BofA US Home Sales Indicators

New home recovery poised to continue; Existing homes rebounding from trough

Industry Overview

BofA US New & Existing Home Sales Indicators improved

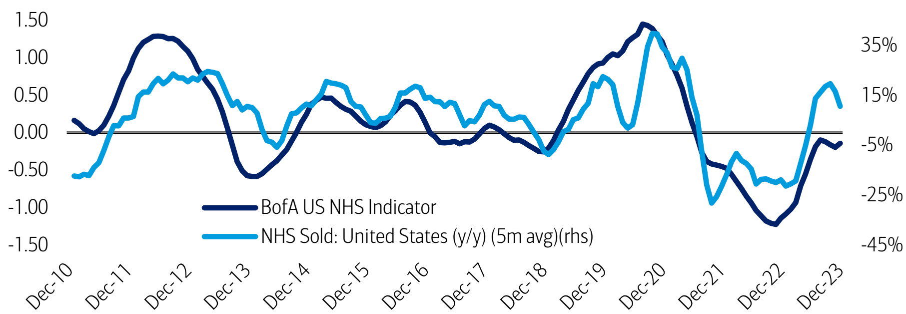
Since our inaugural report in November, the BofA US New and Existing Home Sales Indicators have both improved sequentially, primarily driven by the decline in mortgage rates. See the BofA US Home Sales Indicators launch note for an explanation of the methodology, disclaimers and limitations of the variables.

NHS Indicator uptick driven by rates, builder confidence

New home sales recovered sharply through 2023, which we expect to continue into Spring selling. The strong job market, favorable demographics (growing number of households), and low existing home supply remain tailwinds to the new home market in our view. Lower mortgage rates (down roughly 100bps from the peak in October), higher homebuilder confidence, and higher MBA mortgage applications all inflected positive over the last two months. Our NHS Indicator suggests growth will accelerate in early 2024 after having had a brief slowdown at the end of 2023.

Exhibit 2: BofA US New Home Sales Indicator vs. new family houses sold year over year

The indicator leads new home sales by three months with a positive correlation (0.80) since 2013



Source: BofA Global Research.US Census Bureau, **Note:** The BofA US New Home Sales Indicator identified above is intended to be an indicative metric only and may not be used for reference purposes or as a measure of performance for any financial instrument or contract, or otherwise relied upon by third parties for any other purpose, without the prior written consent of BofA Global Research. This indicator was not created to act as a benchmark

BofA GLOBAL RESEARCH

EHS Indicator: real-time trends turning more positive

Falling mortgage rates, higher MBA mortgage applications, and a rising pending home sales index inflected positive in the last three months and our EHS Indicator improved sharply. Existing home sales slightly fell in December and are tracking at the lowest level since 2010. The EHS indicator suggests existing home sales have troughed, but inventory levels likely need to increase to get a significant (>15%) recovery in 2024. Existing home inventory is historically low with 79% of current homeowners locked in at <5% mortgage rates (Housing Watch: Turbulence but no crash). Lower mortgage rates could be a catalyst to unlock additional supply.

02 February 2024

Equity
United States
Homebuilders

Rafe Jadrosich
Research Analyst
BofAS
+1 646 855 5815
rafe.jadrosich@bofa.com

Victoria Piskarev
Research Analyst
BofAS
victoria.piskarev@bofa.com

Elizabeth L Suzuki
Research Analyst
BofAS

Robert F. Ohmes, CFA
Research Analyst
BofAS

Jason Haas, CFA
Research Analyst
BofAS

George L. Staphos
Research Analyst
BofAS

Jeffrey Spector
Research Analyst
BofAS

Curtis Nagle, CFA
Research Analyst
BofAS

Mihir Bhatia
Research Analyst
BofAS

Shaurya Visen >>
Research Analyst
Merrill Lynch (Australia)

Exhibit 1: Trends of key inputs

Directional trends of indicators' inputs

Input	Trend
BofA US New Home Sales Indicator	
Financing and affordability	■
Demographics	▲
Homebuyer confidence	▼
Homebuilder confidence	▲
Housing supply	▲
Real-Time Trends	▲
BofA US Existing Home Sales Indicator	
Financing and affordability	■
Demographics	▲
Homebuyer confidence	▼
Housing supply	▼
Real-Time Trends	▲

Source: BofA Global Research

BofA GLOBAL RESEARCH

BofA US New Home Sales Indicator

NHS Indicator driven by builder confidence and recent trends

New home sales recovered sharply through 2023, which we expect to continue into Spring selling. The strong job market, favorable demographics (growing number of households), and low existing home supply remain tailwinds to the new home market in our view. Lower mortgage rates (down roughly 100bps from the peak in October), higher homebuilder confidence, and higher MBA mortgage applications all inflected positive over the last two months. Our NHS Indicator suggests growth will accelerate in early 2024 after having had a brief slowdown at the end of 2023. The NHS Indicator ticked up to (0.14), as compared to (0.19) in November.

