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PAST PERFORMANCE IS NO GUARANTEE OF FUTURE RESULTS AND FUTURE RETURNS ARE NOT GUARANTEED.
An Update on the Two Short Ideas I Pitched at the Robin Hood Conference Two Years Ago
Lumber Liquidators Has Collapsed

- Amidst a formaldehyde scandal exposed by 60 Minutes, the stock has fallen 88% from $115.36 to $13.87
- Sales and SSS are down double digits and the company is now reporting losses – trends that I don’t expect will reverse anytime soon
- I believe the business is likely permanently impaired, so it remains a significant short position in my funds
Interoil Has Been More Than Cut in Half

- IOC has fallen 58% from $86.50 to $36.44
- My belief was (and is) that this is nothing more than a run-of-the-mill (albeit clever) natural resources promotion (natural gas in Papua New Guinea, of all places)
- After more than a decade, Interoil still hasn’t produced a single MCF of natural gas – and I don’t think it ever will
- I got fatigued and covered the short – but my view on the company/stock hasn’t changed a bit
An Update on the Long and Short Ideas I Pitched at the Robin Hood Conference Last Year
Exact Sciences, My Primary Short Idea, Has Fallen 61%

- The stock has fallen 61% from $24.22 to $9.39
- The U.S. Preventative Services Task Force’s Colorectal Cancer Screening Draft Recommendation issued recently is devastating for Exact Sciences’ only product, Cologuard
- I think this is the beginning of the end for the company.
- My price target for the stock a year from now is $3, so I shorted more last month ~$10
Even Though the Stock Had Been Cut in Half, I Pitched Lumber Liquidators Again

I presented this slide:

Why I’ve Increased My Short Position at Current Prices

- The business fundamentals are weakening and the stock is expensive at 11.2x EV/EBITDA and 21.3x trailing earnings
- More importantly, however, I now believe that my investment thesis a year ago – that Lumber Liquidators almost certain was (any may still be) sourcing illegally harvested Siberian hardwoods from Chinese mills – is only the tip of the iceberg

I believe that Lumber Liquidators is trafficking in tainted wood to a much greater degree than just hardwoods – and I think I will soon be able to prove this, so stay tuned
Lumber Liquidators Subsequently Collapsed an Additional 76%

• Though it had already been cut in half (from $115.36 to $57.63) since my first presentation, it was still a fantastic short, as it’s since fallen another 76% (from $57.63 to $13.87)
• A good lesson on not falling into the “I missed it” trap – you hadn’t missed it
• What the definition of a stock down 90%?
  • Answer: A stock down 80%...that then gets cut in half!
On the Long Side, I Had Two Duds, SodaStream and Micron

- SodaStream is down 37% and Micron is down 52%
- I still own both and have added to them around current prices
But I Also Pitched Four Airline Stocks, All of Which Have Outperformed, Especially JetBlue

- Last year, I discussed the airlines and concluded: “I have invested 10% of my fund in four airline stocks (in descending order of size): Delta, JetBlue, United & American”
- Since then, all four have handily outperformed the market (JBLU: 118%, DAL 31%, UAL 19%, AAL 15% vs. S&P 500 4%), with the two largest positions (and the only two I continue to own), Delta and JetBlue, rising the most
I’ve Learned Two Lessons from My Past Presentations at this Conference

1) I should definitely pitch my favorite short idea, because it’s sure to collapse
2) I shouldn’t pitch any long ideas, unless they’re airlines

So, with these two lessons in mind, here are one long and one short idea.
My Favorite Long Idea: Spirit Airlines
A Long-Term Growth Story Priced
As If Growth Is Gone Forever
Spirit Is An Ultra-Low-Cost Carrier That Is Growing Very Rapidly

Spirit plans to expand to 20 new markets in ‘16 & 310 total within five years

- Route selection based on optimizing operating margin and utilization
- 360+ daily flights to 57 destinations
- Diversified network
- Low frequency, primarily point-to-point
- 84% of the Top 25 U.S. Metros
- Demographic affinity between Ft. Lauderdale & Caribbean

As of July 2015, includes routes announced but not yet started and seasonal routes

Source: Spirit investor presentation, 8/13/15.
The Basics

- Stock price (11/13/15 close): $33.77
- Market cap: $2.4 billion
- Cash: $749 million
- Debt: $538 million
- Enterprise value: $2.2 billion
- TTM EPS: $4.10
- 2015 est. EPS: $4.08
- 2016 est. EPS: $4.03
- P/E (TTM): 8.2x
- P/E (2015 est.): 8.3x
- P/E (2016 est.): 8.4x
- EV/EBITDA (TTM): 4.3x
- Revenue (TTM): $2.1 billion
- EV/S (TTM): 1.05x

There are very few companies I’m aware of that are growing 20-30%, with 25%+ operating margins and returns on equity, with net cash positions, whose stocks are trading at 8-9x earnings.
Spirit’s Stock Had Been a Huge Winner – Until This Year
Spirit’s Stock Is Down 55% This Year, By Far the Worst of Any U.S. Airline
Why Has Spirit’s Stock Fallen So Much This Year?

• Investors are concerned that Spirit’s current 30%+ capacity growth is too high
  • Available seat miles rose 34% in Q3, though this will likely be the peak
  • Capacity growth is projected to be only ~20% in 2016

• Low oil prices lead competitors to price more aggressively against Spirit; in particular, AAL, which overlaps with 51% of Spirit’s routes (second only to Southwest’s 55%), has started pricing aggressively to maintain/gain back share from Spirit, which was a major factor in Spirit reporting in Q3:
  • “Total revenue per passenger flight segment ("PFS") for the third quarter 2015 decreased 13.1 percent year over year to $120.35, primarily driven by a 20.8 percent decrease in ticket revenue per PFS. The decline in ticket revenue per PFS was driven by lower fare levels as a result of increased competitive pressures as well as a higher percentage of Spirit's markets being under development compared to the same period last year.”
  • Load factor fell from 87.6% to 85.2% YOY
  • Q4 guidance is for unit revenue to decline even more than Q3

• This stock was owned by growth investors – and earnings growth is likely going to be roughly flat for a few quarters, so they’ve fled

• The typical analyst view:
  • “We see few catalysts near-term to bring investors back. Q4 needs a revenue beat & guidance that shows unit revenue declines have bottomed – this won't be known until February.” (Credit Suisse, 10/27/15)
Spirit Has Grown Its Revenues and Profits at a High, Steady Rate
I Think Spirit Is Only Scratching the Surface of Its Total Potential Market Over Time

Ultra-Low-Cost Carriers Are Nearly 20% of the European Market; Spirit, the Largest of the U.S. ULCCs, Is Only 1.8% of the U.S. Market

Source: Spirit investor presentation, 8/13/15.
Spirit Has Been Consistently Profitable

Net Income Margin

Pilot strike
Spirit Has Consistently Been One of the Most Profitable U.S. Airlines

Net Income Margin

- Net Income Margin

- Spirit
- Southwest
- Allegiant
- Alaska Air
- JetBlue
- American
- United
- Delta

Q1 '09 Q2 '09 Q3 '09 Q4 '09 Q1 '10 Q2 '10 Q3 '10 Q4 '10 Q1 '11 Q2 '11 Q3 '11 Q4 '11 Q1 '12 Q2 '12 Q3 '12 Q4 '12 Q1 '13 Q2 '13 Q3 '13 Q4 '13 Q1 '14 Q2 '14 Q3 '14 Q4 '14 Q1 '15 Q2 '15 Q3 '15
Spirit Earns High and Rising Returns on Assets and Equity
Spirit’s Growth and Profitability Are Driven By Its Ultra-Low Costs

- Ultra-low-cost carriers (ULCCs) like Spirit, Allegiant and (recently) Frontier in the U.S. and Ryanair in Europe are not to be confused with low-cost carriers like Southwest, JetBlue and Virgin America

- ULCCs have an extremely low cost structure, usually driven by:
  - One type of plane and one class of service
  - Cramming the maximum number of seats (~20% more) onto every plane by reducing legroom and having seats that don’t recline
  - No seat-back pockets, window shades, wifi or entertainment systems
  - All direct flights (no hub-and-spoke)
  - Limited (or no) customer loyalty/frequent flyer programs
  - Personnel who do multiple jobs (e.g., flight attendants who also clean the plane and act as gate agents)
  - Turning aircraft quickly and flying at all hours, thereby maximizing daily flight time (12.7 hours/day for Spirit; 11.8 for JetBlue; 10.9 for Southwest)
  - Flying out of regional or secondary airports

- Consequently, ULCCs offer extremely low fares, which they partially make up for by having “unbundled” fares, which means they charge extra for nearly everything such as a seat assignment, any bag beyond a small carry-on item, all drinks and food, etc.
Spirit’s Costs Are *a Lot* Lower Than Other Airlines

Who’s going to win this price war?

