

Data visualization for long-term investors

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dataMinds



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About me

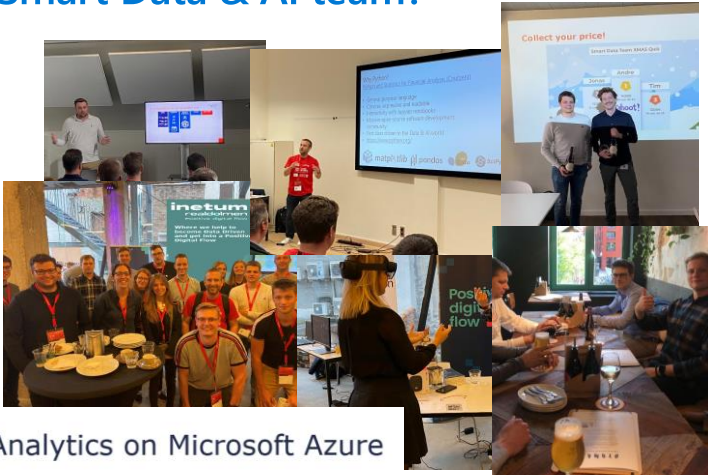


- Solution architect Microsoft Business Applications @Inetum – Realdolmen
- Blogs:
 - <https://jopx.blogspot.com>
 - <https://jopxfin.blogspot.com>
- Twitter: @jopxtwits
- Started investing before the dotcom bubble
- Got bored during Covid and started with Python

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Want to join the Inetum Realdolmen
Smart Data & AI team?



Analytics on Microsoft Azure



- **An experienced team of +40 Data experts with following competences:**
- Data platforms (Azure, Snowflake, AWS)
- Business Intelligence (Power BI)
- Data science (Python, R)
- Artificial Intelligence (Machine & Deep Learning)
- Master Data Management

Talk to our Senior Solution
Manager Data & AI →
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The fine print

The information in this presentation represents an opinion and is for information purposes only. It is not intended to be investment advice. Seek a duly licensed professional for investment advice.

Objective

- See how data can help you make better investment decisions
- Merits of passive investing
- Understand risk & return
- Help you understand investment biases

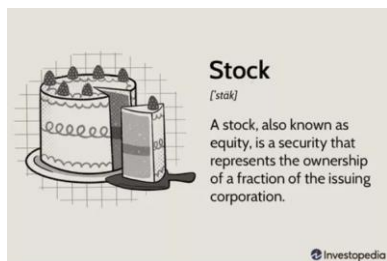


What are we not covering?

- Crypto currencies, bonds, forex, derivative contracts (futures/options)
- Non-financial assets (real estate, P2P lending, luxury goods,...)
- How to's
- Deep dive Synapse & Power BI content

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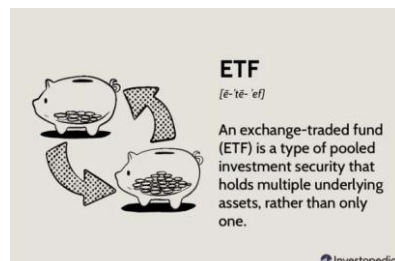
Some terminology