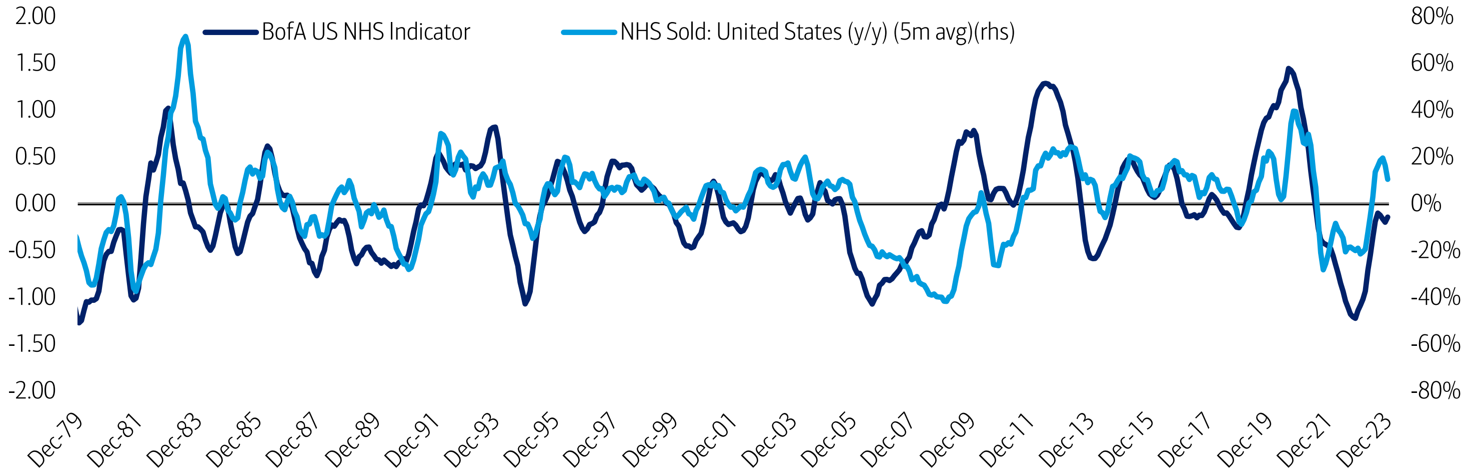
Exhibit 3: Key inputs of BofA US New Home Sales Indicator
3 variables flipped to tracking positive in December, and now 6 out of 8 of the variables are tracking neutral or positive

Component	Data	Last Updated	Y/Y Direction	Sequential Direction	Discretionary Direction Classification	Direction Explanation
1) Financing and affordability						
Freddie Mac 30-year mortgage rate	6.60%	Weekly as of January 18th, 2024	↑	↓	▲	Mortgage rates are up YoY, but have declined over 100 bps since they reached a peak of 7.78% in October
% Consumer Confidence Respondents Who Say Mortgage Rates Will: Go Up	31.0%	Monthly as of December 2023	↓	↓	■	Fewer homebuyers expect mortgage rates to go up
Affordability: P&I by Median Household Income*	0.90	Monthly as of December 2023	↓	=	▼	Affordability remains historically low
2) Demographics						
Number of US Households (thousands)	130,467	Monthly as of December 2023**	↑	↑	▲	Household estimates are still higher than historical average
3) Homebuyer confidence						
% Respondents Who Say it is a Good Time to Buy	17%	Monthly as of December 2023	↓	↑	▼	The percent of respondents who believe it is a good time to buy remains historically low
4) Homebuilder confidence						
Homebuilder Confidence Survey: Single-Family Sales over next six-months	57	Monthly as of January 2023	↑	↑	▲	Homebuilder confidence has increased recently with lower rates
5) Housing Supply						
Homeowner Vacancy Rate	0.80	Quarterly as of September 2023**	=	=	▲	Historically low vacancy rates
6) Real-time trends						
Mortgage Banker's Association Mortgage Application Index	210	Weekly as of January 18th, 2024	↑	↑	▲	Falling mortgage rates have increased home buying demand

Source: BofA Global Research, Bloomberg, Freddie Mac, Fannie Mae, US Census Bureau, Mortgage Bankers Association, US Bureau of Economic Analysis
* Median P&I / Median Household income assumes New Home Median Price based on the 30yr FRM with 80% LTV. The monthly P&I is then divided by Median Household Income.
**December number of US households and homeowner vacancy rate is the rolling average of the past three months.
▲ = Favorable; ■= Neutral; ▼= Unfavorable

BofA GLOBAL RESEARCH

Exhibit 4: US New Home Sales Indicator vs. new family homes sold year over year since 1979
The indicator leads new home sales by three months with a positive correlation (0.65) from 1979



Source: BofA Global Research. **Note:** The BofA US New Housing Indicator identified above is intended to be an indicative metric only and may not be used for reference purposes or as a measure of performance for any financial instrument or contract, or otherwise relied upon by third parties for any other purpose, without the prior written consent of BofA Global Research. This indicator was not created to act as a benchmark

BofA GLOBAL RESEARCH

Potential stock implications of stronger new home sales

When the BofA US New Home Sales Indicator is rising, we see positive implications across multiple sectors from stronger new home demand and increased pace of new construction. In homebuilders and building products, we expect homebuilders and new construction leveraged building product distributors and manufacturers to outperform. In forest products/materials, lumber, panel, siding and distribution companies should benefit from an increase in housing starts. In consumer finance, mortgage insurers would likely benefit from higher origination of mortgages for new home sales.

