Deloitte Retail Volatility Index
How 100 years of conventional wisdom is being disrupted
Is 100 years of conventional wisdom being disrupted?

Around boardroom tables and in the conference rooms of companies across the retailing industry, there is a heated debate underway. With the retail industry only growing at a tepid 1.3 percent\(^1\), executives understand the environment is tough. However, within that soft overall performance lies an opportunity, as e-commerce is growing at 15 percent.\(^2\) So, after a difficult 2015 holiday sales period in which consumer shopping patterns appear to have changed, retailers are taking a long, hard look in the mirror and debating: *are the industry issues merely cyclical or are they structural?*

Last year’s warm winter across much of the US no doubt affected apparel sales, the strong dollar has impacted spending by international visitors, and there has yet to be a clear new fashion trend since the advent of skinny jeans. We’ve seen dynamics like these before and will likely see them again. Assuming you believe that the issues facing retailers today are largely cyclical in nature, then the resulting strategy is likely to buckle down, get back to your knitting, and “operate” your way out of the softness in retail sales. Who knows, maybe the next great fashion trend is right around the corner and will fuel a wardrobe refresh.

However, if the difficulties are the result of issues that are more structural, then the playbook may need some rewriting. Structural changes occur when the fundamentals of the industry shift. The last major structural shift in retail was well documented in *The Walmart Effect*, a book that documented how Walmart successfully changed the industry by focusing on scale and supply chain efficiency, and thereby changed forever the dynamics of the industry. Culprits typically leading to such...
structural changes include fundamental changes in consumer shopping behaviors, massive spending pattern changes, changing industry economics, and new, disruptive business models, often driven by new technology.

While those attributing market changes to cyclical dynamics would have retailers "operate" their way through them, those that see structural changes as the predominant underlying drivers would suggest retailers to "innovate" their way to success.

From the many conversations Deloitte has had with a wide range of retailers, we understand this debate is active, heated, and widespread. It’s not unique to any one retail sector either. To help our clients to more clearly understand the drivers of our current market dynamics, we decided to set out to study the issues more closely. To be clear, we started our research with a hypothesis: that we are in the midst of massive and unprecedented structural changes impacting the retail industry, brought about by exponential advances in technology, consumer adoption and resulting disruption.

We believe the same phenomenon is happening across industries, from media to transportation: Technology drastically decreases barriers to entry and enables a flood of new competition. As a result, market share fragments and margins erode while competition dramatically intensifies.

We recognized that, if this is true, there must be a way to measure it. We know that retail executives are moved by data, not by theory or opinions, so we set out to determine if there is empirical data to support this hypothesis.

**Exponential technology**

In the technology industry, Gordon Moore, co-founder of Intel, observed that, over time, computing would dramatically increase in power and decrease in relative cost, at an exponential pace. “Moore’s Law” effectively describes an exponential curve, with the rate of advancement progressively getting faster and faster, resulting in a profoundly accelerating rate of change. Further, what is observed is that, as technology power progresses and begins to impact an industry, disruptive forces in that industry also appear to accelerate.

The more fascinating observation is that when industries begin to take on digital properties, it could be argued that the industries also begin to adopt the properties of Moore’s Law, with disruptive changes coming at a faster and faster rate. Of course, this is contrary to the traditional model in retail, which is inherently linear, where
.... our hypothesis for our research was that we are in the midst of massive and unprecedented structural changes impacting the retail industry, brought about by exponential advances in technology, consumer adoption and resulting disruption.
Moore's Law of exponential change

Source: Singularity University
prior year’s results drive future plans based on anticipation of incremental changes. A retail CEO recently told us, “Twenty years ago, I was told that e-commerce would destroy my business, and yet twenty years later, e-commerce is only 7 percent of my business. Does that mean I have another twenty years until it is 14 percent?” Clearly a linear way of thinking. If you believe in Moore’s Law, the answer is clearly no! In fact, Moore’s Law would tell us this may not even be the right question, as the rate of technology disruption will increase exponentially, which will likely mean the concept of e-commerce as a percentage of sales likely will not even be the right way to understand the impacts. For example, in Deloitte’s report, *The Digital Divide*, we were able to prove that 64 percent of in-store sales are influenced by digital, fast approaching 100 percent—already destroying the concept of e-commerce as a separate kind of retail.

