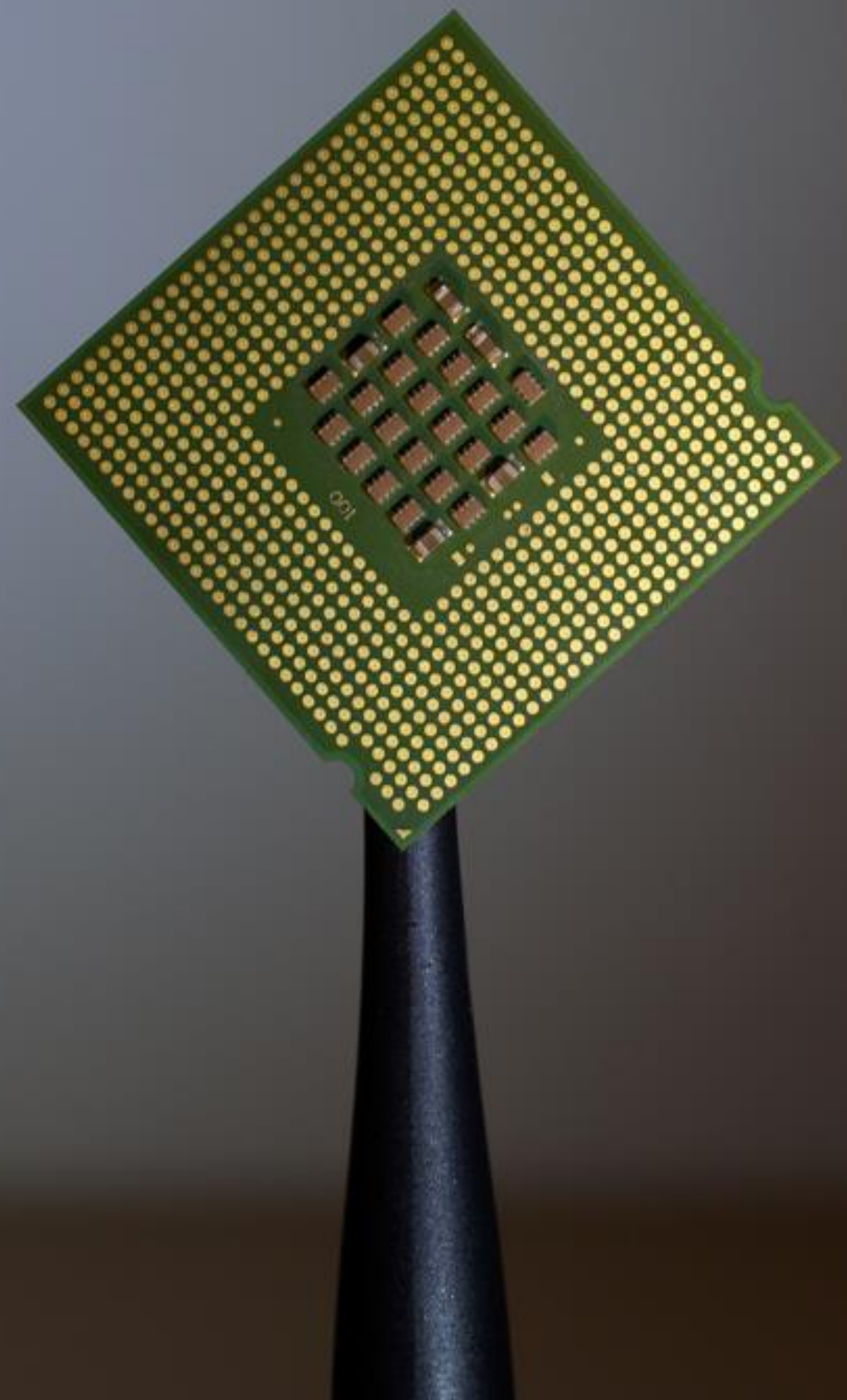




MarketVector™ US Listed Fabless Semiconductor Index

The Future of Semiconductor Innovation
August 2024

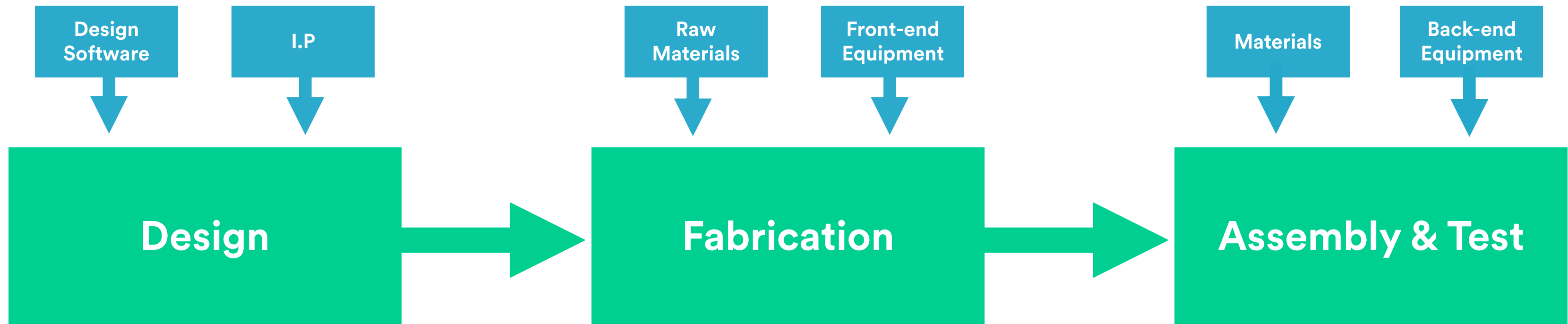


Indexing the Future of Semiconductor Innovation

- ✓✓ Semiconductors are at the center of technological advancement, driving innovation that shape our future
- ✓✓ Understand the total value chain and the role of fabless designers in leading advancements in this space
- ✓✓ Explore investment potential in targeting segmented themes within the semiconductor ecosystem through indexing with MarketVector

Semiconductor Value Chain

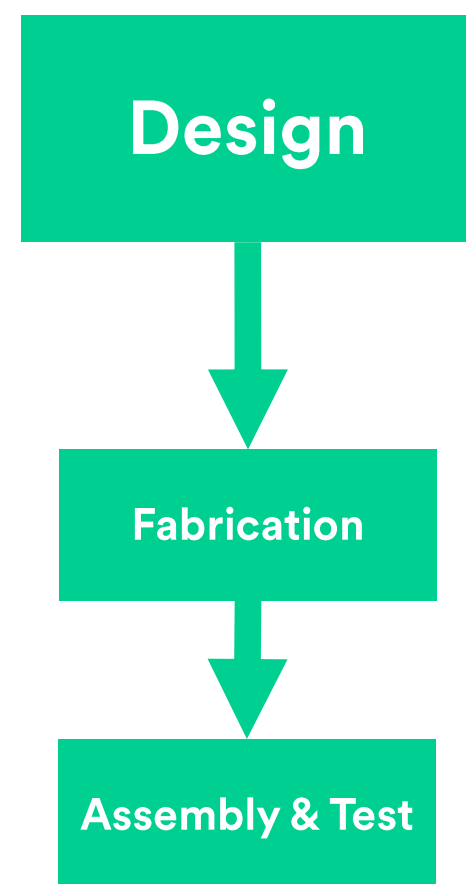
Fabless Designers Leading Innovation



- Innovations in semiconductor manufacturing – such as miniaturization, photolithography, and the discovery of new semiconductor materials – are essential enabling factors.
- In the semiconductor value chain, it is the **Designers** who
 - push the global innovation cycle forward, and,
 - are responsible for developing the devices at the forefront of emerging compute and industry paradigms including artificial intelligence, 5G and 6G communications, cloud and fog computing, autonomous and electric vehicles, smart energy grids, and media streaming to name a few.