<https://www.investopedia.com/terms/s/stock.asp>

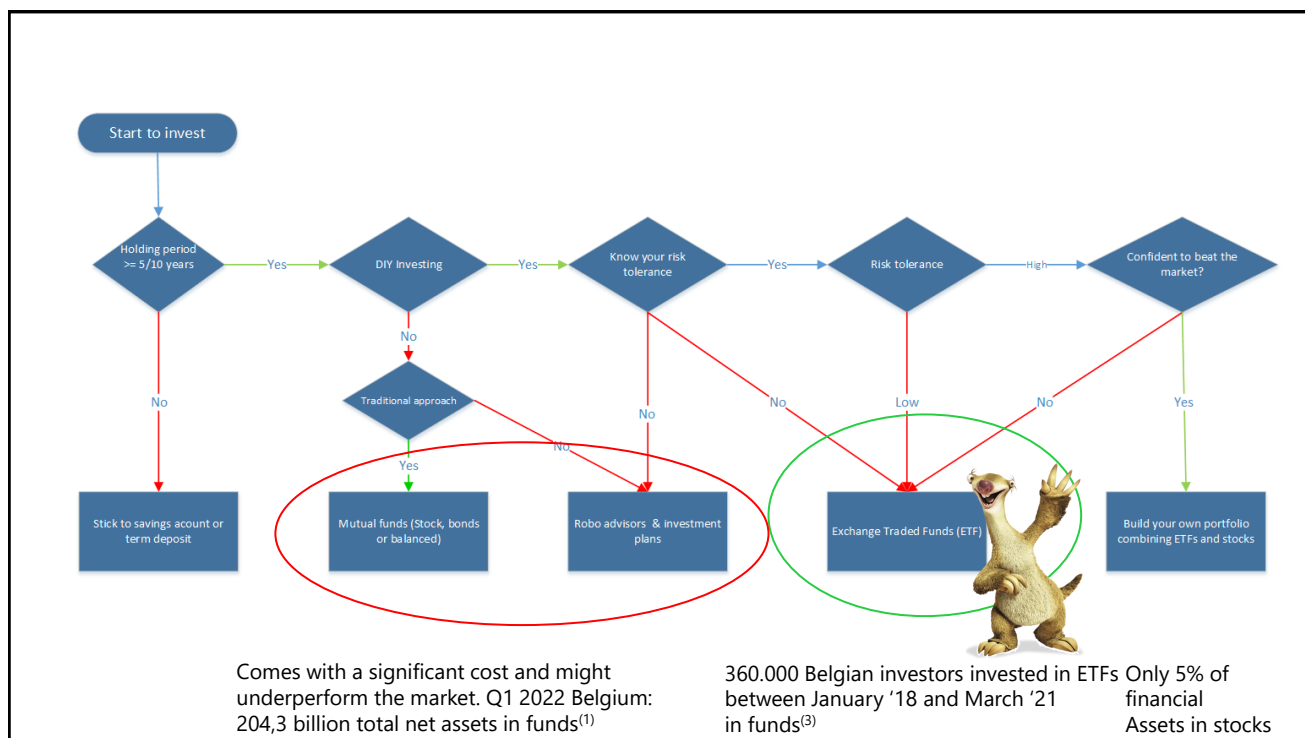


<https://www.investopedia.com/terms/b/bond.asp>



<https://www.investopedia.com/terms/e/etf.asp>

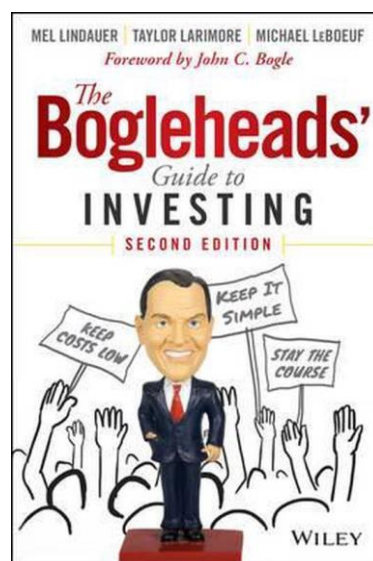
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Efficient market hypothesis (EMH)

- EMH: Share prices reflect all information and consistently beating the market (adjusted for risk) is impossible (Fama and Samuelson, 1960)⁽⁴⁾
- Choose passive investing over active investing
- Over a 10-year period – 83% of actively managed European Equity funds failed to beat the market <https://bit.ly/3qZZo05>
- Bogleheads investment philosophy <https://bit.ly/3LBWMz9>



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Why Python?

- General purpose language
- Concise, expressive and readable
- Interactivity with Jupyter notebooks
- Massive open-source software development community
- First class citizen in the Data & AI world
- <https://www.python.org/>



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PYTHON

NumPy, SciPy, Pandas, Scikit-learn, Jupyter /
IPython, Numba, Matplotlib, Spyder, Numexpr,
Cython, Theano, Scikit-image, NLTK, NetworkX and
150+ packages

conda

- Popular Python distro (150+ packages for data science)
- 25 M+ users
- Open-source individual edition - <https://www.anaconda.com/products/individual>
- **conda**: cross platform and language agnostic package and environment manager.
- **Environments**: custom isolated sandboxes with different versions of packages and/or python
- Conda sheat cheat - <https://bit.ly/3liHtzU>
- Be careful using both Pip and Conda