Looking at history, we find that when technology disrupts an industry and drives significant structural changes, the disruptive forces are often misunderstood, misinterpreted, or underestimated until it is too late. This research piece is designed to dig deep and understand these dynamics, to challenge conventional wisdom where necessary, to look for empirical data to either support or disprove this notion of disruption, and ultimately, to provide insight into how retailers can best prepare and respond to the market dynamics underway.

**Linear versus exponential growth**

It may be said that industries are both disrupted by and enabled by technology. Technology has not only changed customer demands, it has enhanced retailer capabilities, and further complicated how retailers compete with one another. What is often overlooked is that the exponential advancement of technology has done much more than simply created an easier way to shop, technology has fundamentally removed the barriers to entry and, in doing so, it has unleashed an onslaught of new competitors on the retail industry, many with a different business model at their core—again enabled by technology, fueling shifts in market share and ultimately impacting overall industry volatility.
What is retail volatility and why did we measure it?

When we began to think about measuring disruption, our approach began with our observations of the industry. In the last 10 years, the industry has been a spotted with a number of retailers going out of business and donating share, while clearly a new crop of players have arisen and taken share. We recognized the recent competitive dynamics can be summed up as a battle for market share, in a no-to-low-growth environment. Based on this, we looked at ways to measure the battle for share as a proxy for disruptive forces. The thinking was that in disrupted markets, we would see aggressive changing in the share distribution with some aggressively taking share and others donating. It was our hypothesis that increased disruption leads to amplified competition and, hence, to increased changes in market share distribution—or what we call market share volatility. As we set out to measure retail share volatility, we considered how analysts measure global stock market volatility. That’s where we found our inspiration. We developed the Deloitte Retail Volatility Index (RVI) to determine the degree of disruption as measured by the “gives and takes” of market share which we believe is amplified during times of turmoil. And to us, at least anecdotally, this seemed to be occurring, but the question was, “Could we measure and quantify this phenomena?”

In this study, we measure Retail Volatility by looking at how the distribution of retail market share has changed from 2007 to 2015 for the top ~150 retailers in terms of revenue. Understanding market share trends allows us to take a “big picture” view of the retail industry.
Market share volatility

Note:
Based on the top 153 US retailers

1 Market share volatility is measured as the weighted standard deviation; retailers contributing most to annual volatility
What did we find?

When we began digging into the data, our hypotheses about the shifting landscape were borne out: while volatility proved to be just that—volatile, without a doubt—volatility is in fact on the rise, as evidenced by the vast movements in market share over the last several years. What we discovered was that, since 2010, the volatility of market share increased every year, except in 2014.

But volatility alone doesn’t tell us what is happening, as the give-and-takes could indicate the big getting bigger and the small becoming less relevant; frankly, this is the general trend of consolidation we have seen in retail for the last 100 years. Or, conversely, volatility could be the opposite—fragmentation. Understanding volatility alone doesn’t tell us anything except that competitive intensity has increased. So, our next step was to set out to understand the nature of the volatility. 

Deloitte Retail Volatility Index
Deloitte Retail Volatility Index

Market share volatility

Concentration index

Note:
Based on the top 153 US retailers
1 Market share volatility is measured as the weighted standard deviation; retailers contributing most to annual volatility
2 Concentration is measured as the relative mean difference or the “Gini coefficient”
Death by a thousand cuts?

We know from the data that volatility is up, but what is really going on? Is it the big getting bigger, or is something else going on here? We looked at concentration to help answer this question in the context of shifting market share. What we found was that the major force at play was not the consolidation of the market that we had experienced in the US over the last 100 years. Instead, starting in 2009, something interesting changed as we shifted to fragmentation of the retail industry. Since then, we’ve seen a marked acceleration of fragmentation, with significant acceleration in 2015. Smaller, more nimble players are stealing share from larger, more traditional, at-scale retailers, creating a volatile environment of winners, losers, and head-scratchers.

