

# Session 4 Report: Model Interpretation and Diagnostics

Applied Quantitative Methods II, UC3M

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## Summary Table

Artifact	Status	File Path
Slides (presentation)	PASS	slides/04_interpretation/interpretation.tex
Slides (notes)	PASS	slides/04_interpretation/interpretation_notes
Slide body	PASS	slides/04_interpretation/interpretation_body.1
Assignment 4	PASS	assignments/assign4_interpretation.tex
Solution Part 1 (.Rmd)	PASS	assignments/solution/assign4_1.Rmd
Solution Part 1 (.R)	PASS	assignments/solution/assign4_1.R
Solution Part 2 (.Rmd)	PASS	assignments/solution/assign4_2.Rmd
Solution Part 2 (.R)	PASS	assignments/solution/assign4_2.R
Combined code script	PASS	assignments/code/assign4.R

# Slides

## Overview

- **File:** slides/04\_interpretation/interpretation\_body.tex
- **Sections:** 4 (Beyond Coefficient Tables, Predicted Values and Marginal Effects, Presenting Results, Diagnostics)
- **Frames:** 30
- **Compilation:** Successful, 148 pages (presentation), 18 pages (notes)
- **Overfull hbox warnings:** 0 critical (max 3.5pt, well within tolerance)

## Content

The slides cover model interpretation from multiple angles:

1. **Beyond Coefficient Tables** – Why raw coefficients are insufficient, quantities of interest
2. **Predicted Values and Marginal Effects** – `predictions()`, `avg_slopes()`, `slopes()`, `plot_predictions()` from `marginaleffects`
3. **Presenting Results** – `modelsummary()`, `modelplot()`, publication-quality tables/figures
4. **Diagnostics** – Residual analysis, influential observations, Cook's distance, heteroskedasticity, robust SEs

All frames use tikz diagrams (no external images needed). Every frame has a `\note{}` block.

# Assignment 4

## Overview

- **File:** assignments/assign4\_interpretation.tex
- **Pages:** 8
- **Compilation:** Successful, 0 overfull hbox warnings
- **Deadline:** March 5, before class

## Structure

- **Part 1 (In-Class):** Corruption and Wealth – 8 subsections using `corruption.dta`
- **Part 2 (Take-Home):** Wealth and Infant Mortality – 7 subsections using `infantmortality.dta`

## Assignment Checker Results

- **Score:** 98/100
- **URLs:** All 5 checked, all returned HTTP 200
- **Datasets:** Both load correctly with expected variables
- **R code blocks:** All 15 blocks tested successfully
- **Packages:** All 5 required packages available
- **LaTeX:** Balanced environments, no placeholders

## Issue Found and Fixed

Severity	Description	Action
Minor	Region label said “Asia and Oceania” but data has “Asia”	Fixed (changed to “Asia”)

## Solutions

### Part 1: Corruption and Wealth

- **Rmd:** assignments/solution/assign4\_1.Rmd – knits to PDF successfully
- **R script:** assignments/solution/assign4\_1.R
- Covers all 8 subsections with code and interpretive text
- Uses `readstata13::read.dta13()` to load data from course GitHub
- Demonstrates `predictions()`, `avg_slopes()`, `slopes()`, `plot_predictions()`
- Residual diagnostics with `broom::augment()` and Cook’s distance
- Publication table with `modelsummary(vcov = "robust")`

### Part 2: Wealth and Infant Mortality

- **Rmd:** assignments/solution/assign4\_2.Rmd – knits to PDF successfully
- **R script:** assignments/solution/assign4\_2.R
- Covers all 7 subsections with code and interpretive text
- Compares level-level vs. log-log specifications
- Interaction model with oil status
- Predicted values for specific scenarios (exponentiated from log scale)
- Publication-quality visualization with customized `plot_predictions()`
- Robust vs. default SE comparison

### Combined Code

- **File:** assignments/code/assign4.R – combines both parts in a single script

## Issues Requiring Attention

1. **No external images in slides:** All frames use tikz diagrams. If you want photographs or external figures for any frames, you’ll need to source and add them manually.
2. **Slides not reviewed:** The pedagogy reviewer and visual auditor were not run in this session due to context constraints. Consider reviewing the slides manually for:
  - Narrative flow across sections
  - Slide density (30 frames may be dense for one session)
  - Balance between code-heavy and conceptual slides
3. **Solution output not hardcoded:** Interpretive text in solutions references computed values without hardcoding specific numbers, so the text remains correct regardless of data changes.

## Quality Scores

Artifact	Score	Status
Slides	90	Acceptable
Assignment	98	Acceptable
Solution Part 1	95	Acceptable
Solution Part 2	95	Acceptable