PAIR TRADING SNPS-CDNS

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- **Pair trading** is a statistical arbitrage strategy that seeks to exploit temporary deviations in the relative prices of two historically correlated financial instruments. The underlying assumption is that the prices of these two assets, typically from the same industry or with similar risk profiles, will maintain a stable long-term relationship. When the prices diverge, the strategy involves taking a long position in the underperforming asset and a short position in the outperforming one. The positions are then closed when the price relationship reverts to its historical norm. This strategy is considered market-neutral, as it aims to profit from the relative performance of the pair rather than directional movements in the broader market.

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Évolution du cours de SNPS et de CDNS
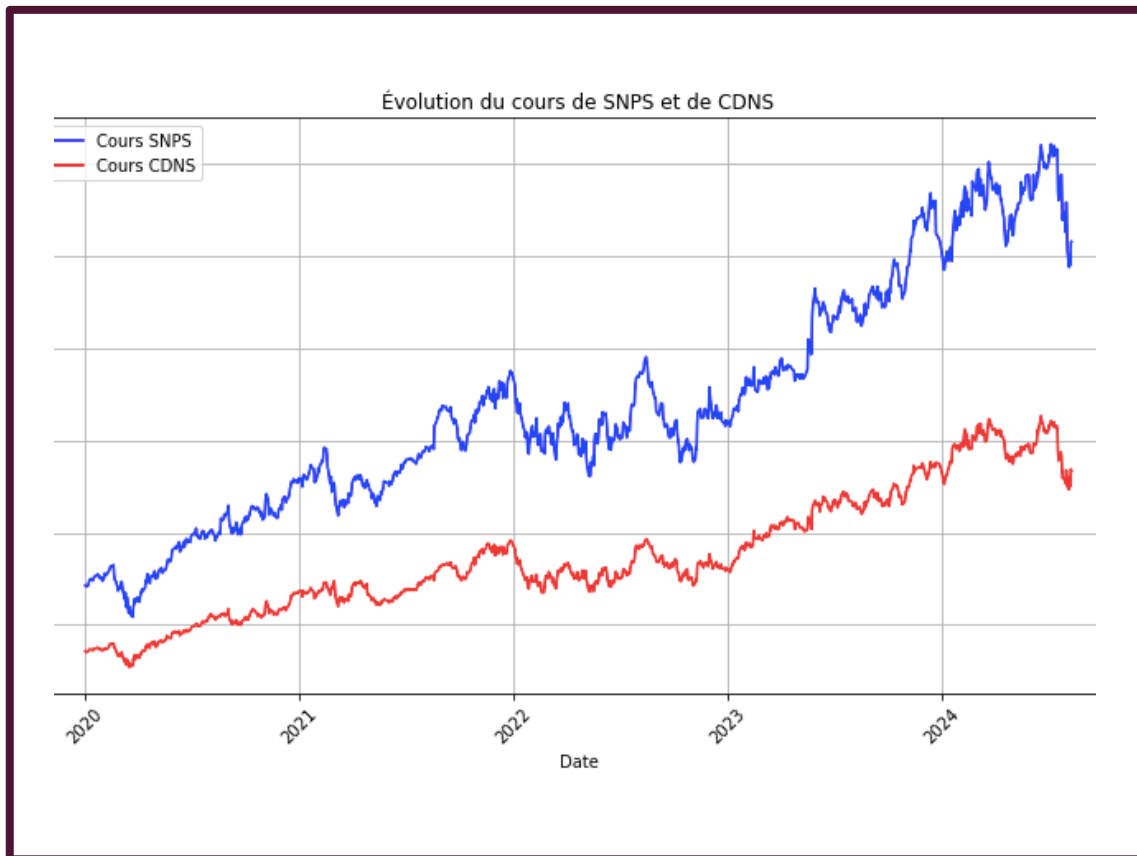
- **The goal was to find two stocks that were co-integrated.** Co-integration is a statistical concept that describes a relationship between two or more time series variables. Specifically, it means that even though the individual time series may be non-stationary (their values can drift over time), there exists a linear combination of them that is stationary (does not drift over time). In other words, the variables move together over time in such a way that their differences remain stable, indicating a long-term equilibrium relationship.