Source: Spirit investor presentation, 8/13/15.
Spirit’s Costs Are So Low That Its Total Price (Including Extras and Its High Profits) Is Lower Than All of Its Competitors’ Costs

Source: Spirit investor presentation, 8/13/15.
Spirit’s Ultra-Low Costs Translate Into Prices That Are A LOT Lower Than Other Airlines

Source: Spirit investor presentation, 8/13/15.

### Average Domestic Fare + Bag & Seat Options (1)

**LTM 12/31/14**

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<tr>
<td>Spirit</td>
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<td>Southwest</td>
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<td>jetBlue</td>
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<td>UNITED</td>
<td>168</td>
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<td>DELTA</td>
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1. Mainline domestic data only for all carriers shown. Data derived from Form 41 for the twelve months ended December 31, 2014; includes domestic passenger revenue (includes seat revenue) plus domestic excess bag revenue divided by domestic revenue passenger enplanements. Data length of haul ("LOH") adjusted to Spirit’s domestic LOH for twelve months ended December 31, 2014 (1,000 miles). formula = other airline amount x (other airline LOH / Spirit LOH)². American includes American and US Airways and Southwest includes Southwest and AirTran.
Spirit’s Ultra-Low Prices Stimulate New Demand

On average, Spirit’s low fares grow the traffic base by about 37%\(^1\)

Average Passengers per Day Each Way

- Chicago & Orlando: Pre Spirit 737, Post Spirit 951
- Ft. Lauderdale & San Jose, CR: Pre Spirit 191, Post Spirit 346
- Los Angeles & Chicago: Pre Spirit 1,347, Post Spirit 1,777
- Las Vegas & Oakland: Pre Spirit 650, Post Spirit 1,048
- Dallas/Fort Worth & Detroit: Pre Spirit 407, Post Spirit 535

Source: Spirit investor presentation, 8/13/15.

1. Measurement period begins January 2007 through June 2014. System average measures only those markets Spirit has served for at least twelve months.
2. Sample markets do not necessarily reflect system average. Pre Spirit is the average for the four calendar quarters prior to Spirit’s entry. Post Spirit is the average for the four calendar quarters following Spirit’s entry.
Spirit Is Trading at Close to Its Lowest P/E Multiple in Many Years
Spirit Has Grown Its Revenue Far Faster Than Allegiant
Spirit Has Also Grown Its Profits Far Faster Than Allegiant, Especially This Year

A major divergence in the last two quarters
In Spite of Higher Growth and Comparable Margins, Spirit’s Stock Trades at a Huge Discount to Allegiant’s
Show of Hands

• Show of hands:
  1. Raise your hand if you’ve ever flown Spirit
  2. Raise your hand if you’ve had at least one terrible experience flying Spirit
  3. Raise your hand if you know someone who’s had such a terrible experience flying Spirit that they vowed never to fly it again

• A review in AirlineReporter.com:
  • It’s true, people vehemently despise Spirit Airlines. Just the mention of the company elicits emotion-filled horror stories. Indeed they have a solid 1 out of 5 star rating on TripAdvisor, and they are frequently found at, or near, the top of various “worst airline” rankings. In direct contrast to these ratings and frequent “I’ll never fly Spirit again” claims, the airline continues to grow and increase market share.
Spirit’s customer service problems fall into two areas: reality and perception.

In total, Spirit’s complaint rate in the first eight months of this year was 6x higher than average (11.75 complaints/100,000 enplanements vs. 1.96)
- This is terrible, but it’s still only one complaint for every 8,500 passengers

Reality
- According to the Department of Transportation, Spirit consistently is among the worst airlines in terms of on-time arrivals and percentage of flights cancelled
- However, the rate of mishandled bags (2.73 reports/1,000 passengers) is better than average (3.33), and the rate of “bumping” passengers is half the average

Perception
- Many of Spirit’s customers (especially first-time ones) aren’t used to being charged for so many extras
- Spirit needs to do a better job of setting expectations
Spirit Is Trying to Do a Better Job of Setting Its Customers’ Expectations

• This is on the home page of Spirit’s web site (“just ass + gas…and a personal item”):

• The best that can be said about Spirit’s customer service is that there’s a lot of room for improvement!
Analysts and Investors Are Not Average Americans and Thus Shouldn’t Overweight Their Own Experiences and Behavior

- I made this mistake and it was costly: the stock was ~$20 when I first looked at it in early 2013 – and then it quadrupled to above $80 in less than two years:

- It was a mistake to think about this from my perspective, not the average Americans’. I am willing/able to pay an extra $50-$100 for a flight with better service, a few extra inches of legroom, a seat that reclines, etc., but many (most?) Americans don’t have this luxury

- As an article in AirReporter.com notes:
  - Ultra-low-cost carriers can be a great option. They can provide you fast and safe transportation, the cheapest way possible. If you only care about getting your body from one place to another, without frills or high expectation of service, you cannot beat an ultra-low-cost carrier. It is about being an informed customer and doing the math to make sure you are choosing the right airline. I don’t walk into McDonald’s expecting a delicious meal. I expect to get a cheap meal and mediocre service. Why would a passenger pay for an ultra-low-cost airline and expect MGM Grand Air level of service?
My Favorite Short Idea: Wayfair
A Growth Story Run Amok, With a Potentially Serious Formaldehyde Problem
Wayfair is a rapidly growing e-commerce company whose mission is “to transform the way people shop for their homes”

- It is the largest pure-play online retailer of home goods in the U.S.
- Wayfair has 7,000+ suppliers who drop-ship directly to the consumer;
  Wayfair has minimal facilities and doesn’t touch most products

Source: Wayfair Q3 earnings presentation, 11/10/15.
The Basics

- Stock price (11/13/15 close): $36.52
- Market cap: $3.1 billion
- Cash and LT investments: $400 million
- Debt: $0
- Enterprise value: $2.7 billion
- TTM revenues: $1.9 billion
- EV/Sales (trailing): 1.4x
- EV/Sales (2016 est.): 0.9x
- Quarterly revenue growth (Q3 YOY): 77%
- Operating income (TTM): -$137 million
- Free cash flow (TTM): +$62 million
- Customers: 4.6 million
After a Rocky Start in the Months Following Its IPO a Year Ago, Wayfair’s Stock Doubled Before a Recent Pullback
Sales Have Soared Since the Company Was Rebranded as Wayfair in 2011

- Growth has skyrocketed since 2011, when Battery Ventures, HarbourVest Partners, Great Hill Partners and Spark Capital invested $165 million and CSN Stores was rebranded as Wayfair
- The company raised a total of $358 million before going public
- Revenue growth in Q3 ’15 was 77% YOY

Source: Wayfair Q3 earnings presentation, 11/10/15.
Losses Have Been Persistent

- Wayfair steadily loses ~$20 million/quarter

Note: the big loss in Q4 '14 was due primarily to non-cash charges; adjusted operating income was -$14.8 million
In the Last 11 Quarters, However, Wayfair Has Generated $62.3 Million of Free Cash Flow

- Free cash flow is positive due to Wayfair’s asset-light business model (almost no inventory or accounts receivable), increasing accounts payable and deferred revenue, and very low cash compensation for top executives (discussed later)

Note: Free cash flow is cash flow from operations minus cap ex
The Bull Case for Wayfair

Investment Thesis: Rapidly Growing Industry Disruptor Trading Far Below Fair Value

• We believe W is a disruptive force in the large, fragmented home furnishings industry. We see long-term 25%+ revenue growth supported by a very compelling value proposition, shifting consumer shopping behavior, accelerated marketing and top-notch back-end operations, all underpinned by a superior technology platform to create sustainable competitive advantages. As the path to profitability through advertising leverage and other scale advantages on the customer and vendor side become clearer, we expect stock price outperformance to follow.