The Volatility Index, which captures the combination of volatility and fragmentation, reveals a tumultuous US retail marketplace, one in which big retailers are subjected to a phenomenon that could be described as a “death by a thousand cuts”. The competition is no longer coming from the big-box across the street, but rather from a myriad of newer and smaller competitors, most perhaps too small to garner much attention from the big players, but each eating away at market share. These “cuts” include a variety of challenges including those from smaller players with different business models to single-category players who offer a greater depth of offerings when compared to more horizontal players; they involve real-estate challenges of brick-and-mortar players trying to get better return on their capital investments, the challenge...
of changing consumer tastes, and further category-specific fragmenting forces the often surprise even big players. Without understanding that the battle has shifted, many retailers may not recognize that the old playbook may no longer be the correct playbook.

Much like Moore's law would suggest, the trend accelerated in 2015 and reached a new high with a number of contributing factors including both changes in market share and in concentration across retailers. Additionally, one strong contributor to fragmentation was in the area of “tech platforms.” Tech-savvy, agile retailers are being enabled by large trading platforms, such as Amazon Marketplace. We wanted to understand more about Amazon’s role as a competitor, but perhaps even more interesting is its role as an enabler of fragmentation. So we did a deep-dive into Amazon’s overall Gross Merchandise Value (GMV), combining both its direct sales and sales through third parties.

Amazon has certainly gained market share. While Amazon doesn’t break out sales publicly, it is our estimate that between 2010 and 2015, it grew direct retail sales (excluding sales from Amazon Marketplace) by $44 billion and gained almost one percent market share. But if you think the story is as simple as the traditional retailer versus Amazon story, think again. When we look deeper at the numbers we found that the story of Amazon’s success is one of fragmentation, not necessarily concentration in the traditional sense.

In addition to the direct threat from Amazon as a retailer, Amazon has also enabled smaller players to grab market share and drive further fragmentation in the retail market. As a matter of fact, we estimate sellers on Amazon Marketplace (third parties), grew GMV by an estimated $40 billion between 2010 and 2015. Our analysis estimates that third parties’ GMV made up 24 percent of total Amazon GMV. However, by 2015, it enabled sellers to generate an estimated $47 billion, growing by 54 percent compound annual growth rate. One has to truly understand this aspect to recognize that Amazon is both a competitor in their own right, but also the enabler of the fragmentation in the market by enabling smaller retailers to sell through their platform.
Note: Amazon Direct and third party sales numbers are estimates based on Deloitte analysis of public data.

Our findings indicate that, since 2009/10, the top-25 retailers (excluding Amazon) have lost 0.9 percent of their combined concentrated market share, which equates to $41 billion in retail sales in 2015. This directly calls into question the conventional wisdom.

Conventional wisdom may say that the loss of share of by the top-25 retailers (excluding Amazon) might simply be an online vs. brick-and-mortar phenomenon, with the traditional retailers losing the e-commerce game. However, what we found was something different, and perhaps surprising. Of the top-25 retailers, sixteen are formidable e-commerce competitors. These traditional retailers have robust and growing e-commerce sales and those sales have consistently outperformed the broader retail e-commerce market. Between 2010 and 2015, these 16 traditional retailers grew their e-commerce business by an average of 20.9 percent compound annual growth rate versus the overall US retail e-commerce market of 15 percent, meaning they are actually stealing share from others in the e-commerce space. This directly calls into question the conventional wisdom.

So, if large retailers are finding success with their e-commerce offerings, as evidenced by their performance, yet they are losing share, then this must tell us that the gain in e-commerce sales doesn’t offset the loss in companies’ traditional business. This tells us that this is not purely a story about ecommerce. It’s more complex than that.

To view the pressure as “digital” in nature is shortsighted. Case in point—international retailers such as H&M, Primark, Aldi and Uniqlo are making in-roads, and are also stealing market share from more established retailers.

