

SAF/No.1/April 2016

Studies in Applied Finance

**INVESTMENT THESIS FOR
MOHAWK INDUSTRIES,
INC. (NYSE: MHK)**

James Shin

Johns Hopkins Institute for Applied Economics,
Global Health, and Study of Business Enterprise



Investment Thesis for Mohawk Industries, Inc. (NYSE: MHK)

By James Shin

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About the Series

The Studies in Applied Finance series is under the general direction of Professor Steve H. Hanke (hanke@jhu.edu), Co-Director of The Johns Hopkins Institute for Applied Economics, Global Health, and the Study of Business Enterprise and Dr. Hesam Motlagh (hnekoor1@jhu.edu), a Fellow at The Johns Hopkins Institute for Applied Economics, Global Health, and the Study of Business Enterprise.

This working paper is one in a series on applied financial economics, which focuses on company valuations. The authors are mainly students at the Johns Hopkins University in Baltimore who have conducted their work at the Institute as undergraduate researchers.

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Summary

This working paper is an in-depth financial analysis of Mohawk Industries, a US-based flooring company. Our analysis examines the economic factors that impact Mohawk's underlying business and how Mohawk has adapted to these ever-changing factors. This economic analysis is then combined with our proprietary, Hanke-Guttridge Discounted Cash Flow (HG-DCF) model to determine Mohawk's financial position. The HG-DCF model will be presented along-side Monte-Carlo simulations to reveal the distribution of probable free cash flows and the likelihood of future earnings. In addition to these quantitative factors, we also examine the compensation plans of Mohawk's executives to assess alignment with shareholders. At the conclusion of this analysis, it is our intention for readers to understand Mohawk's business plan and the company's financial standing to arrive at a sound investment decision.

Acknowledgements

Many thanks to Prof. Steve H. Hanke, Dr. Hesam Motlagh, and Sam Fossum for guidance and draft comments.

Keywords: Financial Modelling, Mohawk Industries, Discounted Cash Flow, Free Cash Flow, Monte-Carlo Simulation, Investment Thesis, Management Compensation

JEL codes: C63, G11



Rating: Buy – Average Free Cash Flow per Share: \$224.86

Company Name:	Mohawk Industries, Inc.
Price:	\$186.82
Date:	3/21/2016
2016 Fiscal Year End:	12/31/2016
52-week Range:	\$148.56 - \$212.16
Market Cap:	13.82 Billion
Enterprise Value:	16.93 Billion
Total Debt:	3.2 Billion
Cash:	\$81 Million
Dividend:	N/A
Diluted Shares Outstanding:	73.96 Million
Current P/E:	22.52
2012 EPS:	\$3.61
2013 EPS:	\$5.07
2014 EPS:	\$7.25
2015 EPS:	\$8.31
2016 P/E (EPS):	16.00x (\$11.95*)
2017 P/E (EPS):	14.85x (\$12.87*)

*Consensus Estimates as of the time of this writing

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Executive Summary

Mohawk Industries, Inc. (NYSE: MHK) is a company that designs, manufactures, and distributes various flooring products. Their products include carpets, rugs, laminates, ceramics, and vinyl tiling. Based on historical averages and recent statements from MHK's board, our Hanke-Guttridge Discounted Cash Flow (HG-DCF) model in conjunction with Monte Carlo simulations reveal that MHK's probable free cash flow generation is approximately \$224.86 per share. Our model takes into account MHK's 10% net sales growth (year-over-year, based on constant exchange basis), and recent announcements that future Capital Expenditure (Cap-Ex) levels will range from \$600-650 million. According to management, this re-investment should support an additional \$1.2-1.4 billion in future topline growth. In addition, MHK's management has guided that they are cutting costs, improving margins, and raising overall productivity. MHK's board is led by Chief Executive Officer (CEO) Jeff Lorberbaum who is well-regarded by investors for his ability to capture market share efficiently by acquiring assets. As of March 21st, 2016 MHK shares are trading at \$188.50 per share, a 19% discount compared to our model estimates. Historic performances also reassure us that we have no reason to doubt MHK and Mr. Lorberbaum's managerial ability thus mitigating execution risk. As a result, we are rating MHK as a **BUY**.

Catalysts and Risks

- Foreign exchange rates attenuating sales and earnings growth.
- General macroeconomic slowdown hampering consumer spending.
- Patent expirations leading to increasing competition and price erosion.
- Slow-down in property development and remodeling.
- Management's possible failure to execute an increase in capacity and an improvement in efficiency through Cap-Ex.

Company Description and Historical Performance

Mohawk Industries, Inc. (NYSE: MHK) is a vertically integrated company that designs, manufactures, and distributes flooring products for residential and commercial spaces. The company was originally founded by the Shuttleworth brothers in 1902. The brothers eventually changed the company name to, "Mohawk Carpet Mills," in 1920 after merging with another mill in Amsterdam, NY. Mohawk (herein referred to as MHK) completed their initial public offering in 1992 and has completed numerous acquisitions since their offering. Most notably, MHK merged with Aladdin Mills in 1994 to create the current flooring conglomerate. Interestingly, Aladdin Mills is the family owned business of MHK's current CEO, Jeffrey Lorberbaum.

MHK is headquartered in Calhoun, GA and generated over \$8 billion in 2015 global sales with a market cap of \$13.8 billion. The Home Furnishings and Fixtures industry, a subgroup under Consumer Goods, includes the company. In Dec 2013, MHK joined the Standard and Poor's 500 and currently accounts for 0.06% of the broad index. MHK is also included in over 80 Exchange Traded Funds (ETFs) the top five weightings of which include: 1) PKB-US (PowerShares Dynamic Building & Construction, 5.01%); 2) XHB-US (S&P Homebuilders, 3.27%); 3) ITB-US (iShares US Home Construction, 1.94%); 4) LALT-US

(PowerShares Multi-Strategy Alternative, 0.93%); and 5) FTC-US (First Trust Large Cap Growth AlphaDex, 0.85%). Additionally, MHK's competitive brand lineup includes Pergo, Marazzi, American Olean, Quick-step, Bigelow, Lees and Unilin.

Despite MHK's brand lineup and dominant market share, the flooring industry is quite fragmented, has limited visibility, and the major players vary from segment to segment (e.g. carpet, rug, soft-flooring, etc.). As of 2014, MHK captured 26% of the carpet and rug business, the largest among all publicly traded carpet and rug companies. However, if we consider private soft-flooring companies in our calculation of market size, Warren Buffet's Shaw Industries captured 31% of the carpet and rug business. From MHK's 2015 10-K filing, the ceramic flooring industry generated over \$73.0 billion in world-wide sales for 2014. MHK, which is considered the largest ceramic flooring company in the world, captured only 4.1% (\$3.0 billion) of sales demonstrating the fragmentation of the industry when considering private companies. Adding to the analysis complexity, the majority of ceramic flooring companies are private hindering visibility into market ownership. This makes financial statements difficult to obtain and to audit. Despite numerous competitors, MHK has been able to raise sales, margins, and earnings per share (EPS) over the last five years. Numerous accretive acquisitions and successful product differentiation efforts are responsible for this trend.

Business Segments

As an international flooring company, MHK realigned their business segments in the second quarter of 2015 to reflect their geographic expansions and diversified brand base:

1. Global Ceramic – tile, porcelain tile, and natural stone products.
 - a. Brands: American Olean, Daltile, KAI, Marazzi, and Ragno.
2. Flooring North America – carpet, laminate, carpet pad, rugs, hardwood, and vinyl.
 - a. Brands: Aladdin, Bigelow, Columbia, Durkan, Horizon, IVC, Pergo, etc.
3. Flooring Rest of World – laminate, hardwood, roofing, insulation boards, medium density fiberboards, and vinyl.
 - a. Brands: IVC, Moduleo, Pergo, Quick-Step, and Unilin.

Inspection of revenue generation per segment reveals that Flooring North America was responsible for 45% of net sales with the Global ceramic division contributing another 37% of net sales. While these two are the largest contributors, they are competing in a saturated market with volatile growth prospects subject to macroeconomic factors outside of the Company's control. To offset this volatility, MHK has been able to lean on the Flooring Rest of World segment's steady growth. In terms of geography, the 'Rest of World' designates operations in Australia, Brazil, Europe, India, Malaysia, Mexico, New Zealand, and Russia. Of note, the recessions in Brazil and Russia are possibly muting MHK's potential growth. We acknowledge that emerging markets pose an interim risk, but the data also indicate that the 'Rest of World' businesses are currently growing at a faster rate than the North American businesses (see Table 1, below).