• Meet the new category killer. Twenty years ago we witnessed the rise of specialty hardlines retailers such as HD and BBBY who took advantage of consumers’ preferences for wider assortment, better pricing, good service and convenience compared to multiline stores. Today, as consumers realize that online retailers’ value proposition across these dimensions is better than specialty retailers in some categories, they are shifting their shopping online. Categories with qualities of value add enhanced by online offerings, such as consumer electronics and books, have moved online more quickly. Now, with sophisticated technology and business models reducing key pain points in the online shopping experience, the scales are tipping in favor of online shopping in other categories. Wayfair is leading the charge to accelerate this trend in home goods as a rare pure-play sector-focused e-commerce company with over $1.3b in sales.

• Potential for at least $6.5b in sales and $340m in operating profit in four years. We see continued 25%+ top-line growth in an industry growing low- to mid-single digits and an online channel growing double digits as the home goods category’s online penetration expands from a modest 8% to levels nearer apparel’s current 15%. Expense leverage improvement points to adjusted operating margins of at least 5% in 2019.

• Valuation. We value W on a blended multiple basis, backed by DCF analysis. Our $55 target is 1.5x EV/2016E sales, a premium to the median of online and offline peers given superior growth dynamics and peer outperformance.

Summary of My Short Thesis

1. I think a major reason Wayfair has grown so rapidly is that it’s been willing to sell dollar bills for 95 cents, but this isn’t a good business
   - I struggle to think of any substantial ($2+ billion revenue), asset-light consumer/retail business that’s losing money – this indicates major flaws in Wayfair’s business model
   - I don’t think the company’s economics will ever improve materially (and could get much worse)
     - Competing head-to-head vs. Amazon, Home Depot, Target, Williams-Sonoma, etc. (did I mention AMAZON???, I think Wayfair’s odds of ever earning a meaningful profit (real profit, not phony “adjusted EBITDA”), much less enough profit to justify a $3.1 billion market cap, are close to zero
     - The economics could get much worse thanks to UPS raising rates for large items

2. In trying the meet the extreme growth expectations built into its high share price, there are signs that the wheels are coming off Wayfair’s bus
   - Customer service reviews are terrible
   - **Wayfair has a formaldehyde problem that goes beyond Chinese-made laminate flooring, meaning that right now I believe that the company is poisoning its customers (as well as the customers of the companies Wayfair does fulfillment for, including Walmart, Kohl’s and Staples)**
     - I had five items of furniture tested that are being sold by Wayfair today and, of the three for which I have results, two tested well above CARB2 formaldehyde limits
     - Wayfair’s business model and extreme growth make it likely that this is (and will continue to be) a major problem

3. Insiders are selling like mad and, in addition, I think Wayfair is playing games with top management compensation to inflate adjusted earnings and free cash flow
Problem #1: Formaldehyde
Based on a Tip, I Had Five Samples of Ark Flooring Sold by Wayfair Tested for Formaldehyde

- A flooring industry insider told me that he suspected that Ark Floors, the North American subsidiary of the Chinese wood company A&W (also known as Anxin), was selling toxic, formaldehyde-drenched, non-CARB2-compliant Chinese-made laminate flooring in the U.S.
- I discovered that Wayfair was selling Ark laminate flooring, so I hired a lab (HPVA) to order and test five samples. Here are the screenshots:
All Five Samples of the Chinese-Made Laminate Wayfair Was Selling Failed – By an Average of 4x

All five samples failed, with formaldehyde levels 2-5x the CARB2 limit

• Around the time that a New York Times reporter called Wayfair to inquire about Ark laminate flooring, Wayfair (wisely) pulled the product from its web site
These Results Are Similar to the Initial Tests I Commissioned Last Year on Lumber Liquidators’ Chinese-Made Laminate

All three samples failed, with formaldehyde levels 2-7x the CARB2 limit.

- NV Chilton Woods Oak
- ISP Sloan Street Team
- Ispiri American Mission Olive

Average: 0.48 ppm
CARB2 limit: 0.11 ppm
Wayfair Was Also Selling All Five Types of Toxic Chinese-Made Laminate on Walmart’s Website

- Wayfair was not only selling toxic flooring to its own customers, but also Walmart’s via a fulfillment agreement.
- Here is what the same product looked like on Walmart’s web site:
Wayfair says it has “sold just 10 orders [of Ark laminate] since December 2014, including one order through Walmart.com,” equal to 0.02% of sales, and immediately pulled the product around the time that a New York Times reporter called to inquire about this, so this is a minor issue, right? Not so fast...

A significant percentage of “knock-down” (ready-to-assemble) furniture is made from MDF (medium-density fibreboard), the same core material used in laminate flooring, which is where the formaldehyde is concentrated

- All MDF products sold in California are subject to California Air Resources Board compliance (CARB2 standard)

Furniture appears to be the largest category of products Wayfair sells

- I was unable to find an exact figure, but the company lists it first whenever it describes what it sells
- When I typed “furniture” into Google this morning, Wayfair was the second link, both paid and unpaid

Shandong province in China is one of the leading suppliers of MDF to both the flooring and furniture industries, and is known in the industry for cutting corners
I Have Commissioned Tests of Five Furniture Products Sold By Wayfair

- My industry source identified five items of furniture sold by Wayfair that he suspected might have toxic levels of formaldehyde, so I hired the same lab to test these products
  - Four are sold on Wayfair’s web site and one on Walmart’s (“Sold by Wayfair”)
  - All five are currently available
- Last week, I received the results for three products
  - I expect the results for the last two shortly
Two of the Three Furniture Products I Had Tested Failed, Including One Sold By Wayfair on Walmart.com
In Addition, Wayfair Is Selling the Toxic Cabinet on the Websites of Many Other Retailers

- Once Walmart, Kohl’s, Staples and Shop Your Way realize that Wayfair is selling a toxic product to their customers, thereby exposing them to significant reputational, legal and regulatory risk, I have to imagine that they will reconsider doing business with Wayfair
This Problem May Be Much Bigger Than Wayfair (Or Anyone) Realizes

- A search under “MDF” on Wayfair’s web site yielded 18,337 items
- The manufacturer of the toxic cabinet, Zings and Thingz, sells 884 items on Wayfair, including 31 end tables, 10 accent chests/cabinets and 9 bathroom storage units
Anyone Selling Wood Products, Especially Sourced from China, Must Be Careful

- China is the Wild West of capitalism: across numerous industries and product categories, Chinese companies are notorious for selling products that are, at best, of very low quality and, at worst, are illegally sourced or poisonous
  - Defective wallboard that soon became filled with toxic mold, melamine-tainted milk and infant formula (resulting in six infant deaths and 54,000 hospitalizations), pigs filled with clenbuterol, poor construction leading to high-speed train crashes and buildings collapsing in earthquakes, etc.
  - Many friends have told me that China is for the Chinese; if they can screw Americans, they will
- It is, of course, possible to get excellent, safe products from China (like the iPhone), but a company needs to know who it’s dealing with, pay a fair price, and have robust compliance and quality assurance programs
- If a company cuts corners or simply relies on assurances from its suppliers, there's a high likelihood that it will get burned
- Many companies that source wood products from China (Home Depot, Lowe’s and, finally, Lumber Liquidators) understand the risks and have invested heavily in compliance – but not Wayfair
Wayfair’s “Quality Control” Appears to Be Nothing More Than Relying on Assurances from Suppliers

- CEO Niraj Shah last week said that Wayfair has “a lot of safeguards to make sure all products meet all federal, all state and all local laws…”
  - What are these safeguards? Who is the Chief of Compliance? How many people are tasked with ensuring that Wayfair is selling safe products?
- CFO Michael Fleisher said on the Q3 conference call last week:
  
  We carry a big selection, as you know, 7 million items...So our approach is actually to be very thorough in worrying about the safety the products we sell. In order to do that, we do a few things. One is all our suppliers, we have supplier agreements with them, we have indemnification agreements with them, we have certificates of insurance from them, we have detailed product information which specifies down to the various regulatory bodies whether they be local, state or federal, what pieces they comply with, or if items don’t comply, so that we can take the appropriate steps in terms of whether we offer them or not. And that’s how we are able to make sure that the products are of high quality, and meet all the guidelines.