When looking closely at the winners and losers over the past five years, we also found a number of mid-tier retailers gaining market share and contributing to the market volatility. In the same time period where the top-25 retailers (excluding Amazon) lost $41 billion in retail sales, the mid-tier retailers (top-26 to 50) gained 0.2 percent combined market share, or $9 billion in retail sales in 2015. The retailers include a number of regional retailers that expanded nationally, and cut across different industry sectors.
Amazon’s estimated gross merchandise value (GMV) in North America [$ in millions]

<table>
<thead>
<tr>
<th>Year</th>
<th>3rd Parties [CAGR: 53.8%]</th>
<th>Amazon Direct [CAGR: 30.3%]</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>$22,814</td>
<td>$17,331</td>
</tr>
<tr>
<td>2011</td>
<td>$33,509</td>
<td>$24,359</td>
</tr>
<tr>
<td>2012</td>
<td>$45,921</td>
<td>$30,967</td>
</tr>
<tr>
<td>2013</td>
<td>$55,646</td>
<td>$38,524</td>
</tr>
<tr>
<td>2014</td>
<td>$78,167</td>
<td>$51,278</td>
</tr>
<tr>
<td>2015</td>
<td>$112,161</td>
<td>$64,979</td>
</tr>
</tbody>
</table>

+38%

**Note:** Third party GMV estimated based on an average marketplace commission rate of 10% and reported unit sales through marketplace. Data excludes AWS and other revenues (e.g., Credit Card.)

**Source:** Amazon Annual Reports, ChannelAdvisor
Is retail spend fragmenting?

While volatility is on the rise and a fragmentation of market share can be seen, consumer behavior is creating its own set of additional challenges that only compound the disruption. When we look at how consumers spend their disposable income it reflects what may prove to be a fundamental shift in consumer behavior.

More and more, the data suggest that consumers are choosing experiences over physical product, shifting spending away from more traditional retail categories. For example, spending on air travel hit record levels in 2015. Restaurant sales were up a robust eight percent, easily outperforming the one percent increase seen in the overall retail industry. Further, we observe a significant increase in the spending on what we call “the digital life”, that is all things digital—connectivity, data, devices, subscriptions and related service.

In fact, millennial consumers were on track in 2015 to spend an average of $750 each on media, including video games and streaming services. Increasingly, shoppers are also passing up the cashmere sweaters or leather handbags and instead shelling out for experiences such as a beach vacation, a dinner out on the town, or a concert.

This furthers the view that the complexity of the disruption needs to be understood beyond a simplistic brick-and-mortar vs. online view.
Consumer expenditure [% of total household expenditure]

Note: Goods include Food & Drinks, Tobacco, Clothing & Footwear, and household goods. Services include Communications, Leisure & Recreation, Hotels & Catering
What does the retail volatility index tell us about the future?

Understanding stock market correlation
After we collected the data and began analyzing results, we once again turned to the stock market, this time to explore its relation to our findings. We found a strong relationship between the Retail Volatility and stock price for the top 20 public retailers. From the period of 2007 of 2015, the average annual stock price of the top-20 retailers in our study mimicked their market share volatility with an extremely strong correlation.

What does this tell us? Our analysis indicates that market share volatility in the industry is generally a good indicator of stock price volatility. This makes intuitive sense—as customers gravitate to smaller, more nimble players, or trade spend in highly competitive markets, retailers see associated gains and losses in sales and ultimately in stock price.
Correlation between Deloitte Retail Volatility Index and stock price volatility of top-20 public retailers

Note:
Based on the top 139 US retailers

1 Stock price volatility is measured as the weighted standard deviation of the top-20 public retailers

2 Deloitte Retail Volatility is measured as the weighted standard deviation of market share for all retailer in the index
Despite what retailers may be feeling, we believe we are still in the “small numbers” early phase of disruption, but we believe that technology is a fundamental driver, and much like Moore’s Law, as technology advances, the disruption will advance at an increasing rate. We believe the analysis here confirms that the retail market is being disrupted but, in our opinion, the technology you may read about on the front-page of the popular business press—like artificial intelligence, 3D Printing, Internet of Things, augmented reality—are not causing the disruption. Based on our research, it is our view that what we are seeing is disruption driven by first and second generation internet technology like web browsers, mobile technologies, high speed internet, and XML data exchanges. This disruption not only impacts the way consumers shop, but perhaps more intensely and less obviously, these technologies remove barriers to entry, enabling the decoupling of the value-chain and radically changing the business models being brought to market.