Table 1: Mohawk's Revenue mix and Segment Growth

Segment	2013	2014	2015	Assumed
Flooring North America	3,423,093	3,441,018	3,602,112	
% growth		0.52%	4.68%	4.68%
Global Ceramic	2,677,058	3,015,279	3,012,859	
% growth		12.63%	(0.08%)	(0.08%)
Flooring Rest of World	1,249,279	1,354,018	1,456,898	
% growth		8.38%	7.60%	7.60%
Intersegment sales	(676)	(6,869)	(306)	
% growth		916.12%	(95.55%)	(95.55%)
Total	7,348,754	7,803,446	8,071,563	
% growth	0.00%	6.19%	3.44%	4.81%

The key point to this table is that there has been unsteady revenue growth for Flooring North America and Global Ceramic while Flooring Rest of the World has experienced sustained high single-digit growth.

Source: Mohawk's SEC-10K

Although it is clear from Table 1 that there are competing forces in play for revenue generation, we thought it was best to model MHK through overall company sales. This method not only allows us to determine overall topline growth, in today's prices, but it also reflects management's holistic approach to improving MHK and reduces the number of adjustable variables leading to more robust conclusions. For instance, MHK utilized Italian based designs from Marazzi to improve Flooring Rest of World which were inevitably converted into vinyl and tile products to benefit all operating segments. Indeed, we find that integrating management's guidance into our model is significantly more amenable to a single revenue projection.

Historical Performance

Over the last 10 years (2005 to 2015), MHK has increased average annual sales by 2.8% year-over year (y/y). To better understand macroeconomic factors that affect MHK's business, we conducted a 10-year analysis to evaluate the effects of the housing boom and crash (see Figure 1, below).

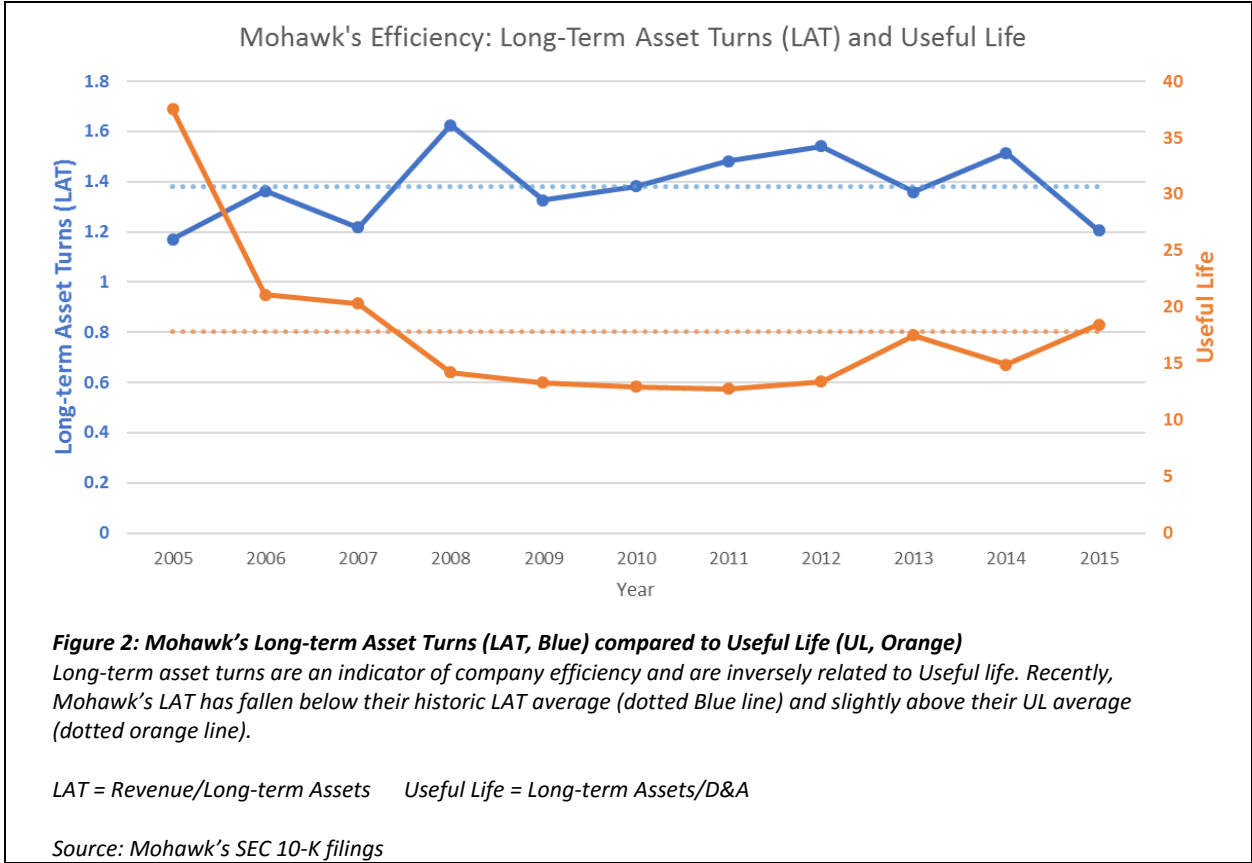


Figure 1: Total US Housing Starts from 2006 to 2015

This figure demonstrates the current state of US housing developments. The plot is year versus the units of Privately Owned Housing Starts (in thousands). In 2006, US housing starts were booming, but crashed leading into the 2009 Sub-Prime Mortgage crisis. Since 2009, housing starts in the US have steadily recovered at an approximate linear rate.

Source: [Federal Reserve Bank of St. Louis](http://www.federalreservebankofstlouis.org). Accessed 3/25/2016.

During the housing price peak in 2005, MHK increased net sales by 19.4% y/y. Conversely, the collapse of the housing bubble resulted in a -21.7% sales decline for 2009 y/y. These significant swings in sales demonstrate MHK’s inherent risk exposure to the housing market, and hence, overall economic growth and consumer confidence. According to the US Census Bureau, housing starts are steadily recovering from the 2009 crash which can be appreciated by the approximately linear increase in housing starts in Figure 1 after the gray shaded region. This is an encouraging trend for MHK investors should it continue (we leave it to the reader to decide on their macroeconomic view). Upon further inspection, it becomes clear that MHK also has indirect exposure to Oil and Lumber prices, which correlates with consumer discretionary goods for home remodeling projects. Although sales fluctuated between polar extremes over these last 10 years, Long-term Asset Turns (LAT = Revenue / Long-Term Assets, a measure of the Company’s efficiency) have ranged from 1.17-1.63 never falling below the 1.0 mark (Figure 2). For 2015, MHK reached a LAT value of 1.21, which is below their 10-year historic average of 1.38 and indicates possible room for improvement. In our model, we optimistically projected MHK’s LAT to reach 1.82 in their terminal period citing confidence in management and their ability to optimally allocate capital for long-run value creation. We concede that this exceeds MHK’s historic LAT performance, but we believe that management has the track record and balance sheet to reach new efficiency levels.



During the recent bull market (2011-2015), MHK has rewarded shareholders handsomely by outperforming the Standard and Poor's 500 by nearly 4-fold. In the last year MHK stock has pulled back from its August 19th high of \$212, yet we believe there are near-term catalysts that will signal to investors that MHK has additional earnings power. Analysts covering MHK seem to agree with our hypothesis, since 85.7% rate MHK shares as BUY (see Figure 3, below). Confident in the macroeconomic landscape and MHK's yet to be harnessed earnings power (from LAT), we built a Hanke-Guttridge Discounted Cash Flow (HG-DCF) model as detailed below to determine how much (if any) potential upside the company may provide upon investment.

