MARKOWITZ.SYSTEMS TECHNICAL MONOGRAPH // REPORT NO. MKW-CFO-2026-03
Portfolio Theory for the Agentic Firm: ’Correlation Is the New Headcount’
Mean-Variance, Semivariance, Tobin CML, Ledoit-Wolf Shrinkage & Audit CVaR (2026)
Lineage: Markowitz J. Finance (1952) ´• Monograph 16, Wiley (1959) ´• Nobel 1990 (w/ Miller & Sharpe)
PDF: https://markowitz.systems/papers/markowitz-portfolio-theory-agentic-firm-2026.pdf
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1. THESIS: YOUR AGENTS SHARE ONE BASE MODEL. YOUR RISK DOESN’T DIVERSIFY.
Under equal weights (1/N), equal variance sigma^2, and pairwise correlation rho:
  Var(e_bar) = sigma^2 * [rho + (1 - rho)/N] --> sigma^2 * rho; N_eff = N / (1 + (N-1)rho)
At N=50 and rho=0.60 (Kim et al. arXiv:2506.07962), 50 agents yield N_eff = 1.64 independent
agents (collapsing to 1 only as rho -> 1). mu_i = E[v_i] (expected net value/task);
Sigma_ij = Cov(v_i, v_j) = Cov(e_i, e_j) (if value = const - error).
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2. EXECUTIVE CFO & QUANT ARCHITECTURAL EQUATIONS
  [EQ-01] Markowitz Program: min_w w^T Sigma w s.t. w^T mu = mu*, w^T 1 = 1, w^T c <= B_CFO
  [EQ-04] CAPM Error Beta: e_i = beta_i F_base + eps_i (only eps_i diversifies as 1/N)
  [EQ-05] Tobin CML (Code idealized risk-free leg): sigma_code=0; mu_CML = mu_code + SR_tan*sigma_p
  [EQ-06] N > T Singularity: N=50, T=30d => rank(S_emp)<=29<50; Sigma_LW = (1-d*)S_emp + d*vI
  [EQ-07] Monograph 16 Ch. 9: Downside Semivariance Sigma^-_ij = E[min(v_i-tau,0)min(v_j-tau,0)]
  [EQ-08] Audit Materiality: CVaR_99%(L(w)) <= M_audit (statutory materiality as risk budget)
  [EQ-09] Agent Sharpe & ROE: SR_i = (E[Value_i - Cost_i] - mu_code)/sigma_i <-> Walrasian ROE
  [EQ-10] Multi-Vendor & LEX: Anthropic+OpenAI+Google paired evals lower rho; Basel LEX caps
  [EQ-11] Regime Drift: Every model release shifts Sigma_t -> Sigma_{t+1} => Rebalance w*
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3. AUDITED CFO CASE BENCHMARKS & ESSENTIAL PREPRINTS
  * CASE-01 Month-End Close ($4.2B): -71% API spend, -46% total cost, -89% CVaR_99%, 2.3d close
  * CASE-02 FP&A / AP Cascade ($1.9B): -78% token bill ($1.62M->$356K/yr), 99.4% precision
  * CASE-03 Cybernetic Deal Pods: +44% deals/FTE, -34% unit cost, HHI cut 1.00 -> 0.36
  * CASE-04 Autonomous Treasury ($6.5B): $14M cash freed, +62 bps (+$868K/yr), 0h outage
  * Key Preprints: Kim et al. (2506.07962), FrugalGPT (2305.05176), RouteLLM (2406.18665),
    Dekoninck (2410.10347), Kapoor (2407.01502), Dell’Acqua (NBER w33641), Ju & Aral (2503.18238)

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