  The other thing we do though, that not many people do, is that we do not source items directly from the factories that they are made overseas. So we are sourcing from folks who are the distributors and the actual product designers, who are generally American and European companies who are then sourcing in Asia. So we have an additional layer of QA, QC that a lot of the other retailers who are directly sourcing may not have, except through their own QC personnel, who would be on site. And so that’s our approach, it’s been pretty thorough, it’s worked quite well.

- Fleisher claims that, by not sourcing directly, Wayfair has “an additional layer” of quality control, but I believe that exactly the opposite is true: the company appears to have no compliance or quality control whatsoever. Rather, it appears to be relying on little more than assurances from more than 7,000 suppliers, supplying more than seven million items
- This is a recipe for disaster
Wayfair Needs to Immediately Suspend Sales
of Certain Products and Make a Substantial
Investment in Compliance

In light of the likely widespread product safety risks that are now clear, Wayfair needs to:

1) Immediately suspend sales of furniture and other wood products manufactured in China (and other similarly questionable countries), especially those that are constructed of wood composite materials such as MDF and particleboard; and

2) Make a substantial investment in compliance, which would include hiring a senior-level Chief of Compliance, engage firms that specialize in on-the-ground monitoring of suppliers (especially those in Asia), and regularly test products being sold on its site.
Lumber Liquidators Gross Margin Plunged After the Feds Raided Its HQ and Then the 60 Minutes Story Both Forced the Company to Clean Up Its Act

Lumber Liquidators Gross Margin

Agents from two federal agencies raid LL’s headquarters after a report charges the company with violating the Lacey Act

Rob Lynch becomes CEO; pursues high growth and margin expansion with no concern for compliance

The 60 Minutes story airs on March 1st, 2/3 of the way through Q1

Lynch resigns
This Is Not Lumber Liquidators Part 2, But It Does Underscore Serious Issues

- Lumber Liquidators was selling ~$140 million annually of Chinese-made laminate flooring before the scandal, whereas Wayfair has likely been selling far less toxic product.
- Also, furniture isn’t as toxic as flooring (less material, children don’t crawl on it)
- Lastly, unlike Lumber Liquidators, I don’t think Wayfair is deliberately poisoning its own customers to save a few bucks on sourcing costs.
- So this issue isn’t going to be a death blow to Wayfair.
- However, to me it is compelling evidence of Wayfair’s incompetence and/or a business that’s completely out of control.
- How could any company be selling Chinese-made laminate flooring without thoroughly testing it, after what’s happened to Lumber Liquidators???
- The answer, I think, lies in two factors:
  1. Wayfair’s business model; and
  2. The company’s extreme growth.
Wayfair’s business model combined with extreme growth virtually guarantee a host of problems from customer service, timely deliveries, product quality and, as we’ve seen in previous slides, safety.

Wayfair takes pride in the fact that it has virtually no inventory (4.5 days in Q3), as this gives Wayfair a less capital intensive business model and higher free cash flow.

But this total reliance on outside suppliers and delivery companies means that Wayfair has much less ability to both prevent various problems from happening – and also to handle them quickly and effectively when they do.

These problems might be manageable if the business were growing at, say, a normal, healthy 10-15% rate, but instead, in a frantic bid to justify its very high valuation, Wayfair is pulling out all of the stops to grow like wildfire.

Sort of like Herman Cain’s “9-9-9”, the key numbers for Wayfair are 77% (growth rate), 7,000 (number of suppliers) and 7 million (number of SKUs).

In my opinion, this is growth run amok.

I’ve seen this story so many times by companies trying to justify their insane share prices – it’s a curse because it almost always ends in tears…
Problem #2: Customer Service
Wayfair’s Customers Give the Company Terrible Reviews on Major Ratings Web Sites

- The combination of Wayfair’s extreme growth plus its business model (in which it must rely on the execution of 7,000+ suppliers and also doesn’t have any stores in which customers can return merchandise, etc.) appears to be resulting in significant customer dissatisfaction, which is inconsistent with Wayfair’s goal of becoming a category killer
  - Yelp gives Wayfair a 1.5 rating (out of 5; 39 reviews)
  - Pissedconsumer.com gives Wayfair a 1.9 rating (out of 5; 92 reviews)
  - Trustpilot gives Wayfair a 5.5 rating (out of 10; 33 reviews)
  - Sitejabber gives Wayfair a 2.6 rating (out of 5; 159 reviews)
  - Consumeraffairs.com gives Wayfair a 1.4 rating (out of 5; 177 reviews)
  - Among 762 reviews at the Better Business Bureau, 58% are negative

However,
  - Resellerratings.com gives Wayfair an 8.66 rating (out of 10; 58,407 reviews), though I view this highly skeptically because Wayfair is an “Elite Merchant Member”
One Customer’s Experience With Wayfair

• My brother-in-law, upon hearing of my short position in Wayfair, told me of his experience as a customer:

  I was looking for toilet brushes so I did a Google search and one from Wayfair came up at the top of the list. I liked the design and it was cheap so I ordered four of them.

  I ordered four, but initially only two were delivered, even though the packing slip indicated that four were shipped. When I followed up with them, they immediately corrected the error and said that the others were on back order. This was about three months ago. Finally, late last week I received an email that they would be shipping and should arrive on Nov. 11th.

• Even if all four had arrived promptly and it had been a satisfactory experience, this would hardly be the hallmark of a good business

• Rather, it shows that if a company pays Google a lot of money to be high in the search rankings, prices extremely aggressively, and tolerates very spotty customer service, then it can attract customers and generate revenues (but, I suspect, not profits)
Problem #3: Shipping Rates Rising
Shipping Companies Raising Rates May Affect Wayfair Negatively

- Two weeks ago UPS nearly doubled its rate (from $57.50 to $110) to deliver oversize items such as mattresses and patio furniture, which could have a devastating impact on Wayfair’s business (especially if other shippers follow, even partially).

- When asked about this on the Q3 call, Wayfair’s CEO, Niraj Shah, said:
  
  I will tell you that, so we’re obviously a large shipper. We are large shipper of both small parcel items for which we use UPS and FedEx, and for large parcel items, for which we have a different freight network. And as you would expect, at the scale that we ship at, we have deep relationship with these folks. We have very nuanced contracts, we have our own transportation operation where we move product in advance of tendering into these carriers.

  So what I will tell you is that these types of developments that you’re seeing where they are changing rates, the effect that they would have on us as not something that we would tell you gives us any pause, in the sense that we tend to think about where these things are headed well in advance, we understand them, and how we operate with these carriers is not the same off the street rate structure that someone gets if they sign up for a new account.