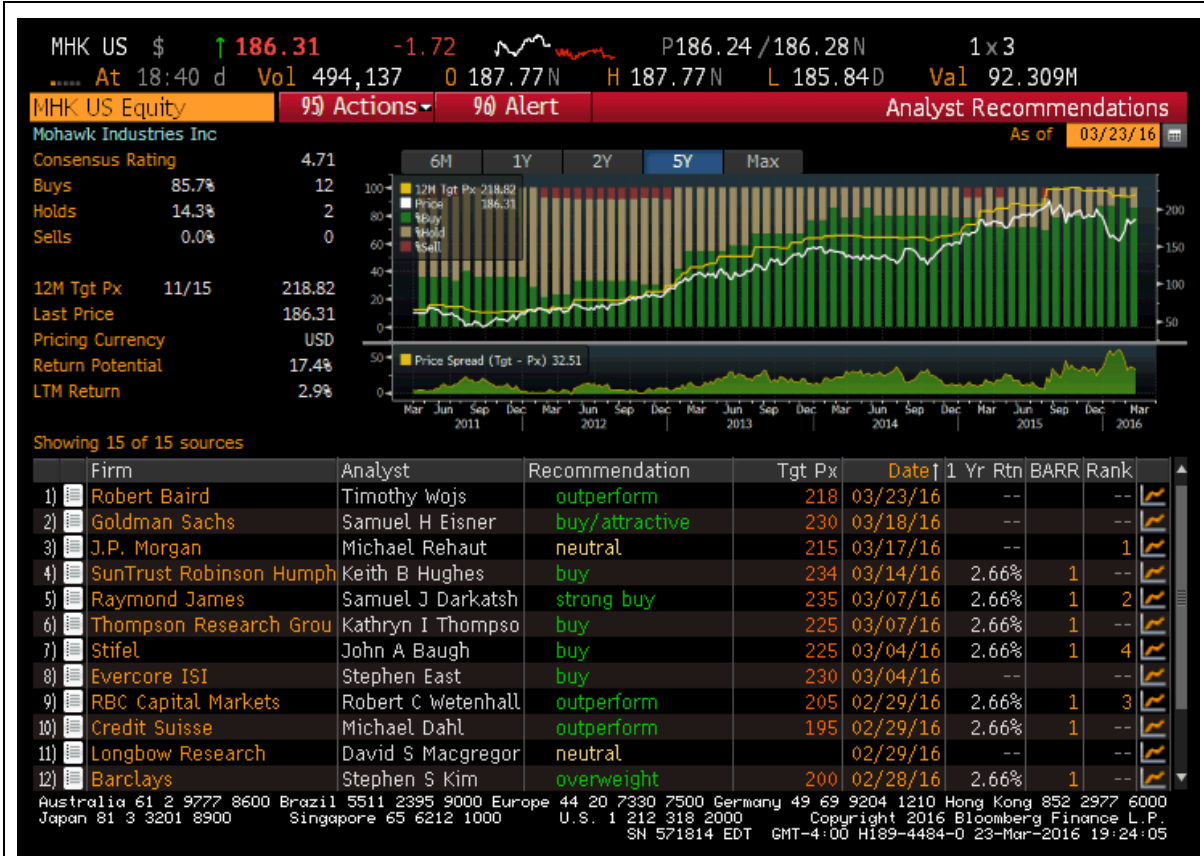


Figure 3: Analyst Recommendations for Mohawk from a Bloomberg Terminal
 As of 3/23/2016, 12 out of 14 analysts had a 'Buy' rating for Mohawk shares and an average target price of \$218.82.

Source: Bloomberg Terminal. Command: <ANR>. Accessed 3/23/2016

Model Assumptions

Our HG-DCF-MC models utilize historic averages and standard deviations of growth and margins as a baseline for our projections. Typically, we use historic averages for revenue growth, cost structure, working capital, and Cap-Ex. Historic long-term asset turns are also referenced as a litmus test for our model assumptions and projections to ensure we are not forecasting productivity that is unsustainable in the long run as we project the company into the future. We can deviate from these historic averages if management provides material information that will impact their business or have reason to believe.

During the most recent earnings call (4th Quarter 2015), Mr. Lorberbaum revealed that MHK’s top-line growth was 10% after adjusting for foreign exchange headwinds. He also disclosed that MHK will be allocating approximately \$600-650 million towards Cap-Ex. These reinvestments are earmarked to improve efficiency and support an additional \$1.2-1.4 billion in sales. For our model, we projected revenue growth to align with historic averages (9% y/y) slightly below management’s guidance. We also assumed Cap-Ex will trickle down from sales and improve MHK’s cost structure. Based on their 30+ acquisitions over the last 25 years, we are optimistic that MHK will increase capital expenditures.

Balance Sheet and Income Statement Trends

These results are contained in the 'Balance Sheet' and 'Income Statement' tabs of the accompanying spreadsheet.

MHK's acquisitive behavior becomes readily apparent upon inspection of the Balance Sheet. This has led to an increase in Goodwill (+67%), Plant, Property and Equipment (+84%), Accounts Receivable (+83%), "Other intangible assets" (+500%), and an overall increase in assets by +60% over our historical survey period. These asset increases have been slightly offset by a 73% decrease in cash levels, used to partially fund these acquisitions. Interestingly, despite MHK's acquisitive behavior their, "long-term debt, less current portion," is remarkably steady. From this, we interpret that MHK's leadership has managed their leverage very well. This is implicitly reflected in Moody's upgrading MHK's credit rating to Baa2 with a stable outlook.

Given MHK's acquisitive nature, it behooves us to consider if the ability to generate free cash flow is sustainable and how the company has managed debt on their balance sheet historically. Should there be any distress in the company, this would most likely reflected in the credit markets. To address this, we first analyzed MHK's debt trends to assess historical leverage levels and then inspected whether individual bonds were signaling distress in the credit markets. Towards this end, we also examined MHK's 'total long-term debt to equity' ratio over the last 5 years. From 2011 to 2015, the 'total long-term debt' figure for MHK increased steadily from 0.46 to 0.66 (see [Table 2](#), below). In contrast, the 'long-term debt, less current portion' (i.e. Non-current portion of Long-term Debt) did not demonstrate a systematically increasing trend. This indicates that Mr. Lorberbaum replenishes MHK's paid-off debts with newer debt to maintain a certain non-current, long-term debt to equity ratio (see [Table 3](#), below). Our conclusion from this coarse analysis in addition to management guidance is that MHK's debt levels may fluctuate into the future, however, the net debt to equity ratio will not reach levels that would be problematic given MHK's experience with debt management.

Table 2: Mohawk's Historic Long-term Debt Profile

Year	Total long-term debt (in thousands of \$)	Total equity (in thousands of \$)	Total long-term debt to Equity
2011	1,586,439	3,449,508	0.46
2012	1,382,942	3,719,617	0.37
2013	2,260,008	4,470,306	0.51
2014	2,253,440	4,422,813	0.51
2015	3,199,931	4,882,815	0.66

This table illustrates MHK's rising Debt to Equity ratio. This increase corroborates with Mr. Lorberbaum's Cap-Ex plans to increase capacity and efficiency through capital allocation.

Total long-term debt = Current Portion of Long-Term Debt + Non-Current Portion of Long-Term Debt

Source: Mohawk's SEC 10-K filings

Table 3: Mohawk's Stable Non-Current Long-term Debt

Year	Non-current long-term debt (in thousands of \$)	Non-current long-term debt to equity
2011	1,200,184	0.35
2012	1,327,729	0.36
2013	2,132,790	0.48
2014	1,402,135	0.32
2015	1,196,928	0.25

Mohawk has maintained a relatively stable amount of 'long-term debt, less current portion' (i.e. Non-Current Long-term Debt) over the last 5-years. Combined with the data in Table 2, this indicates that MHK replenishes their Non-Current Long-term Debt levels as they mature.

Source: Mohawk's SEC 10-K filings

To assess individual debt repayments, we analyzed the distribution of maturing debt obligations in the future against our forecasted free cash flow values in Table 4 (see the following sections for details on the input into our model). This maturing debt figure includes bonds, notes, fees to credit facilities, securitization fees, and capital leases. Note that the approximate \$2.0 billion of Maturing Debt for 2016 includes a \$645 million payment already realized on January 15th, 2016. The remaining \$1.4 billion of obligations will most likely be addressed with cash on hand and by MHK's Senior Credit Facility. When comparing total maturing debt obligations to the projected discounted free cash flows, we can see that MHK's Free Cash Flow is either: 1) Outpacing the debt accumulation; or 2) Well-timed in a staggered manner where the debt maturities are spread out to allow for accumulation of Free Cash. Given that we are using the discounted cash flow and not the free cash flow as a proxy for debt repayment, we remain confident that the Company will meet its debt obligations. According to SEC filings, MHK has bonds maturing in 2016, 2022 and 2023. Judging by the close proximity of these maturity dates, it seems Mr. Lorberbaum expects Free Cash flows to outpace debt accumulation rates (see Table 4, below).

Table 4: Mohawk's Maturing Debt Obligations and Projected Discounted Free Cash Flows

Year	Maturing Debt Obligations (in thousands of \$)	Projected Discounted Free Cash Flows (in thousands of \$)
2016	1,999,161	775,934
2017	1,875	768,880
2018	1,650	761,890
2019	1,546	754,964
2020	43,161	748,101
Thereafter	1,152,538	12,732,457
Total	3,199,931	16,542,225

From 2011 to 2015, we believe Mohawk increased their leverage ratio (Total Debt:Equity) to increase capacity and efficiency. By comparing the projected Discounted Free Cash Flows from 2016 and beyond to the corresponding maturing debt Obligations, we can see that Mohawk is well-positioned to pay their debts. Furthermore, the large spread between the Free Cash flow and Debt obligation indicates improved capacity and efficiency.

The Discounted Free Cash Flow here is levered. Discount Rate used is 10%.

