Regression and factor analysis applied in econometrics

J. H. F. SCHILDERINCK
Tilburg School of Economics,
Social Sciences and Law,
the Netherlands

Second edition

Technische Hochschule Darmstadt
Inv. Nr. F8 95
Fachgebiet für
Statistik und Ökonometrie

Martinus Nijhoff Social Sciences Division
Leiden 1978

Contents

PREFACE / V

1. Some theoretical and statistical aspects of a linear econometric model / 1

1.1 Motivation for the use of a model / 1
1.2. Definition of a model / 2
1.3. The linear econometric model / 3
1.4. The variables / 6
1.5. The general form of a single equation linear econometric model / 8
1.5.1. Ordinary least squares (O.L.S.) / 9
1.5.2. Generalized least squares (G.L.S.) / 13
1.6. The general form of a simultaneous linear econometric model / 15
1.6.1. The formulation of a simultaneous linear econometric model / 16
1.6.2. Two stage least squares / 23
1.6.3. Three stage least squares / 35
1.7. Statistics for a single equation linear econometric model / 40
1.7.1. The adjusted correlation coefficient / 40
1.7.2. The relative variance-share coefficient / 43
1.7.3. The t-test / 44
1.7.4. Tests on multicollinearity / 47
1.7.5. Tests on autocorrelation / 51

2. Factor analysis as a method of economic research / 59

2.1. Motivation for the use of factor analysis / 59
2.2. Aim of factor analysis / 62

2.3. Regression analysis versus factor analysis / 64
2.4. Normalization of variables / 67
2.5. The model of factor analysis / 70
2.6. The solution of the factor analysis model / 77
2.6.1. The geometric approach / 77
2.6.2. The algebraic approach / 82
2.7. The interpretation of the commonfactor coefficients / 98
2.8. Factor rotation / 101

3. Structure of the model / 114

3.1. The structure of expenditure in the Dutch economy in the pre-war and post-war period / 114
3.2. The structure of the model / 134
3.3. The consumption equation / 142
3.4. The investment equation / 165
3.5. The inventory equation / 172
3.6. The export equation / 175
3.7. The import equation / 185
3.8. The employment and unemployment equation / 187
3.9. The price equations / 189

4. Some applications of factor analysis / 196

4.1. A factor analytical comparison of each variable in the whole of variables / 196
4.2. Investments / 202
4.2.1. The relation between investment and financing variables / 202
4.2.2. The relation between investment and final expenditure / 213
4.3. Consumption / 220
4.4. Government expenditure / 227

BIBLIOGRAPHY / 236