A Tale of Two Business Models

Comparing Fabless Designers and Integrated Device Manufacturers

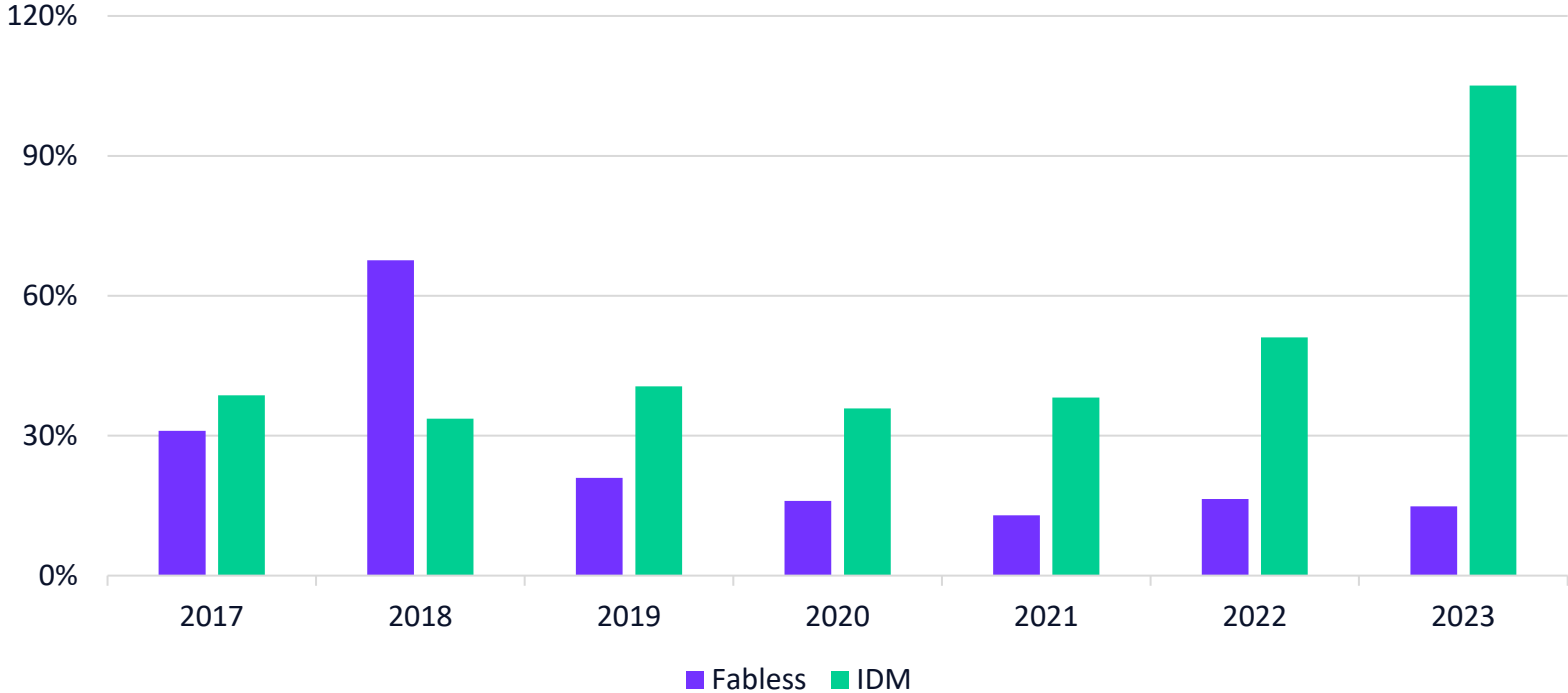


Description	The Good and The Bad	Examples
Electronic Design Automation (“EDA”) Software		
Provide software to automate the design, simulation, and testing of electronic systems.	Play an integral part in enabling major trends in semiconductor design; while not engaged in the manufacture of semiconductors themselves they view both Fabless and IDMs and their customer base.	Synopsys Cadence Design
Intellectual Property (“I.P.”) Licensors		
Design and license I.P. cores to chip manufacturers, often serving as foundational technologies.	Play a crucial role in semiconductor innovation and scalability enabling faster and more cost-effective development of chips. Similar to Fabless Manufacturers, below, these companies are generally able to commit a relatively high level of resources to R&D.	ARM Holdings CEVA
Fabless Manufacturers		
Engaged in the design and sale of semiconductor products while outsourcing most fabrication and manufacturing.	Ability to focus capital on R&D and generally can operate with significantly lower debt and capital expenditures. Because Fabless companies outsource manufacturing, they are more at risk to supply chain disruptions and the negotiating power of outsourced providers.	NVIDIA Broadcom AMD Qualcomm
Integrated Device Manufacturers (“IDMs”)		
Engaged in the design, manufacture, and sale of semiconductor products, generally controlling the entire production process.	Controlling all aspects of the production process IDMs are able to better optimize and innovate in the manufacturing process and focus on quality control; IDMs are also less beholden to outsourced providers. However, this business model is more capital intensive and CAPEX requirements tend to crowd-out investments in R&D.	Intel Texas Instruments Analog Devices Micron