Nevertheless, in spite of the disruption being felt, new technologies emerging on the horizon have yet to truly impact the retail industry, and very little, if any of the disruption being seen, is attributable to any these technologies. Like Moore’s Law predicts, new, evolving technologies and changes to their underlying relative costs will likely continue to drive exponential and disruptive change. In other words, looking out the rearview mirror may seem to show carnage, but looking out the front windshield would tell you to fasten your seatbelt, as we haven’t seen anything yet!

If 100 years of retail consolidation can be upended with first and second generation technology, it is not hard to imagine how disruptive these next generation technologies might be.

We may not know exactly what these technologies will bring to the retail industry, but the trajectory of progress and degree of disruption is only set to accelerate. And hopefully from this research, it is understood that the disruptive forces extend well beyond how consumers shop, but perhaps more forcefully impact the retail business model, the competitive environment, and the underlying industry economics.
How to win in a highly volatile retail market

It’s not all bad news for retailers though. When we move beyond macro-sector impacts and instead look closely at individual retailers it becomes clear that there are some who are winning. To understand the winners vs. the losers, and gain insights into the strategies that are coming out on top in our current volatile environment, we continued our study.

We analyzed a group of 86 of the largest public US retailers over a period of five years (2010 to 2015), looking closely at publicly available data. We developed a framework to group the retailers into one of four cohorts. For each retailer, we determined the level of product and experience differentiation, from low to high. By plotting each retailer along these two dimensions we were able to develop four distinct groupings.

From our analysis, we found a number of retailers predominantly competing on value and convenience. These retailers would be focused on driving down operating costs to offer customers better value, and invest in real estate and logistics to provide a high degree of convenience.

Other retailers are focusing on creating highly differentiated experiences but sell a set of products that are not all that differentiated, often available at many other retailers. They focus on providing easy and enjoyable interactions with staff, offering education and entertainment, and personalized content.

There is a third group of retailers that are competing with highly differentiated products and services that cannot be found elsewhere but perhaps compete through a brand experience that is less differentiated. This experience can be offered through private or exclusive brands, vertical integration, or through a limited supply of products that create a sense of urgency and greater motivation to purchase the product immediately.

Finally, a small number of retailers have successfully combined both highly differentiated products and experience. They have an unconventional customer understanding and integrate experiences into unique products or services that address, or even surpass customers’ needs and expectations.
From our analysis, we found that retailers that compete on highly differentiated experiences have seen compound average revenue growth of almost eight percent in the last five years and EBITDA growth of 9.5 percent. This contrasts with retailers competing on value and convenience that grew compound annual revenue growth of 3.5 percent and experienced a negative compound annual EBITDA growth of 3.2 percent. Retailers with a highly differentiated offering grew compound annual revenue growth of 4.8 percent but with a lower EBITDA growth of 2.4 percent. However, a small group of retailers that combined both highly differentiated offerings and experience, delivered solid EBITDA growth of almost 15 percent per annum and revenue growth of 10.7 percent.

We don’t believe volatility predicts the end for physical retail. Though the research does seem to indicate that retailers that focus on broad selections in less engaging physical environments may be the most at risk. For some in this quadrant, there may be opportunity to win as the cheapest, fastest, or easiest. But a changing marketplace may spell opportunity for retailers who can find new ways to remain connected to the customer and create value (and margin) by differentiating their brand along the product and/or experience continuum.

Conclusion
If Moore’s law continues to hold true, it tells us that the exponential changes now being observed in technology will likely continue to drive related changes in the retail marketplace. What challenges retailers face today only heralds the beginning of more disruption and a greater retail evolution ahead.

Consumers will continue to spend for items, services, and experiences, even as their own preferences and behaviors change.

Online retail aggregation and new digital platforms will continue to give smaller retailers greater influence without requiring enormous capital investment, upending traditional barriers to entry. Global players will continue to find new channels of influence even as consumers adopt and use new technologies that impact manufacturing and distribution channels once thought to be the basis for all retail.

However, volatility does not mean the end for retail. In fact, a changing marketplace may spell opportunity for retailers who are the most informed, best prepared and, perhaps most important in a fast-changing competitive environment—best able to adapt.