HG-Discounted Free Cash Flow:

$$\frac{(EBITDA - \text{Interest and Other Expenses} - \text{Income Tax Provision} - \text{Change in Working Capital} - \text{CapEx})}{(1 + \text{Discount Rate})^{\text{Period}}}$$

Sources: Mohawk's SEC 10-K filings

To see if credit market sentiments agreed with our debt ratio analysis, we examined how MHK's bonds currently trade. We note that a full analysis of credit distress should encapsulate every debt issuance, however, such an analysis is outside the scope of this paper and we found that the conclusion is robust amongst all bonds we inspected. To demonstrate the sentiment of the credit markets, we decided to evaluate one of Mohawk's unsecured senior notes that was issued in 1/28/2013 for \$600M with a 3.85% coupon rate. This note is set to mature on February 1st, 2023 (see Figure 4, below) which would lead us to conclude that the company is not showing symptoms of financial duress.



From November 2015 through March 2016, the bond has consistently traded at a premium (Figure 5, below). We decided to use this time span to see if bond investors reacted to the statements made by MHK's management during the 2015 earnings call. The earnings call was on 2/26/2016. Judging by the timing and the price trends, it seems the fixed income market agrees with our analysis: MHK will generate future earnings for bondholders. Thus, we conclude that should MHK take on additional debt in the future for acquisitions, the company will most likely not find itself in financial duress.

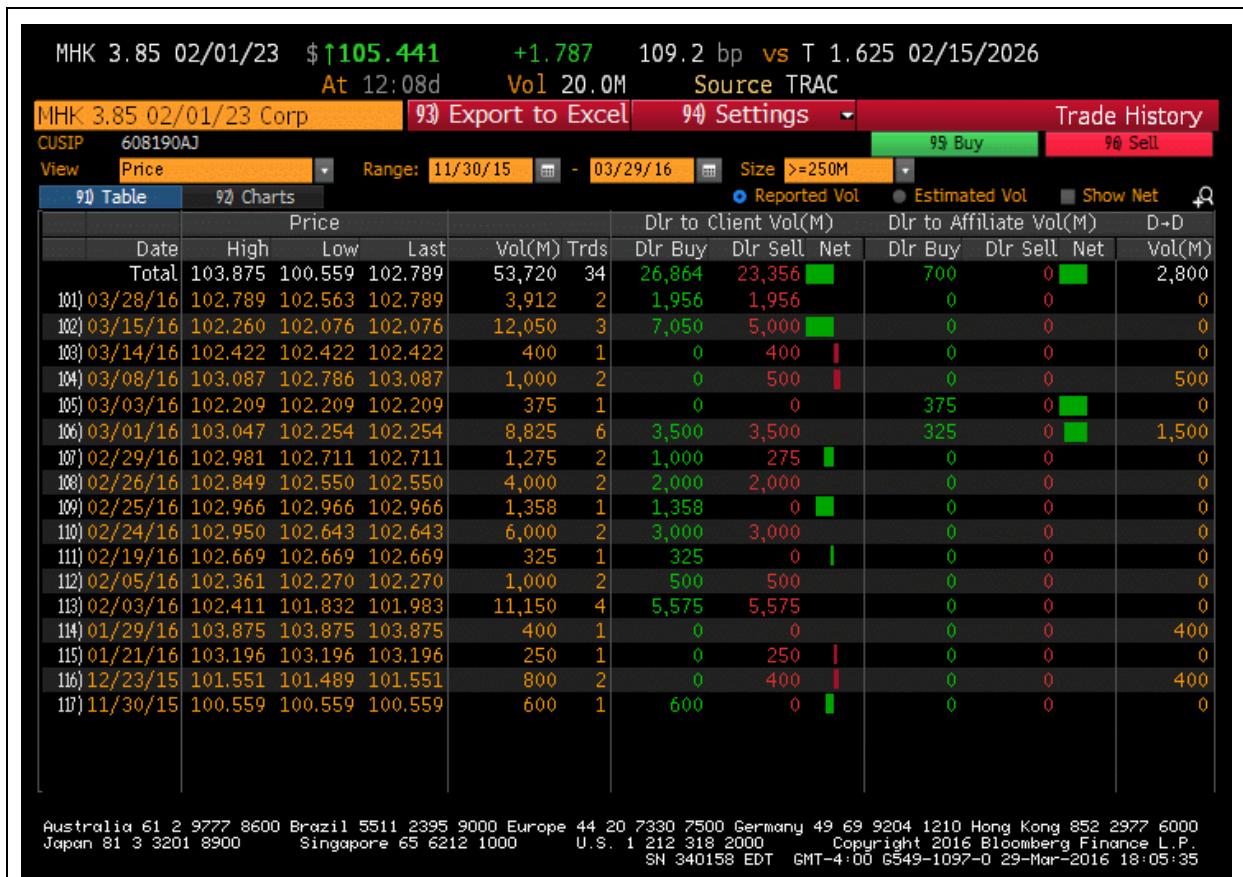


Figure 5: Mohawk’s corporate Bond Prices from 11/30/2015 to 3/29/2016.

This figure lists the price and volume activity for Mohawk’s corporate bond that matures on 2/1/2023 with a 3.85% coupon rate. The first column lists the dates of bond trading and the adjacent column to the right are the corresponding prices. Notice the steady increase in prices from 11/30/2015 to 3/29/2016. Of note, MHK’s 2015 earnings call was on 2/26/2016, this call was also followed by a slight uptick in price.

Source: Bloomberg Terminal. Command: CORP →TDH

Similar to the balance sheet, the income statement has seen positive trends over the last 5 years. From 2011-2015, MHK generated growth in top-line sales (+43%), operating income (+165%), and net income (+253%). During this period, Mohawk’s management increased EBITDA margins by ~400bp. Management has also guided that more improvements are on the horizon. Given our confidence in the balance sheet and income statement, we turned our attention to the operational efficiency of the Company to determine how to forecast future earnings.

Value Drivers (HG-CF) Tab

These results are contained in the ‘HG-CF’ tab of the accompanying spreadsheet.

To determine MHK’s historical performance for forecasting, we determined the historical margins in addition to the value drivers of the company. Upon inspection of these statistics, a few items stood out (for reference, please refer to the accompanying Spreadsheet uploaded to the Institute website). First, MHK’s interest expenses have remained stable, which reflects their relatively flat long-term debt in

absolute value. We also see the effects of actively acquiring over 30 companies via escalating Cap-Ex levels. However, the most concerning variable for Mohawk was their change in Working Capital. The change in Working Capital has dramatically fluctuated over the last 5 years as can be appreciated by the standard deviation. As a result, this variable contributes significantly to the uncertainty in our forecasts upon performing Monte-Carlo simulations.

This is uncommon for a large, well-established company such as MHK. Dramatic changes are usually hallmarks of growing companies, but perhaps that is exactly what Mr. Lorberbaum is targeting. If we utilize recent trends, then management has decreased the daily capital-requirements. We are not sure how long this trend will continue, especially given MHK's acquisitive nature. As MHK continues to acquire companies, their balance sheet will continue to grow and increase the likelihood that change in Working Capital will have to follow suit. Indeed, acquiring new companies will be accompanied by uncertainties in the daily capital requirements contributing to these capital fluctuations until the business is fully integrated. For the model, we assumed that change in Working Capital will actually decrease (-2.94% y/y) as a result of quality re-investments (7.5% Cap-Ex). These re-investments will not only maintain current assets, but will also improve MHK's cost structures. We noticed that management has steadily reduced Cost of Sales by 400 basis points (bps). We believe this trend will continue for another 150bps. For Selling, General, & Administrative (SG&A), we deducted 100bps based on management's comment that sales force and distribution center efficiencies will also improve. With these assumptions of revenue growth and value drivers in hand, we forecasted cash flows into the future to determine the fundamental value of MHK.

Model Results

These results are contained in the 'DCF' tab of the accompanying spreadsheet.

With our base-case assumptions, the HG-DCF model yielded a probable free cash flow of \$224.86 per share of MHK. Although our assumptions seem optimistic, they are in fact grounded on historic trends and management's guidance. We admit that LAT has begun to enter uncharted territories (>1.63) by the final forecasted period, but we think management is re-investing earnings to build capacity to justify such a Bullish forecast. Another way to assess company efficiency to justify our view is to examine the Return on Invested Capital (ROIC). Similar to our LAT analysis, we examined MHK's ROIC from 2006 to 2016 (Figure 6, below). In addition, we also charted the US housing starts from 2006 to 2016 to examine MHK's return as housing starts recover. As shown in Figure 6, MHK's ROIC (white line) seems to correlate with US housing starts (green line). This relationship is supported by the fact that 45% of MHK's sales are from the US (see Table 1). From 2006 to mid-2009, MHK's ROIC and US housing starts show similar trends. However, from mid-2009 and onwards the difference becomes apparent. We ascribe this spread to Mr. Lorberbaum increasing capacity through the acquisition of quality assets, which synergized with MHK's existing assets to improve overall efficiency.