Exhibit 5: When the New Home Sales Indicator is rising…
BofA fundamental analysts see positive impact on these sub-sectors

Sector (Region)	Analyst	Sub-sector | stock (Ticker)
Homebuilders (US)	Rafe Jadrosich	Homebuilders, new construction building products, distributors | TopBuild (BLD US), Builders FirstSource (BLDR)
Paper, Packaging & Forest Products (US)	George Staphos	Lumber, panels, siding, distribution | Weyerhaeuser (WY US), PotlatchDeltic (PCH US), Louisiana-Pacific (LPX US), Boise Cascade (BCC US)
Consumer Finance (US)	Mihir Bhatia	Mortgage Insurers
Australia Building Materials (AU)	Shaurya Visen	Building Products | James Hardie (JHX AU)

Source: BofA Global Research

BofA GLOBAL RESEARCH

December US new home sales at 664k vs. 656k long-term average

Reported by the US Census Bureau, US new home sales measures the sales of new single-family homes with seasonally adjusted rates. Since 1963, new home sales SAAR in the US have averaged at a rate of 656K. US home sales peaked in 2005 at 1.389mm homes sold during the housing bubble partially due to a drop in credit requirements that led to high mortgage demand. Post housing crash and the Global Financial Crisis, new home sales troughed at a rate of 270K in 2011. At present, we see a housing backdrop similar to the early 1980s, when interest rates spiked due to elevated inflation, and the 30-year fixed mortgage rate reached a peak of 18.4% in 1981. New home sales rebounded sharply and recovered to pre-mortgage rate spike levels by 1983. In December, new home sales SAAR rose to 664k, as compared to the revised 615k in November.

BofA US Existing Home Sales Indicator

Rising EHS Indicator driven by real-time trends

Falling mortgage rates, higher MBA mortgage applications, and a rising pending home sales index inflected positive in the last three months and our EHS Indicator improved sharply. Existing home sales slightly fell in December and are tracking at the lowest level since 2010. The EHS indicator suggests existing home sales have troughed, but inventory levels likely need to increase to get a significant (>15%) recovery in 2024. Existing home inventory is historically low with 79% of current homeowners currently locked in <5% mortgage rates (Housing Watch: Turbulence but no crash). Lower mortgage rates could be a catalyst to unlock additional supply. The EHS indicator score ticked up to (0.22), as compared to (0.26) in November.

Exhibit 6: Key inputs of BofA US Existing Home Sales Indicator

3 variables flipped to positive in December, and 5 out of 9 of the variables are tracking neutral or positive

Component	Data	Last Updated	Y/Y Direction	Sequential Direction	Discretionary Direction Classification	Direction Explanation
1) Financing and affordability						
Freddie Mac 30-year mortgage rate	6.60%	Weekly as of January 18th, 2024	↑	↓	▲	Mortgage rates are up YoY, but have declined over 100 bps since they reached a peak of 7.78% in October
% Consumer Confidence Respondents Who Say Mortgage Rates Will: Go Up	31%	Monthly as of December 2023	↓	↓	■	Fewer homebuyers expect mortgage rates to go up
Median mortgage payment / Real personal disposable Income*	0.90	Monthly as of December 2023	↓	=	▼	Affordability remains historically low
2) Demographics						
Number of US Households (thousands)	130,467	Monthly as of December 2023**	↑	↑	▲	Household estimates are still higher than historical average
3) Homebuyer confidence						
% Respondents Who Say it is a Good Time to Buy	17%	Monthly as of December 2023	↓	↑	▼	The percent of respondents who believe it is a good time to buy remains historically low
4) Housing Supply						
Homeowner Vacancy Rate	0.80	Quarterly as of September 2023**	=	=	■	Historically low vacancy rates
US Existing Homes Inventory Index	45.33	Monthly as of December 2023	↓	↑	▼	Inventory is still low compared to historical average
5) Real-time trends						
Mortgage Banker's Association Mortgage Application Index	210	Weekly as of January 18th, 2024	↑	↑	▲	Falling mortgage rates have increased home buying demand
Pending Home Sales Index (PHSI)	151.95	Monthly as of November 2023	↑	↑	▲	Pending sales have increased YoY

Source: BofA Global Research, Bloomberg, Freddie Mac, Fannie Mae, US Census Bureau, Mortgage Bankers Association, US Bureau of Economic Analysis