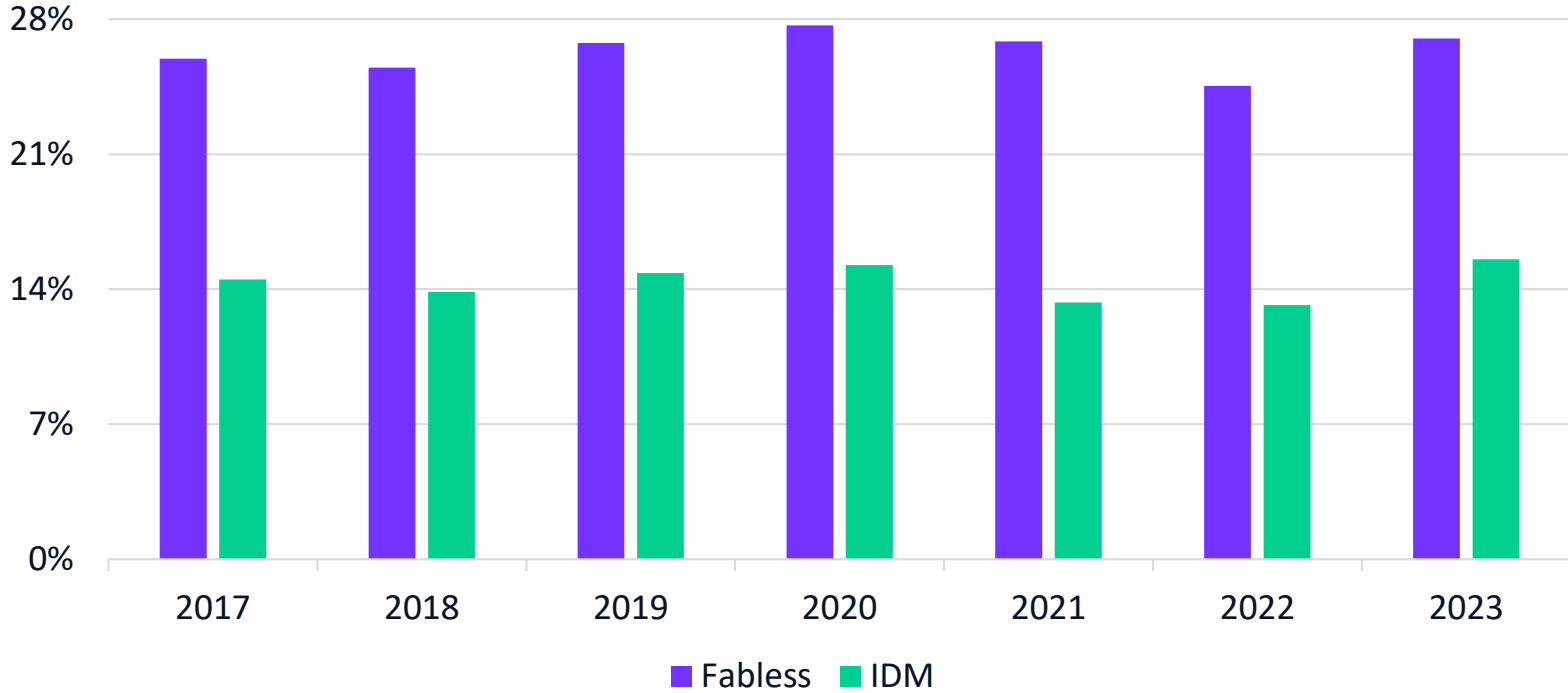
EDA, I.P. Licensors, and Fabless manufacturers are eligible for inclusion in the MarketVector US Listed Fabless Semiconductor Index

Fabless vs IDM Business Models by the Numbers

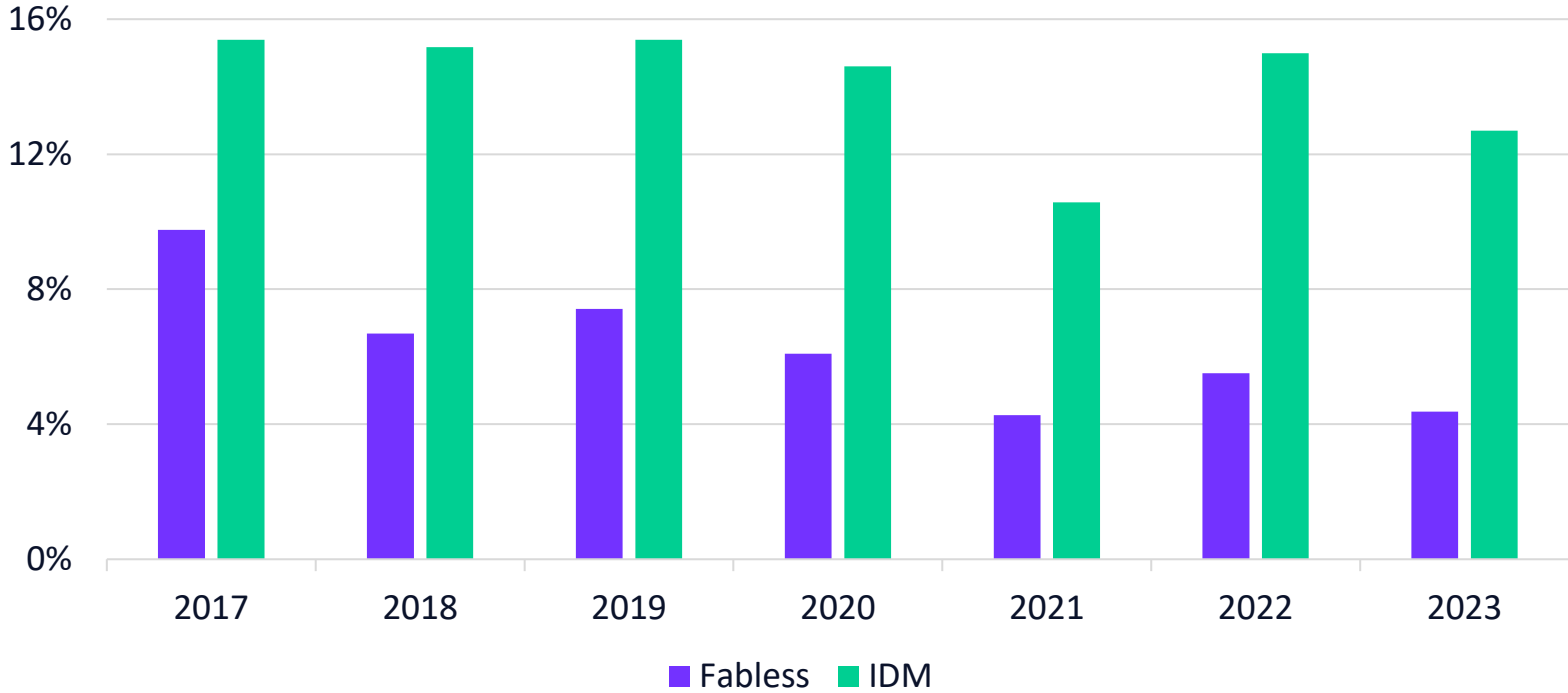
CAPEX to Operating Cash Flow



Research & Development Expense to Sales



Total Debt to Enterprise Value



- The IDM business model requires a higher level of CAPEX as a percentage of cash from operations, compared to their Fabless peers, presumably due to upgrades and maintenance to manufacturing facilities...
- Higher levels of CAPEX and operating assets must be financed, as likely evidenced by IDMs' higher debt levels concerning enterprise value.
- With lower capex and interest expense, the Fabless business model can allocate more capital and resources to R&D.

Fabless: Top-10 components of the MVSMHX index by current market cap
 IDM: Top-10 components of the MarketVector IDM basket by current market cap
 Data calculated as average of all stocks for which historical annual is available
 Source: FactSet, MarketVector.

Fabless vs IDM: Different Product Mix and Focus

With a significantly greater budget for R&D, Fabless companies can generally focus product design on higher-value add products which could lead to long-term competitive moats.