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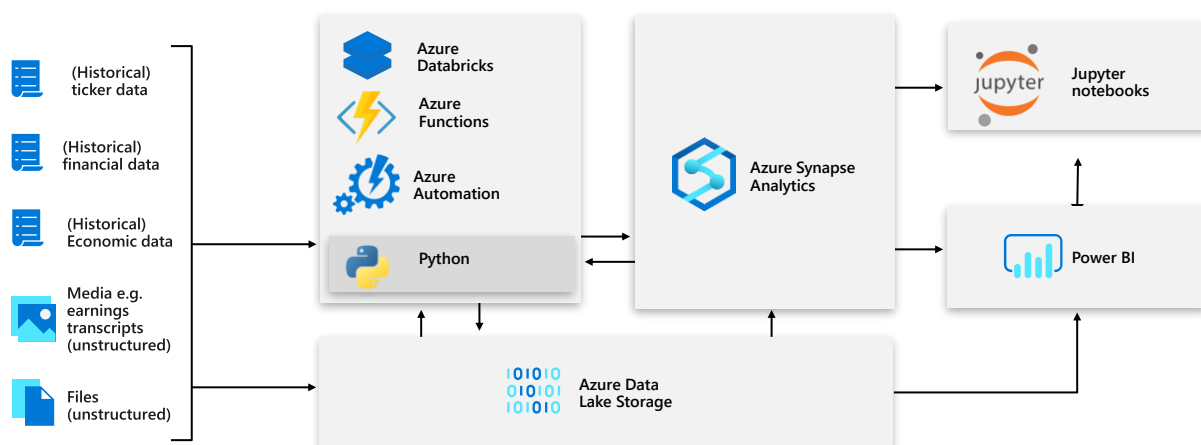
Visual Studio Code Python extension

- Available in the extension marketplace
- Works on any OS
- Requires Python 3
- Features:
 - Syntax coloring
 - Code completion
 - Linting
 - Debugging
 - Code navigation
 - Code formatting
 - Jupyter notebook support



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My toolbelt



Explore and analyze stock ticker data in Azure data lake with Azure Synapse Serverless SQL Pool <https://bit.ly/3vyy5Nj>

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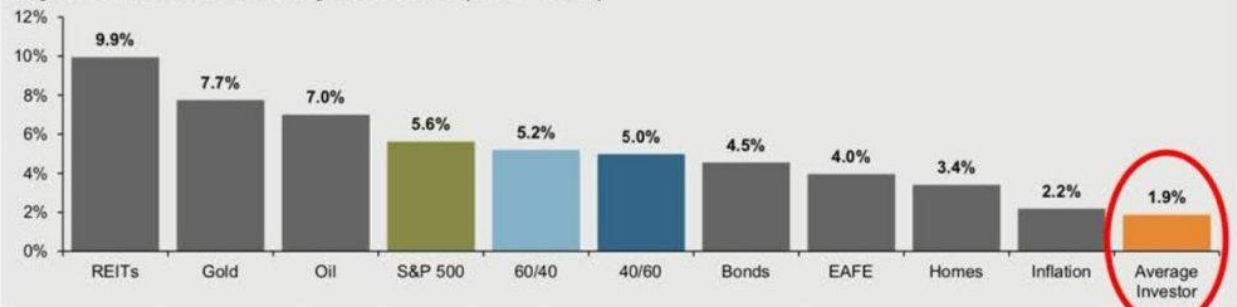
Demo - Explore and analyze the S&P 500 using Azure Synapse Serverless SQL

- Time in the market over market timing

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Assessing returns

20-year annualized returns by asset class (1999 – 2018)



Source: J.P. Morgan Asset Management; (Top) Barclays, Bloomberg, FactSet, Standard & Poor's; (Bottom) Dalbar Inc. Indices used are as follows: REITS: NAREIT Equity REIT Index, EAFE: MSCI EAFE, Oil: WTI Index, Bonds: Bloomberg Barclays U.S. Aggregate Index, Homes: median sale price of existing single-family homes, Gold: USD/troy oz., Inflation: CPI, 60/40: A balanced portfolio with 60% invested in S&P 500 Index and 40% invested in high-quality U.S. fixed income, represented by the Bloomberg Barclays U.S. Aggregate Index. The portfolio is rebalanced annually. Average asset allocation investor return is based on an analysis by Dalbar Inc., which utilizes the net of aggregate mutual fund sales, redemptions and exchanges each month as a measure of investor behavior. Returns are annualized (and total return where applicable) and represent the 20-year period ending 12/31/18 to match Dalbar's most recent analysis. Guide to the Markets – U.S. Data are as of March 31, 2019.