- After listening to that incoherent non-answer, I’m even more convinced that Wayfair has a big problem here, which could lead to lower-than-expected sales and/or higher-than-expected costs in the all-important Q4.
Problem #4: Competitively Disadvantaged
I Believe Wayfair Is Significantly Competitively Disadvantaged Vs. Its Major Competitors

• In the online world, Amazon is such a ferocious juggernaut, destroying competitor after competitor, that being “Amazoned” has entered the lexicon
  • Amazon has more than 50 times Wayfair’s revenue, yet somehow Wayfair will be able to profitably compete??? I think not…
  • Yes, long ago a few very specialized companies were able to compete somewhat successfully against Amazon – Zappos and Diapers.com are good examples
  • But Amazon, even at less than 1/3 today’s size, inflicted huge pain on them, and bought them for depressed prices in 2009 and 2010, respectively
  • I believe that the window for almost all niche, online competitors to Amazon has long since closed
  • Wayfair is like Montgomery Ward trying to compete against Walmart decades ago – ultimately it will get crushed (and Amazon is unlikely to buy the carcass)
  • eToys and Pets.com are better analogies
• Wayfair is also hugely competitively disadvantaged relative to store-based retailers like Williams-Sonoma, Restoration Hardware, IKEA, Crate & Barrel, Home Depot, etc., most of which are making a big push into e-commerce
Wayfair Has Been Unable to Raise Its Gross Margin for Years

- This is indicative of the fierce competitive environment
- Rather than expanding, as the company and analysts project, I think gross margin is more likely to decline
Parallels With Williams-Sonoma, zulily and Overstock

- Williams-Sonoma has TTM revenue of $4.8 billion, half of which is generated online and half in ~600 stores
  - Its store base gives it a huge competitive advantage vs. Wayfair (the ability to see and touch products before buying, easy returns, etc.)
    - WS says that “Multi-channel is the retail format of the future. Stores remain a vital component to retail success.”
  - It is a fabulous business, with solid growth and EBITDA margins of ~14%, nearly double what Wayfair aspires to – yet its EV/Sales is only 1.4x

- zulily IPO’d in late 2013, with the stock trading in the mid-$30s. It then briefly soared to over $70 before reality set in and the stock crashed to under $12 (1x EV/Sales) before investors got bailed out (sort of) when Liberty Interactive bought zulily for $17.40 (1.4x EV/Sales)
  - zulily had been consistently profitable (on a GAAP net income basis) since the end of 2012

- Overstock turned profitable in 2009 and since then has had EBITDA (GAAP, not phony “adjusted EBITDA”) margins ranging from 1.4%-2.8%
  - I think this is a much more realistic range for Wayfair
  - Overstock has $1.6 billion in TTM revenue and has an EV of $261 million, for an EV/Sales ratio of 0.16x
  - At this EV/Sales ratio, even if Wayfair’s revenues double to $4 billion, its stock would be under $8
For More on the Short Case on Wayfair, I Recommend These Five Reports/Articles

1) *Wayfair is the Most Mispriced Stock Citron Research has Seen in Years, Fair Value Under $10*, by Andrew Left, Citron Research, 8/31/15

2) *Sell Wayfair When Negligent Wall Street Analysts Are Too Lazy To Google*, Xuhua Zhou, 9/9/15 [Xuhua is the analyst who first wrote about Lumber Liquidators’ formaldehyde problems in June 2013 – see here and here]

3) *Don’t Get Zulily’d By Wayfair’s Overstocked Valuation*, The Friendly Bear, 8/17/15

4) *This Stock is Another Sign We’re in a Tech Bubble*, by Andre Rouillard, 3/30/15

5) *The Wayfair Battleground*, IPO Candy, 9/10/15
Problem #5: Compensation Shenanigans and Insider Selling
A compensation scheme to artificially boost “Adjusted EBITDA” and Free Cash Flow

A compensation scheme that inflates the value of a chronically money-losing business:
1) Persuade investors and analysts to focus on “adjusted” EBITDA/earnings and free cash flow rather than GAAP earnings;
2) Pay top management very low cash salaries;
3) Replace this lost income with large stock/option grants; and
4) Institute a Rule 10b5-1 automatic selling plan to convert the stock/option grants back into cash comp

As a result of this compensation scheme:
• Adjusted EBITDA (or earnings) is enhanced because it excludes “the impact of equity-based compensation and related taxes”; and
• Free cash flow is enhanced because lower cash comp means “cash provided by operating activities” is higher

In fairness to Wayfair, this scheme is fairly common among tech and venture/private equity-back companies – but Wayfair’s is among the blatant and has among the biggest impacts on reported financials
Such a Scheme Appears to Be Exactly What Wayfair Is Doing – and Insiders Are Selling Like Mad

• The top eight officers at Wayfair have annual cash comp of a mere $1.8 million combined – and have dumped $48 million of stock since April 1st – an average of nearly $7 million per month – a jaw-dropping run for the exits

<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
<th>Salary (cash)</th>
<th>Apr. 1 - Nov. 2, 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steven Conine</td>
<td>Co-chair, Founder</td>
<td>$80,000</td>
<td>$18,721,548</td>
</tr>
<tr>
<td>Niraj Shah</td>
<td>CEO, Co-chair, Founder</td>
<td>$80,000</td>
<td>$18,704,297</td>
</tr>
<tr>
<td>James Savarese</td>
<td>COO</td>
<td>$265,000</td>
<td>$3,581,704</td>
</tr>
<tr>
<td>Nicholas Malone</td>
<td>Chief Admin</td>
<td>$265,000</td>
<td>$2,554,218</td>
</tr>
<tr>
<td>John Mulliken</td>
<td>SVP Strategic Initiatives</td>
<td>$265,000</td>
<td>$1,965,283</td>
</tr>
<tr>
<td>Michael Fleisher</td>
<td>CFO</td>
<td>$350,000</td>
<td>$1,624,400</td>
</tr>
<tr>
<td>Edmond Macri</td>
<td>SVP Marketing Analytics</td>
<td>$235,000</td>
<td>$517,983</td>
</tr>
<tr>
<td>Stephen Oblak</td>
<td>SVP General Manager</td>
<td>$235,000</td>
<td>$283,940</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>$1,775,000</strong></td>
<td><strong>$47,953,373</strong></td>
</tr>
</tbody>
</table>

• But wait – it gets worse!
  • Wayfair’s co-founders, Shah and Conine, each “elected to reduce their base salaries to $80,000 for 2014 from $480,000 in 2013…because our goal was to weigh compensation towards providing equity awards to ensure that a significant portion of an NEOs’ [named executive officers’] compensation opportunity is related to factors that directly and indirectly influence stockholder value”
  • Offsetting this negligible cash compensation, both executives received large stock awards (restricted stock units) in October 2013 valued at $3.1 million

Source: Wayfair 14A, filed 4/10/15; SEC Form 4s; salaries for Savarese and Macri are estimates
The Impact of Such a Compensation Scheme Is Enormous (1)
The Impact of Such a Compensation Scheme Is Enormous (2)

Net Income (GAAP) and Adjusted EBITDA (Non-GAAP)

Over these nine quarters, net income was -$217.2 million vs. adjusted EBITDA of -$81.1 million, $135.1 million higher. 64% of this improvement was due to excluding “equity-based compensation and related taxes”
Final Thoughts on Shorting
Wayfair Is a Crowded Short – But Be Patient

- Wayfair is a crowded short (~43% of the float), so size it appropriately
- I am paying a negative rebate of -14.4%
- I have heard that getting the borrow in size to short Wayfair is difficult
- This isn’t surprising given that the stock only went public a year ago and only 36% of the 84 million shares outstanding are part of the float currently
- However, the borrow may become less expensive and more readily available over time as insiders and private equity firms continue to sell
- I expect that, assuming the stock remains elevated, Wayfair will do a secondary in the next month or two, which will significantly increase the float – and put a lot of stock into weak hands
  - The best time to short the stock may be in the aftermath of the secondary
  - At that point, to quote a friend, the stock from the secondary will be in the hands of “some chumps whose investment banking salesperson told them, ‘You gotta take this down.’”
This Isn't a Short-and-Distort Campaign

