XIRR vs CAGR: Meaning, Formula & When Each Works Best

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When evaluating how an investment has performed, both CAGR and XIRR are useful metrics each appropriate in different scenarios.

CAGR reflects the average annual growth rate of an investment over a fixed period, assuming the investment compounds and no intermediate cash flows occur. It requires only three inputs initial value, final value, and the number of years. This makes it suitable for evaluating lump sum investments held for a continuous period without additional contributions or withdrawals.

XIRR, on the other hand, accounts for multiple cash flows at irregular intervals. It considers both the amount and timing of each investment or withdrawal, providing a more nuanced return metric in scenarios like Systematic Investment Plans (SIPs), Systematic Withdrawal Plans (SWPs), or staggered contributions. Due to its complexity, XIRR is typically calculated using Excel or financial software.

Both CAGR and XIRR serve specific roles in investment analysis. While CAGR is straightforward and easy to compare across investments, XIRR better reflects the real world performance of investments involving multiple transactions over time.

Key Takeaways

- CAGR is **simple and suitable** for evaluating **one time investments** held **continuously** over a **fixed period**.
- XIRR is more appropriate for investments with **multiple cash flows** occurring at **different time intervals**.
- While CAGR can be **calculated manually**, XIRR typically requires **Excel or a financial calculator**.

Quick Difference Between XIRR & CAGR

The main difference between XIRR and CAGR lies in how they handle cash flows.

- **CAGR** assumes a single investment and redemption. It calculates the average annualised return between the beginning and end values. It is suitable for lump sum investments with no interim transactions.
- **XIRR** is used in scenarios with multiple transactions, such as **SIP** or staggered investments. It considers the amount and timing of each cash flow, providing an annualised return that reflects the overall investment experience.

What is CAGR?

CAGR, stands for Compound Annual Growth Rate, measures the average annual growth of an investment over a specific period, assuming the investment grows at a steady rate every year. It

provides an average annual return, assuming smooth compounding, but it does not reflect short term volatility or intra period performance.

CAGR is most useful when:

- There's a single investment at the start.
- No further cash inflows or withdrawals occur during the investment period.
- You want to compare the historical performance of different investments or funds.

Example:

If a hypothetical investment of ₹1,000 grows to ₹2,200 over four years, the CAGR would be approximately 21.7% per year.
(This example is for illustration only and does not represent actual or expected returns. KMAMC is not guaranteeing any futuristic returns.)

What is XIRR?

XIRR stand for Extended Internal Rate of Return, is a refined version of IRR (Internal Rate of Return) that calculates the **annualised return** of investments with multiple cash flows occurring at irregular intervals.

It is particularly useful in scenarios where money is invested or withdrawn on different dates and in varying amounts such as in Systematic Investment Plans (SIPs), Systematic Transfer Plans (STPs), or partial redemptions.

If you're investing through SIPs, understanding how SIP returns are calculated can help you evaluate your performance more accurately using XIRR.

For Example:

If an investor contributes ₹5,000 monthly through an SIP and later withdraws part of the amount, XIRR accounts for the exact timing and amount of each transaction. This allows it to calculate the return more accurately than methods that ignore cash flow dates.

Key Differences Between XIRR and CAGR

To better understand how XIRR and CAGR work, here's a simple comparison that highlights their core differences:

Aspect	**CAGR**	**XIRR**
Best suited for	One time or lump sum investments	Investments with multiple or irregular cash flows (e.g., SIPs, STPs)
Accuracy Context	Appropriate for fixed period, single investments	Suitable when transactions occur on different dates

Aspect	CAGR	XIRR
Treatment of Timing	Assumes constant growth, ignores cash flow timings	Considers exact dates and amounts of all inflows and outflows
Primary Use Case	Start to end return calculation without interim cash flows	Evaluating investments with staggered transactions
Calculation Method	Can be done manually or using basic calculators	Typically requires Excel, financial software, or mutual fund platforms

So, if you're looking at a one time investment and its return over a few years, CAGR is more than enough. But if your mutual fund investment involves regular contributions, XIRR provides a clearer, real world picture.

Formula and Numeric Example of CAGR

To calculate the Compound Annual Growth Rate (CAGR), use this formula: **CAGR = [(Ending Value / Beginning Value) ^ (1 / Number of Years)] – 1**

Example:

- Suppose you invest ₹1,00,000 and it grows to ₹1,50,000 in 3 years.
- CAGR = [(150000 / 100000) ^ (1/3)] – 1 = 14.47%

This means your investment grew at an average annual rate of 14.47%, assuming smooth, compounded growth each year. The growth is measured using the change in portfolio value, which in the case of mutual funds is driven by fluctuations in NAV.