Generally, Fabless companies' products tend to have experienced greater adoption or play a more critical role in artificial intelligence and next-gen communications devices.

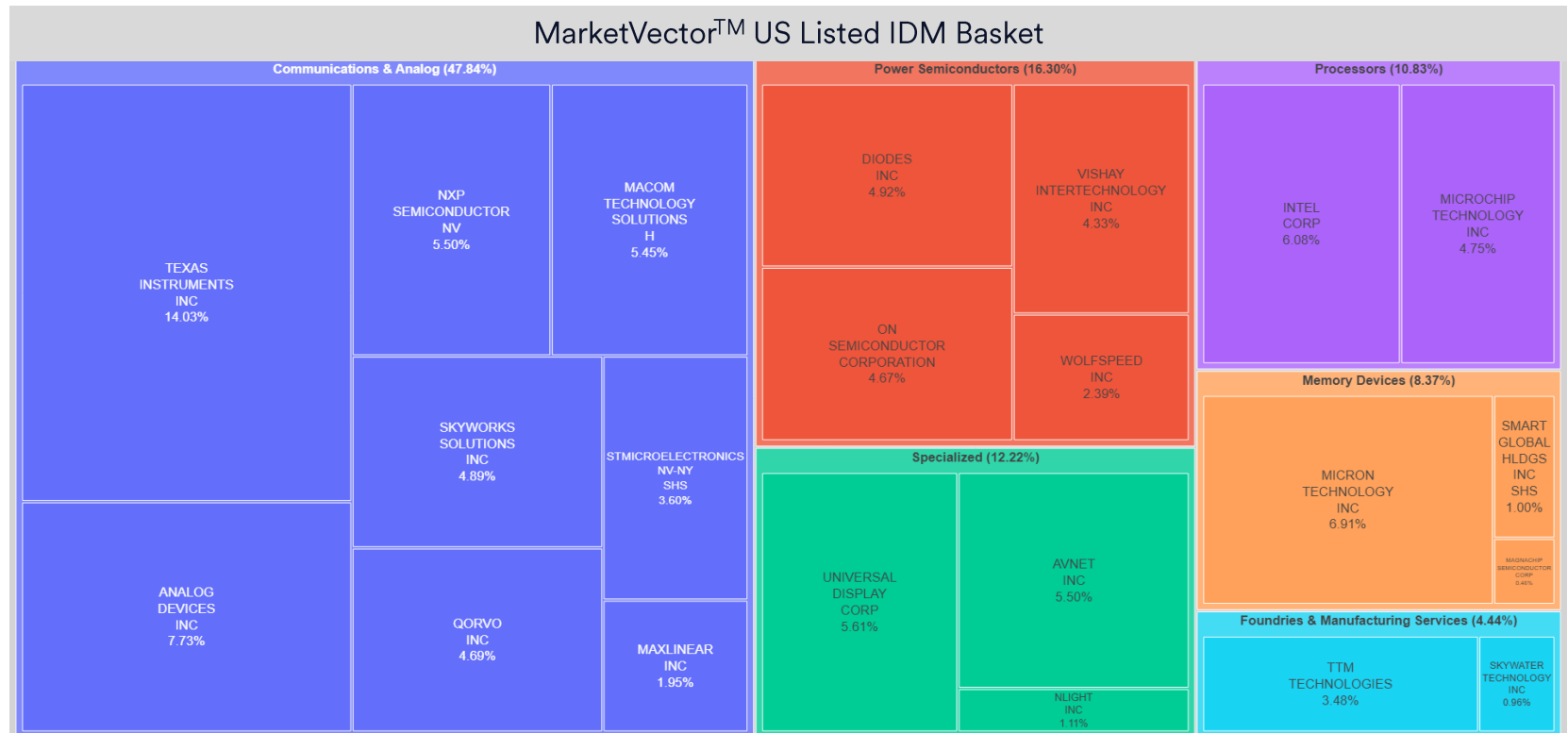
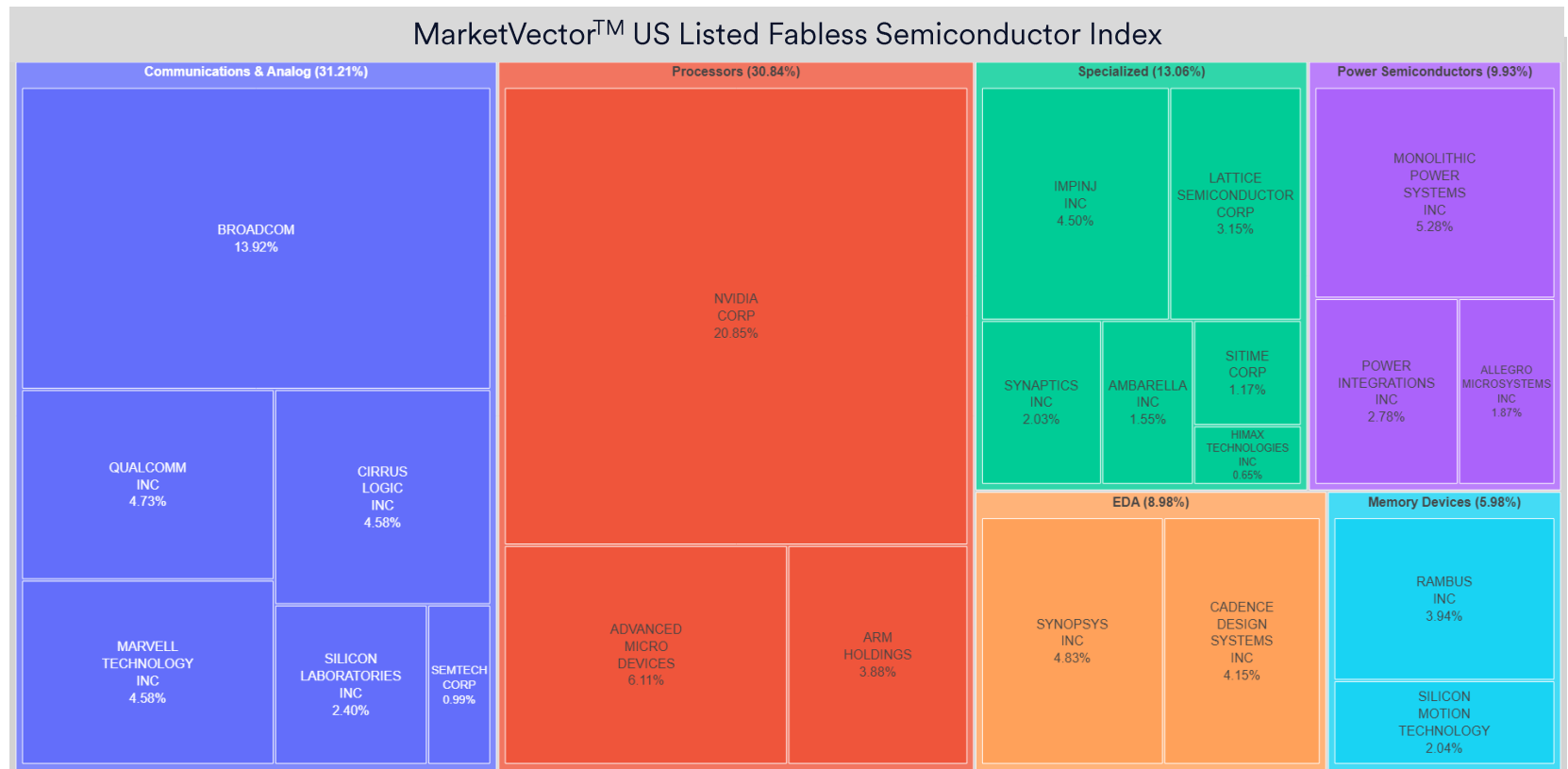
The MarketVector Fabless Index, compared to the MarketVector IDM basket, has:

