Chapter D

Statistical Specifications and Supplementary Results

D.1 Overview

This appendix collects the principal statistical equations underlying the empirical results reported in Chapters 35, 36, and 37.

The equations are repeated here for technical reference.

D.2 Industry Heterogeneity

For each core proxy X_{it}, the industry specification is

$$X_{it} = \alpha + \sum_{g=2}^{G} \gamma_g Industry_{ig} + \sum_{t=2}^{T} \delta_t Year_t + \varepsilon_{it}.$$

The null hypothesis is

$$H_0 : \gamma_2 = \gamma_3 = \cdots = \gamma_G = 0.$$

Joint significance is evaluated using a Wald test.

The final analysis rejects the joint null for all six core proxies.

Thus,

$$\boxed{6/6}$$

core proxies exhibit statistically significant industry heterogeneity.

D.3 Persistence

For each core proxy,

$$X_{it} = \alpha + \beta X_{i,t-1} + \sum_t \delta_t Year_t + \varepsilon_{it}.$$

The principal parameter is

$$\beta.$$

Five of the six core proxies display statistically significant persistence.

The principal exception is accrual intensity, which is substantially more time-varying.

D.4 Within-Between Decomposition

Each proxy can be represented as

$$X_{it} = \bar{X}_i + \left(X_{it} - \bar{X}_i\right).$$

The first component captures the firm's persistent average.

The second captures within-firm deviations.

A diagnostic ratio is

$$WTR_j = \frac{\sigma_{Within,j}}{\sigma_{Total,j}}.$$

Low values indicate predominantly structural variation.

High values indicate greater within-firm movement.

The contrast between goodwill intensity and accrual intensity is particularly strong:

$$WTR_{GWINT} \approx 0.126,$$

while

$$WTR_{ACCRUALINT} \approx 0.734.$$

D.5 Recognition Specification

The pooled Recognition model is

$$GWINT_{it} = \alpha + \beta_R RDINT_{it} + \boldsymbol{\theta}' \mathbf{C}_{it} + \boldsymbol{\gamma}' Industry_i + \boldsymbol{\delta}' Year_t + \varepsilon_{it}.$$

The estimated pooled coefficient is approximately

$$\hat{\beta}_R = -1.681.$$

The relationship is statistically significant.

The corresponding firm-fixed-effect specification is

$$GWINT_{it} = \alpha_i + \beta_R^{FE} RDINT_{it} + \boldsymbol{\theta}' \mathbf{C}_{it} + \boldsymbol{\delta}' Year_t + \varepsilon_{it}.$$

The fixed-effect coefficient is approximately

$$\hat{\beta}_R^{FE} = 0.098,$$

and is not statistically significant.

The Recognition relationship is therefore interpreted as predominantly between-firm and structural.

D.6 Measurement Specification

The pooled Measurement model is

$$ACCDEPINT_{it} = \alpha + \beta_M PPEINT_{it} + \boldsymbol{\theta}' \mathbf{C}_{it} + \boldsymbol{\gamma}' Industry_i + \boldsymbol{\delta}' Year_t + \varepsilon_{it}.$$

The estimated pooled coefficient is approximately

$$\hat{\beta}_M = -0.691.$$

The firm-fixed-effect specification is

$$ACCDEPINT_{it} = \alpha_i + \beta_M^{FE} PPEINT_{it} + \boldsymbol{\theta}' \mathbf{C}_{it} + \boldsymbol{\delta}' Year_t + \varepsilon_{it}.$$

The estimate remains statistically significant:

$$\hat{\beta}_M^{FE} \approx -0.674.$$

The Measurement dimension therefore contains both persistent structure and within-firm dynamics.

D.7 Timing Specification

The pooled Timing model is

$$DTINT_{it} = \alpha + \beta_T ACCRUALINT_{it} + \boldsymbol{\theta}'\mathbf{C}_{it} + \boldsymbol{\gamma}' Industry_i + \boldsymbol{\delta}' Year_t + \varepsilon_{it}.$$

The estimated coefficient is approximately

$$\hat{\beta}_T = -0.0276,$$

and is statistically insignificant.

The corresponding firm-fixed-effect coefficient is also insignificant.