This corroborates with our thesis that management will increase company capacity and efficiency, resulting in new levels of performance. To test the robustness of our forecast, we conducted a Monte-Carlo simulation (see Figure 7, below), which places our estimated free cash flow per share at the 50th percentile of possible free cash flow distributions. The current stock price is within the 45th percentile and indicates that the market has not accounted for these new possible earnings. We acknowledge today's stock price is near the median distribution. Indeed, the distribution is relatively wide and has large negative and positive values. This is most likely due to the 10% Standard Deviation for MHK's revenue, Change in Working Capital, and Capital Expenditures over the last 5 years. Looking at MHK's revenue over a 10-year period, we also noticed tremendous spikes and troughs. This volatility persisted for Cap-Ex as well. The spikes are most likely due to MHK acquiring companies early on, which had a tremendous impact on sales growth and Cap-Ex. The troughs are most likely due to housing development slow-downs that occur cyclically. Our analysis thus far indicates that MHK may provide return upon investment, however, to assess whether management compensation is aligned with our thesis and forecast, we analyzed the compensation plan provided for executives in addition to current trading multiples and whether they corroborate with our valuation.

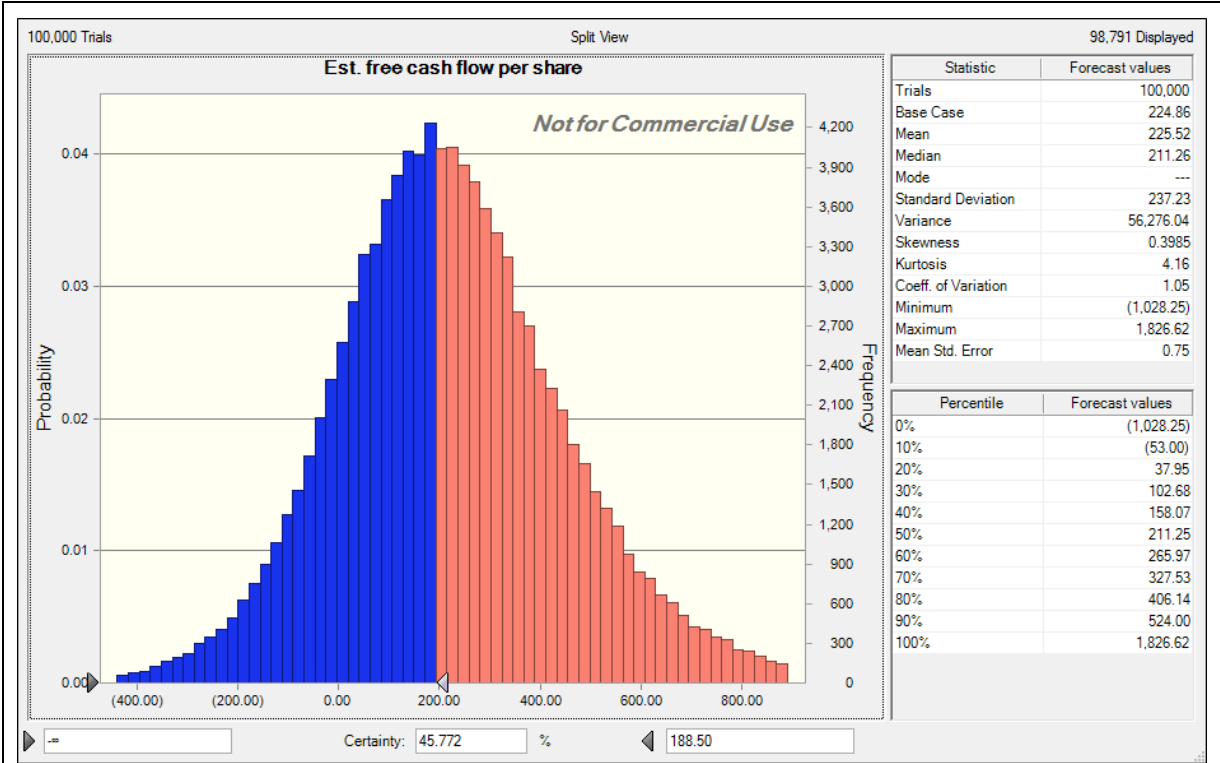


Figure 7: Monte Carlo Simulation Results from Mohawk HG-DCF model

These are the results from 100,000 Monte-Carlo simulations of Mohawk’s discounted Free-Cash Flow model. The plot is probability versus the possible discounted free cash levels per share. The pink portion of the figure indicates possible free cash flow levels that are above today’s stock price. The blue region denotes values that are below today’s stock price.

Proxy Findings

Management Compensation

These results are based on an in-depth analysis of the proxy statement: SEC Filing DEF-14A.

Given that management has discretion to allocate capital, we conducted a compensation analysis to see if management is obligated, or incentivized, to generate shareholder returns aligned with our investment thesis. Mohawk’s CEO is Jeffrey S. Lorberbaum, age 62, and has been in his current role since 2001. Prior to joining Mohawk, Mr. Lorberbaum was Vice President of Aladdin Mills, his family owned carpet business. In 1994, Mohawk and Aladdin merged, with Mr. Lorberbaum serving as president before being appointed CEO.

According to Mohawk’s 2014 proxy statement, executive compensation is divided into 3 segments:

1. Base salary
2. Annual cash incentive
3. Long-term incentive

Base Salary

The base salary for named executives is based on marketplace rates, economic conditions and subjective individual performances. In 2014, all named MHK executives received a 2.5% increase in base salary.

Annual Cash Incentive

The annual cash incentive is based on 3 parameters:

1. MHK must have a positive “adjusted operating income” for cash incentives to be distributed.
2. The Annual Cash Incentive for named executives is taken from a bonus pool.
 - i. This bonus pool is 1.25% of the adjusted operating income.
 - ii. Mr. Lorberbaum was able to receive up to 24% of the bonus pool.
3. The performance metrics used to determine the Annual Cash Incentive is tied to company EPS and business unit EPS.

Table 5: Mohawk’s Executive Annual Cash Incentive Performance Metrics - EPS

	Company EPS	Carpet EPS	Laminate & Wood EPS
Threshold	\$6.55	\$1.49	\$2.16
Target	\$8.15	\$1.83	\$2.43
Maximum	\$8.75	\$2.14	\$2.75
2014 Performance	\$8.18	\$1.87	\$2.34

Source: Mohawk 2014 Proxy

Table 6: Realized Cash Incentive for Named Mohawk Executives

Named Executives	Aggregate Performance Against Target	2014 Award
Jeffrey S. Lorberbaum (CEO)	103%	\$1,004,316
Frank H. Boykin	103%	\$450,967
W. Christopher Wellborn	103%	\$867,807
Bernard P. Thiers	103%	\$491,116
Brian M. Carson	103%	\$446,593

Source: Mohawk 2014 Proxy

Long-term Incentive Plan (LTIP)

The LTIP parameters are as follows:

1. MHK must have a positive operating income in the prior year.
2. LTIP award is distributed as Restricted Stock Units (RSUs).
 - a) Number of RSUs granted is based on Total Shareholder Return (TSR) over a 3-year period, and compared to peer companies.
 - b) Peers (See Table 7) are selected according to similarities in Market Cap, Revenue, and distribution channels.

Table 7: List of Mohawk's Peers

Armstrong World Industries	The Sherwin-Williams Company
Herman Miller, Inc.	Snap-On Incorporated
HNI Corporation	Steelcase, Inc.
Interface, Inc.	Universal Forest Products, Inc.
Leggett & Platt, Incorporated	USG Corporation
Lennox International	Vulcan Materials Company
Martin Marietta Materials, Inc.	Whirlpool Corporation
Newell Rubbermaid Inc.	Stanley Black and Decker, Inc.
Masco Corporation	Owens Corning

Source: Mohawk 2014 Proxy

3. The value of RSUs awarded is relative to base salary and determined by TSR.
 - a) Less than 25th percentile of TSR = 0% of base salary value.
 - b) Threshold is at 25th percentile of peers = 60% of base salary value.
 - c) TSR at 50th percentile of peers = 120% of base salary value.
 - d) TSR at 75th percentile of peers = 240% of base salary value.
 - a. This system changed in 2015. The percent awarded is now based on a, "target award," rather than as a salary percentage. The percent awarded will also range from 50 – 175% of the target award. TSR must still be maintained in the 25th to 75th percentile range.
4. Individual performances can also lead to additional RSUs for named executives.
 - a) The number of RSUs awarded for individual performances is capped at 30% of base salary value.
 - b) Individual performance is based on subjective measures such as executing productivity strategies, and capital plan projects.
 - c) In 2015, this Individual Component will be based on quantitative metrics such as business segment performance. The individual performance awards will also have a, "target," objective (based on percentage of base salary). The actual RSUs awarded will then be a percentage of this target, ranging from 0 – 175%.
5. LTIP to invest ratably over a 3-year period following the grant date.