- ~20% higher weight in processors
- ~16% lower weight in analog and communications devices

Weights as of Q1 2024 review

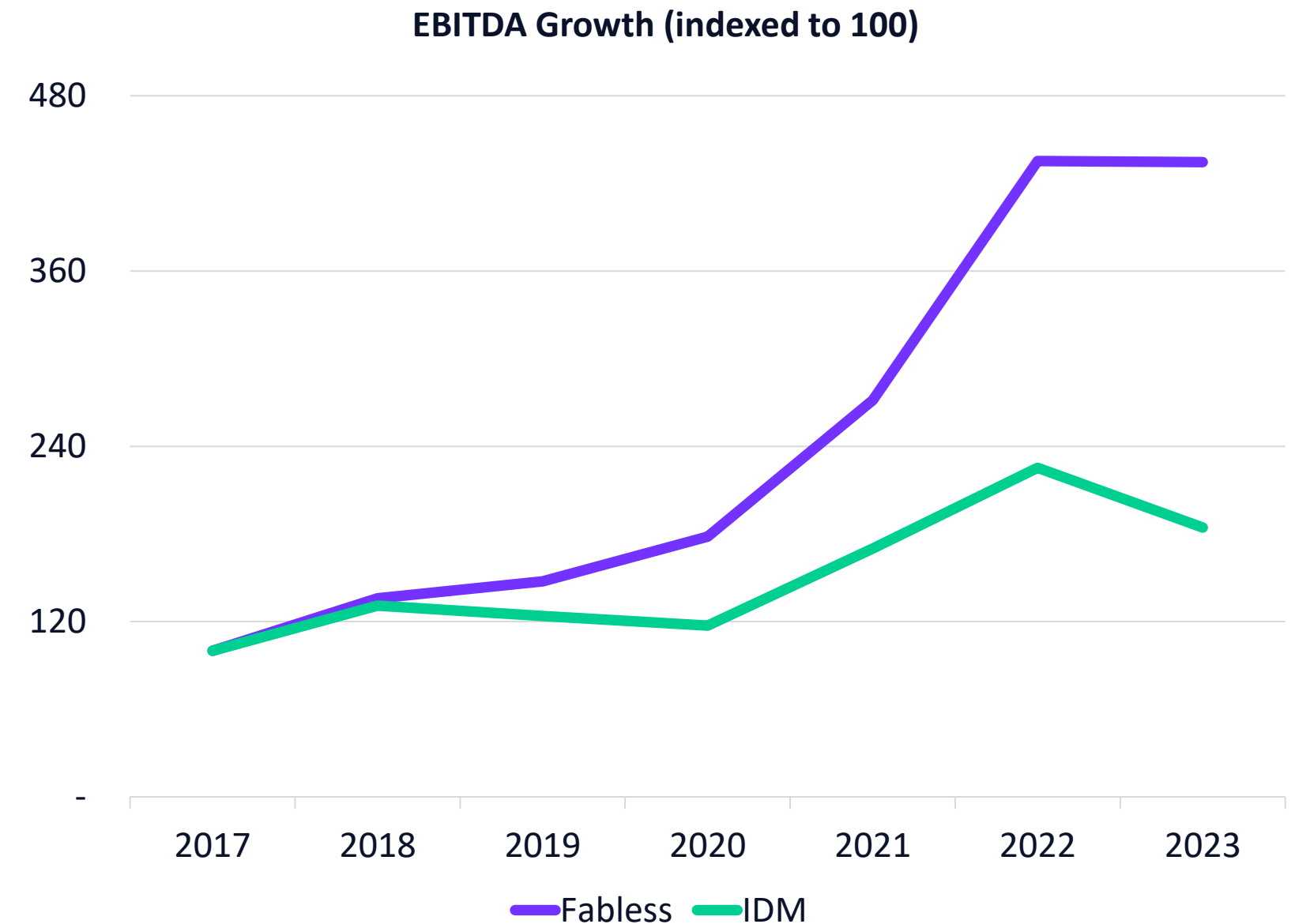
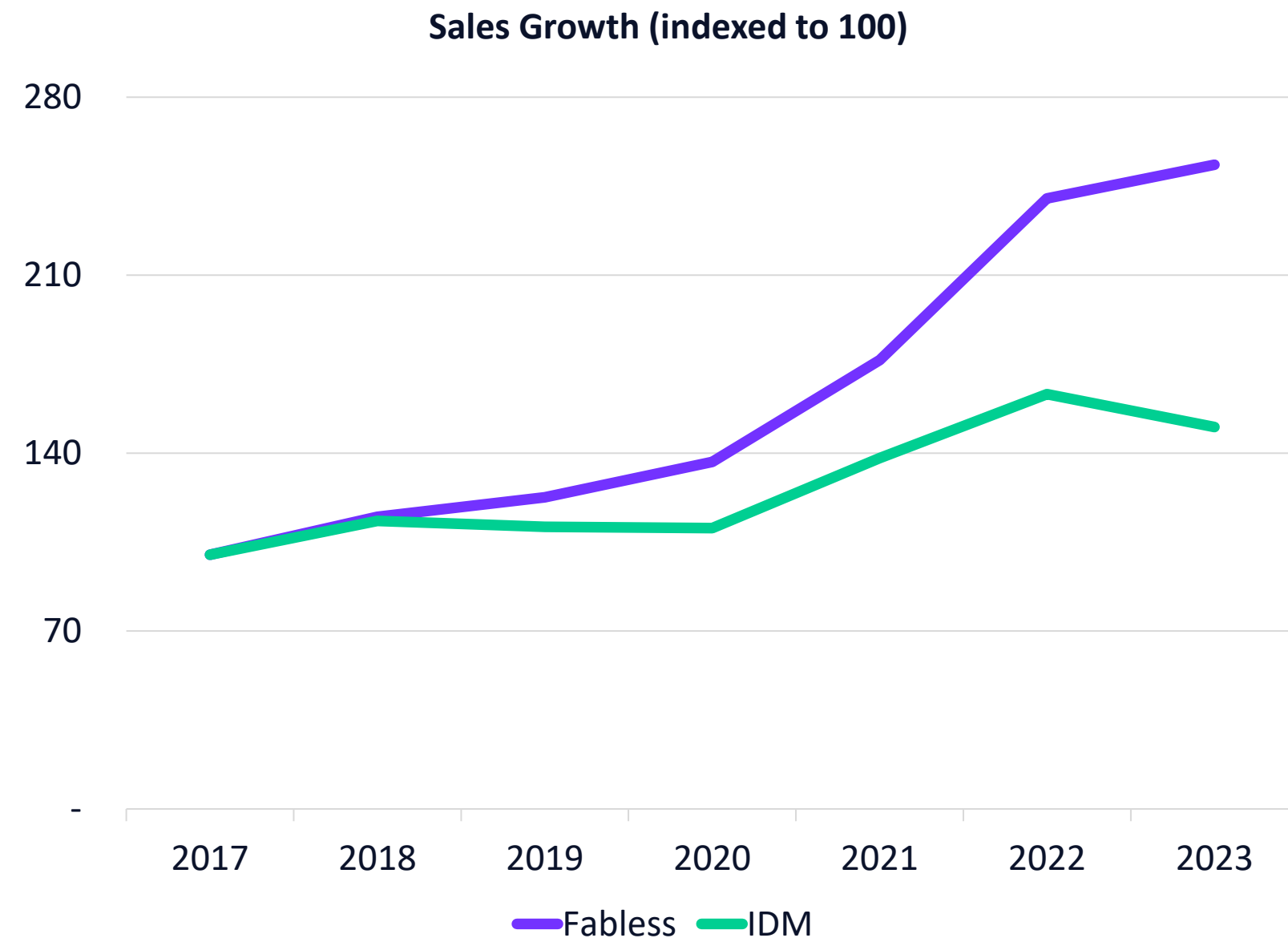
MarketVector IDM Basket includes the 22 largest IDMs covered by MarketVector