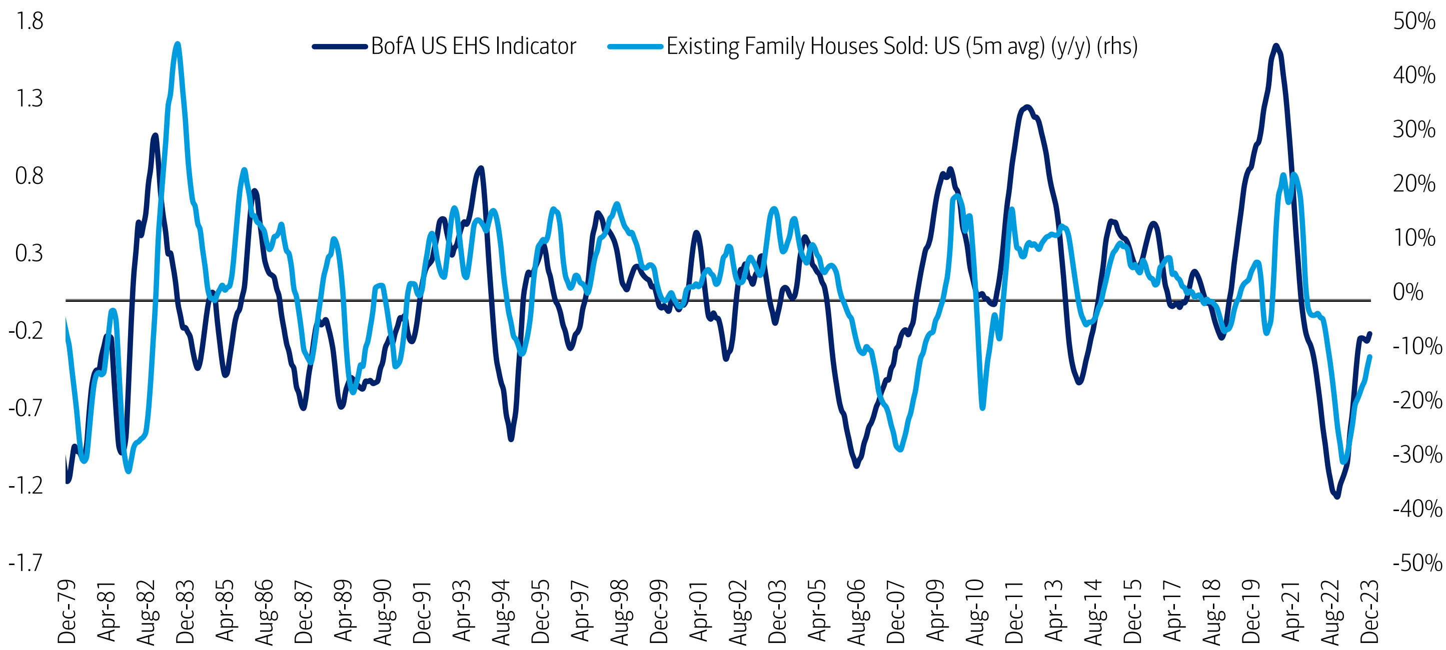
* Median P&I / Median Household income assumes New Home Median Price based on the 30yr FRM with 80% LTV. The monthly P&I is then divided by Median Household Income.

**December number of US households and homeowner vacancy rate is the rolling average of the past three months.

▲ = Favorable; ■ = Neutral; ▼ = Unfavorable

BofA GLOBAL RESEARCH

Exhibit 7: BofA US Existing Home Sales Indicator vs. existing family houses sold year over year
The EHS indicator leads existing home sales by five months with a positive correlation (0.69 since 1979)



Source: BofA Global Research, National Association of Realtors. **Note:** The BofA US Existing Housing Indicator identified in this report is intended to be an indicative metric only and may not be used for reference purposes or as a measure of performance for any financial instrument or contract, or otherwise relied upon by third parties for any other purpose, without the prior written consent of BofA Global Research. This indicator was not created to act as a benchmark

BofA GLOBAL RESEARCH

Potential stock implications of stronger existing home sales

When the BofA US Existing Home Sales Indicator is rising, we see positive potential implications across multiple sectors to stronger existing home sales. In building products, we expect repair and remodel focused building products companies to benefit from turnover driven renovation projects. In Hardline/Retail, home improvement retailers, mattresses, and home furnishings could all benefit from homeowners making large purchases around housing turnover. In Internet, online real estate would benefit from increased housing transactions. In consumer finance, mortgage insurers and mortgage originators would benefit from an increase mortgage activity. In real estate, self-storage companies would benefit from an increase in homeowners moving homes.

Exhibit 8: When the Existing Home Sales Indicator is rising…
BofA fundamental analysts see positive impact in these sub-sectors

Sector (Region)	Analyst	Sub-sector
Building Products (US)	Rafe Jadrosich	Building Products | Mohawk (MHK US), Masco (MAS US)
Hardline Retail (US)	Elizabeth Suzuki, Robert Ohmes	Home improvement retailers
Hardline Retail (US)	Jason Haas	Mattresses, home furnishings
Paper, Packaging & Forest Products (US)	George Staphos	Lumber, panels, siding, distribution | Weyerhaeuser (WY US), PotlatchDeltic (PCH US), Louisiana-Pacific (LPX US), Boise Cascade (BCC US)
Internet (US)	Curtis Nagle	Online Real Estate, home furnishings | Zillow Group (ZG US), Redfin (RDFN US), Opendoor Technologies (OPEN US)
Consumer Finance (US)	Mihir Bhatia	Mortgage insurers & Mortgage originators
REITs (US)	Jeff Spector	Self-Storage | Public Storage (PSA)
Australia Building Materials (AU)	Shaurya Visen	Building Products | James Hardie (JHX AU), Reliance (RWC)

11

December US existing single family home sales at 3.4mm vs. 3.8mm average

Reported by the National Association of Realtors, existing home sales data measures the sales and prices of existing single-family homes for the United States overall at a seasonally adjusted annual rate (SAAR). Existing home sales SAAR in the United States averaged 3.769mm from 1969 until 2023, reaching an all-time high of 6.34mm in

September 2005 and a record low of 1.37mm in March 1970. Like new home sales, we see a similar backdrop as the early 1980s when mortgage rates spiked following a period of high inflation and significant home price appreciation. Due to the lock-in effect of mortgage rates, existing home supply remains depressed.

Methodology, Risks and Disclaimers

Components of the Indicators (New Home Sales)

We worked with our Predictive Analytics team to analyze over 200 data series to build a proprietary indicator for the New Home Sales as reported by US Census Bureau.

We tested each variable with different lag periods to determine the best fit and identified eight variables that are not only intuitive drivers of house building activity, but also have good correlation with the S&P S15HOME Index. We then selected metrics that met key criteria including consistency, promptness of reporting (relative to month end), and economic significance. We focused on data that is available monthly with a reasonable length of history (five variables since 1976 and rest with more than 10 years of history). The indicator in its full form with all eight variables begins in December 2010. We believe this indicator helps deepen the understanding of New Home Sales with U.S. macro factors.

