Incwert Valuation Chronicles
Series 2 | 2022

The Cross-Section of Volatility in Returns of Enterprises from Micro to Large Cap

Long range assessment of volatility in equity return of enterprises stratified by size

February 2022

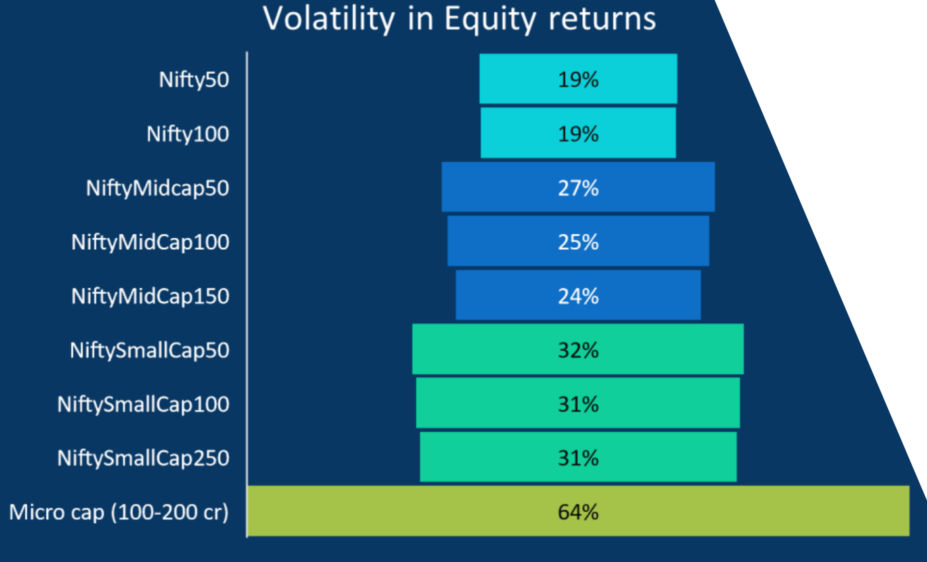
Foreword

We are pleased to release the second edition of Incwert's Volatility Study, assessing the quantum of volatility in the asset prices differentiated by size based on the analysis of indices and listed companies in India.

Our study determining the volatility in equity returns is guided by the need for valuing the equity/options of unlisted entities wherein the size and sector of guideline companies play a critical role in the process of benchmarking. We observe higher equity volatilities in a) smaller, b) less diversified and c) enterprises operating in riskier areas. As part of our empirical analysis, we analysed the volatility in returns of the companies having market capitalisation ranging between INR 100-200 crore (INR 1,000-2,000 million) as a benchmark.

In determining the volatilities, we have given due consideration to the observable time frame and the selection of indices.

This study could be of worth to the valuation professionals when undertaking the valuation of **equity-based compensation and share-based payments** made by **privately held companies and start-ups**, for financial reporting purposes. We hope you find the results of our study of interest and value.



60-65%

Volatility band that may of significance for capturing the risk factor in privately held companies and start-ups

About Authors

Punit brings with him 17 years of experience in sell-side and buy-side advisory across equity and fixed income. He has worked on several bespoke valuations and lent research support to dozens of asset managers/investment bankers/brokers/consulting firms across the globe.

In the fixed income segment, he worked as a fundamental analyst across the capital structure: leveraged loans, distressed debt, insolvency/bankruptcy situations and high-yield asset classes. He has also helped sell-side & consulting firms increase their market presence by coming up with thematic and white label papers.

He started his career as an analyst with Zacks Investment Research & then was a part of a UK-based CLO manager's research team. Then he moved on to set up research practices for a couple of startups before moving on to become Global Head of Research at one of the largest BPO/KPO globally and then finally co-founded Incwert.

He won 40 under 40 Alternative Professionals Awards 2020 by AIWMI

Sunit has an overall experience of over 15 years in valuation advisory, transaction advisory and M&A advisory.