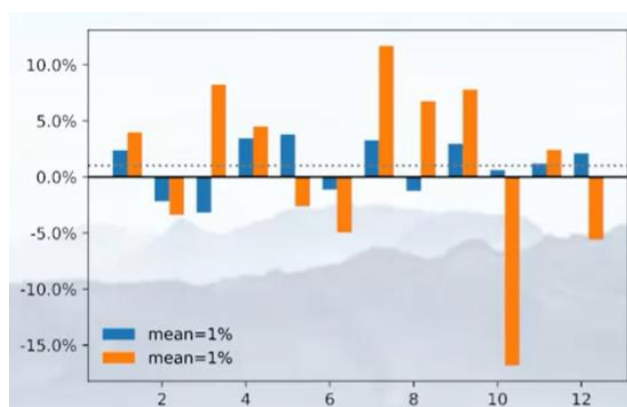
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Nothing teaches you an important investing lesson faster than losing money (Brian Feroldi)

If you can't sleep at night because of your stock market position, then you have gone too far. If this is the case, then sell your positions down to the sleeping level (Jesse Livermore)

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Risk and return



- Volatility as measure for risk
- Volatility measured by standard deviation
- Different metrics for comparing reward (return) to risk (standard deviation)
 - Beta, Sharpe ratio, max drawdown, Sortino ratio, Calmar ratio, sterling ratio, ...

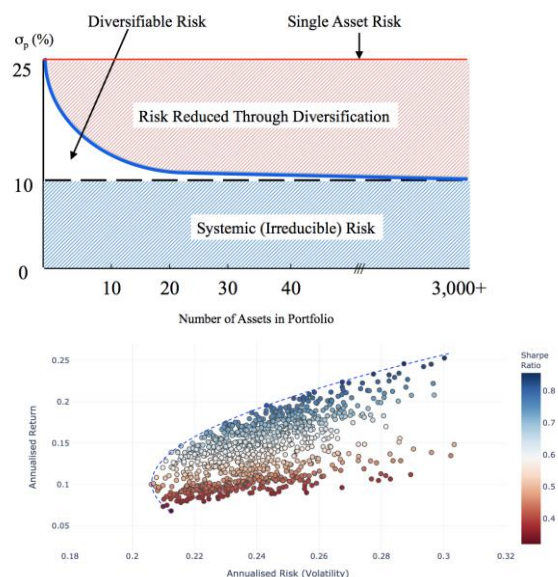
$$\sigma = \sqrt{\frac{\sum (x_i - \mu)^2}{N}}$$

Introduction to Portfolio Construction and Analysis with Python(Coursera)
<https://github.com/jorisp/tradingnotebooks/blob/master/riskratios.ipynb>

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Modern Portfolio Theory and diversification

- Harry Markowitz (Nobel Prize 1990) – Journal of Finance 1952- “Portfolio Selection” (5)(6)
- Modern portfolio theory (MPT) is a theory on how risk-averse investors can construct portfolios to maximize **expected return** based on a given level of **market risk**.
- Portfolio diversification allows you to get rid of a portion of risk
- Limits to diversification –during market crashes, covariance will increase

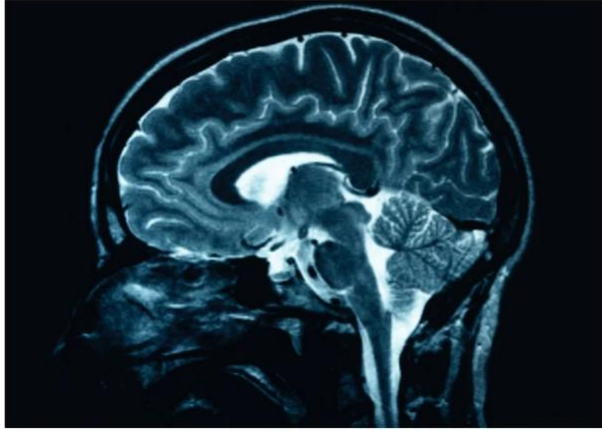


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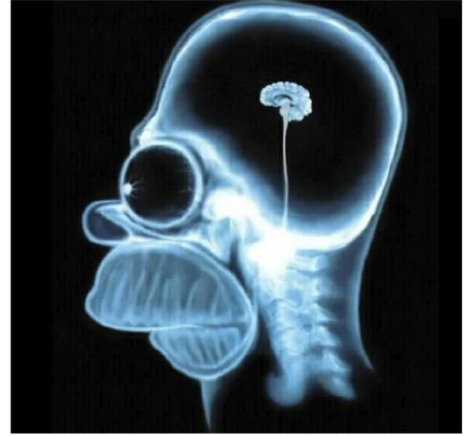


Demo - Visualizing risk vs return and diversification

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This is your brain ...