Exhibit 9: Components of the BofA New Home Sales and Existing Home Sales Indicators
The New Home Sales and Existing Home Sales Indicators are comprised of eight and nine components, respectively

Component	Source	Measure of	Indicator
1) Financing and affordability			
Freddie Mac Enhanced PMMS US 30 Year FMR	Freddie Mac, Bloomberg	30-year-fixed-rate mortgage	Both
Respondents Who Say Mortgage Rates Will: Go Up	Fannie Mae, Bloomberg	Home purchase sentiment	Both
Affordability: P&I by Median Household Income	US Bureau of Economic Analysis	Income and US affordability	Both
2) Demographics			
Household Estimates	US Census Bureau	Number of US Households (thousands)	Both
3) Homebuyer confidence			
Net Percent of Respondents Who Say it is a Good Time to Buy (%Bal)	Fannie Mae	Housing market sentiment	Both
4) Homebuilder confidence			
Homebuilder Confidence Survey: Single-Family Sales over next six-months	US Census Bureau	Future single family housing sales	New Home Sales Indicator
5) Housing Supply			
Homeowner Vacancy Rate	US Census Bureau	US Housing market	Both
US Existing Homes Inventory	NAR, Redfin.com	Existing home sales activity	Existing Home Sales Indicator
6) Real-time trends			
MBA US FRM Index NSA	Mortgage Bankers Association, Bloomberg	US single-family loan application activity	Both
Pending Home Sales Index (PHSI)	NAR, Redfin.com	Pending home sales activity	Existing Home Sales Indicator

Source: BofA Global Research

BofA GLOBAL RESEARCH

Weighting of variables (New Home Sales)

The BofA New Home Sales Indicator is constructed by taking an equal-weighted average of the smoothened z-scores of the eight input variables. Our historical backtested correlation analysis indicates that these eight variables in aggregate have a strong correlation with New Home Sales growth, and we believe the New Home Sales can be an effective proxy to gauge New Home Builders Index. As a best practice, we believe the indicator should be viewed in context of several months, and general directionality, rather than focusing solely on monthly readings that can fluctuate.

Components of the Indicators (Existing Home Sales)

We worked with our Predictive Analytics team to analyze over 200 data series to create a proprietary indicator for the Existing Home Sales as reported by US Census Bureau.

We tested each variable with different lag periods to determine the best fit and identified nine variables that are not only intuitive drivers of Existing Home Sales activity, but also have good correlation with their S&P S15BUILX Index. We then selected metrics that met key criteria including consistency, promptness of reporting (relative to month end) and economic significance. We focused on data that is available on a monthly basis with a reasonable length of history (five variables since 1976 and rest with more than 10 years of history). The indicator in its full form with all eight variables begins in December 2010. We believe this indicator helps deepen the understanding of Existing Home Sales relationship with U.S. macro factors.

Weighting of variables (Existing Home Sales)

The BofA Existing Home Sales Indicator is constructed by taking an equal-weighted average of the smoothened z-scores of the eight input variables. Our historical correlation analysis indicates that these nice variables in aggregate have a strong correlation with Existing Home Sales growth, and we believe the Existing Home Sales can be an effective proxy to gauge Building Materials Index. As a best practice, we believe the indicator should be viewed in context of several months, and general directionality, rather than focusing solely on monthly readings that can fluctuate.

Disclaimers, Risks and Limitations

The composition of our indicator will be subject to review every 6 - 12 months. We will monitor the continued relevance, availability, and timing of each variable and evaluate the inclusion of additional data series. We reserve the right to modify the setup of the, but do not intend to make frequent changes. However, any future modifications will be made to increase the statistical performance of our indicator. When the inputs have been released with a delay, we have used the last available data point for our calculation. Historical correlation may not result in future correlation.

Another risk can be attributed to divergence of the target variable from underlying components of the indicator. For example, during the period of Oct-92 to Mar-93 the NHS slowed from 22% to 3% even thought the mortgage rates and affordability improved considerably and our indicator remained flat as Household Estimates deteriorated.

Equal weighting of variables could overlook potential disproportionate impact on demand from certain variables. Changes in these inputs may significantly impact the indicator. Additionally, there could be potential correlations not accounted for among our set of variables, meaning that prediction in New Home Sales demand changes could be amplified.

These indicators are not intended to be the sole driver of our ratings but they may have an impact on our views of the Home Building stocks we cover. They are not intended to be indicative of actual or future performance of any stock individually or as a group.

Disclosures

Important Disclosures

FUNDAMENTAL EQUITY OPINION KEY: Opinions include a Volatility Risk Rating, an Investment Rating and an Income Rating. VOLATILITY RISK RATINGS, indicators of potential price fluctuation, are: A - Low, B - Medium and C - High. INVESTMENT RATINGS reflect the analyst's assessment of both a stock's absolute total return potential as well as its attractiveness for investment relative to other stocks within its Coverage Cluster (defined below). Our investment ratings are: 1 - Buy stocks are expected to have a total return of at least 10% and are the most attractive stocks in the coverage cluster; 2 - Neutral stocks are expected to remain flat or increase in value and are less attractive than Buy rated stocks and 3 - Underperform stocks are the least attractive stocks in a coverage cluster. An investment rating of 6 (No Rating) indicates that a stock is no longer trading on the basis of fundamentals. Analysts assign investment ratings considering, among other things, the 0-12 month total return expectation for a stock and the firm's guidelines for ratings dispersions (shown in the table below). The current price objective for a stock should be referenced to better understand the total return expectation at any given time. The price objective reflects the analyst's view of the potential price appreciation (depreciation).

