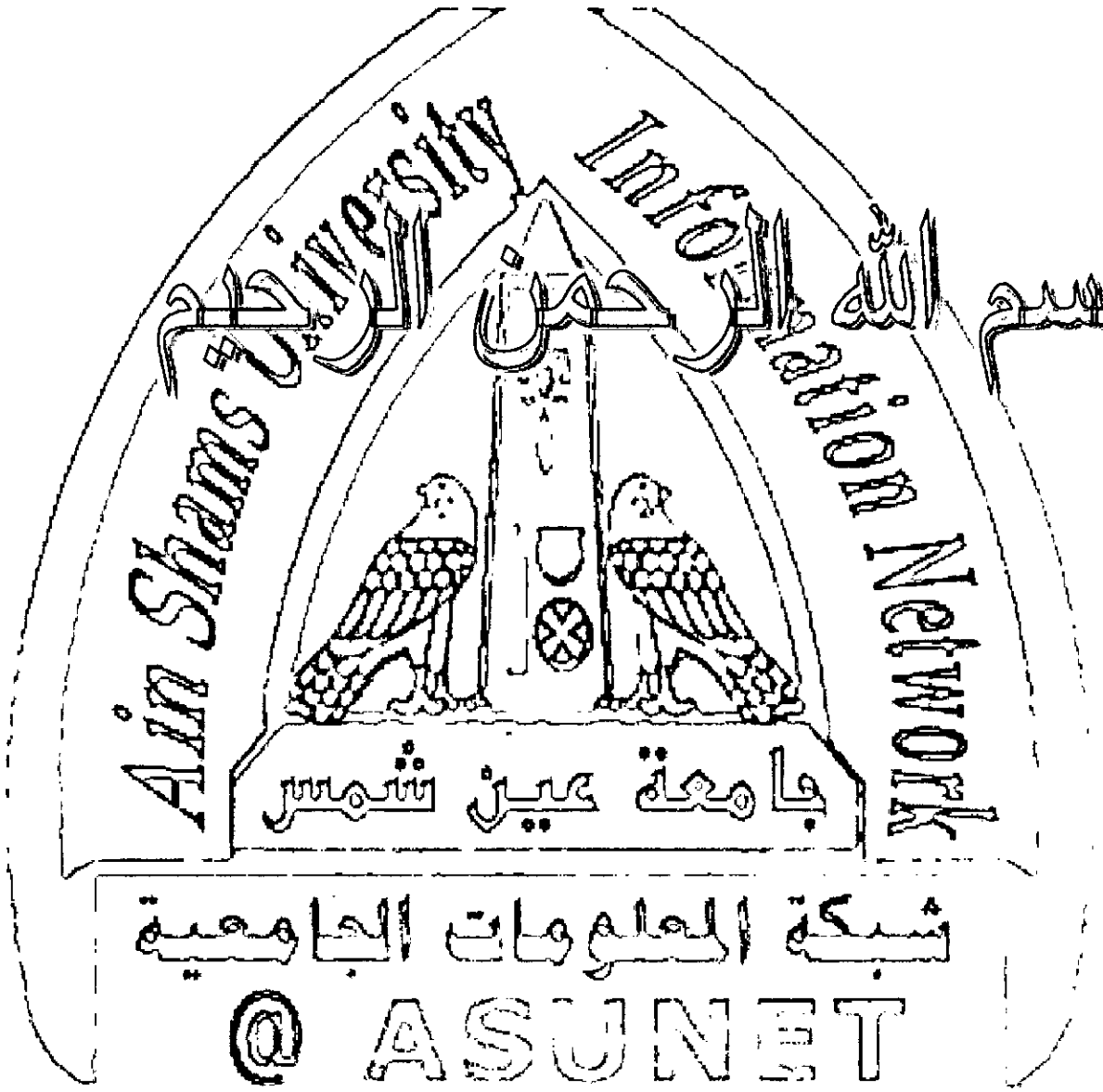
شبكة المعلومات الجامعية



شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

شبكة المعلومات الجامعية

جامعة عين شمس

التوثيق الالكتروني والميكروفيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأفلام قد أعدت دون أية تغيرات