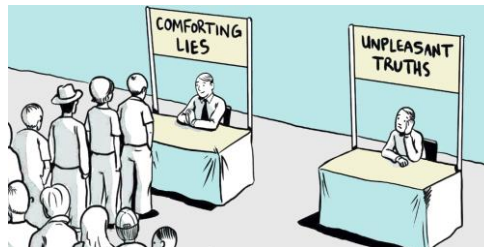
This is your brain when thinking about money

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Cognitive and behavioral biases



Overconfidence



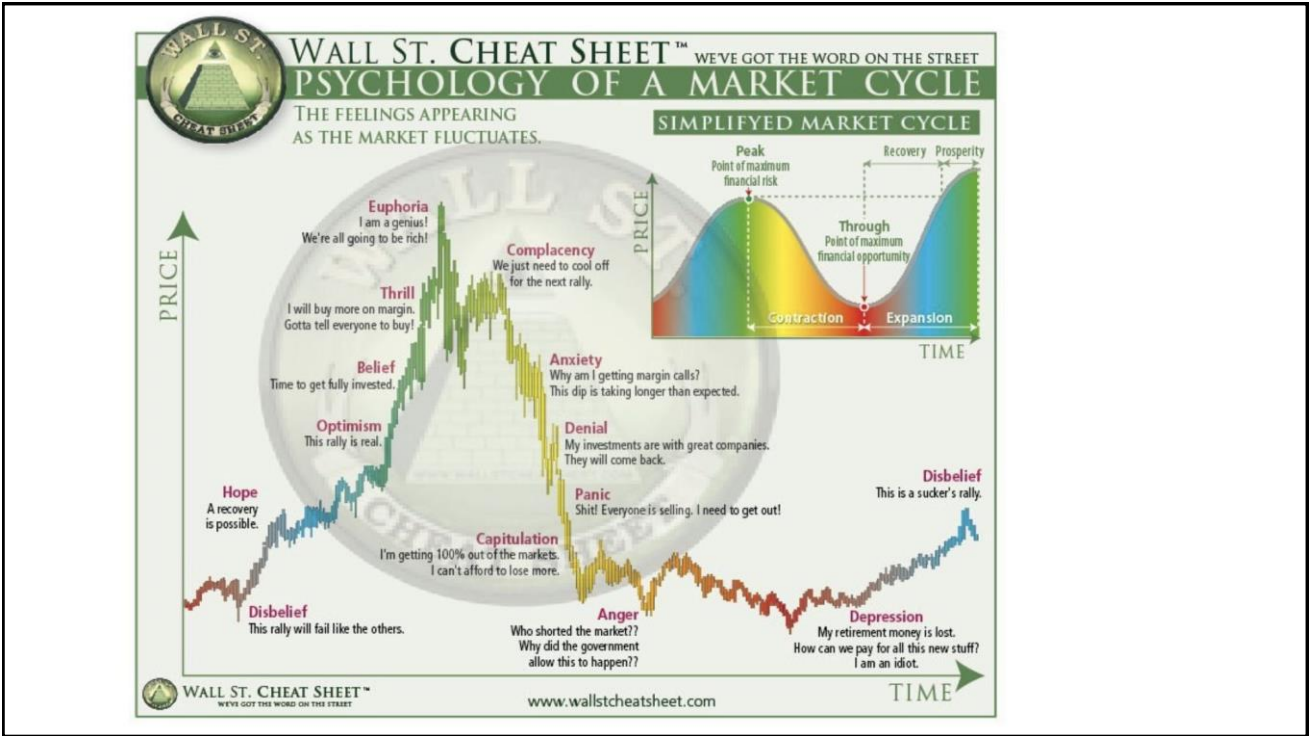
Confirmation bias & narrative fallacy



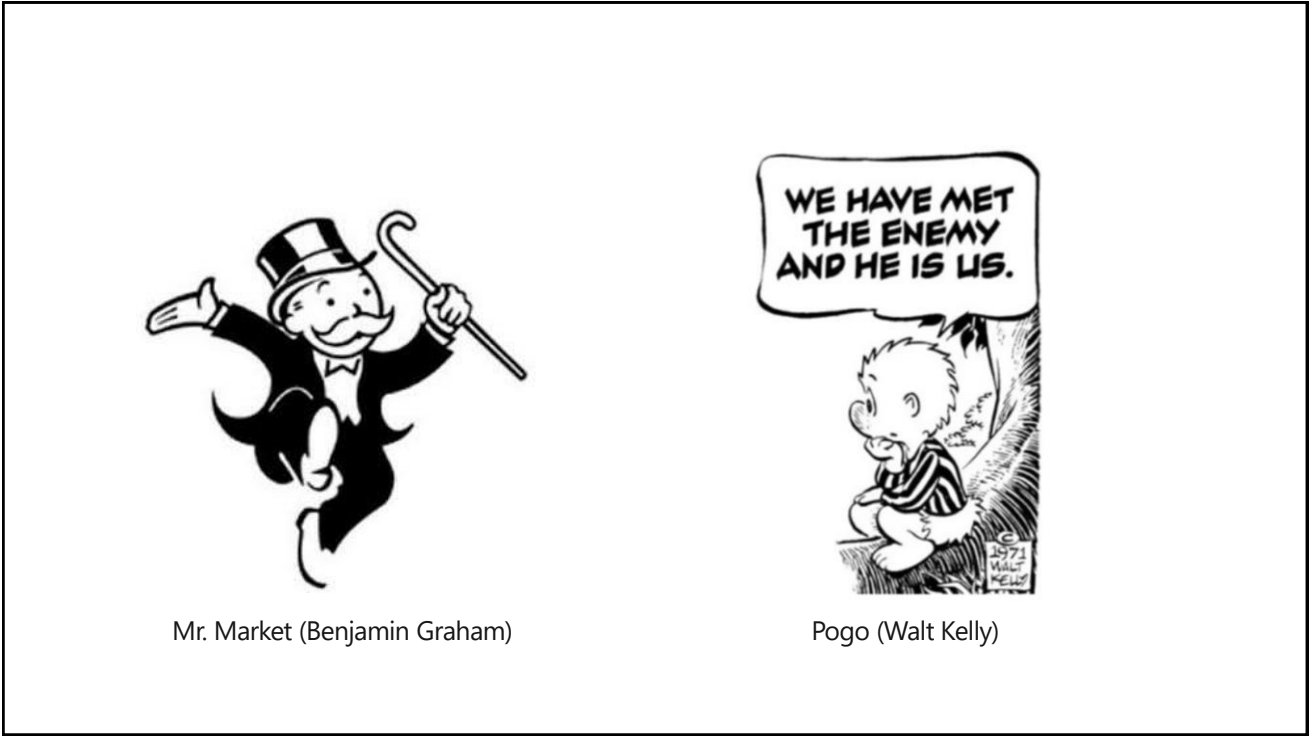
Loss aversion & endowment effect

Thinking fast and slow (Daniel Kahneman, 2013)

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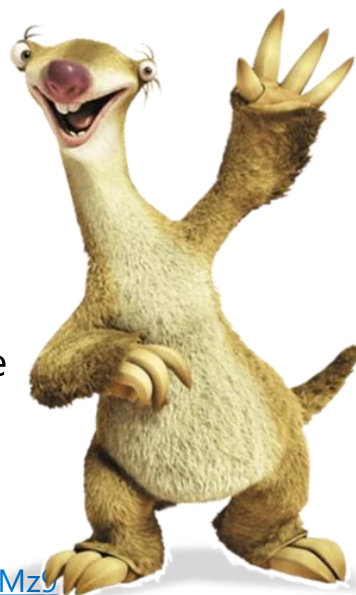
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Investing like a sloth

- **S**implicity rules - [Two-fund portfolio – Bogleheads](#) and fixed contributions
- **L**ow fees (and low taxes)
- **O**wn the world: diversify using worldwide trackers
- **T**ime in the market instead of timing the market
- **H**eadstrong - stick to the plan

[Alternatives to VWCE for Belgians \(curvo.eu\)](#)

Same principles as Bogleheads - <https://bit.ly/3LBWMz9>



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Demo - <https://backtest.curvo.eu/>

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Summary

- Everyone can invest using low-cost ETFs
- Time in the market beats market timing
- No easy way to make money fast
- Python and Jupyter notebooks easy solution to gather/transform/visualize information
- Azure Synapse Serverless SQL rocks !!!
- Use Azure when you need to scale or get started quickly (otherwise work locally)

