Generating LaTeX PDFs with Claude Code

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Abstract

Claude Code can generate, compile, and iterate on LaTeX documents entirely from the **Code section of the Claude mobile app**—no laptop, no terminal, no IDE required. This document, its `.tex` source, and the accompanying blog post were all produced this way—through a few prompts and some back-and-forth iteration, from a porch swing on a sunny Seattle day. The workflow is illustrated with a set of canonical econometric estimators.

1 The Mobile-First Workflow

The Claude mobile app includes a **Code** tab that runs a full Claude Code agent in the cloud with shell access, package installation, and Git integration—everything available in a local terminal, from your phone or tablet. The core loop is:

1. Open the Code section of the Claude mobile app and connect it to your repository.
2. Ask Claude to write a `.tex` file for whatever you need.
3. Claude calls `pdflatex` (or `xelatex`) via its Bash tool to compile the document and checks the log for errors.
4. Review the PDF, ask for revisions, and Claude iterates—all without leaving the app.

Because the Code agent has full shell access it can install missing packages via `tlmgr` or `apt`, fix compilation errors by reading the log, and place the finished PDF anywhere in your repository—including linking to it from a website.

2 Why This Is Useful for Economists

Writing econometric papers involves a lot of repetitive LaTeX: regression tables, equation environments, theorem/proof pairs, TikZ diagrams. Claude Code can:

- Transcribe a hand-written estimator into a clean `align` environment.
- Generate `estout` or `stargazer` tables directly from Python, R or even Stata output.
- Produce a full article skeleton (front matter, sections, bibliography) from a one-sentence description.
- Rebuild a document after you change a package or switch between `pdflatex` and `lualatex`.

3 Canonical Econometric Estimators

The examples below represent the estimators an applied economist encounters most often. Each was typeset by Claude Code in a single pass.

3.1 Ordinary Least Squares

The OLS estimator minimises the sum of squared residuals:

$$\hat{\beta}_{\text{OLS}} = \arg\min_{\beta} (y - X\beta)^\top (y - X\beta) = (X^\top X)^{-1} X^\top y.$$

Under the Gauss–Markov assumptions it is BLUE. Its sampling variance is

$$\text{Var}(\hat{\beta}_{\text{OLS}} \mid X) = \sigma^2 (X^\top X)^{-1}.$$

3.2 Instrumental Variables / Two-Stage Least Squares

When $\text{Cov}(X, \varepsilon) \neq 0$ we need instruments Z satisfying relevance ($Z^\top X \neq 0$) and exogeneity ($\text{Cov}(Z, \varepsilon) = 0$). The 2SLS estimator is

$$\hat{\beta}_{\text{2SLS}} = \left(X^\top P_Z X\right)^{-1} X^\top P_Z y, \qquad P_Z = Z(Z^\top Z)^{-1} Z^\top.$$

With a single instrument this collapses to the Wald estimator:

$$\hat{\beta}_{\text{IV}} = \frac{\text{Cov}(Z, y)}{\text{Cov}(Z, X)} = \frac{\bar{y}_1 - \bar{y}_0}{\bar{X}_1 - \bar{X}_0}.$$

3.3 Difference-in-Differences

The two-way fixed-effects DiD regression is

$$Y_{it} = \alpha + \tau D_{it} + \gamma_i + \delta_t + \varepsilon_{it},$$

where γ_i are unit fixed effects, δ_t are time fixed effects, and D_{it} is the treatment indicator. Under parallel trends, $\hat{\tau}_{\text{DiD}}$ identifies the average treatment effect on the treated (ATT).

With staggered adoption (Callaway & Sant'Anna 2021) the ATT for cohort g at time t is

$$\text{ATT}(g, t) = \mathbb{E}\left[Y_t(g) - Y_t(0) \mid G = g\right],$$

and the aggregate ATT aggregates over (g, t) pairs with appropriate weights.

3.4 Regression Discontinuity

The sharp RD estimand is the local average treatment effect at the cutoff c:

$$\tau_{\text{RD}} = \lim_{x \downarrow c} \mathbb{E}[Y \mid X = x] - \lim_{x \uparrow c} \mathbb{E}[Y \mid X = x].$$

A local-linear estimator with bandwidth h solves

$$\min_{\alpha_\ell, \beta_\ell, \alpha_r, \beta_r} \sum_i K\left(\frac{X_i - c}{h}\right) \left[Y_i - \alpha_{s(i)} - \beta_{s(i)}(X_i - c)\right]^2,$$

where $s(i) \in \{\ell, r\}$ indicates the side of the cutoff and $K(\cdot)$ is a kernel function (commonly triangular).

3.5 Panel Fixed Effects and the Within Estimator

For panel data the fixed-effects model is

$$y_{it} = X_{it}^\top \beta + \alpha_i + \varepsilon_{it}.$$

Demeaning within units eliminates α_i:

$$\ddot{y}_{it} = \ddot{X}_{it}^\top \beta + \ddot{\varepsilon}_{it}, \quad \ddot{y}_{it} \equiv y_{it} - \bar{y}_i.$$

The within estimator $\hat{\beta}_{\text{FE}} = (\ddot{X}^\top \ddot{X})^{-1} \ddot{X}^\top \ddot{y}$ is numerically equivalent to including unit dummies.

3.6 Generalised Method of Moments

GMM minimises the weighted distance of moment conditions $g(\theta) = \frac{1}{n} \sum_i m(W_i; \theta)$:

$$\hat{\theta}_{\text{GMM}} = \arg\min_\theta \; g(\theta)^\top W \, g(\theta).$$

The efficient (two-step) GMM sets $W = S^{-1}$ where $S = \operatorname{Var}\big(\sqrt{n}\, g(\theta_0)\big)$ is the long-run variance of the moments. The asymptotic distribution is

$$\sqrt{n}\,(\hat{\theta} - \theta_0) \xrightarrow{d} \mathcal{N}\Big(0,\ (G^\top S^{-1} G)^{-1}\Big), \quad G = \mathbb{E}\left[\frac{\partial m}{\partial \theta^\top}\right].$$

4 Practical Tips

Use the Claude mobile app's Code tab. Everything in this document was produced from the Code section of the Claude mobile app—the blog post, this `.tex` file, and this PDF—without a laptop or local terminal.

Be explicit about packages. Tell Claude which LaTeX packages you want to use (`amsmath`, `booktabs`, `pgfplots`, etc.). Claude will use them and install them if missing.

Ask for iterative compilation. A good prompt ends with "compile and fix any errors." Claude will read the `.log` and revise until the build is clean.

Commit both `.tex` and `.pdf`. The source is the authoritative record; the compiled PDF lets others read without a LaTeX install.

Use `latexmk` for multi-pass documents. Bibliographies and cross-references need multiple runs. Ask Claude to use `latexmk -pdf` instead of bare `pdflatex`.