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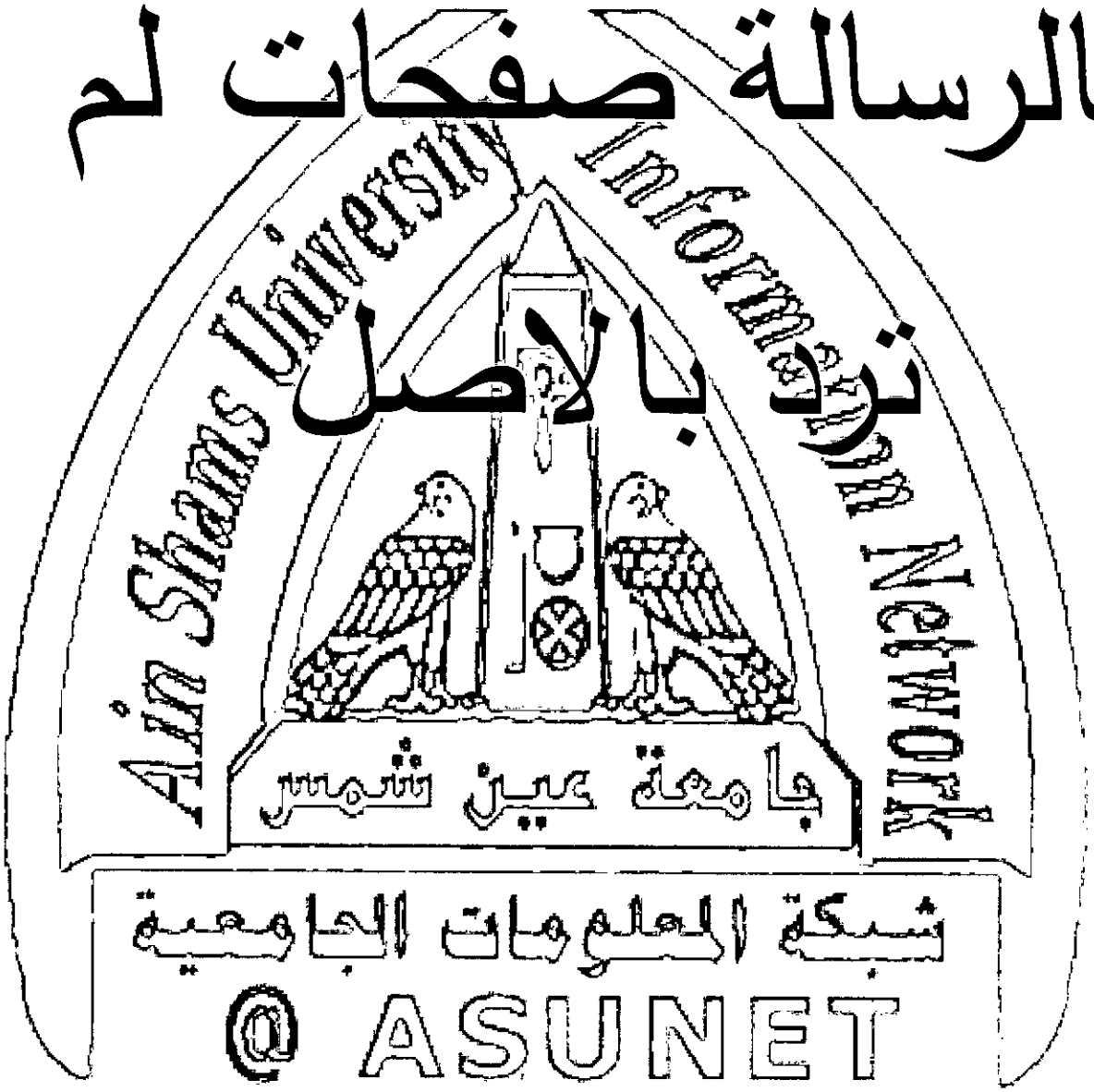

CAIRO UNIVERSITY
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SOME ASPECTS OF STATISTICAL INFERENCE IN COINTEGRATING RELATIONS

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SOME ASPECTS OF STATISTICAL INFERENCE IN COINTEGRATING RELATIONS

By

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Certification

I certify that this work has not been accepted in substance for any academic degree and is not being concurrently submitted in Candidature for any other degree.

Any portions of this thesis for which I am indebted to other sources are mentioned and explicit references are given.

The Student: .....

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CONTENTS

SUMMARY

The analysis of nonstationary time series, unit roots and cointegration has developed dramatically over the last 30 years. The papers presented during this period variously describe new methods of estimating cointegrating relations, and testing for cointegration.