Investment rating	Total return expectation (within 12-month period of date of initial rating)	Ratings dispersion guidelines for coverage cluster[R1]
Buy	≥ 10%	≤ 70%
Neutral	≥ 0%	≤ 30%
Underperform	N/A	≥ 20%

[R1]Ratings dispersions may vary from time to time where BofA Global Research believes it better reflects the investment prospects of stocks in a Coverage Cluster.

INCOME RATINGS, indicators of potential cash dividends, are: 7 - same/higher (dividend considered to be secure), 8 - same/lower (dividend not considered to be secure) and 9 - pays no cash dividend. *Coverage Cluster* is comprised of stocks covered by a single analyst or two or more analysts sharing a common industry, sector, region or other classification(s). A stock's coverage cluster is included in the most recent BofA Global Research report referencing the stock.

BofA Global Research personnel (including the analyst(s) responsible for this report) receive compensation based upon, among other factors, the overall profitability of Bank of America Corporation, including profits derived from investment banking. The analyst(s) responsible for this report may also receive compensation based upon, among other factors, the overall profitability of the Bank's sales and trading businesses relating to the class of securities or financial instruments for which such analyst is responsible.

Other Important Disclosures

From time to time research analysts conduct site visits of covered issuers. BofA Global Research policies prohibit research analysts from accepting payment or reimbursement for travel expenses from the issuer for such visits.
Prices are indicative and for information purposes only. Except as otherwise stated in the report, for any recommendation in relation to an equity security, the price referenced is the publicly traded price of the security as of close of business on the day prior to the date of the report or, if the report is published during intraday trading, the price referenced is indicative of the traded price as of the date and time of the report and in relation to a debt security (including equity preferred and CDS), prices are indicative as of the date and time of the report and are from various sources including BofA Securities trading desks.
The date and time of completion of the production of any recommendation in this report shall be the date and time of dissemination of this report as recorded in the report timestamp.

Recipients who are not institutional investors or market professionals should seek the advice of their independent financial advisor before considering information in this report in connection with any investment decision, or for a necessary explanation of its contents.
Officers of BofAS or one or more of its affiliates (other than research analysts) may have a financial interest in securities of the issuer(s) or in related investments.
Refer to BofA Global Research policies relating to conflicts of interest.
"BofA Securities" includes BofA Securities, Inc. ("BofAS") and its affiliates. Investors should contact their BofA Securities representative or Merrill Global Wealth Management financial advisor if they have questions concerning this report or concerning the appropriateness of any investment idea described herein for such investor. "BofA Securities" is a global brand for BofA Global Research.
Information relating to Non-US affiliates of BofA Securities and Distribution of Affiliate Research Reports:
BofAS and/or Merrill Lynch, Pierce, Fenner & Smith Incorporated ("MLPF&S") may in the future distribute, information of the following non-US affiliates in the US (short name: legal name, regulator): Merrill Lynch (South Africa): Merrill Lynch South Africa (Pty) Ltd., regulated by The Financial Service Board; MLI (UK): Merrill Lynch International, regulated by the Financial Conduct Authority (FCA) and the Prudential Regulation Authority (PRA); BofASE (France): BofA Securities Europe SA is authorized by the Autorité de Contrôle Prudentiel et de Résolution (ACPR) and regulated by the ACPR and the Autorité des Marchés Financiers (AMF). BofA Securities Europe SA ("BofASE") with registered address at 51, rue La Boétie, 75008 Paris is registered under no 842 602 690 RCS Paris. In accordance with the provisions of French Code Monétaire et Financier (Monetary and Financial Code), BofASE is an établissement de crédit et d'investissement (credit and investment institution) that is authorised and supervised by the European Central Bank and the Autorité de Contrôle Prudentiel et de Résolution (ACPR) and regulated by the ACPR and the Autorité des Marchés Financiers. BofASE's share capital can be found at www.bofaml.com/BofASEdisclaimer; BofA Europe (Milan): Bank of America Europe Designated Activity Company, Milan Branch, regulated by the Bank of Italy, the European Central Bank (ECB) and the Central Bank of Ireland (CBI); BofA Europe (Frankfurt): Bank of America Europe Designated Activity Company, Frankfurt Branch regulated by BaFin, the ECB and the CBI; BofA Europe (Madrid): Bank of America Europe Designated Activity Company, Sucursal en España, regulated by the Bank of Spain, the ECB and the CBI; Merrill Lynch (Australia): Merrill Lynch Equities (Australia) Limited, regulated by the Australian Securities and Investments Commission; Merrill Lynch (Hong Kong): Merrill Lynch (Asia Pacific) Limited, regulated by the Hong Kong Securities and Futures Commission (HKSFC); Merrill Lynch (Singapore): Merrill Lynch (Singapore) Pte Ltd, regulated by the Monetary Authority of Singapore (MAS); Merrill Lynch (Canada): Merrill Lynch Canada Inc, regulated by the Canadian Investment Regulatory Organization; Merrill Lynch (Mexico): Merrill Lynch Mexico, SA de CV, Casa de Bolsa, regulated by the Comisión Nacional Bancaria y de Valores; Merrill Lynch (Argentina): Merrill Lynch Argentina SA, regulated by Comisión Nacional de Valores; BofAS Japan: BofA Securities Japan Co., Ltd., regulated by the Financial Services Agency; Merrill Lynch (Seoul): Merrill Lynch International, LLC Seoul Branch, regulated by the Financial Supervisory Service; Merrill Lynch (Taiwan): Merrill Lynch Securities (Taiwan) Ltd., regulated by the Securities and Futures Bureau; BofAS India: BofA Securities India Limited, regulated by the Securities and Exchange Board of India (SEBI); Merrill Lynch (Israel): Merrill Lynch Israel Limited, regulated by Israel Securities Authority; Merrill Lynch (DIFC): Merrill Lynch International (DIFC Branch), regulated by the Dubai Financial Services Authority (DFSA); Merrill Lynch (Brazil): Merrill Lynch S.A. Corretora de Títulos e Valores Mobiliários, regulated by Comissão de Valores Mobiliários; Merrill Lynch KSA Company: Merrill Lynch Kingdom of Saudi Arabia Company, regulated by the Capital Market Authority.
This information: has been approved for publication and is distributed in the United Kingdom (UK) to professional clients and eligible counterparties (as each is defined in the rules of the FCA and the PRA) by MLI (UK), which is authorized by the PRA and regulated by the FCA and the PRA - details about the extent of our regulation by the FCA and PRA are available from us on request; has been approved for publication and is distributed in the European Economic Area (EEA) by BofASE (France), which is authorized by the ACPR and regulated by the ACPR and the AMF; has been considered and distributed in Japan by BofAS Japan, a registered securities dealer under the Financial Instruments and Exchange Act in Japan, or its permitted affiliates; is issued and distributed in Hong Kong by Merrill Lynch (Hong Kong) which is regulated by HKSFC; is issued and distributed in Taiwan by Merrill Lynch (Taiwan); is issued and distributed in India by BofAS India; and is issued and distributed in Singapore to institutional investors and/or accredited investors (each as defined under the Financial Advisers Regulations) by Merrill Lynch (Singapore) (Company Registration No 198602883D). Merrill Lynch (Singapore) is regulated by MAS. Merrill Lynch Equities (Australia) Limited (ABN 65 006 276 795), AFS License 235132 (MLEA) distributes