Source: MarketVector.



Fabless vs. IDM: Divergent Growth, Distinct Outcomes

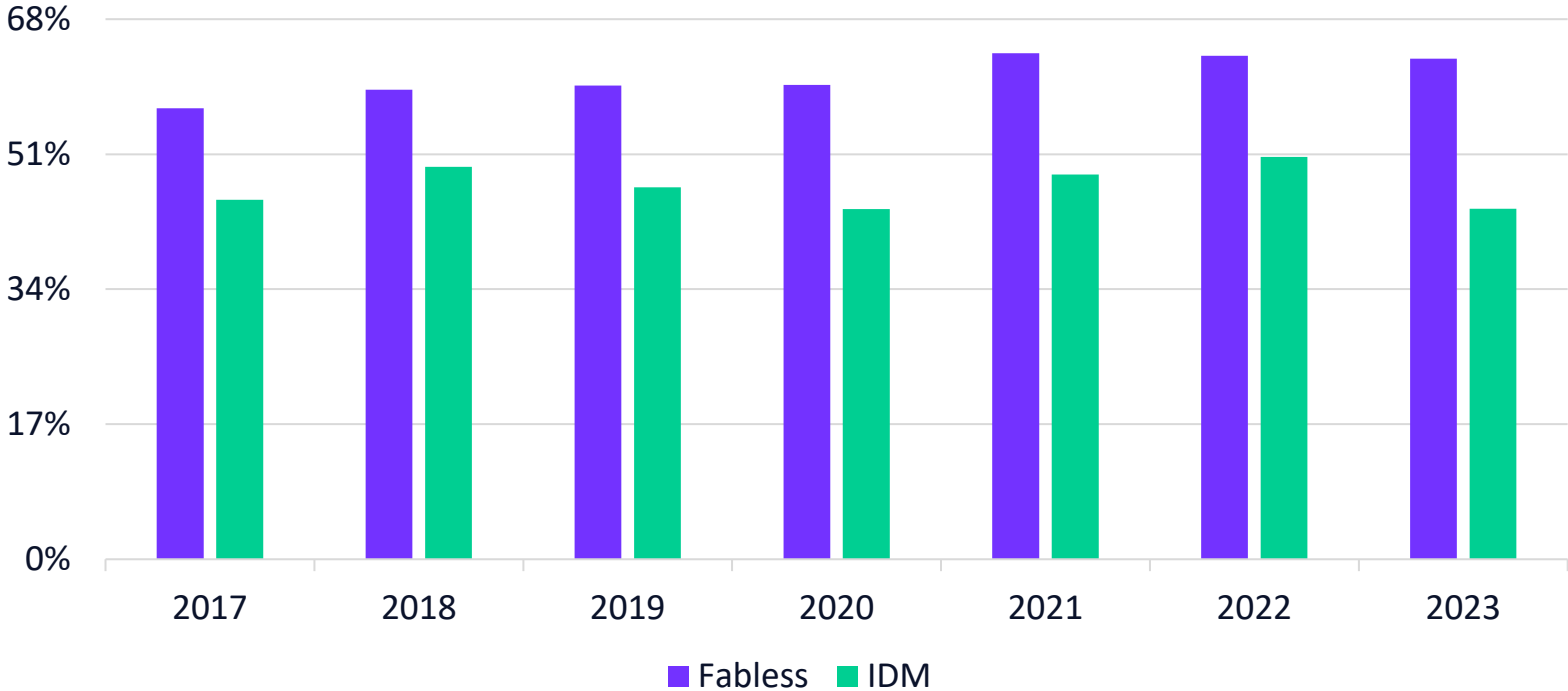
Over the last six years fabless companies' sales and EBITDA CAGR have exceeded that of their IDM peers by 10% and 17%, respectively.



Fabless: Top-10 components of the MVSMHX index by current market cap
IDM: Top-10 components of the MarketVector IDM basket by current market cap
Data calculated as average of all stocks for which historical annual is available (growth is calculated as average annual growth rate for all stocks for which historical annual data is available).
Source: FactSet, MarketVector.