It is now over 30 years since the landmark paper by Engle and Graner (1987) on cointegration. This paper brought the concept to the attention of most economists beside the specialized econometricians. It seemed then that to estimate a cointegrating relationship all one need to know was how to carry out a simple regression using ordinary least squares OLS one could always appeal to the super-consistency results to support one's technique. However, the paper appeared before 1987, many econometricians were finding problems with simple OLS with integrated processes (Philips and Durlauf, 1986) and were beginning to put forward alternative estimators.

A number of problems exist with OLS. Firstly, there are difficulties if one tries to estimate accurately a "long-run" relationship with only a small sample over a short time period. Furthermore, while the OLS estimator may be super consistent, i.e., of order (1/T) instead of the usual (1/ $\sqrt{T}$), it can be biased in finite samples. The distribution is not symmetric, because of a unit root term within it, plus there is additional bias created not necessarily by a contemporaneous covariation but rather a "long-run" covariation between the regressors, X, and the

error term, u. This "long term" covariation is defined as the sum of all the covariances of X_{t-k} with u_t for k=0 to infinite. Because of the analogy with the standard assumption that $Cov(x_t,u_t)\neq 0$ in normal OLS, this bias is sometimes referred to a simultaneity or endogeeity bias, X.

Given these problems with OLS many alternative estimators have emerged among the many estimators for long- run coefficients .

The concept of cointegration was first introduced by Granger (1981) and elaborated further by Engle and Granger (1987), Engle and Yoo (1987, 1991), Phillips and Ouliaris (1990), Stock and Watson (1988), Phillips and Loretan (1991) and Johansen (1988, 1991, 1994), among others. Working in the context of a bivariate system with at most one cointegrating vector, Engle and Granger (1987) propose to estimate the cointegrating vector $\xi = (1,\xi_2)^T$ by regressing the first component $z_{1,t}$ of z_t on the second component $z_{2,t}$ using OLS (which is called the cointegrating regression), and then testing whether the OLS residuals of this regression have a unit root, using the Augmented Dickey-Fuller (ADF) test.

In the literature on cointegrated time series, hypothesis tests developed for testing for cointegration have a null hypothesis of "NO COINTEGRATION". Such tests can be found in Engle and Granger (1987), Phillips and Ouliaris (1990). However, there would seem to be some merit in constructing a test of the null hypothesis of "COINTEGRATIION".

If we were to use the Standard Dickey-Fuller tests of the null hypothesis of cointegration, then we are implicitly saying that we believe the variables are NOT COINTEGRATED unless the data can, convincingly demonstrate otherwise.

Instead, if we suggest a test of the null hypothesis of cointegration, so that we will believe the variables to be COINTEGRATED unless the data can strongly convince us otherwise. Such an approach may prove to be useful.

The major objectives of this thesis are:

- To perform a comparative study of different methods of estimating cointegration and this will be done via Mont Carlo simulation.
- To show that the Ordinary Least Squares Estimator may not be too hazardous for testing the cointegration relation for the models with drift.
- To use the small σ approximate to drive the bias to order $O(\sigma^2)$, and the mean square error (MSE) to order $O(\sigma^4)$ of the ordinary least squares (OLS) estimator of cointegrating coefficient .

The thesis contains five chapters. After the introduction in chapter one,

Chapter (2) introduces a brief introduction to the Wiener process, the Functional Central Limit Theorem (FCLT), Continuous Mapping Theorem (CMT) , and some applications of the above three tools. Also to models of non stationary Time Series and their estimation and inference will be discussed. Finally this chapter ended with the concepts of Spurious Regressions, and the "Error Correction Models (ECM).

In Chapter (3) the concept of cointegration is introduced with its different extensions. Three theorems which considered as the backbone of the Mathematical Analysis of cointegration models are introduced. Finally the existence and the nature of long-run relations are investigated using cointegration technique.

The main contributions of this thesis are given in chapters four and five.

In chapter (4), Monte-Carlo simulation experiment is used to compare between the six estimators of cointegrating relations (Ordinary Least Squares , Augmented Ordinary Least Squares , Fully Modified estimator , Three Step estimator , Vector autoregressive Maximum likelihood estimator , And Box Tiao).

Finally in Chapter (5) the model, assumptions, and cointegration Estimator, matrix formulation of the sampling error are introduced with its proof.