Table 8: Total Compensation for Mohawk CEO, Jeffrey Lorberbaum

Name and Principal Position	Year	Salary (\$)	Stock Awards (\$)	Non-Equity Incentive Plan Compensation (\$)	All Other Compensation (\$)	Total (\$)
Jeffrey S. Lorberbaum (CEO)	2014	1,082,144	2,907,489	1,004,316	11,753	5,005,702
	2013	1,055,750	2,586,033	1,583,625	12,560	5,237,968
	2012	1,030,000	2,222,106	1,036,000	9,251	4,297,357

Source: Mohawk 2014 Proxy

Based on our analysis, it is our opinion that MHK's compensation structure is not a detriment to shareholders or our investment thesis. Relative to stock performance, we feel that Mr. Lorberbaum and his team are adequately compensated for their duties. In terms of qualitative assessments, we would like

to note that Mr. Lorberbaum has a longstanding history in the flooring industry from his days at Aladdin Mills. More importantly, he appears to take tremendous pride ensuring MHK leads the flooring industry.

Dividend and Share History



MHK has not declared any dividends over the last 5 years. The company's outstanding shares and equity float have increased over the last 5 years indicating that the company is not likely to dilute shareholder value by issuing equity for acquisitions. The equity float is greater than the shares outstanding. This may be the result of Mohawk shares being owned by the Aladdin group, which is Mr. Lorberbaum's family owned business (see Figure 8, above).

Management Guidance

During the 4th quarter 2015/Annual earnings call, Mr. Lorberbaum provided some details on future expectations for Mohawk. Mr. Lorberbaum and CFO, Frank Boykin, stated they expect 2016 Capital Expenditures to be in the \$600-650 million range and that these expenditures will support an additional \$1.2-1.4 billion in sales. When questioned about any possible future acquisitions, Mr. Lorberbaum stated that MHK's balance sheet is capable of handling another \$1.5 billion worth of debt. Both executives also reminded analysts that MHK's management has not finished optimizing their business and there is still room for improvement. In terms of economic factors, MHK also iterated that currency headwinds are depressing their sales, but volumes are increasing. Considering the current muted economic conditions in Russia and Brazil, management was encouraged by increasing volumes. Overall, they were very eager

to remind investors that management has not finished their projects, implying analysts have not accounted all future earnings.

Multiples

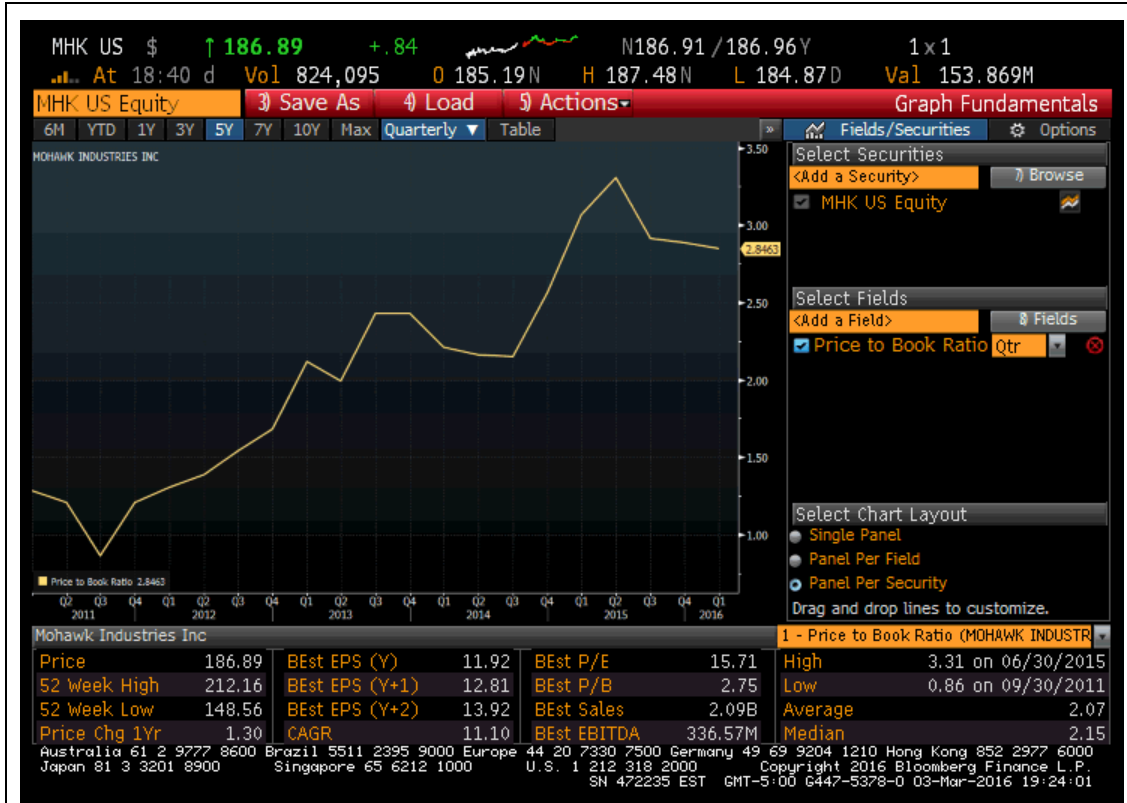


Figure 9: Mohawk’s Price to Book Ratio from 2011 to 2015
 The trend for Mohawk’s P:B ratio seems to be following their stock price.

Source: Bloomberg Terminal. Command: GF. Accessed 3/3/2016

In Figure 9 (above), Mohawk has a 2.07 average Price to Book Value ratio and 65.75 Book Value per share (MRQ). According to these multiples, Mohawk should be valued at \$136.10 per share. If we use the current Price to Book Value of 2.85, each share would be valued at \$187.39. From a historic Book Value standpoint, MHK shares are currently overvalued. This is a slight concern. However, we think that this increase in Price to Books ratio has not yet reached unsustainable levels, given MHK’s ability to integrate new assets (i.e. increase their books value). Consistent with this assertion, consensus estimates have an increase in sales and EPS estimates forecasted into the future (Figure 10).

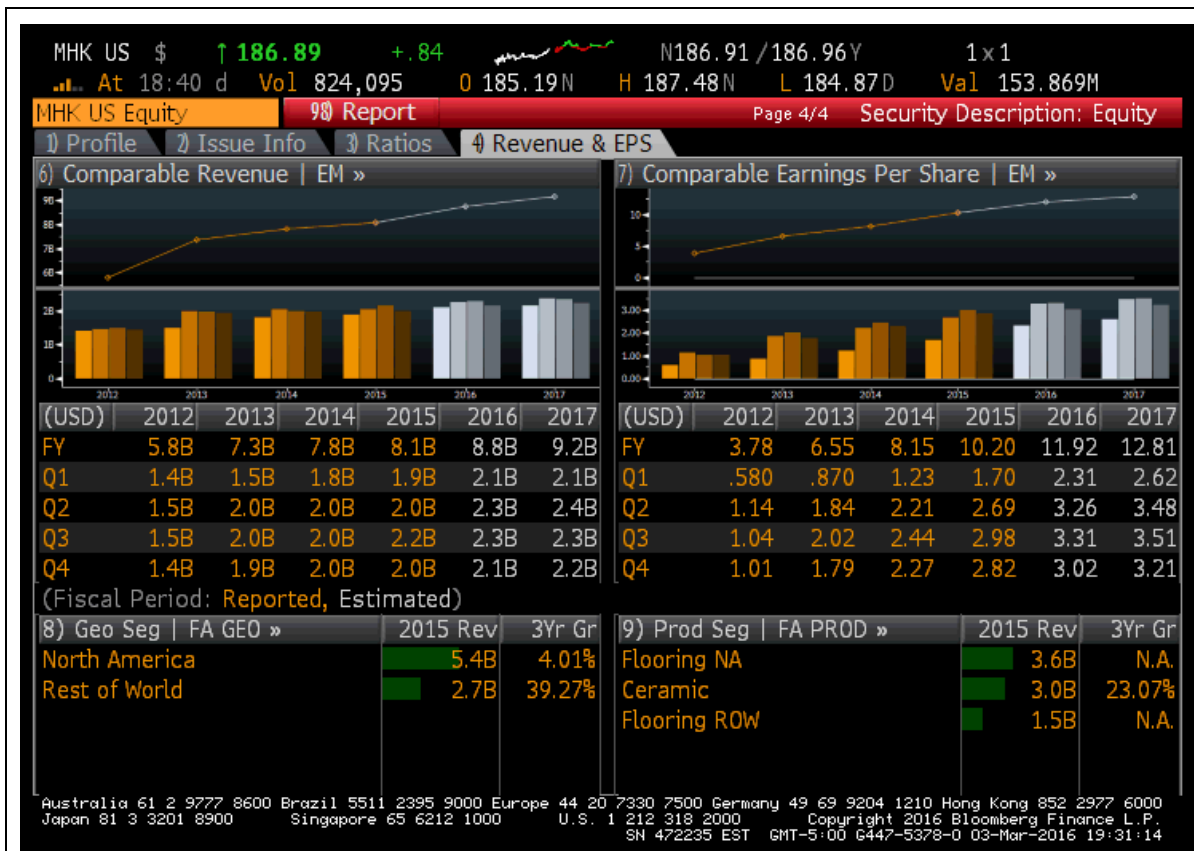


Figure 10: Mohawk's EPS from 2012 to 2017

Both revenue and EPS figures have steadily increased and are projected to continue their trends.