As the retail marketplace itself evolves, retailers that will succeed must choose, also, to evolve. Those retailers that “innovate” their way through, remain nimble, establish a strong points of differentiation, adopt and use new technologies to their benefit, and find their footing in this volatile environment will continue to grow and thrive, perhaps in new and unexpected ways.

Deloitte Retail Volatility Index
Model assessment [2010-15] – Compound Annual Growth Rate [CAGR]

Highly Differentiated Offering
- 5-year CAGR Revenue: 5.8%
- 5-year CAGR EBITDA: 2.4%

Highly Differentiated Offering + Experience
- 5-year CAGR Revenue: 10.7%
- 5-year CAGR EBITDA: 14.5%

Value & Convenience
- 5-year CAGR Revenue: 3.5%
- 5-year CAGR EBITDA: (3.2)%

Highly Differentiated Experience
- 5-year CAGR Revenue: 8.0%
- 5-year CAGR EBITDA: 9.5%

Note: Top 80 public US retailers
Source: Deloitte Consulting, 2015
What’s the volatility in different sectors?

Our deep dive prompted us to further explore volatility, not only in the retail market overall, but also within a number of key retail sectors. Our goal was to determine how these trends play out in different areas of the industry.

Our research tells us that while Volatility has impacted—and will likely continue to impact—all sectors, but not all sectors have been impacted at the same pace or in the same way.
Volatility in the clothing, footwear and jewelry sector

Volatility in the clothing, footwear and jewelry sector has been driven by smaller players with a lifestyle-targeted offering, increasing number of retailers presenting offerings on tech platforms, as well as the decline of many traditional apparel namesakes. Though the superstore we all know and love has retained the number one position for the past five years, it has lost market share in three of those years.

Deloitte Retail Volatility Index - Clothing, footwear and jewelry

Market share volatility\(^1\)  Concentration index\(^2\)

<table>
<thead>
<tr>
<th>Year</th>
<th>Market Share Volatility</th>
<th>Concentration Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>11.0%</td>
<td>0.860</td>
</tr>
<tr>
<td>2008</td>
<td>9.0%</td>
<td>0.855</td>
</tr>
<tr>
<td>2009</td>
<td>7.0%</td>
<td>0.850</td>
</tr>
<tr>
<td>2010</td>
<td>5.0%</td>
<td>0.845</td>
</tr>
<tr>
<td>2011</td>
<td>6.0%</td>
<td>0.840</td>
</tr>
<tr>
<td>2012</td>
<td>8.0%</td>
<td>0.835</td>
</tr>
<tr>
<td>2013</td>
<td>7.0%</td>
<td>0.830</td>
</tr>
<tr>
<td>2014</td>
<td>6.0%</td>
<td>0.825</td>
</tr>
<tr>
<td>2015</td>
<td>5.0%</td>
<td>0.820</td>
</tr>
</tbody>
</table>

Note:

Based on the top 115 US retailers (excluding Albertson’s/Supervalu/Safeway merger; Western Grocers/Winn-Dixie Stores)

1 Market share volatility is measured as the weighted standard deviation; retailers contributing most to annual volatility

2 Concentration is measured as the relative mean difference or the “Gini coefficient”
Volatility in the consumer electronics sector

Market volatility in consumer electronics remained relatively stable until the merger of two large players in 2013. During that time, concentration began steadily decreasing after 2009, mimicking overall retail trends. A number of large established superstore retailers have lost market share for the past five years in this sector, while several smaller online retailers have shown consistent gains over the last three to five years.

Note:
Based on the top 104 US retailers (excluding Albertson’s/Supervalu/Safeway merger; Western Grocers/Winn-Dixie Stores)

1 Market share volatility is measured as the weighted standard deviation; retailers contributing most to annual volatility
2 Concentration is measured as the relative mean difference or the “Gini coefficient”
Volatility in the home improvement and furniture sector

The home improvement sector experienced periods of high volatility in 2013 driven by a major industry merger.

Despite this, the top market share holder in the space has retained the top position for the last ten years, and grown market share for the last four. Smaller players have increased market share at the expense of larger, traditional retailers since 2006.