Fabless vs. IDM: Differentiated Margins

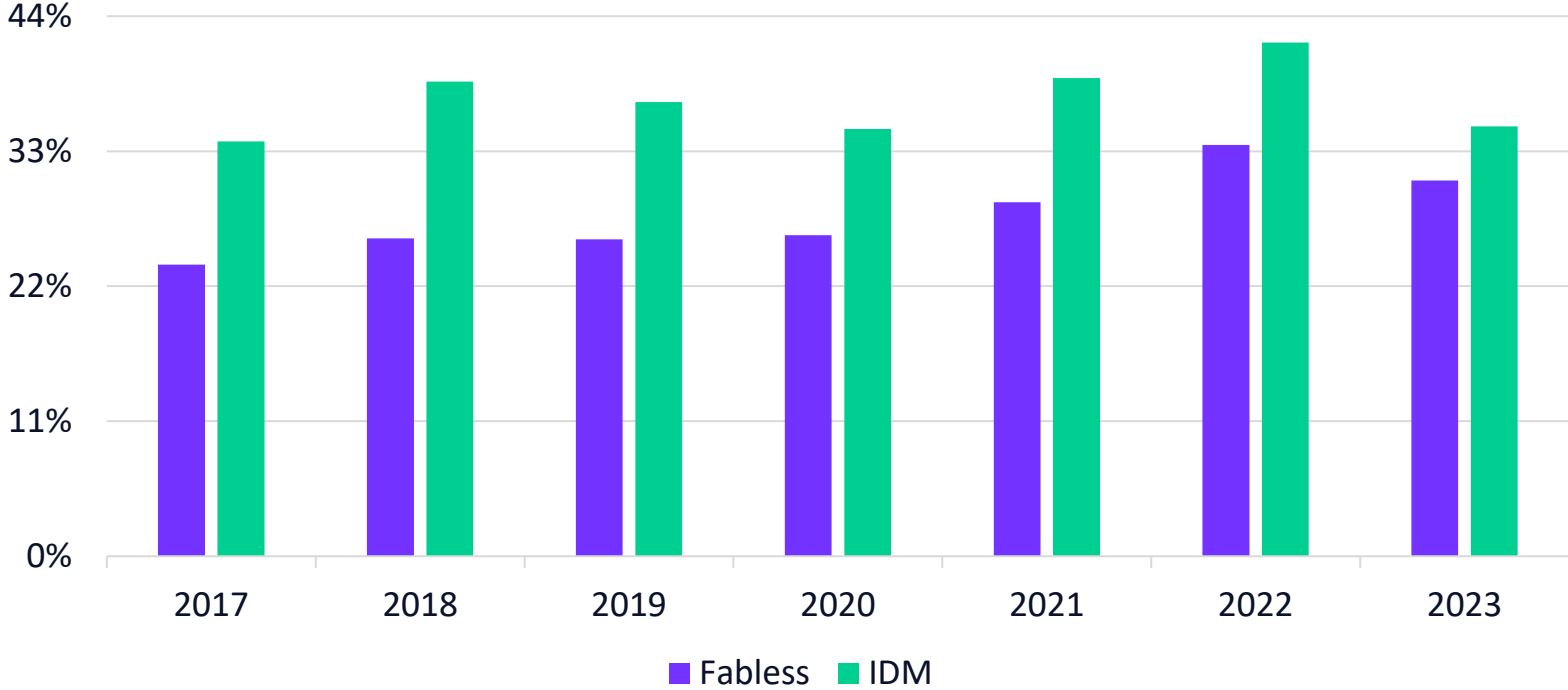
Gross Profit to Sales



EBITDA (ex-R&D) to Sales



EBITDA to Sales

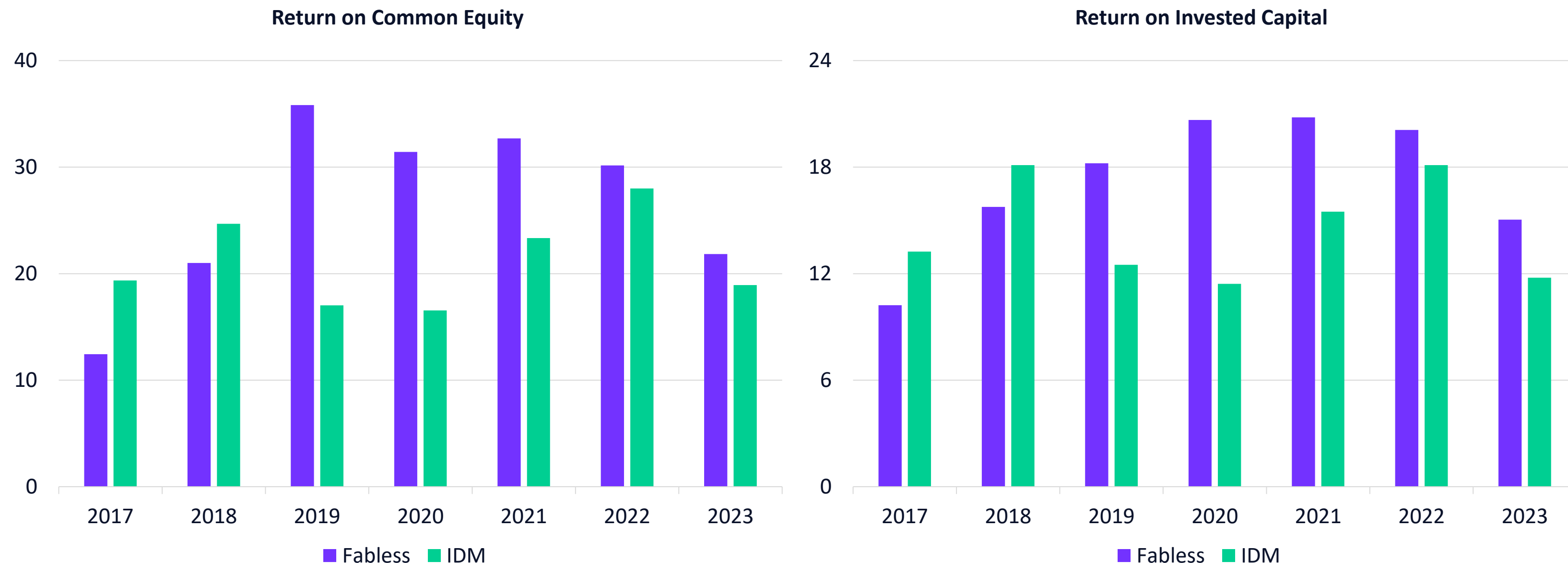


- The fabless business model has consistently earned a higher gross profit margin.
- The IDM business model has consistently earned a higher EBITDA margin.
- But ONLY due to lower investment in R&D which, in turn, may have enabled superior top-line growth for fabless companies.

Fabless: Top-10 components of the MVSMHX index by current market cap
 IDM: Top-10 components of the MarketVector IDM basket by current market cap
 Data calculated as average of all stocks for which historical annual is available (growth is calculated as average annual growth rate for all stocks for which historical annual data is available).
 Source: FactSet, MarketVector.

Fabless vs. IDM: Compounding Returns Lead to...