- **Cadence Design Systems and Synopsys are both leading companies** in the field of electronic design automation (EDA) since the early 2000s and are perfect examples for this project.

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$$Z = \frac{x - \mu}{\sigma}$$

Score → x ← Mean
σ ← SD

- To be sure that there is co-integration between the two assets, we can run **an Augmented Dickey-Fuller test**.

- **In this project, I employ a z-score as a key indicator** in my pair trading strategy, utilizing it to identify when the price relationship between the two stocks deviates from its historical norm. This allows me to determine optimal entry and exit points for the strategy, aiming to capitalize on the eventual reversion to the mean.

z-score SNPS-CDNS
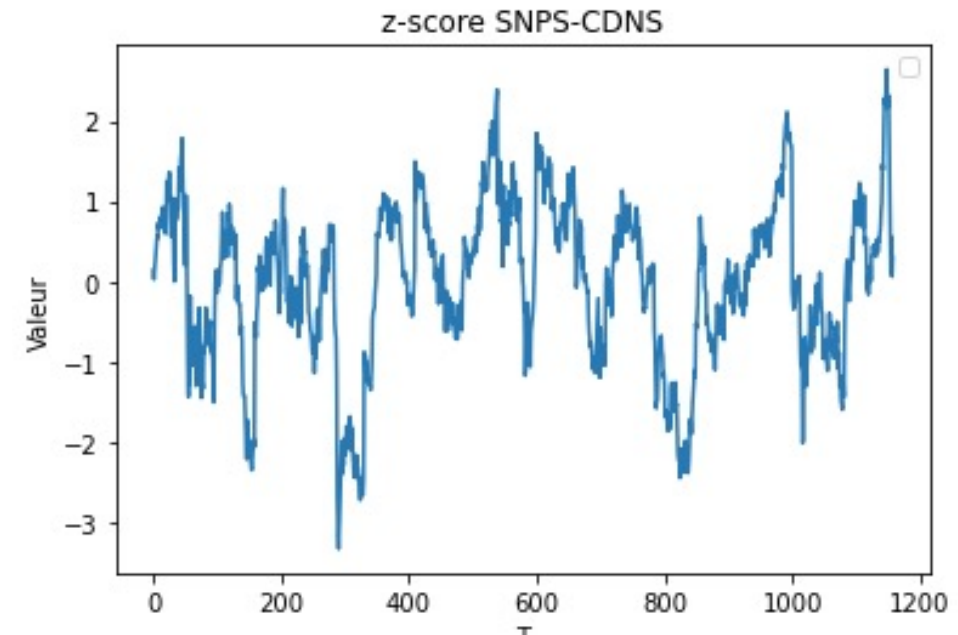
STRATEGY PRESENTATION

- If Z score < -1

  ➢ In that case, we go Long on SNPS and Short on CDNS. The trade remains intact until the z-score is greater than -0.5. As soon as the z-score exceeds this limit, the trade is unwound, and we can compute the overall return of the trade.

- If -1 <Z score < 1

  ➢ In this range of values, no Long or Short positions are taken.

- If Z score >1

  ➢ In that case, we go Short on SNPS and Short on CDNS. The trade remains intact until the z-score is less than 0.5. As soon as the z-score drops below this limit, the trade is unwound, and we can compute the overall return of the trade.

RESULTS

Rendements composés dans le temps

Returns 2020-2024

Year	Ann return	Volatility	Sharpe Ratio	Max Drawdown
2020	10,19%	9,60%	1,06135586	-3,5%
2021	7,04%	6,75%	1,043938529	-3,7%
2022	7,95%	8,09%	0,981779218	-2,9%
2023	2,42%	6,11%	-0,013215367	-4,1%
2024	5,52%	6,19%	0,487813608	-3,5%

■ The strategy seems quite conistent and interesting with a SR close to 1 from 2020 to 2022 and particularly with a very limited drawdown over the backtest period. (Max DD of 4.1%)