• Wayfair's CEO, Niraj Shah, told Jim Cramer last Wednesday that “These short sellers just look for a stock they can knock around and make a quick buck or two” and accused me by name of getting the New York Times “to write the story for him”
• I've spent my entire life building a good reputation. Of course I have an interest in making money – that's my job – but the idea that I would destroy my reputation by inventing a story to smear an innocent company to benefit a position in my portfolio is beyond absurd
• It would also be easy for the company to show that I’m lying – and I’d likely end up banned from the industry (or worse)
• One might not agree with my analysis or conclusions, but know that my beliefs are genuinely held
• Rather than having a conflict of interest, I believe I have a confluence of interest: in speaking out, I am both doing my job and also serving the public interest by warning Wayfair, suppliers, regulators and customers about the likely dangers of certain Wayfair products
• I find it quite ironic that the company is accusing me of distorting the truth for my own financial gain when it is, in fact, the senior executives of the company who have far greater incentives to do so than I
  – This is one of two dozen positions in my fund (only 10 of which are shorts), so it's not going to make or break me one way or another
  – In contrast, the outcome of this battle means everything to Shah and his fellow executives, both reputationally and financially
  – Shah and the other co-founder, Steven Conine, each own Wayfair stock worth $594 million
  – The top eight executives at Wayfair have been selling an average of nearly $7 million of stock per month for the past seven months, led by Shah and Conine, at $2.7 million per month each
Appendix A: My Lumber Liquidators Slides on Formaldehyde, Presented May 27, 2015
Formaldehyde Causes Numerous Adverse Health Effects

- The National Cancer Institute and the Centers for Disease Control and Prevention say that formaldehyde can cause "watery eyes; burning sensations in the eyes, nose, and throat; coughing; wheezing; nausea; and skin irritation," "upper respiratory tract irritation (that) can potentially exacerbate asthma symptoms and other respiratory illnesses," "chronic runny nose, chronic bronchitis, and obstructive lung disease," and is a "known human carcinogen" associated with "several cancers, including nasopharyngeal cancer and leukemia."