As a valuation professional, Sunit has undertaken valuation of businesses for transactions, fundraising, strategic decision making, and corporate restructuring. He has also undertaken valuation of intangible assets, option valuation, litigation support, private equity portfolio valuation and valuation for reporting purposes such as purchase price allocation and impairment test under IFRS and Indian GAAP.

In past he has worked with KPMG India (as Associate Director), BDO, Grant Thornton, KPMG UK, and DBDBS a boutique M&A advisory firm.

Sunit has also been an active speaker on valuation at the National Institute of Finance Management (NIFM).

Professor Divya Aggarwal holds a Ph.D. in Finance from XLRI – Xavier School of Management. She has completed The Fellow Programme in Management from XLRI which is a full-time, residential doctoral programme. She is a Company Secretary (the Institute of Company Secretaries of India) and has done her Bachelors in Finance & Investment Analysis from the Delhi University. Her corporate work stints include working in corporate finance roles with McKinsey Knowledge Centre, KPMG, and investing banking roles with Avendus Capital. Before embarking on an academic career, she was working as an AVP in the financial planning team at SwissRe, a leading reinsurance firm.

In 2020 she got featured in the AIWMI list of "India's top 100 women in finance 2020" under the progressing category. She is a recipient of many awards and scholarships including "Peter Drucker essay competition 2014", "The Case Centre scholarship" and best paper awards at several national conferences.

Her research work has been published in international journals like the Journal of Behavioural and Experimental Finance, Research in Economics and Qualitative Research in Financial Markets. She has presented her research work in several national conferences like Pan-IIM, ISDSI, etc. along with international conferences such as biannual meetings of SPUDM.

Our **expertise includes valuation** for financial reporting, tax & regulatory compliances and transaction support

- Business valuation
- Purchase price allocation
- Impairment testing

Complex valuations which includes the following:

- Convertible securities
- Contingent consideration
- Cross-country interest rate swaps
- Expected credit loss (ECL)
- Embedded derivatives
- Financial Guarantee Contracts
- Forward agreements
- Hybrid securities
- Loan portfolios
- Non-controlling interests
- Right of Use (ROUs)
- Swaps
- Warrants
- Commodities

incwert Valuation | Research

ABOUT INCWERT

Incwert focuses on rendering services in the area of valuations and financial research. As a leading valuation advisory firm in India, it supports clients across life cycles (from early-stage to mature) on valuations concerning the transaction, tax and financial reporting. Incwert is trusted by the clients for its incisive research which forms the basis of credible advice. The company also offers offshore valuation support services which include setting up valuation models and report writing.

Incwert's client footprint is across cities & metros in India and globally in the US, UK, Singapore and middle-east. Incwert has offices in Delhi (NCR) and Mumbai, along with Kolkata and Surat where it has affiliate/network partners.

In India, Incwert is registered with The Insolvency and Bankruptcy Board of India as a Registered Valuer Entity.

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DATA SOURCES

For producing the analysis, we have extensively relied on data available as part of the Company filings, NSE website, other publicly available information and proprietary database providers.

The information and data presented in the study have been obtained with the greatest of care from sources believed to be reliable but are not guaranteed to be complete, accurate or timely.

Acknowledgements

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We thank Anurag Garg and Chahak Garg of Incwert for his assistance in assembling the exhibits presented herein. Other team members of Incwert for keen insights and assistance in quality check.