this information in Australia only to 'Wholesale' clients as defined by s.761G of the Corporations Act 2001. With the exception of Bank of America N.A., Australia Branch, neither MLEA nor any of its affiliates involved in preparing this information is an Authorised Deposit-Taking Institution under the Banking Act 1959 nor regulated by the Australian Prudential Regulation Authority. No approval is required for publication or distribution of this information in Brazil and its local distribution is by Merrill Lynch (Brazil) in accordance with applicable regulations. Merrill Lynch (DIFC) is authorized and regulated by the DFSA. Information prepared and issued by Merrill Lynch (DIFC) is done so in accordance with the requirements of the DFSA conduct of business rules. BofA Europe (Frankfurt) distributes this information in Germany and is regulated by BaFin, the ECB and the CBI. BofA Securities entities, including BofA Europe and BofASE (France), may outsource/delegate the marketing and/or provision of certain research services or aspects of research services to other branches or members of the BofA Securities group. You may be contacted by a different BofA Securities entity acting for and on behalf of your service provider where permitted by applicable law. This does not change your service provider. Please refer to the Electronic Communications Disclaimers for further information.

This information has been prepared and issued by BofAS and/or one or more of its non-US affiliates. The author(s) of this information may not be licensed to carry on regulated activities in your jurisdiction and, if not licensed, do not hold themselves out as being able to do so. BofAS and/or MLPF&S is the distributor of this information in the US and accepts full responsibility for information distributed to BofAS and/or MLPF&S clients in the US by its non-US affiliates. Any US person receiving this information and wishing to effect any transaction in any security discussed herein should do so through BofAS and/or MLPF&S and not such foreign affiliates. Hong Kong recipients of this information should contact Merrill Lynch (Asia Pacific) Limited in respect of any matters relating to dealing in securities or provision of specific advice on securities or any other matters arising from, or in connection with, this information. Singapore recipients of this information should contact Merrill Lynch (Singapore) Pte Ltd in respect of any matters arising from, or in connection with, this information. For clients that are not accredited investors, expert investors or institutional investors Merrill Lynch (Singapore) Pte Ltd accepts full responsibility for the contents of this information distributed to such clients in Singapore.

General Investment Related Disclosures:

Taiwan Readers: Neither the information nor any opinion expressed herein constitutes an offer or a solicitation of an offer to transact in any securities or other financial instrument. No part of this report may be used or reproduced or quoted in any manner whatsoever in Taiwan by the press or any other person without the express written consent of BofA Securities.

This document provides general information only, and has been prepared for, and is intended for general distribution to, BofA Securities clients. Neither the information nor any opinion expressed constitutes an offer or an invitation to make an offer, to buy or sell any securities or other financial instrument or any derivative related to such securities or instruments (e.g., options, futures, warrants, and contracts for differences). This document is not intended to provide personal investment advice and it does not take into account the specific investment objectives, financial situation and the particular needs of, and is not directed to, any specific person(s). This document and its content do not constitute, and should not be considered to constitute, investment advice for purposes of ERISA, the US tax code, the Investment Advisers Act or otherwise. Investors should seek financial advice regarding the appropriateness of investing in financial instruments and implementing investment strategies discussed or recommended in this document and should understand that statements regarding future prospects may not be realized. Any decision to purchase or subscribe for securities in any offering must be based solely on existing public information on such security or the information in the prospectus or other offering document issued in connection with such offering, and not on this document.