Source: Bloomberg Terminal. Command: DES. Accessed 3/3/2016

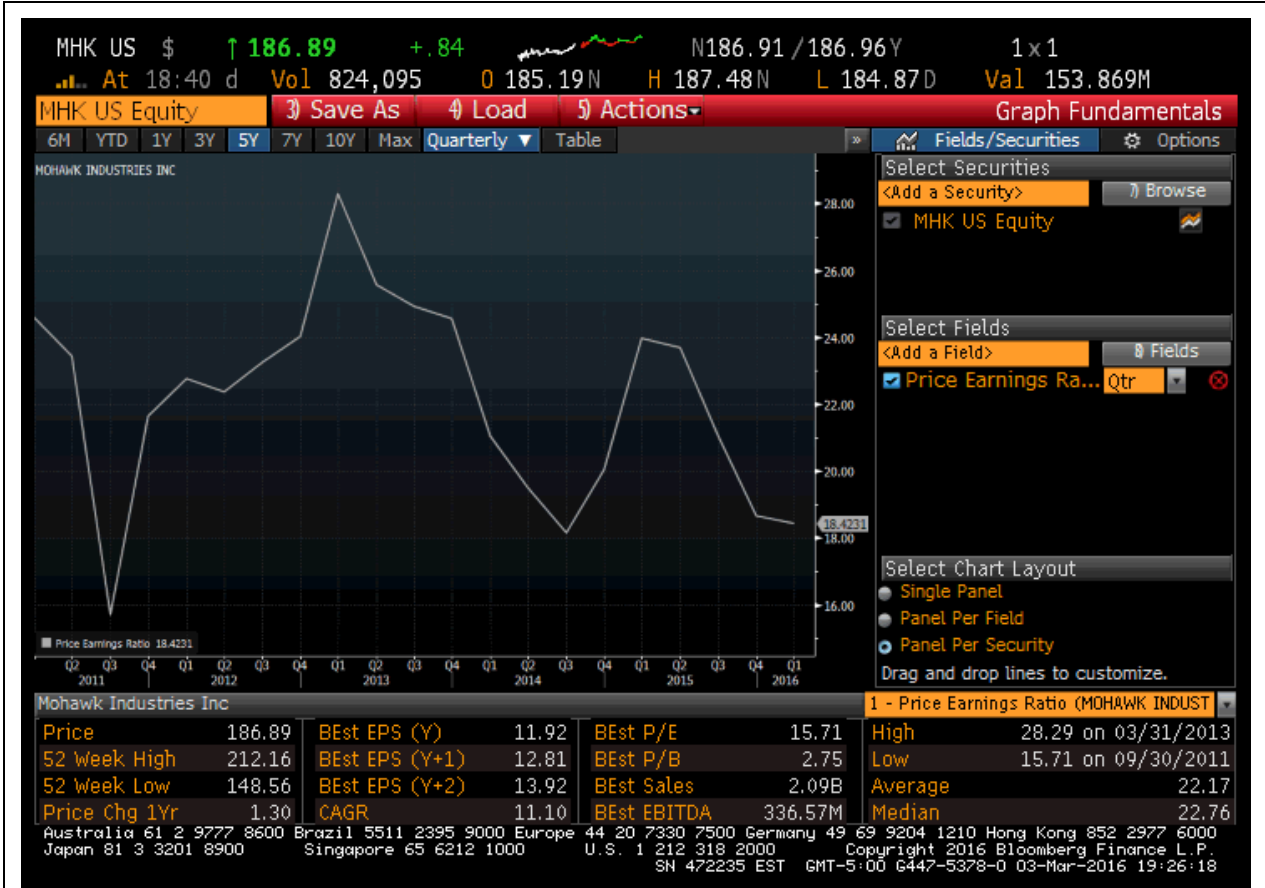


Figure 11: Mohawk's P/E ratio from 2011 to 2015
 The last 5 years of P/E ratios have fluctuated. Very dissimilar to revenue and EPS trends.

Source: Bloomberg Terminal. Command: GF. Accessed 3/3/2016

Judging by the historic averages for the EPS (7.17) and P/E (22.17) multiples from Figure 10 and Figure 11, respectively, Mohawk should be valued at \$158.96 per share. Much like the historic Price to Book Value analysis, the EPS and P/E analysis indicates that Mohawk shares are currently overvalued. We believe there are multiple reasons why this may be the case. Firstly, multiples analysis are based on relative valuation and do not explicitly incorporate fundamental value of the company. Secondly, we contend that given MHK's brand recognition and market share, investors are willing to pay more per dollar of earnings than other competitors leading to this higher multiple. Finally, given earnings growth, our thesis remains valid if the multiple does not compress into the future. We believe that multiple compression would most likely reflect a deterioration of the general macroeconomic landscape for housing which is an inherent risk of investing in MHK.

Holders and Insider Trading

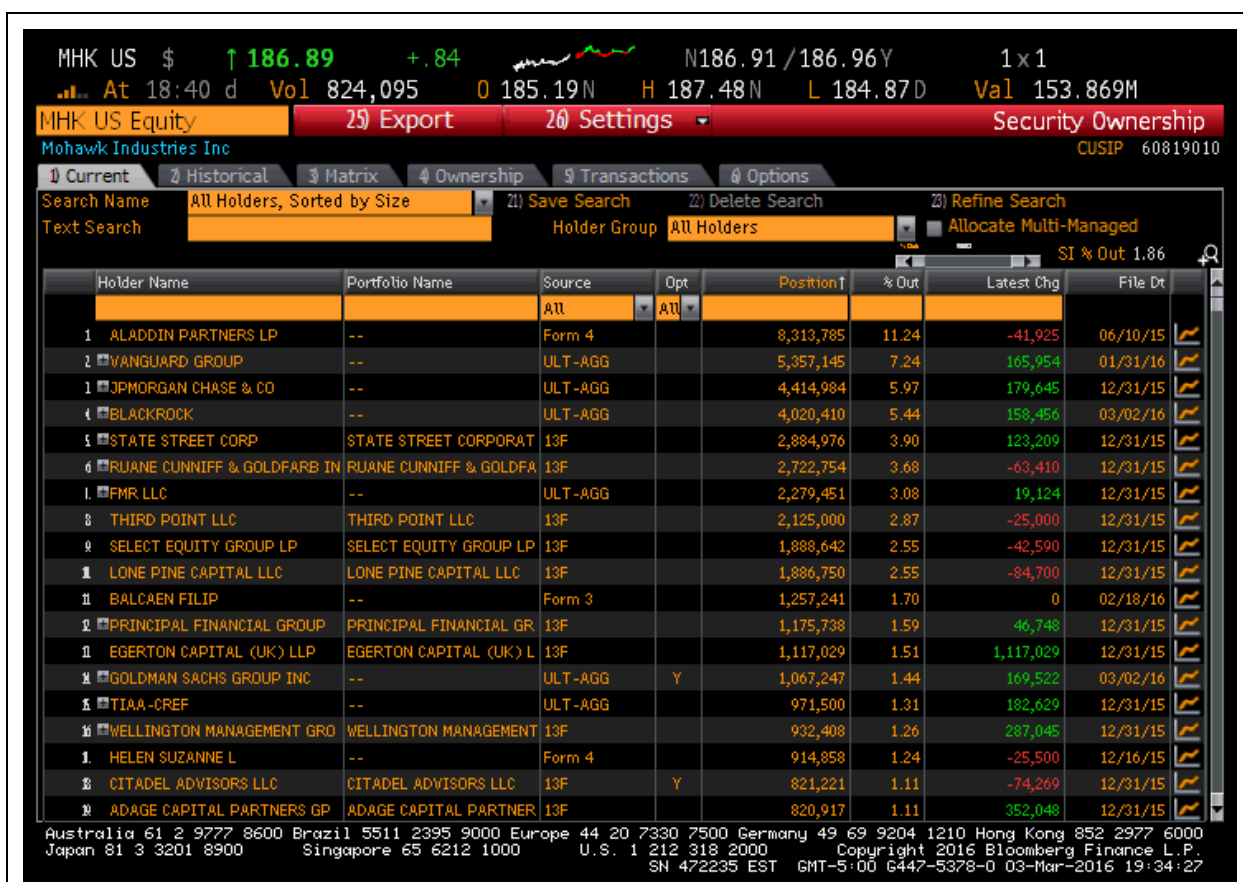


Figure 12: Mohawk's Institutional and Insider Shareholders
 It is reassuring to see executive officers, denoted by 'Form 3' and 'Form 4' sources, included in the top 15 shareholders.