XIRR vs CAGR: Pros and Cons

Aspect	CAGR	XIRR
Pros	Simple to calculate and understand Useful for evaluating one time or lump sum investments	Captures multiple transactions and their exact timing Appropriate for SIPs, redemptions, or staggered cash flows
Cons	Assumes consistent growth, does not account for cash flow timing Not suitable for investments with multiple or irregular transactions	Requires tools like Excel or investment platforms for calculation May be less intuitive for new investors

Limitations Associated with XIRR and CAGR

- CAGR assumes that the investment grows at a steady, compounded rate over the period. However, actual market returns are typically volatile. CAGR does not reflect interim cash flows such as additional investments or partial withdrawals. Hence, it is best suited for evaluating the performance of one time, lump sum investments held throughout the investment horizon.
- XIRR accounts for multiple and irregular cash flows by incorporating their respective dates and amounts, offering a more detailed reflection of returns. However, accuracy depends on precise input data. Even small errors in dates or values may affect the result. Additionally, XIRR is calculated through an iterative method and generally requires tools like Excel or financial calculators, which may limit manual accessibility.

CAGR vs XIRR: Which is Better?

Both CAGR and XIRR serve different investment scenarios and should be used accordingly:

- Use CAGR when evaluating a one time investment held for a specific duration. It provides a straightforward average annualized return and is useful for comparison across similar products with consistent holding periods.
- Use XIRR when the investment includes multiple cash flows at different times such as in Systematic Investment Plans (SIPs), Systematic Transfer Plans (STPs), or partial redemptions. It captures the impact of timing and size of each transaction, offering a more representative return in such cases.

There is no “better” metric overall the appropriate measure depends on the investment pattern. For a linear investment with no additional cash flows, CAGR suffices. For non linear cash flows typical in most mutual fund investments, XIRR is more suitable.

Conclusion

Both CAGR and XIRR are useful tools for evaluating investment returns, but they apply to different scenarios.

- CAGR is suitable when there is a single investment and a single redemption, such as a lump sum held over a fixed period.
- XIRR is more appropriate for investments involving multiple or irregular cash flows, such as SIPs, STPs, or partial withdrawals.

By understanding which return measure to apply based on your investment pattern, you can interpret your mutual fund performance more accurately and align it better with your financial objectives.

FAQs

1. Which is better, CAGR or XIRR?

It depends on the investment pattern. CAGR is suitable for lump sum investments held over a fixed period. XIRR is more appropriate for investments with multiple cash flows, such as SIPs or STPs, as it considers both the amount and timing of each transaction.

2. What does 20% XIRR mean?

A 20% XIRR indicates that the investment earned an annualised return of 20%, accounting for all inflows and outflows along with their respective dates. This is a historical measure and does not indicate or assure future performance.

3. What is a good XIRR for 5 years?

There is no fixed benchmark for a good XIRR. It varies depending on the asset class, fund performance, and market conditions. Always align return expectations with your risk tolerance and financial goals.

4. Why is XIRR used for SIP returns instead of CAGR?

Since SIPs involve periodic investments, XIRR is preferred because it considers the timing and size of each installment. CAGR, which assumes a one time investment, does not capture this complexity.

5. Which is better: CAGR or absolute return?

CAGR offers a more meaningful insight for time bound investments as it reflects the annualised growth rate. Absolute return shows only the total gain or loss, irrespective of the time taken.

6. Can we convert XIRR to CAGR?

No. XIRR and CAGR use different inputs and assumptions. XIRR considers irregular cash flows and dates, while CAGR assumes a single lump sum investment, so they are not directly convertible.

7. Can XIRR be negative?

Yes. If the current value of the investment is lower than the total invested amount, XIRR can be negative, indicating a net loss over the investment period.

8. Is a higher XIRR always better than a higher CAGR?

Not necessarily. These metrics serve different purposes. XIRR captures cash flow complexity, while CAGR reflects average annual growth for a lump sum investment. Comparison should consider the nature of the investment.

9. When should I use CAGR instead of XIRR?

Use CAGR when there's a single investment and redemption. Use XIRR when the investment includes multiple or staggered cash flows, like SIPs, STPs, or redemptions.

10. What is a good XIRR for long term SIPs?

There is no fixed number. However, past performance is not indicative of future returns. Always invest as per your risk profile and goals.

11. Why do mutual fund statements show both CAGR and XIRR?

To provide clarity and transparency. CAGR is used for lump sum investments, while XIRR is applied to investments with multiple transactions. This helps investors evaluate performance in the appropriate context.

12. Are annualised return and CAGR the same?

CAGR is a type of annualised return, suitable for one time investments. In the case of multiple or irregular cash flows, XIRR is another method to compute annualised returns.