Deloitte Retail Volatility Index - Home improvement and furniture

Note:
Based on the top 100 US retailers (excluding Albertson’s/Supervalu/Safeway merger; Western Grocers/Winn-Dixie Stores)

1 Market share volatility is measured as the weighted standard deviation; retailers contributing most to annual volatility

2 Concentration is measured as the relative mean difference or the “Gini coefficient”
Methodology

Concentration index methodology
The Gini coefficient is used to indicate how the distribution of retail market share has changed from 2007 - 2015 for the top 120 - 140 retailers in 2015.

Market concentration is a useful index as it indicates the degree of competition in the market. To measure market concentration in this study, the Gini coefficient was used to indicate how the distribution of retail sales has changed within the top 120 - 140 retailers (based on sales) from 2007 - 2015.

A Gini coefficient ranges from 0 (market share is distribution evenly across all firms) to 1 (one firm has all sales). It is a function of the number of firms and their respective shares of the total sales. It's calculated as the mean of the difference between every possible pair of data points, divided by the mean of all the data points.

Volatility index methodology
Volatility measure is based on year-over-year weighted standard deviation of market share change.

Standard deviation is often used to measure historical volatility of price related to a financial instrument over a given time period. For this study, standard deviation is applied to measure historical volatility of market share for the top 120 - 140 retailers from 2007 - 2015.

A higher volatility over time can be interpreted as increased market share volatility within the top 120 - 140 retailers. An increase in market shares being “traded” versus a lower volatility over time reflects lower market share volatility or less market shares being “traded”.

References:
http://mathworld.wolfram.com/GiniCoefficient.html
End notes

1. US Commerce Department, 2015 Retail Sales growth rate
2. US Commerce Department, 2015 e-Commerce Sales growth rate
3. Based on the top 153 US retailers; Market Share Volatility is measured as the weighted standard deviation
4. Based on the top 153 US retailers; Market Share Volatility is measured as the weighted standard deviation
5. Concentration is measured as the relative mean difference or the “Gini coefficient”
6. See Appendix for an overview of the research methodology
7. 3rd Party GMV estimated based on an average Marketplace commission rate of 10% and reported unit sales through Marketplace. Data excludes AWS and other revenues (e.g., Credit Card)
8. US Commerce Department, Deloitte Analysis
9. Internet Retailer, Top 500 e-Commerce Retailers Database, 2016
10. Internet Retailer, Top 500 e-Commerce Retailers Database, 2016
11. US Commerce Department, 2015 Retail Sales growth rate, Deloitte Analysis
14. Deloitte analysis of the correlation between stock price volatility and market share volatility. Pearson correlation of 0.8.
About the authors

Kasey Lobaugh
Kasey Lobaugh serves as the Chief Retail Innovation officer and omni-channel retail practice leader for Deloitte Consulting LLP. He works with many retailers to drive strategic perspectives and organizational change. Kasey consults with clients to think about the implications of the changing competitive landscape and the rapidly evolving consumer. Kasey focuses on broad business-based strategy that will enable innovative customer experiences, operational scalability and provide return-on-investment. He is the co-author of Deloitte’s Digital Divide study.

Jacob Bruun-Jensen
Jacob Bruun-Jensen is one of Deloitte Consulting LLP’s thought leaders on business model innovation and transformation. He is a principal in the US Strategy service line Monitor Deloitte with a focus on Strategy and Business Transformation. Jacob works with leading retailers to make sense of the converging forces of consumer changes, technologies, and business ecosystems to rethink business models and innovation. His experience spans 10 years in the industry in various strategy and commercial roles, as well as 12 years in strategy consulting.

Jacob researches and writes about business model innovation and operating model transformation, and is the co-author of “Minimum Viable Transformation” and “Business Model Innovation in the Consumer Goods Industry”, part of the Deloitte University’s Business Trends series.

Acknowledgements
The authors would like to thank Ed Chen, Kristen Jones Miller, Karen Shin, Rachel Smeak, Irene Van Ryn, and Herb Williams-Dalgart for their invaluable assistance with this research.