

New Zealand Economic Papers >

Volume 44, 2010 - [Issue 1](#)

112 | 21 | 3  
Views | CrossRef citations to date | Altmetric

Research articles

# Two New Zealand pioneer econometricians

Peter C.B. Phillips 

Pages 1-26 | Published online: 22 Mar 2010

 Cite this article  <https://doi.org/10.1080/00779951003614057>

Sample our  
Economics, Finance,  
Business & Industry Journals  
>> [Sign in here](#) to start your access  
to the latest two volumes for 14 days

 Full Article  Figures & data  References  Citations  Metrics

 Reprints & Permissions [Read this article](#) [Share](#)

## Abstract

Two distinguished New Zealanders pioneered some of the foundations of modern econometrics. Alec Aitken, one of the most famous and well-documented mental arithmeticians of all time, contributed the matrix formulation and projection geometry of linear regression, generalized least squares (GLS) estimation, algorithms for Hodrick Prescott (HP) style data smoothing (six decades before their use in economics), and statistical estimation theory leading to the Cramér Rao bound. Rex Bergstrom constructed and estimated by limited information maximum likelihood (LIML) the largest empirical structural model in the early 1950s, opened up the field of exact distribution theory, developed cyclical growth models in economic theory, and spent nearly 40 years of his life developing the theory of continuous time econometric modeling and its empirical application. We provide an overview of their lives, discuss some of their accomplishments, and develop some new econometric theory that connects with their foundational work.

Keywords:

Aitken

Cramér Rao bound

HP filter

minimum variance unbiased estimation

projection

GLS

Bergstrom

continuous time

exact distribution

LIML

UK economy

pioneers of econometrics

---

## Acknowledgements

This paper was presented in July 2009 at the New Zealand Association of Economists Conference, Wellington. Thanks are due to Olav Bjerkholt and Deborah Blood for helpful comments on the original version. This research was supported by the NSF under Grant No. SES 06-47086.

---

## Notes

1. The matrix treatment of correlation and scatter analysis was originally promoted by Frisch (1929).
  2. The Guinness book of records and internet list some astonishing recently recorded feats of memory and mental arithmetic of the same genre as those demonstrated by Aitken. Daniel Tammet (an autistic savant) is said to have recited  $\pi$  to 22,514 digits in 5 hours 9 minutes; Shakuntala Devi, known as the human computer in India, multiplied two 13 random digit numbers (picked by the computer science department at Imperial College) in 28 seconds in 1980 (a feat mentioned in the Guinness book of records, 1995, p. 26). One of the famous Chinese Kaohsiung siblings, Wang Chia-lu, multiplied two 13 digit numbers in 26.51 seconds in 2000. Alexis Lemaire (who, at the time of writing, is a PhD student in artificial intelligence) found the 13th root of a random 200 digit number in 70 seconds at the London Science Museum.
  3. This paper is usually cited as Whittaker (1923), but in the journal records on Cambridge Online Vol. 41 is listed as appearing in February 1922. At the head of the article itself, it is recorded that it was 'received in amended form' in August 1923.
-

# Additional information

## Notes on contributors

Peter C.B. Phillips

This is a solicited article based on the keynote speech delivered by the author at the New Zealand Association of Economists Conference held at Wellington, New Zealand in June 2009.

---

## Related research

Recommended articles

Cited by  
21

## Information for

[Authors](#)

[R&D professionals](#)

[Editors](#)

[Librarians](#)

[Societies](#)

## Opportunities

[Reprints and e-prints](#)

[Advertising solutions](#)

[Accelerated publication](#)

[Corporate access solutions](#)

## Open access

[Overview](#)

[Open journals](#)

[Open Select](#)

[Dove Medical Press](#)

[F1000Research](#)

## Help and information

[Help and contact](#)

[Newsroom](#)

[All journals](#)

[Books](#)

## Keep up to date

Register to receive personalised research and resources by email

 [Sign me up](#)



[Copyright © 2026](#) [Informa UK Limited](#) [Privacy policy](#) [Cookies](#) [Terms & conditions](#)

[Accessibility](#)

 Taylor and Francis Group

Registered in England & Wales No. 01072954  
5 Howick Place | London | SW1P 1WG