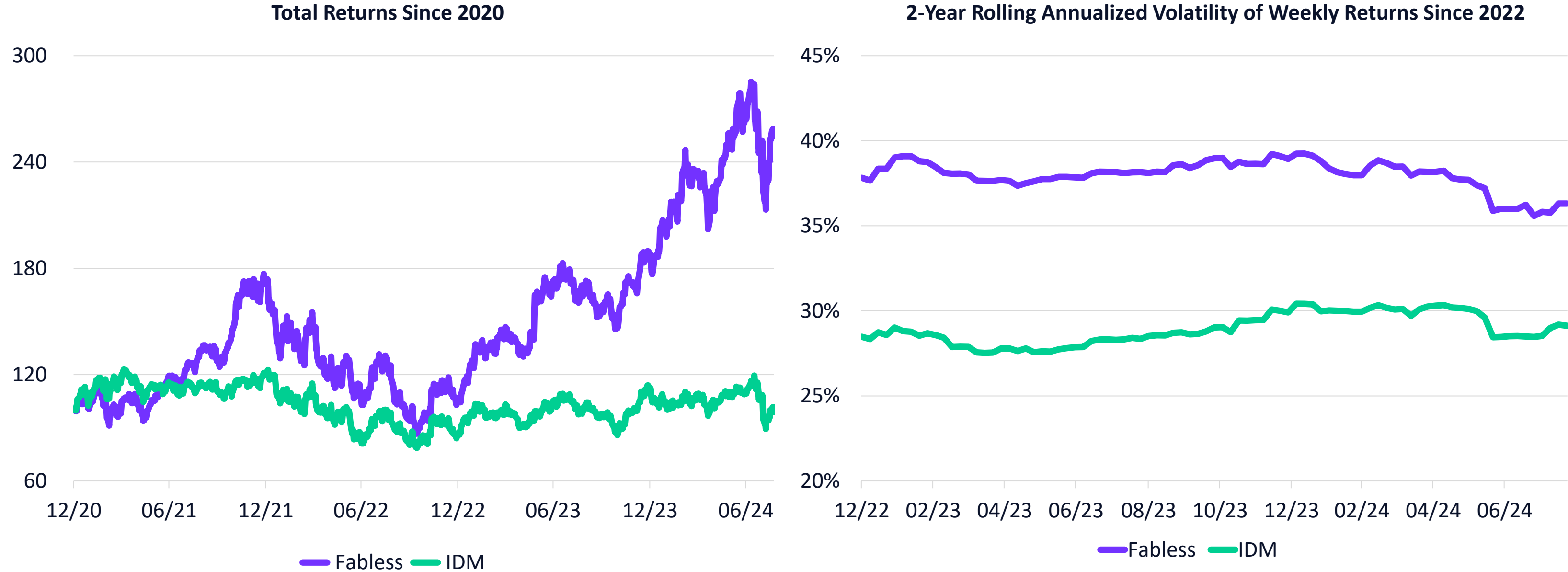
Higher margins, lower financial and capex burden, and faster top-line growth have resulted in greater ROE and ROIC for fabless companies.



Fabless: Top-10 components of the MVSMHX index by current market cap
IDM: Top-10 components of the MarketVector IDM basket by current market cap
Data calculated as average of all stocks for which historical annual is available
Source: FacSet, MarketVector.

...Distinct Long-Term Returns and Volatility

Compounding of higher rates of return translates into differentials in share price performance and volatility over the long-term.



Fables is represented by the MarketVector™ US Listed Fables Semiconductor Index
 IDM represented by a basket of the 22 largest IDMs covered by MarketVector, rebalanced semi-annually
 Source: MarketVector. Indexed to 100, data as of August 22, 2024.

Partner with Us

Inspiration made investable

MarketVector goes beyond the traditional to turn your vision into a comprehensive, investable index solution.

With a track record of breaking new ground, our solutions measure and capture performance with unparalleled precision, giving you an edge in the market.

sales@marketvector.com | marketvector.com

5G.

Crypto.

Global logistics.

Semiconductors.

Quantum computing.

The undefined.

The uncharted.

The impossible.

Indexed.

Disclaimer

Copyright © 2024 by MarketVector Indexes GmbH ('MarketVector') All rights reserved. The MarketVector family of indexes (MarketVector™, Bluestar®, MVIS®) is protected through various intellectual property rights and unfair competition and misappropriation laws. MVIS® is a registered trademark of Van Eck Associates Corporation that has been licensed to MarketVector. MarketVector™ and MarketVector Indexes™, are pending trademarks of Van Eck Associates Corporation. BlueStar®, BlueStar Indexes®, BIGI® and BIGITech® are trademarks of MarketVector Indexes GmbH. Redistribution, reproduction and/or photocopying in whole or in part are prohibited without written permission. All information provided by MarketVector is impersonal and not tailored to the needs of any person, entity or group of persons. MarketVector receives compensation in connection with licensing its indexes to third parties. You require a license from MarketVector to launch any product that is linked to a MarketVector™ Index to use the index data for any business purpose and for all use of the MarketVector™ name or name of the MarketVector™ Index. Past performance of an index is not a guarantee of future results.

It is not possible to invest directly in an index. Exposure to an asset class represented by an index is available through investable instruments based on that index. MarketVector does not sponsor, endorse, sell, promote or manage any investment fund or other investment vehicle that is offered by third parties and that seeks to provide an investment return based on the performance of any index. MarketVector makes no assurance that investment products based on the index will accurately track index performance or provide positive investment returns. MarketVector is not an investment advisor, and it makes no representation regarding the advisability of investing in any such investment fund or other investment vehicle. A decision to invest in any such investment fund or other investment vehicle should not be made in reliance on any of the statements set forth in this document.

Prospective investors are advised to make an investment in any such fund or other vehicle only after carefully considering the risks associated with investing in such funds, as detailed in an offering memorandum or similar document that is prepared by or on behalf of the issuer of the investment fund or other vehicle. Inclusion of a security within an index is not a recommendation by MarketVector to buy, sell, or hold such security, nor is it considered to be investment advice.

All information shown prior to the index launch date is simulated performance data created from backtesting ("Simulated past performance"). Simulated past performance is not actual but hypothetical performance based on the same or fundamentally the same methodology that was in effect when the index was launched. Simulated past performance may materially differ from the actual performance. Actual or simulated past performance is no guarantee for future results.

These materials have been prepared solely for informational purposes based upon information generally available to the public from sources believed to be reliable. No content contained in these materials (including index data, ratings, credit-related analyses and data, model, software or other application or output therefrom) or any part thereof (Content) may be modified, reverse-engineered, reproduced or distributed in any form by any means, or stored in a database or retrieval system, without the prior written permission of MarketVector Indexes™. The Content shall not be used for any unlawful or unauthorized purposes. MarketVector and its third-party data providers and licensors (collectively "MarketVector Parties") do not guarantee the accuracy, completeness, timeliness or availability of the Content. MarketVector are not responsible for any errors or omissions, regardless of the cause, for the results obtained from the use of the Content. THE CONTENT IS PROVIDED ON AN "AS IS" BASIS. MARKETVECTOR PARTIES DISCLAIM ANY AND ALL EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, ANY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR USE, FREEDOM FROM BUGS, SOFTWARE ERRORS OR DEFECTS, THAT THE CONTENT'S FUNCTIONING WILL BE UNINTERRUPTED OR THAT THE CONTENT WILL OPERATE WITH ANY SOFTWARE OR HARDWARE CONFIGURATION. In no event shall MarketVector Parties be liable to any party for any direct, indirect, incidental, exemplary, compensatory, punitive, special or consequential damages, costs, expenses, legal fees, or losses (including, without limitation, lost income or lost profits and opportunity costs) in connection with any use of the Content even if advised of the possibility of such damages.