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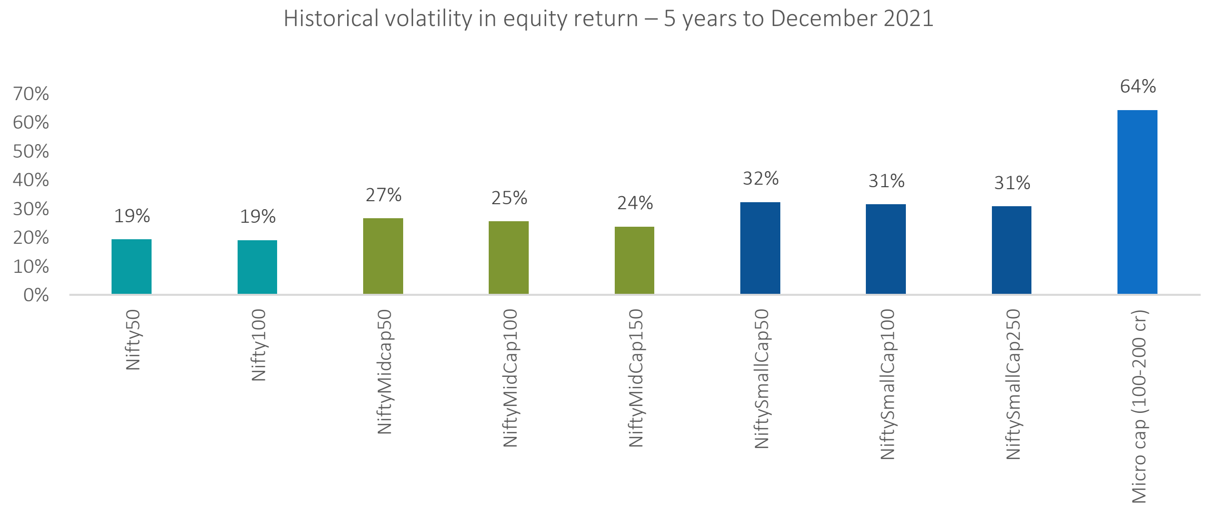
Key findings of the study



Note: 1) We have analysed Nifty indices and stock prices for the period 01 January 2016 to 31 December 2021.
2) Volatility in monthly returns have been annualized.

Source: Publicly available information and Incwert analysis

Large-cap companies have the least **volatility of ~ 20%**

Mid-cap companies display moderate **volatility ranging between 20-30%**

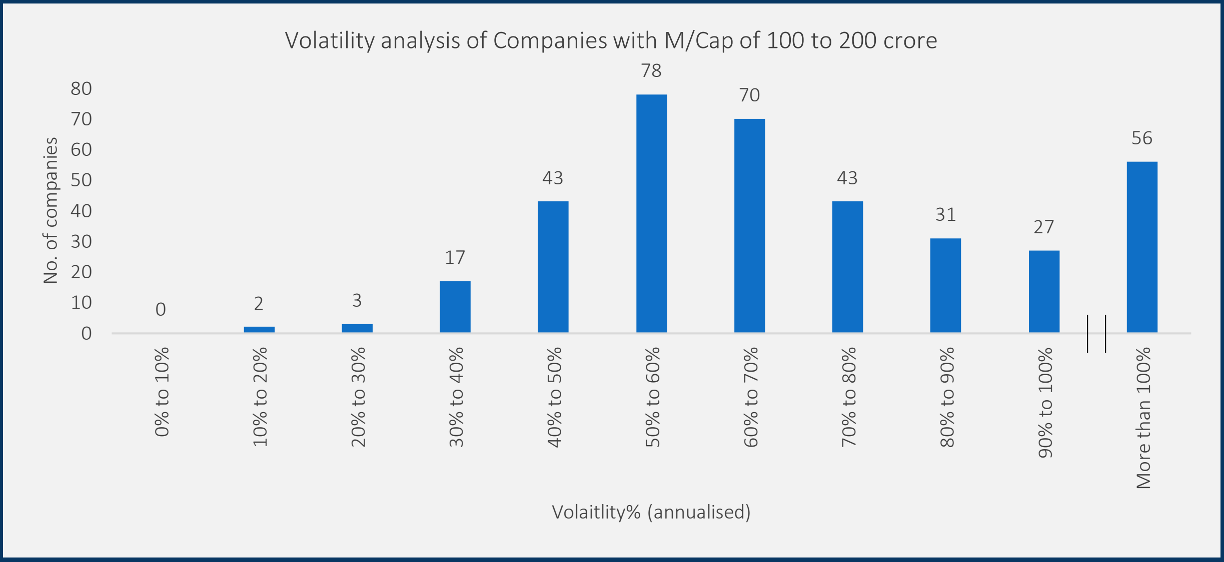
Small-cap companies have **volatility in the band of 30-35%**

Micro-cap companies have the highest **volatility averaging 60-65%**

Based on our analysis, we observe that the volatility in the equity return band is increasing as the market capitalisation of the companies is decreasing. The finding is not surprising given that small-cap companies tend to be riskier investments than large-cap companies. They have greater growth potential and tend to offer better returns. Still, they do not have large-cap companies' resources, making them more vulnerable to adverse events and bearish sentiments.