- This chart, in a report by the Consumer Product Safety Commission, summarizes it nicely:

```
<table>
<thead>
<tr>
<th>Affected Areas/Systems</th>
<th>Potential adverse health effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eyes</td>
<td>• Stinging, burning, or itching</td>
</tr>
<tr>
<td></td>
<td>• Excessive tearing</td>
</tr>
<tr>
<td>Nose or throat</td>
<td>• Stinging, burning, or itching</td>
</tr>
<tr>
<td></td>
<td>• Sore throat</td>
</tr>
<tr>
<td></td>
<td>• Runny nose</td>
</tr>
<tr>
<td></td>
<td>• Blocked sinuses</td>
</tr>
<tr>
<td></td>
<td>• Sneezing</td>
</tr>
<tr>
<td></td>
<td>• Cancer (human and laboratory animals)</td>
</tr>
<tr>
<td>Respiratory</td>
<td>• Chest tightness</td>
</tr>
<tr>
<td></td>
<td>• Wheezing</td>
</tr>
<tr>
<td></td>
<td>• Asthma</td>
</tr>
<tr>
<td>Skin</td>
<td>• Allergic contact dermatitis</td>
</tr>
<tr>
<td></td>
<td>○ Skin rash, blisters, and flaky dry skin</td>
</tr>
<tr>
<td>Neurological</td>
<td>• Headaches</td>
</tr>
<tr>
<td></td>
<td>• Mood changes (i.e., depression, irritability)</td>
</tr>
<tr>
<td></td>
<td>• Insomnia</td>
</tr>
<tr>
<td></td>
<td>• Attention deficit</td>
</tr>
<tr>
<td></td>
<td>• Nausea</td>
</tr>
<tr>
<td></td>
<td>• Impairments in dexterity, memory, and equilibrium</td>
</tr>
</tbody>
</table>
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It's Easy to Find LL Customers Suffering Symptoms Consistent With Formaldehyde Exposure (1)

• I just wanted to thank you for your work on Lumber Liquidators. My wife and I put the St James Vintners Reserve (a Chinese-made laminate) in our house back in May 2013. We have a 7-month-old who had basically been sick his whole life with all the symptoms caused by formaldehyde poisoning (asthma, rashes, upper resp. infections, daily breathing treatments, constant wheezing) and we (including the pediatricians, who were trying everything) for the longest time could not figure out what was wrong with him until we saw the airing of 60 Minutes. We got our things and got out of our house while we could figure out what steps to do next. During the time out of the house (little over a month) my son started almost immediately doing better as did my wife, me and our little girl.

• …our dogs have developed allergies and my youngest daughter who will be 4 in August has been running fever like an off and on switch every few weeks she runs a high fever for a couple of days then she's OK until the next episode. I'm not sure if this has to do with the flooring. I'm almost speechless on one hand I want to rip the floor out on the other we don't have the money to put flooring back in...So at this point I'm not sure what to do.

• I had head and chest congestion the whole time we were installing the floor. My friends teased me that maybe I was allergic to the floor. I was at the doctors so many times that he sent me to an allergist. Severe symptoms subsided when we finished putting down the floor. But I still use an inhaler when I exercise.

Source: Email to me; Classaction.org blog
It's Easy to Find LL Customers Suffering Symptoms Consistent With Formaldehyde Exposure (2)

• My symptoms are burning eyes and nose and coughing up phlem at night. Also have itchy skin. My two dogs also cough. I thought they had kennel cough, but now think it is the flooring… Open your windows and air the place out frequently, especially before bed. Then pray this gets settled soon as I read that the off gassing can last 10 years.

• I was doing some reading of scientific papers on this formaldehyde effects, wondering two things. 1. Could my tremors that I have had for the past few month be related to this? Sadly, yes. It also cause neurological damage. 2. How long does outgasing go on with a product like laminate flooring. Bad news again. It was estimated to be in the 10 year range.

• …we have had boughts of sore throays, burning eyes and my son and I always have stuffy, runny noses.

• …the itching was so sever I literally had scratches all over my body – it was insane…

• …my husband…has had MAJOR skin issues…

• …our children and dogs and I have had multiple issues…

• My husband has had major skin issues since installation (he installed it).

• We both have runny noses and burning eyes.

Source: Classaction.org blog
Formaldehyde Isn't Asbestos, However

• The levels of formaldehyde Lumber Liquidators' customers are being exposed to are likely causing a range of adverse health effects, some even debilitating and requiring medical attention, with possible long-lasting effects.

• There are three mitigating factors, however:
  a) Formaldehyde, at the levels and length of exposure at issue here, is unlikely to cause cancer;
  b) The most common symptoms can be caused by many things, not just formaldehyde, so in court the company will surely claim other causes for its customers' ailments; and
  c) Formaldehyde dissipates("off-gasses") in 3-10 months.

• For these three reasons, Lumber Liquidators' problem, while serious, isn't as serious as asbestos because:
  a) Exposure to asbestos can cause a much more serious illness: mesothelioma, an often-deadly form of cancer;
  b) Asbestos exposure is pretty much the only way to get mesothelioma; and,
  c) Asbestos doesn't off-gas in the environment, nor does it dissipate in the body.
But This Doesn't Mean Lumber Liquidators Is Off the Hook

- The fact that formaldehyde isn't as serious as asbestos is great news for Lumber Liquidators and its customers and installers, but it doesn't mean the company is off the hook.
- Many, many people – perhaps tens of thousands, maybe more – have likely been harmed and suffered adverse health effects, ranging from unpleasant to debilitating.
- But in one critical way, things may be much worse for Lumber Liquidators than for the companies associated with asbestos:
  - Asbestos wasn't known to be a dangerous product when most of these companies were mining, using and/or installing it, so they could honestly claim that they had no idea they were endangering their employees and customers.
  - In contrast, I think it's highly likely that the senior managers of Lumber Liquidators knew that they were buying toxic, formaldehyde-drenched, non-CARB compliant laminate from their Chinese suppliers, knowingly putting untold numbers of American families at risk.
Lumber Liquidators' Defense – MDF Cores Are Compliant (1)

- As part of its first web site responding to the crisis (since removed), LL showed this chart of test results of the MDF cores it claims were used to make its laminate flooring:
Based on my conversations with a number of experts, it's not possible for formaldehyde levels of the finished product that 60 Minutes, Drury and I all independently tested to be as high as they were – 6-7 times CARB2 limits – if the MDF cores had low levels of formaldehyde.

Thus, either the test results are bogus or, more likely, the MDF tested (and shown to be compliant) wasn't what was used to produce the laminate LL bought.

It would be very easy for the Chinese laminate mills to cheat. They produce both CARB-compliant and non-CARB-compliant laminate, depending on customers’ wishes, so they could simply produce the latter for Lumber Liquidators (using cheap, non-CARB-compliant MDF), while providing the company with the documentation it desired showing CARB2 compliance.

The mills may also be using corrupt and/or conflicted inspectors. An industry insider with first-hand knowledge of many mills that Lumber Liquidators buys from told me:

"What even LL does not know is their own QC (quality control) inspector is paid a commission by the factories. This inspector knows there's no way to make CARB2-compliant product at the prices LL demands, especially after he takes his cut of the price."

I have no way to verify this statement, but: a) I believe the person is credible; and b) It's consistent with what I know about China – namely, that creating phony documents is very common.
Lumber Liquidators' Defense – Its Finished Product Is Compliant (1)

- LL also showed this chart of test results of the finished product:
The problem with this test is that Lumber Liquidators didn’t “deconstruct” the finished product (i.e., sand off the veneer/outer layer).

The formaldehyde is in the MDF and resins used to make the laminate, so it’s mostly sealed in by the veneer.

Thus, testing how much formaldehyde is emitted by the laminate sample without deconstruction (especially when the sides and back of the sample are sealed) will of course show minimal levels of formaldehyde.

CARB was aware of this when developing its testing methodologies and standards. It set a standard based on the formaldehyde in the MDF, so naturally it requires deconstruction prior to testing finished product.

Lumber Liquidators says: "60 Minutes used a 'deconstructive test,' which would be like testing the emissions of a car by removing the catalytic converter and muffler."

This is a spurious analogy. A correct one would be if the emissions standard for cars was set by regulators based on a test in which the catalytic converter and muffler were removed, and then a company rigged the test by not removing them – and then (falsely) reported that its cars met the standard.
More on Deconstruction (1)

- Lumber Liquidators says that "CARB has indicated to us that no one in the industry is required to conduct deconstructive testing for compliance purposes."
- This is a typical statement from Lumber Liquidators: true but highly misleading and disingenuous.
- It's true that CARB does not require testing finished products – only the MDF core prior to being processed into laminate.
- But many companies that sell laminate (including Lumber Liquidators), to their credit, test the finished product for the logical reason that, especially when you're dealing with Chinese manufacturers, it's important to trust but verify.
- However, if testing of finished product is done, CARB clearly specifies that it must first be deconstructed.
More on Deconstruction (2)

• While plenty of people and companies (including, of course, Lumber Liquidators) question whether this is the right way to do the testing, there's no question that CARB requires it – it's under the frequently asked questions section of its web site (emphasis added):

  42. How will CARB test pre-assembled case goods made of composite wood products (e.g., a small table) that are painted, with no edges unsealed?

    CARB will purchase case goods, deconstruct them, remove the paint, and test the exposed composite wood product surface using our enforcement test method. CARB staff has developed the sample preparation protocol to be followed to remove the layer of paint or laminate, and then will determine if the composite wood product in the case good complies with applicable standards or not.

• Contrary to Lumber Liquidators' claims, deconstruction isn't a new or unproven test method. Rather, it was developed over several years, with industry consultation and peer review, and was finally published in 2013.
More on Deconstruction (3)

- CARB's Final Statement of Reasons (FSOR) on page 42 states:
  Agency Response [24-Landry-070423-CWIC]: Yes it is correct that finished products must be deconstructed to test for compliance. But, we disagree that there is great uncertainty in the enforcement program. Deconstructive testing is needed for finished goods to verify compliance with the emission standards.

- And on page 231 states:
  Agency Response [20.4-Bradway-080215-Mannington]: …To determine if compliant materials are being used to make finished goods, we must deconstruct the finished good and test its component parts...

- To summarize, the regulation and the official legislative history make clear that finished composite wood products should be tested through deconstructive testing and that CARB would be developing a sample preparation method for such testing. That method is the SOP (Standard Operating Procedures), an official CARB agency guidance document that is consistent with the regulation and therefore has the force of law and is entitled to deference. Lumber Liquidators' argument that the SOP is to be ignored makes no sense and ignores black-letter legal principles. Instead, the SOP is an official CARB agency document entitled to great deference.
Kip Howlett, the President of HPVA, which operates HPVA Laboratories, a CARB-certified lab that I hired to test samples of Lumber Liquidators' products, said:

