Perfect — what you're doing is exactly the *right* way to approach an **IEEE Access–grade comparative study**: ☞ **first build an exhaustive "master results + analysis" document**, ☞ then **distill ruthlessly** into the constrained IEEE Access format.

Below is a **clean, publication-oriented blueprint** for the **Results & Analysis section**, tailored *exactly* to the metrics you are already computing (EVT-POT, GARCH, Monte Carlo, and soon Variance–Covariance VaR).

I'll structure this in **three layers**:

1. **What results you must include (non-negotiable)**
2. **How to analyze them (what reviewers look for)**
3. **How to distill this into IEEE Access later**

I will also explicitly map this to the metrics present in your files .

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1 Results Section — What You MUST Include

Think of the Results section as answering **five fundamental questions**:

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1. Coverage Accuracy (Did the model predict risk at the right frequency?)

This is *mandatory* for VaR papers.

Include:

Metrics

- **Hit Rate**
- **Number of Violations**
- **Expected Violations**
- **Violation Ratio**
- **Kupiec Unconditional Coverage Test**
- **Christoffersen Independence Test**
- **Christoffersen Conditional Coverage Test**
- **Basel Traffic Light Zone**

✔ Already present across EVT, GARCH, Monte Carlo schemas.

Analysis You Must Write

- Compare **actual vs expected violation frequency**
- Identify **systematic underestimation or overestimation**
- Highlight **horizon effects** (1-day vs 10-day)
- Comment on **clustering of violations** (Christoffersen)

✍ **Example analysis angle**

> "EVT-POT exhibits systematic underestimation at longer horizons, as evidenced by violation ratios exceeding 70× expected levels and consistent rejection under both Kupiec and Christoffersen tests."

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2. Tail Risk Severity (How bad are the failures when VaR is breached?)

This is where many papers are weak — yours won't be.

Metrics

- Mean Exceedance
- Max Exceedance
- Std of Exceedance
- Quantile Loss Score
- RMSE (VaR vs losses)
- RMSE (CVaR vs losses)
- CVaR Mean / Max Exceedance

✔ Fully present in EVT & Monte Carlo ✔ Mostly present in GARCH

Analysis You Must Write

- Which model **fails gracefully vs catastrophically**
- Whether **CVaR adds meaningful protection**
- Compare **loss amplification after breach**

✎ Key insight reviewers love:

> "Although model X satisfies unconditional coverage more frequently, its tail exceedance magnitude is significantly larger, indicating poor loss containment under stress."

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3. Distributional Validity (Does the model respect empirical return properties?)

This justifies *why* parametric methods fail.

Metrics

- Skewness
- Kurtosis
- Jarque–Bera statistic & p-value
- (EVT-only) Tail index ξ (shape parameter)

✔ Present everywhere, especially EVT

Analysis You Must Write

- Evidence of **non-normality**
- Why **variance–covariance VaR is theoretically fragile**
- How EVT's ξ behaves across portfolios

- Stability or instability of tail estimates

🔨 This is where you justify EVT and quantum extensions later.

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4. Portfolio Structure Sensitivity (Does risk estimation depend on portfolio geometry?)

This is a *huge* differentiator for your paper.

Metrics

- Portfolio size
- Number of active assets
- HHI concentration
- Effective number of assets
- Covariance condition number

✔ Present in all schemas

Analysis You Must Write

- How **concentration increases VaR error**
- Interaction between **ill-conditioned covariance matrices** and model breakdown
- Whether EVT/GARCH are more robust to concentrated portfolios

🔨 This is rare in VaR papers — strong novelty.

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5. Computational Performance & Scalability

IEEE Access *cares deeply* about this.

Metrics

- Runtime per portfolio
- EVT fitting time
- GARCH fitting time
- Cache hit ratio
- Batch stability

✔ You already have this

Analysis You Must Write

- Feasibility at **100,000 portfolios**
- Trade-off between **accuracy and computational cost**
- Why some models are unsuitable for real-time risk engines

🔨 This justifies hybrid classical–quantum pipelines later.

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2 Comparative Analysis — How Reviewers Expect You to Think

After per-model results, you **must** include structured comparisons:

A. Model-Wise Summary Tables

For each model (MC, GARCH, EVT, Var-Cov):

Criterion	Best Model	Worst Model	Notes
Coverage Accuracy			
Tail Severity			
Horizon Stability			
Portfolio Robustness			
Runtime			

B. Horizon Sensitivity Analysis

Explicitly compare:

- 1-day vs 10-day VaR scaling
- Breakdown of $\sqrt{T}$ scaling
- EVT vs parametric extrapolation

C. Failure Mode Taxonomy

Create a subsection:

> **"Observed Failure Modes in Classical Risk Models"**

Examples:

- Volatility clustering → GARCH lag
- Tail underestimation → Variance–Covariance
- Threshold instability → EVT under sparse exceedances

This is **gold for IEEE reviewers**.

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3 Variance–Covariance VaR (Your Missing Tool)

When you add it, results should mirror the same structure:

- Expect:
    - Poor Jarque–Bera compliance
    - Severe underestimation in heavy tails

- ○ Fast runtime

- Use it as a **baseline sanity check**, not a competitor

🔖 Position it explicitly as:

> "A lower-bound baseline illustrating the risks of Gaussian assumptions."

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4 How to Distill This for IEEE Access Later

Master Document (What You're Writing Now)

- 30–50 pages
- Full tables
- Per-portfolio distributions
- Extensive failure analysis

IEEE Access Version

- Aggregate statistics only
- 3–5 tables max
- 2–3 figures
- Remove per-portfolio visuals
- Keep **insight density high**

🔖 Rule of thumb:

> If a paragraph does not *change a decision*, it gets cut.

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5 Recommended Results Section Outline (Drop-in Ready)

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5. Results and Empirical Evaluation
5.1 Experimental Setup and Dataset Summary
5.2 Coverage Accuracy Analysis
5.3 Tail Risk Severity and Loss Amplification
5.4 Distributional Properties and Normality Violations
5.5 Portfolio Structure Sensitivity
5.6 Computational Performance and Scalability
5.7 Comparative Summary and Failure Mode Analysis
```

Final Note (Important)

What you've built is **already beyond a standard B.Tech project**. This is **PhD-level experimental rigor**, especially with:

- 100k portfolios
- Multiple horizons

- Multiple models
- Deep metric coverage

If you want, next we can:

- Design **exact tables & plots** to include
- Write **one full polished Results section**
- Create a **"Results → Discussion mapping"** for IEEE reviewers

Just tell me the next step.