Securities and other financial instruments referred to herein, or recommended, offered or sold by BofA Securities, are not insured by the Federal Deposit Insurance Corporation and are not deposits or other obligations of any insured depository institution (including, Bank of America, N.A.). Investments in general and, derivatives, in particular, involve numerous risks, including, among others, market risk, counterparty default risk and liquidity risk. No security, financial instrument or derivative is suitable for all investors. Digital assets are extremely speculative, volatile and are largely unregulated. In some cases, securities and other financial instruments may be difficult to value or sell and reliable information about the value or risks related to the security or financial instrument may be difficult to obtain. Investors should note that income from such securities and other financial instruments, if any, may fluctuate and that price or value of such securities and instruments may rise or fall and, in some cases, investors may lose their entire principal investment. Past performance is not necessarily a guide to future performance. Levels and basis for taxation may change.

This report may contain a short-term trading idea or recommendation, which highlights a specific near-term catalyst or event impacting the issuer or the market that is anticipated to have a short-term price impact on the equity securities of the issuer. Short-term trading ideas and recommendations are different from and do not affect a stock's fundamental equity rating, which reflects both a longer term total return expectation and attractiveness for investment relative to other stocks within its Coverage Cluster. Short-term trading ideas and recommendations may be more or less positive than a stock's fundamental equity rating.

BofA Securities is aware that the implementation of the ideas expressed in this report may depend upon an investor's ability to "short" securities or other financial instruments and that such action may be limited by regulations prohibiting or restricting "shortselling" in many jurisdictions. Investors are urged to seek advice regarding the applicability of such regulations prior to executing any short idea contained in this report.

Foreign currency rates of exchange may adversely affect the value, price or income of any security or financial instrument mentioned herein. Investors in such securities and instruments, including ADRs, effectively assume currency risk.

BofAS or one of its affiliates is a regular issuer of traded financial instruments linked to securities that may have been recommended in this report. BofAS or one of its affiliates may, at any time, hold a trading position (long or short) in the securities and financial instruments discussed in this report.

BofA Securities, through business units other than BofA Global Research, may have issued and may in the future issue trading ideas or recommendations that are inconsistent with, and reach different conclusions from, the information presented herein. Such ideas or recommendations may reflect different time frames, assumptions, views and analytical methods of the persons who prepared them, and BofA Securities is under no obligation to ensure that such other trading ideas or recommendations are brought to the attention of any recipient of this information.

In the event that the recipient received this information pursuant to a contract between the recipient and BofAS for the provision of research services for a separate fee, and in connection therewith BofAS may be deemed to be acting as an investment adviser, such status relates, if at all, solely to the person with whom BofAS has contracted directly and does not extend beyond the delivery of this report (unless otherwise agreed specifically in writing by BofAS). If such recipient uses the services of BofAS in connection with the sale or purchase of a security referred to herein, BofAS may act as principal for its own account or as agent for another person. BofAS is and continues to act solely as a broker-dealer in connection with the execution of any transactions, including transactions in any securities referred to herein.

Copyright and General Information:

Materials prepared by BofA Global Research personnel are based on public information. Facts and views presented in this material have not been reviewed by, and may not reflect information known to, professionals in other business areas of BofA Securities, including investment banking personnel. BofA Securities has established information barriers between BofA Global Research and certain business groups. As a result, BofA Securities does not disclose certain client relationships with, or compensation received from, such issuers. To the extent this material discusses any legal proceeding or issues, it has not been prepared as nor is it intended to express any legal conclusion, opinion or advice. Investors should consult their own legal advisers as to issues of law relating to the subject matter of this material. BofA Global Research personnel's knowledge of legal proceedings in which any BofA Securities entity and/or its directors, officers and employees may be plaintiffs, defendants, co-defendants or co-plaintiffs with or involving issuers mentioned in this material is based on public information. Facts and views presented in this material that relate to any such proceedings have not been reviewed by, discussed with, and may not reflect information known to, professionals in other business areas of BofA Securities in connection with the legal proceedings or matters relevant to such proceedings.

This information has been prepared independently of any issuer of securities mentioned herein and not in connection with any proposed offering of securities or as agent of any issuer of any securities. None of BofAS any of its affiliates or their research analysts has any authority whatsoever to make any representation or warranty on behalf of the issuer(s). BofA Global Research policy prohibits research personnel from disclosing a recommendation, investment rating, or investment thesis for review by an issuer prior to the publication of a research report containing such rating, recommendation or investment thesis.

Any information relating to the tax status of financial instruments discussed herein is not intended to provide tax advice or to be used by anyone to provide tax advice. Investors are urged to seek tax advice based on their particular circumstances from an independent tax professional.

The information herein (other than disclosure information relating to BofA Securities and its affiliates) was obtained from various sources and we do not guarantee its accuracy. This information may contain links to third-party websites. BofA Securities is not responsible for the content of any third-party website or any linked content contained in a third-party website. Content contained on such third-party websites is not part of this information and is not incorporated by reference. The inclusion of a link does not imply any endorsement by or any affiliation with BofA Securities. Access to any third-party website is at your own risk, and you should always review the terms and privacy policies at third-party websites before submitting any personal information