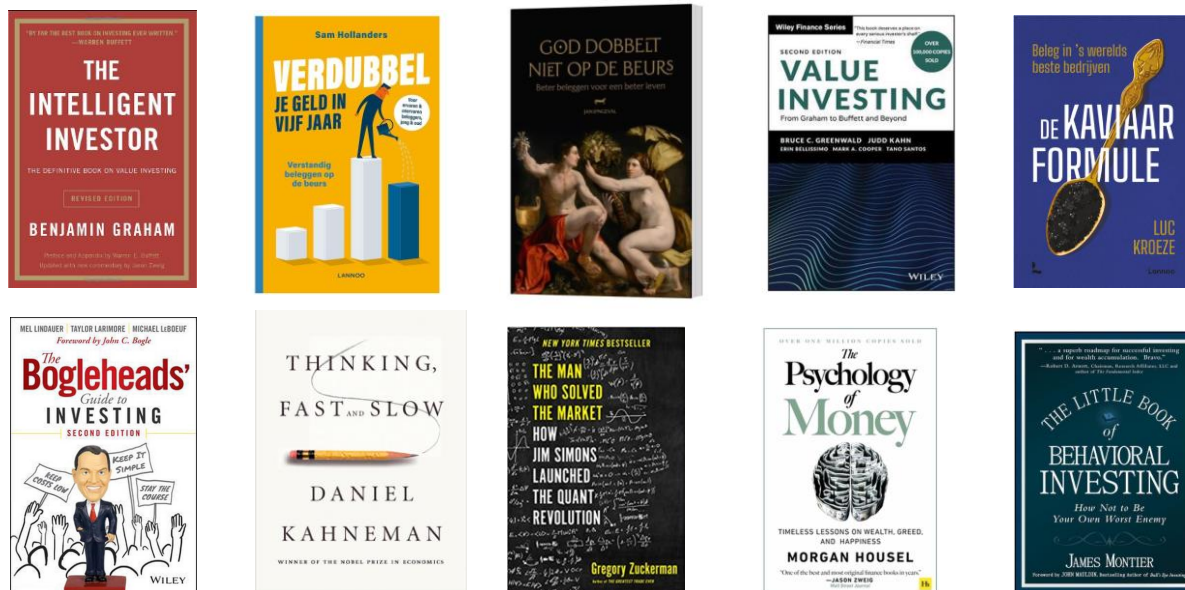


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Resources - Getting started

- Passive Investing
 - Bogleheads investing philosophy <https://bit.ly/3LBWMz9>
 - Are markets efficient (discussion between Fama and Thaler <https://www.youtube.com/watch?v=bM9bYOBuKF4>)
- Active Investing
 - <https://spaarvarkens.be/> (NL)
 - Vlaamse Federatie van Beleggers (VFB) - <https://www.vfb.be/> (NL)
 - Chess Capital (NL only) - <https://www.chesscapital.be/start-hier/> (NL)
 - Chess Capital podcast – Alles over waardebeleggen - <https://spoti.fi/301gXmj> (NL)
 - Inside Beleggen Podcast van Trends - <https://spoti.fi/303EPFV> (NL)
 - De Beurs van Tegenwoordig (De Tijd) - <https://spoti.fi/3mA4nly> (NL)
- Python
 - <https://docs.microsoft.com/en-us/learn/paths/python-first-steps/>
 - <https://aka.ms/python-getting-started>
 - PyCon and [PyVideo.org](https://pyvideo.org/)
 - Master the basics of Conda environments in Python - <https://www.youtube.com/watch?v=1VVCd0eSkYc>

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References

1. FSMA Quarterly update Belgian open ended investment funds – June 2022 - <https://bit.ly/3Q2gFzW>
2. NBB Stats - financial assets and liabilities of individuals and non-financial corporations <http://stat.nbb.be/Index.aspx?DataSetCode=FAHHNFC&lang=nl>
3. [Webinar - Retailbeleggers op de beurs | FSMA](#) (June 2021)
4. Efficient Capital Markets: a review of theory and empirical work (Journal of Finance, 1970) - <https://www.jstor.org/stable/2325486>
5. Portfolio selection (Harry Markowitz, 1952) <https://bit.ly/3UC5ce9>
6. Yale Courses (YouTube) - Portfolio diversification and supporting financial institutions https://www.youtube.com/watch?v=B_24GUWdSM

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Questions?