The micro-cap companies (chosen as enterprises with a market capitalisation in the range of INR 100-200 crores) tend to be a good proxy for assessing the start-ups' risks. Non-trading days are typically high in micro-cap companies, making them a suitable alternative for testing the risk arising from lack of marketability of unlisted start-up enterprises.

Micro cap companies (with market capitalisation of INR 100-200 crore) had volatility of 60-65% in equity returns



Note: 1) We have analysed Nifty indices and stock prices for the period 01 January 2016 to 31 December 2021.
2) Companies whose volatility is in excess of 100% overflow in the last bin.
3) Volatility in monthly returns have been annualized.

Source: Publicly available information and Incwert analysis

Analysis of monthly returns of 370 micro-cap companies suggests the following:

- Mere 6% (company count: 22) of the selected sample displayed annualised volatility of less than 40%
- 79% (company count: 292) of the sample size displayed annualised volatility of more than 40% but less than 100%
- 15% (company count: 56) of the sample had annualised volatility of more than 100%
- The average annualised volatility was 72%
- The median annualised volatility was 64%

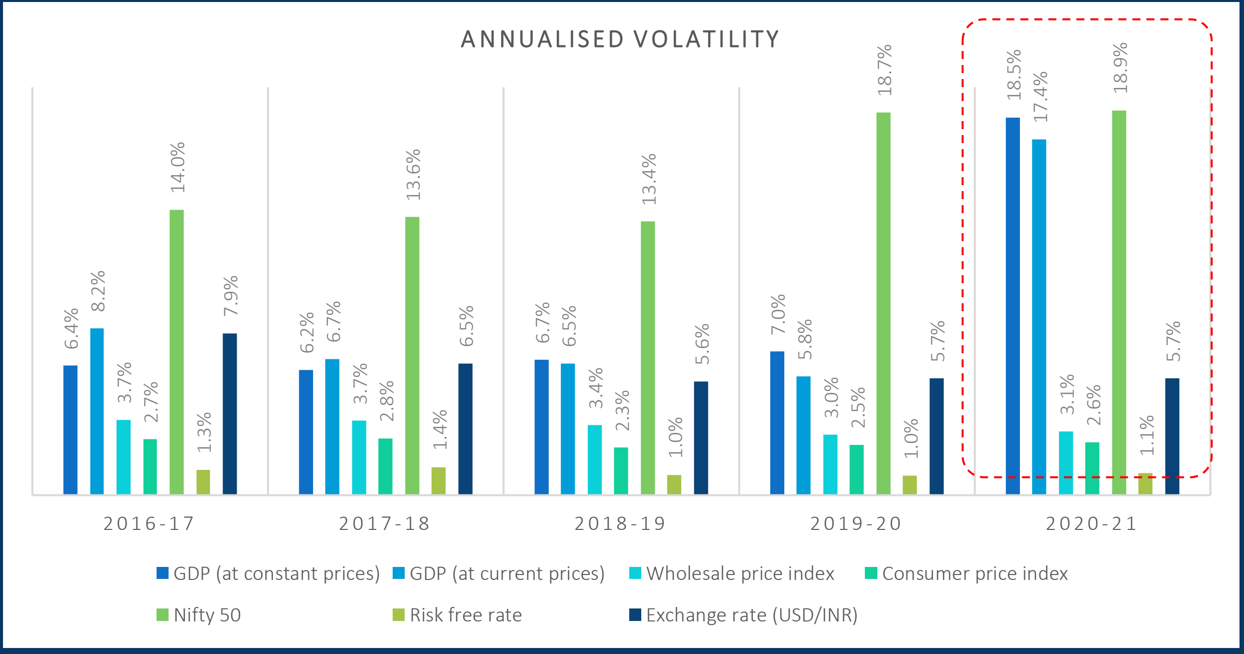
The empirical study is in line with volatilities observed in the security-based approaches used for measuring discount for lack of marketability in the US.