Source: Bloomberg Terminal. Command: OWN. Accessed 3/3/2016

Figure 12 (above) is a list of MHK's shareholders in descending order. The top spot is held by Aladdin Partners, which is Mr. Lorberbaum's family-owned carpet business. Other notable Mohawk insiders, made by the 'Form 3' source title, include Balcaen Filip, founder of IVC group, a luxury vinyl tile manufacturer that was acquired by MHK in the 4th quarter of 2015. Helen Suzanne is Mr. Lorberbaum's sister and is also a large stakeholder in the company. Inspection of insider trading reveals that Mr. Lorberbaum recently purchased shares of MHK from the open market, albeit those shares are from Aladdin Partners (Figure 13, below). Lorberbaum has also stated on the record that he plans to keep his Mohawk shares for the foreseeable future. MHK is also owned by large institutional investors such as Vanguard and State Street. Another notable supporter of Lorberbaum comes from Third Point's fund manager, Dan Loeb, who is a shareholder activist that is notorious for verbally chastising and ousting poorly performing executives. In MHK's case, Loeb has publicly praised Lorberbaum for his managerial abilities.



Figure 13: Mohawk's Recent Insider Transactions

Each red pentagonal shape represents a divestiture or sale of Mohawk shares. The green pentagonal shapes are purchases of shares. The plot is of share price versus time in year and month.

Source: Bloomberg Terminal. Command: <GPTR>. Accessed 3/3/2016

Firm Specific Issues

We are concerned that Mohawk has relied on acquisitions to generate growth. This is reflected in the company's Capital Expenditures, which has a 5-year average run-rate that is twice Depreciation and Amortization run-rates. Dan Loeb, however, has praised Lorberbaum for being an active acquirer in this low-interest rate environment. The upside to these acquisition is future capacity for MHK. The Company now has offices in Europe, South America, and North America. This global presence will allow MHK to continue taking advantage of their vertical integration and utilize their additional capacity.

Conclusions

MHK seems to be accumulating capacity and increasing its presence in the flooring business. We believe Mohawk will capitalize on this excess capacity and increase sales to historic averages (9.05%), which will increase long-term asset turns to unprecedented levels and yield ~18% gain for shareholders. A possible hole in our thesis is the change in Working Capital and if management can reach new levels of efficiency. We believe this execution risk is mitigated by MHK's exceptional management, experience, and

compensation plan being aligned with shareholders. Overall, we think MHK’s management has demonstrated their ability to meet internal goals and investor expectations. Thus, we rate Mohawk as a [BUY](#).

Addendum

We conducted a basic comparative analysis to gauge MHK’s position in the flooring industry. Tarkett, a European flooring company, placed Table 6 in their 2014 Annual Report. From an investor standpoint, it is encouraging to see that peers view MHK as an industry leader.

Ranking based on latest sales data (in m€)		Ceramics	Vinyl & Linoleum	Carpet	Wood & Laminate	Rubber	Turf & Tracks	Product categories
Mohawk	5	✓	✓	✓	✓	✓		5
Shaw	4		✓	✓	✓		✓	4
Tarkett	5		✓	✓	✓	✓	✓	5
Armstrong	2		✓		✓			2
Beaulieu	3		✓	✓	✓			3
Interface	1			✓				1
Polbo	2		✓	✓				2
Gerflor	1		✓					1
MANNINGTON	5	✓	✓	✓	✓	✓		5
MARMA	1			✓				1

Table 9: Tarkett’s view of the flooring industry landscape for 2014

In this table, Tarkett, a European flooring company, is presenting the competitive landscape. As you can see, Mohawk, with 5 product categories was considered the flooring industry leader.

Source: Tarkett’s 2014 Annual Report

We also performed a Monte-Carlo Simulation for a bull-case where management executed their Cap-Ex strategy in 2016 and subsequently entered into a historic average state (Figure 14, below). We assumed that once Cap-Ex effects are realized, Mohawk would steadily support a +9.0% y/y sales growth. From 2017 onwards, we also assumed that Cap-Ex would return to 10-year historic averages (5.40% of net sales). We then projected Mohawk to become more efficient over time as capacity is utilized, thus decreasing daily capital requirements for the future. All other inputs of our Monte-Carlo simulation were held constant.

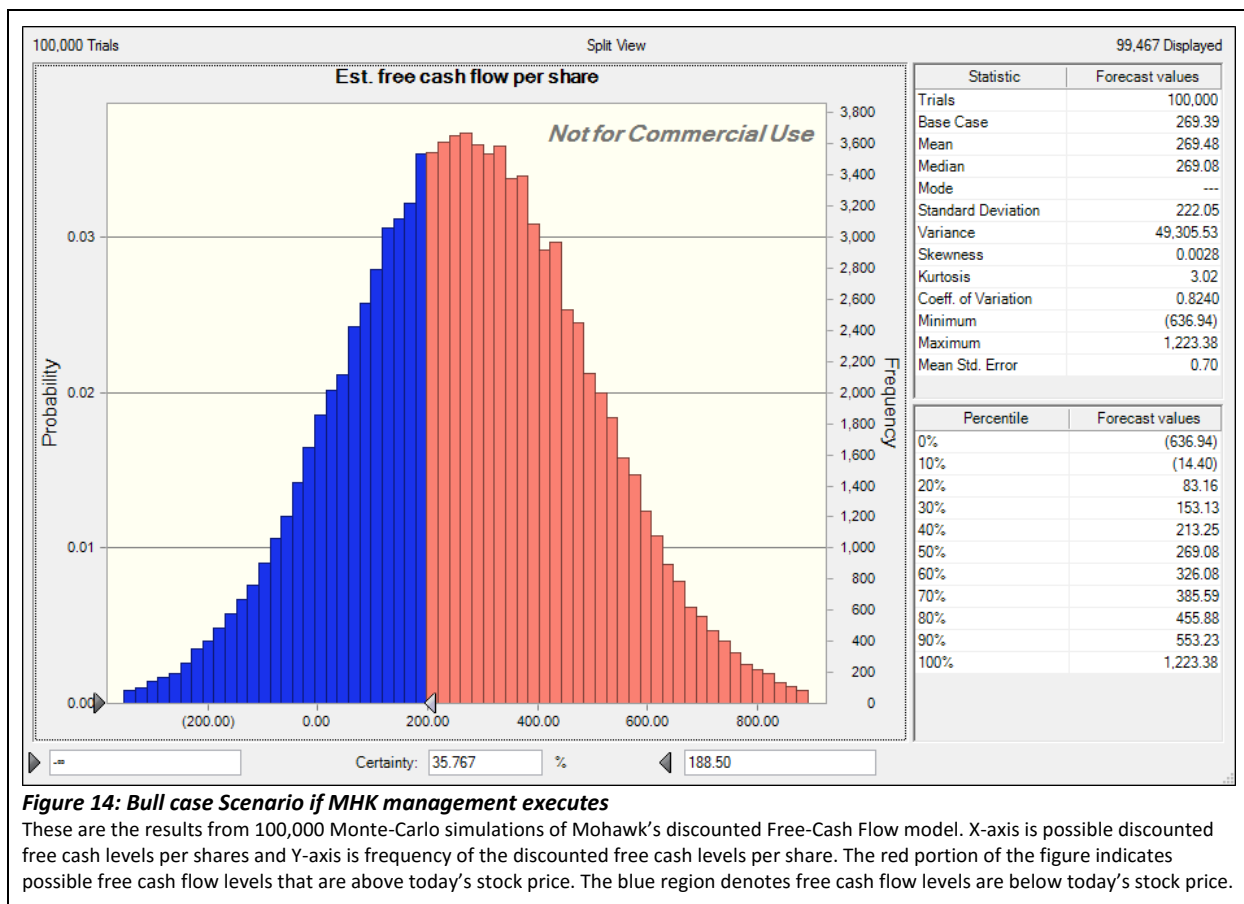


Figure 14: Bull case Scenario if MHK management executes

These are the results from 100,000 Monte-Carlo simulations of Mohawk’s discounted Free-Cash Flow model. X-axis is possible discounted free cash levels per shares and Y-axis is frequency of the discounted free cash levels per share. The red portion of the figure indicates possible free cash flow levels that are above today’s stock price. The blue region denotes free cash flow levels are below today’s stock price.