The result supports a decomposition of Timing into distinct mechanisms:

$$\boxed{Timing = Operating\ Timing + Tax\ Timing.}$$

D.8 Return-on-Assets Models

For each core proxy X_j, the principal profitability specification is

$$ROA_{it} = \alpha + \beta_j X_{j,it} + \boldsymbol{\theta}'\mathbf{C}_{it} + \boldsymbol{\gamma}' Industry_i + \boldsymbol{\delta}' Year_t + \varepsilon_{it}.$$

The principal controls are

$$SIZE, \quad EQUITY\_RATIO, \quad ASSET\_GROWTH.$$

The baseline single-proxy models identify statistically significant negative associations for

$$GWINT$$

and

$$DTINT.$$

The approximate goodwill coefficient is

$$\hat{\beta}_{GWINT} = -0.1166,$$

while the deferred-tax coefficient is approximately

$$\hat{\beta}_{DTINT} = -0.482.$$

These models are associational.

They do not establish causal effects.

D.9 Restricted Multivariate ROA Model

The robustness specification includes all six core proxies:

$$\begin{aligned} ROA_{it} = \alpha &+ \beta_1 RDINT_{it} + \beta_2 GWINT_{it} \\ &+ \beta_3 PPEINT_{it} + \beta_4 ACCDEPINT_{it} \\ &+ \beta_5 ACCRUALINT_{it} + \beta_6 DTINT_{it} \\ &+ \boldsymbol{\theta}'\mathbf{C}_{it} + \boldsymbol{\gamma}' Industry_i \\ &+ \boldsymbol{\delta}' Year_t + \varepsilon_{it}. \end{aligned}$$

The complete-case sample contains

$$N = 103$$

firm-year observations across

$$23$$

firms.

The statistically significant Accounting Bias proxy coefficients in this restricted model are approximately

$$\hat{\beta}_{GWINT} = -0.277,$$

$$\hat{\beta}_{ACCRUALINT} = -0.529,$$

and

$$\hat{\beta}_{DTINT} = -0.287.$$

Because complete-case requirements materially change the sample composition, this specification is treated as a robustness analysis rather than the principal profitability test.

D.10 Principal Component Analysis

The cross-dimensional PCA uses

$$GWINT, \quad PPEINT, \quad ACCDEPINT,$$
$$ACCRUALINT, \quad DTINT.$$

The complete sample is

$$N = 141.$$

The first three components explain approximately

$$45.0\%,$$

$$21.3\%,$$

and

$$17.3\%$$

of standardized variance respectively.
Thus,

$$PC1 + PC2 = 66.3\%,$$

and

$$PC1 + PC2 + PC3 = 83.5\%.$$

The first component does not display a simple loading structure that can be interpreted as a universal Accounting Bias scale.

It is more naturally interpreted as a broad accounting and business-model configuration axis.

PCA is therefore retained as a structural diagnostic rather than used to construct the principal empirical Accounting Bias measure.

D.11 Clustered Standard Errors

The main regression models use standard errors clustered at the firm level.

This permits

$$Cov\left(\varepsilon_{it}, \varepsilon_{is}\right) \neq 0$$

for different years t and s belonging to the same firm.

The adjustment is appropriate because the dataset contains repeated observations for each company.

D.12 Interpretive Limits

The statistical tests identify

- structure;
- persistence;
- conditional association;
- within-firm co-movement.

They do not directly identify

$$A_{it} - E_{it}.$$

Nor do they imply that significant coefficients represent causal effects. The empirical conclusions should therefore be expressed in terms of

exposure,

association,

structure,

and

dynamics,

rather than direct measurement of economic misstatement.

D.13 Final Empirical Interpretation

The supplementary evidence supports the representation

$$\boxed{\begin{aligned} Accounting\ Bias = [\, &Recognition,\ Measurement,\\ &Timing,\ Estimation\,]. \end{aligned}}$$

with different dimensions exhibiting different combinations of persistent and time-varying behavior.

A useful empirical abstraction is

$$X_{it}^{d} = S_{i}^{d} + D_{it}^{d},$$

where d denotes the accounting mechanism, S_{i}^{d} its structural component, and D_{it}^{d} its dynamic component.

The evidence suggests that Recognition is predominantly structural, Measurement contains both components, and accrual-based Timing is relatively dynamic.

Accordingly, the final empirical framework favors Accounting Bias *profiles* over a mechanically aggregated Accounting Bias ranking.