For example, Chaffee determined his proxy of a Discount for Lack of Marketability based on volatilities in excess of 60% based on analysis of small Over the Counter ("OTC") public companies.

Annualised volatility : 2021
Sample size-370 Companies

72% Average	64% Median
10% Minimum	260% Maximum
54% 25th Percentile	86% 75th Percentile

Volatility trends in the real economic and the financial economic factors



Volatility heat map

Index is set at standard deviation = 100% for each parameter

- Above average (>125% of index value)
- Average
- Below average (<75%of index value)

Real economy	Basic volatility 2012 - 2021	2016-17	2017-18	2018-19	2019-20	2020-21
GDP (at constant prices)	14%	0.44	0.43	0.46	0.49	1.28
GDP (at current prices)	14%	0.59	0.48	0.47	0.42	1.26
Wholesale price index	3%	1.09	1.07	1.01	0.87	0.92
Consumer price index	3%	1.03	1.06	0.88	0.94	0.99
Financial economy						
Nifty 50	17%	0.81	0.79	0.78	1.09	1.10
Risk free rate	2%	0.82	0.91	0.66	0.62	0.72
Exchange rate (USD/INR)	7%	1.16	0.95	0.82	0.84	0.84

Note:
1) Quarterly numbers have been considered for calculating the annualised volatility.
2) Basic volatility is the standard deviation calculated for the period April 2012 to March 2022
3) Calculations at each period end have been performed using 5 year back histories.
4) Analysis presented in the graph set above is based on financial year and hence, there will be differences when compared to the volatilities calculated based on the calendar year.
5) Yield on 10-year G-Sec has been considered for the risk free rate.
6) Base year for GDP index is 2011-12

Source: National statistics office (NSO); RBI; Oanda.com, NSE; CCIL; Proprietary databases

Comparative analysis of the real economic factors with the financial economic factors illustrates the following:

- Risk free rate emerged as the least volatile factor ranging between 1% to 1.5%.
- Nifty 50 indicates the highest volatility among all factors that ranges between 10% to 25% in last 5 years
- Exchange rate (USD in terms of INR) shows the volatility of around 6%-8%
- Wholesale price index has been more volatile than the consumer price index
- Generally, GDP (both at constant and current prices) shows the volatility of 6% to 8%, but in extraordinary situations i.e. COVID-19 it moved up to 19%

A brief overview of our approach

- In performing the analysis, we analysed Nifty indices across different market capitalisations (i.e. large-cap, mid-cap and small-cap). For setting up the reference micro-cap sub-set, companies listed in India (in either NSE or BSE) with a market capitalisation of INR 100-200 crores were analysed.
- For the micro-cap, a total of 370 companies with a share price history of two months or more at 31 December 2021 were selected. The selected set has a certain level of survivorship biases as some companies in the chosen sample have a trading history of fewer than five years.
- Monthly returns were computed for the past five years ending 31 December 2021.
- Volatility was computed based on monthly returns over the said period. The monthly volatilities were annualised using a factor of sqrt of twelve (√12).

Basis of bifurcation into large-cap, mid-cap and small-cap by the stock exchange/s?

As per SEBI circular SEBI/HO/IMD/DF3/CIR/P/2017/114 dated 06 October 2017, large cap, mid cap and small cap companies are classified as follows:

a. Large Cap: 1st-100th company in terms of full market capitalisation
b. Mid Cap: 101st-250th company in terms of full market capitalisation
c. Small Cap: 251st company onwards in terms of full market capitalisation

The Association of Mutual Funds in India (AMFI) publishes names of all listed companies in order of their average market capitalisation (in decreasing order). Applying the SEBI guideline on the latest list as of June 2020, we can perceive that on an average:

Large cap companies have market capitalisation of more than INR 25,000 crores,
Mid cap companies have market capitalisation in the range of INR 7,000 to 25,000 crores, and
Small cap companies have market capitalisation of less than INR 7,000 crores.

