Building a Set-and-Forget ETF Strategy for Graduate Students

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Motivation: Why do many graduate students avoid investing?

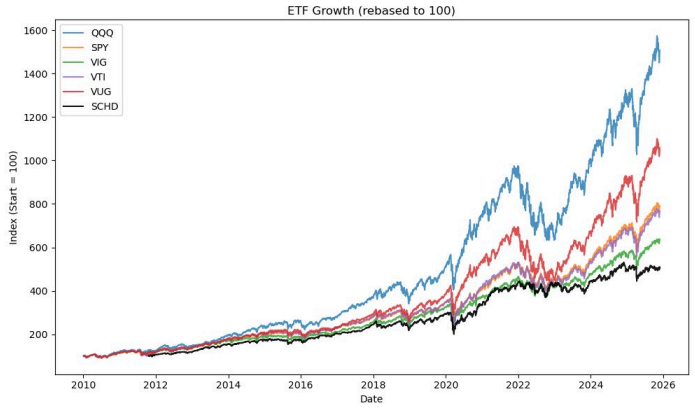
- Many students think investing is too complicated or risky
- Most believe small contributions don't matter
- Waiting until "later in life" feels safer — but costly

- **Goal of this project: use real ETF data to show how simple automated investing can realistically build long-term wealth**

Data Sources and Methodology

Data Source	Description	How Processed	Purpose
Yahoo Finance (ETF Prices)	Daily price history for QQQ, SPY, VIG, VTI, VUG, SCHD	Loaded via `yfinance` → cleaned/matched dates → saved to CSV	Real market data for ETF growth analysis
Derived Monthly Metrics	Monthly returns + CAGR + volatility + Sharpe	Resampled daily → calculated metrics → saved to CSV	Compare performance & risk across ETFs
Simulation Models	DCA, Lump Sum, start-early vs start-late	Python compounding functions (no external data)	Test long-term investing strategies for students

ETF Return Comparison: Growth vs Dividend vs Blended



ETF Growth (rebased to 100) from 2010-2025

CAGR vs Annual Volatility for Different ETFs

- **Growth ETFs (QQQ, VUG)**

  Highest returns over time
  Higher volatility and drawdowns
  Technology and growth sector exposure

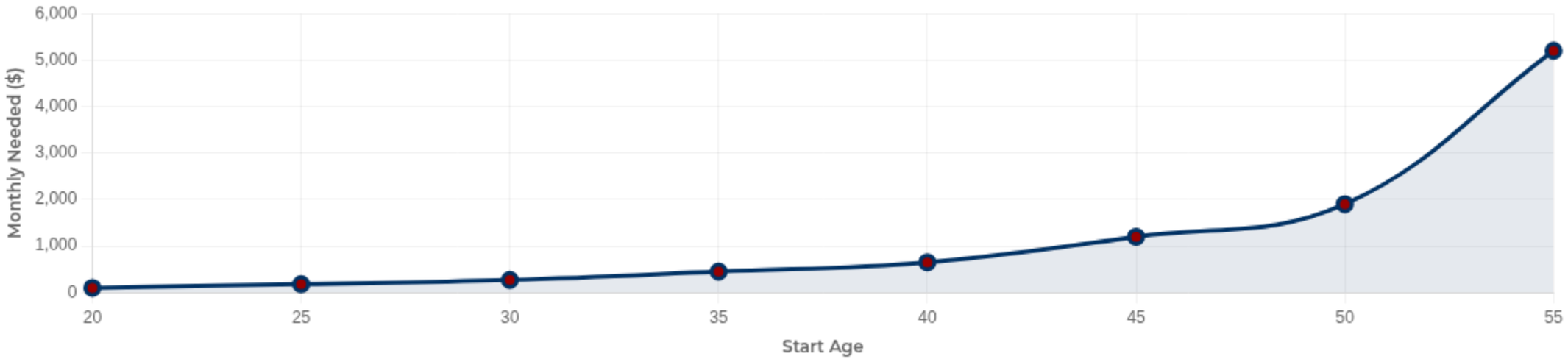
- **Dividend ETFs (SCHD, VIG)**

  Smoother returns with less volatility
  Strong risk-adjusted performance
  Income-focused with quality companies

- **Blended ETFs (SPY, VTI)**

  Balanced long-term growth
  Moderate volatility profile
  Broad market exposure (ideal core)

Monthly Savings Needed to Reach $1M by Age 65



Starting in Your 20s

$120/month

Starting at age 22
Baseline: Equivalent to a basic streaming subscription + coffee

Starting in Your 30s

$270/month

Starting at age 30
2.25× more than starting at 22

Starting in Your 40s

$650/month

Starting at age 40
5.4× more than starting at 22

Starting in Your 50s

$1,900/month

Starting at age 50
15.8× more than starting at 22

🔵 The Early Advantage

Starting at age 22 → only ~$120/month

Starting at age 30 → ~$270/month (more than 2× increase)

🟢 Exponential Growth With Delay

Starting at age 40 → ~$650/month (about 5× increase vs age 22)

Starting at age 50 → ~$1,900/month (about 16× increase vs age 22)

🔴 Why This Matters

The later you start, the steeper the cost

Time in the market matters more than contribution size

Even small early deposits beat large late deposits

A Practical Set-and-Forget Strategy

Risk Preference	Suggested ETF Mix	Characteristics
Conservative	60% SCHD + 40% VOO	Lower volatility approach with strong dividend income component. Smoother returns during market turbulence. Drawdown historically limited to ~31-33%. Ideal for shorter time horizons or lower risk tolerance.
Standard	60% VOO + 40% QQQ	Balanced growth and risk profile. Core S&P 500 exposure with tech/growth tilt. Moderate volatility (~3.8-4.0% annual). Strong risk-adjusted returns (Sharpe ~0.19). Suitable for most graduate students.
Aggressive	100% QQQ	Highest expected long-term returns with technology/growth sector concentration. Highest volatility (~4.5% annual). Largest potential drawdowns (~35%). Best for long time horizons (25+ years) and high risk tolerance.

Dollar-Cost Averaging (DCA) Implementation Principles

1. Set up **automatic monthly transfers** to your brokerage account
2. Invest on the **same day each month** regardless of market conditions
3. **Rebalance your portfolio** once per year to maintain target allocations
4. Use **tax-advantaged accounts** when possible (Roth IRA, 401k)
5. **Start as early as possible** with whatever amount you can afford
6. **Ignore market fluctuations** and maintain consistency over decades

Challenges & Future Improvements

Project Challenges

1. Data Cleaning & Processing
2. Return Assumptions
3. API Reliability
4. Visualization Challenges

Future Improvements

1. Inflation Adjustment
2. Account Type Comparison
3. Asset Allocation Strategies

Thank You

Questions?