“CARB has an SOP (Standard Operating Procedures) where you take the surface layer off to test the formaldehyde level in the core. So when you have five labs follow the SOP and remove the surface layer – and all show levels of formaldehyde higher than the CARB2 standard, you have a problem. And when it's 1,000% higher, you have a big problem!

When you have five labs all doing it the same way and getting the same results, it isn't about the test method. The company either didn't understand the SOP, or did understand it and did a work-around. They're either stupid or they're lying – which is it?

Another problem they have is that if you stamp the box “CARB2 compliant”, you had damn well better be CARB2 compliant.

It's telling that the American-made laminate was all compliant, but every sample from China wasn't. The Chinese producers are completely and totally unfairly competing with American and Canadian companies who abide by the law and produce safe laminate.”
Another Type of Test: “Exposure Scenario”

• Rather than testing samples in a lab, what most people really care about is how much formaldehyde people are actually exposed to.

• To measure this, one must use an “exposure scenario” test, which follows rigorous protocols established by the California Department of Public Health (CDPH), including making assumptions that are widely accepted and scientifically based regarding various factors such as the temperature, humidity and air circulation in the home.

• This "exposure scenario" test is what the Consumer Product Safety Commission is doing.

• Lumber Liquidators claims that its tests "measure a product according to how it is actually used by consumers,“ which at first glance might lead one to conclude that it’s done exposure scenario tests, but in fact it hasn’t (or at least hasn’t disclosed this). Rather, this is the company’s way of saying it doesn’t deconstruct its samples prior to doing chamber tests.
Dr. Philip Landrigan's Comments on the Exposure Scenario Test Results

• 60 Minutes commissioned three exposure scenario tests of samples of Lumber Liquidators’ Chinese-made laminate, which showed formaldehyde levels of 57, 93 and 268 ppb.

• 60 Minutes showed these test results to Dr. Philip Landrigan, one of the world's leading experts on formaldehyde and exposure to toxic chemicals, and here's what he said:

  Dr. Philip Landrigan: It's not a safe level, it's a level that the US EPA calls polluted indoor conditions.

  Anderson Cooper: Would you want that in your home?

  Dr. Philip Landrigan: No.

Dr. Philip Landrigan of N.Y.'s Mt. Sinai Hospital, specializes in environmental pediatrics and exposure to toxic chemicals. He's talking about the results of another kind of test Drury and Larson conducted measuring the concentration of formaldehyde emissions coming off the laminates into the air of a typical home.

Dr. Philip Landrigan: I would say long-term exposure at that level would be risky because it would increase the risk for chronic respiratory irritation, change in a person's lung function, increased risk of asthma. It's not going to produce symptoms in everyone but children will be the people most likely to show symptoms at that sort of level.
There Are Many Sources of Formaldehyde

• According to the Environmental Protection Agency (EPA), "Everyone is exposed to small amounts of formaldehyde in the air" because formaldehyde is found in:
  – Resins used in the manufacture of composite wood products (i.e., hardwood plywood, particleboard and medium-density fiberboard)
  – Building materials and insulation
  – Household products such as glues, permanent press fabrics, paints and coatings, lacquers and finishes, and paper products
  – Preservatives used in some medicines, cosmetics and other consumer products such as dish washing liquids and fabric softeners
  – Fertilizers and pesticides

• It is a byproduct of combustion and certain other natural processes, and so is also found in:
  – Emissions from un-vented, fuel burning appliances, like gas stoves or kerosene space heaters
  – Cigarette smoke

• The primary way you can be exposed to formaldehyde is by breathing air containing off-gassed formaldehyde. Everyone is exposed to small amounts of formaldehyde in the air that has off-gassed from products, including composite wood products.
So Why Worry About the Formaldehyde in Lumber Liquidators' Flooring?

• I asked Dr. Philip Landrigan the following question:  
  Given all of these sources of formaldehyde, why should anyone be worried about a little bit more from Lumber Liquidators' laminate?

• He replied:  
  It all depends on how much someone is exposed to. Substances considered toxic are harmless in small doses and, conversely, an ordinarily harmless substance can be deadly if over-consumed.

• Exactly. For all the talk about the many sources of formaldehyde in a home, various studies have shown that the average American is actually exposed to very low and declining levels of formaldehyde in their home.

• The most recent study found the "mean concentration of formaldehyde…in housing of 17 ppb…(and) a mean level of formaldehyde for mobile homes or trailers ranging from 15.5 to 24.7 ppb." (Note that this study is a decade old, so levels are likely even lower today.)

• This trend of declining formaldehyde levels in the average home is a testament to the effectiveness of strong environment regulation and is great news for American families.
Regulators Have Set Various Limits (1)

- There is no national law setting a limit for formaldehyde in indoor air – rather, various regulators have come up with vastly different numbers, as this table shows:

<table>
<thead>
<tr>
<th></th>
<th>FEMA</th>
<th>NIOSH</th>
<th>HUD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formaldehyde Exposure Limits-8 hours</td>
<td>Maximum concentration - Less than 16 parts per billion (ppb) or 0.016 ppm as directed by FEMA. Samples shall be taken for eight (8) continuous hours. Following the 7-day and 14-day waiting period, the indoor air for each unit shall be tested to document that the IAQ is below the required threshold limits.</td>
<td>NIOSH REL: Ca TWA 0.016 ppm or 16 parts per billion (ppb)[1]. This is a workplace limit.</td>
<td>A 1985 HUD regulation covering the use of pressed wood products in manufactured housing was designed to ensure that indoor levels are below 0.4 ppm[2]. No time limit noted.</td>
</tr>
<tr>
<td>Ratio of Limits: Compared to FEMA</td>
<td>none</td>
<td>FEMA’s limit is exactly 25 times more stringent than HUD’s limit of 0.016 ppm. Ratio of FEMA to HUD std. in: 0.016/0.006 = 25</td>
<td>FEMA in nearly 47 times more stringent then OSHA’s PEL of 0.75 ppm. Ratio of FEMA to OSHA standard in: 0.016/0.469 = 0.034</td>
</tr>
<tr>
<td>Exposure Limits- Short Term</td>
<td>C 0.1 ppm [15-minute]</td>
<td>C 0.1 ppm [15-minute]</td>
<td>none</td>
</tr>
<tr>
<td>Recommended Monitoring Methods</td>
<td>Mean SaphirRe infrared spectroscopy analyzer or similar direct-reading electronic instrumentation with data logging</td>
<td>none</td>
<td>Short Term Exposure Limit (STEL): The employer shall assure that no employee is exposed to an airborne concentration of formaldehyde which exceeds two parts formaldehyde per million parts of air (0.75 ppm) as an 8-hour TWA TWA. This is a workplace limit.</td>
</tr>
<tr>
<td>Additional FEMA Exposure Limitations</td>
<td>Total Organic Compounds (TCOM) Maximum concentration - 500 micrograms per cubic meter (μg/m3)</td>
<td>none</td>
<td>Sampling media: Coupled XAD-2 Tube (150/75 mg sections, 20/60 mesh); coating is 10% (w/v) 2-(Hydromethyl) peroxide at 5-10% solution</td>
</tr>
</tbody>
</table>

[1] NIOSH Pocket Guide to Chemical Hazards, September 2005 (NIOSH is the National Institute for Occupational Safety and Health, a division of the Centers for Disease Control and Prevention)
In addition, here are three more data points:

1. The California Office of Environmental Health Hazard Assessment (COEHHA) sets formaldehyde limits of 55 micrograms per meter cubed for acute (short-term) exposure and 9 micrograms per meter cubed [7 ppb] for 8-hour and chronic exposure.

2. COEHHA, in another document, sets formaldehyde limits of 40 micrograms per meter cubed [33 ppb] for "No Significant Risk Levels (NSRLs) for Carcinogens."

3. The California Air Resource Board (CARB), in a 2004 report entitled Formaldehyde in the Home, notes that adverse health effects begin at 40 ppb and, in addition, citing a study by COEHHA, concluded that:

   For an eight-hour exposure time, no short-term adverse effects would be expected to occur if average levels do not exceed 27 ppb (OEHHA's interim 8-hour REL).

   However, people often spend more than eight hours a day in their homes; infants, young children and the infirm sometimes spend virtually the entire day inside their home. Thus, it is highly desirable that residential levels remain well below 27 ppb to avoid acute effects in such individuals. To avoid irritant effects, air concentrations in new homes, including manufactured homes, also should not exceed 27 ppb.

(Note that a 1991 report by CARB, entitled Formaldehyde in the Home, Indoor Air Quality Guideline No. 1 and Supplement, set 100 ppb as an "action level" and 50 ppb as a "target level," but this has been superseded by the 2004 CARB report.)
Regulators Have Set Various Limits (3)

- To summarize, the seven regulators are all over the map, at 7 ppb at the low end and 750 at the high end, as this table shows:

<table>
<thead>
<tr>
<th>Regulator</th>
<th>Formaldehyde Limit (ppb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>COEHHA</td>
<td>7</td>
</tr>
<tr>
<td>FEMA</td>
<td>16</td>
</tr>
<tr>
<td>NIOSH</td>
<td>16</td>
</tr>
<tr>
<td>CARB</td>
<td>27</td>
</tr>
<tr>
<td>COEHHA</td>
<td>33</td>
</tr>
<tr>
<td>HUD</td>
<td>400</td>
</tr>
<tr>
<td>OSHA</td>
<td>750</td>
</tr>
</tbody>
</table>

- Recall that the three samples of Lumber Liquidators' Chinese-made laminate that 60 Minutes had tested came in at 57, 93 and 268 ppb, so depending on which standard one uses, one could conclude that the laminate is far (8-38 times) above a safe level of 7 ppb – or that's it's well below the HUD and OSHA levels.

- What should we conclude? And, more importantly, after numerous federal regulators such as the Consumer Product Safety Commission and EPA finish emissions tests on Lumber Liquidators' Chinese-made laminate, what are they likely to conclude?
Regulators Are Likely to Set a National Standard at a Low Level (1)

My view is that regulators are highly likely to set a national standard somewhere in the range of the very low levels established by COEHHA, CARB, NIOSH and FEMA for six reasons:

1. The HUD and OSHA standards are very out of date: the former was established 30 years ago in 1985 and the latter was last revised 23 years ago in 1992. Since then, the science on formaldehyde has improved dramatically, and there's now far greater awareness of its dangers (it's been established as a known carcinogen, among other things), which are reflected in the more recent and much lower levels set by other regulators.

2. The OSHA standard is for a workplace (i.e., adults, eight hours per day) whereas, for flooring, regulators will be concerned about babies and children in homes pretty much 24/7.

3. There are five data points between 7 and 33 ppb – and two extreme outliers. Where do you think regulators are likely to set the national standard?
4. Note that the maximum formaldehyde levels in the table above are for all formaldehyde in indoor air, not just from flooring, so when regulators set a level for flooring only, they are likely to pick an even lower number.

5. The regulatory agencies looking into this are part of a Democratic administration that's been very strong on environmental issues.

6. Given that there will always be some level of ambiguity – it's not like anyone can definitively say "16 ppb is safe, but 17 isn't" – I can't think of any reason why an agency charged with protecting consumers would want to take any risk.

My answer: they won't. I think regulators are almost certain to set a standard in the 7-33 ppb range (probably much closer to the low end), which means all three Lumber Liquidators samples 60 Minutes had tested are far out of compliance.

Assuming the regulators' tests show similar results, it's unclear what actions they might take, but I suspect they'll be very onerous for Lumber Liquidators – and its stock.