Volatility – Meaning and its role

Meaning

In finance, volatility is a measure of the dispersion of returns for a given security or market index. In other words, it gauges how much the value of securities or market indices can fluctuate.

Volatility is measured using either standard deviation or variance. In both the cases, higher the value – more volatile are the prices of the securities and market indices, hence it makes them riskier for the market participants. Companies with low volatility, such as regulated industries and other large-cap companies, are expected to grow slowly, but steadily, over time. On the other hand, the stock prices of higher volatility companies (e.g., start-ups) can move significantly from one day to the next.

Generally, there are three measures to estimate volatility. The first, historical volatility, refers to the actual variability in the movement of own stock over a specified historical period. The second measure, implied volatility, is the volatility generated from the actual trading price of market-traded options; it is the market's "consensus" estimate on a company's expected future volatility. A third measure, used primarily by private or newly listed companies, involves deriving volatility by benchmarking with the historical (or implied) volatilities of peer companies.

Role in Valuation

Volatility has a remarkable role as a factor determining the valuations:
- valuation of stock options,
- assessment of discount for lack of marketability using security-based or analytical approaches,
- analysis of restricted stock,
- examination of other forms of equity-based compensation and share-based payments

Understanding, selecting, and using an appropriate volatility factor is important to accurately determine the value of financial instruments issued by entities.

"For the investor who knows what he is doing, volatility creates opportunity"

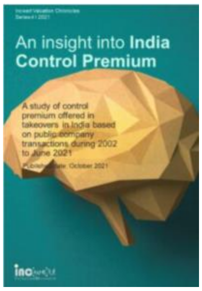
- John Train

Client footprint across India and outside

Reference | Incwert Publications

Holdco Discount - January 2022

India control premium study - October 2021



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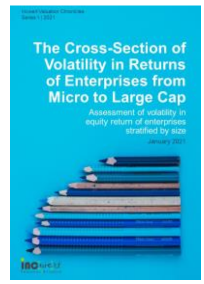
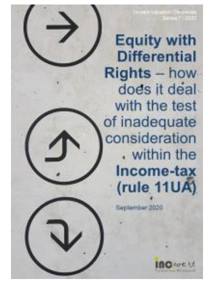


DVR and Rule 11UA - September 2020



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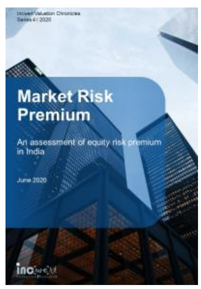

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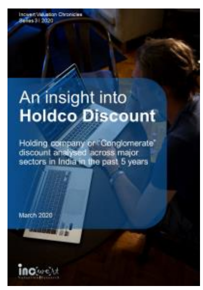

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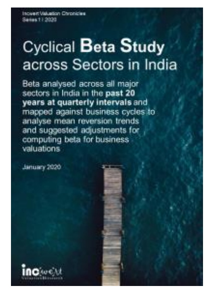

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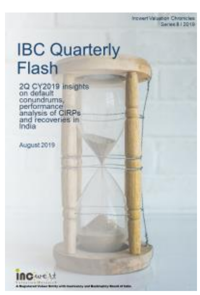

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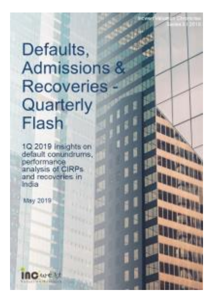

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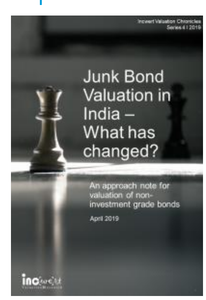
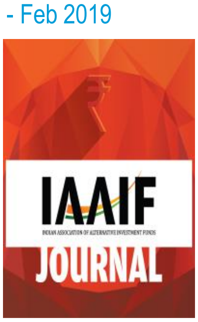


Perspective on valuation of DVRs - Mar 2019

Valuation challenges in AIF (Pg. 69-80) - Feb 2019



Equity risk premium in India - Jan 2019

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