“Financial Physics represents the interconnected relationships among key elements in the economy and the financial markets that determine the stock market’s overall direction.”
This presentation introduces Crestmont’s core "Financial Physics" model. The model represents a framework to understand the relationship of the economy ('the source of wealth') and the equity markets ('the measure of equity wealth').

This presentation, although abbreviated and presented in slides, is intended to be self-explanatory. A more descriptive presentation and discussion of the material is included in chapters 7 and 8 of Unexpected Returns: Understanding Secular Stock Market Cycles and chapters 3—7 of Probable Outcomes: Secular Stock Market Insights, both books by Ed Easterling. For more information about implications of Financial Physics for the next decade, please contact Info@CrestmontResearch.com.

In summary, the key factors include Real GDP, Inflation, Nominal GDP, Earnings Per Share (EPS), and P/E Ratio. Since Real GDP has been relatively constant over extended periods of time and all other factors are driven by inflation, a primary driver of the stock market is the inflation rate—as it trends toward or away from price stability. Given the current state of low inflation and the likelihood of it either rising (inflation) or declining (deflation), P/E ratios are expected to decline for a number of years. As P/E ratios decline and EPS grows, the result will be another relatively non-directional secular bear market.
INTRODUCTION

- Conventional Wisdom And Long-Term Studies Often Ignore The Fundamental Factors That Drive Intermediate Stock Market Cycles

- The S&P 500 Stock Index Started 1982 At 123; The 20-Year Treasury Bond Yielded 14.6%

- By 1999, The S&P 500 Stock Index Reached 1,469; The 20-Year Treasury Bond Yielded 6.7%

- The Secular Bull Market Was Driven By Fundamentals And Ultimately Accentuated By A Stock Market Bubble
The Preceding 16 Years (1966-1981) Were Also Driven By Fundamental Factors

Stocks Were Virtually Flat; Bond Yields Soared And Total Returns Were Disappointing

P/E Ratios Declined During The Secular Bear Market Starting In 1966 And Inflation Rose

Starting In 1982, The Inflation Cycle Reversed And A Secular Bull Market Started

During The Late 1990’s, An Infection Of Emotions And Other Factors Created A Stock Market Bubble
INTRODUCTION (cont.)

- Real GDP Rose Equally During Both Secular Periods, Averaging Near 3% Annually


- The Stock Market Was Virtually Flat During The Secular Bear; Soared Dramatically During The Secular Bull

- Stock Market Returns Were Affected By The P/E Cycle, Which Is Driven By Inflation Rate Trends
The Factors—Real GDP, Nominal GDP, Inflation, EPS, and P/E Ratios—Share An Interrelated Relationship That Crestmont Research Calls “Financial Physics”

This Presentation Will Explore The Consistency, Predictability, And Dependence For Each Of These Factors And Among The Factors

For Those Seeking To Understand The Potential Returns Available In The Stock Market In 5, 10, or 20 Years, The Financial Physics Model Provides The Framework To Determine Your Own Perspective
To Determine The Level Of The Stock Market In The Future, Estimates For Two Variables Are Needed: 

**1) Price/Earnings Ratio (“P/E”),** The Price Of The Market Index Divided By Earnings Per Share, And 

**2) Earnings Per Share (“EPS”)**


If We Can Estimate The Future Stock Market Level, We Can Assess The Overall Investment Environment For Stocks Over 5, 10, or 20 Years
Stocks And Bonds Are Financial Assets That Often Are Not Correlated Month-To-Month, But Do Perform Similarly Over Longer Periods

During The 1960s & 1970s, Both Had Poor Returns; Yet During The 1980s & 1990s, Both Had Solid, Above-Average Returns
Regarding The Model Diagram On Slide 10:

- A Factor Is Considered ‘Given’ When It Tends To Be Consistent Over Long Periods Of Time And Is Fundamentally Based Upon Underlying Factors; Prior To The 2000s, GDP-R Was Considered To Be Given, But It Is Now An “Uncertainty” Due To Significantly Lower Growth In the Past Decade

- A Factor Is Considered “Driven” When It Is Directly Affected By Other Given Or Assumed Factors

- A Factor Is Considered An “Uncertainty” When It Is Generally Unpredictable And Its Future Is Uncertain
REAL GDP

- Real Gross Domestic Product ("GDP") Represents The Absolute Level Of The Economy Before Inflation; Essentially The Revenues Of All Companies
- Real GDP Growth Has Been Relatively Consistent Over The Past Century
- Annual Real GDP Averaged 3.3%
- Most Decades Between 3.0%-4.5%
- The ‘70s, ‘80s, & ‘90s: 3.2%, 3.0%, 3.2%
REAL ECONOMIC GROWTH: TREND OR REVERSION?; INFLATION HAS BEEN VARIABLE
POPULATION GROWTH DECLINING... STANDARD OF LIVING GAINS (GDP PER CAPITA) REVERTING?

Note: Real GDP for the decade of the 2000s was below 2%. Last decade’s GDP shift is generally unexplained. It is unclear if this decade (the 2010s) will restore the trend average, or whether there will be a new trend line growth rate.
Nominal GDP Is Real GDP Plus Inflation ("Real" Means "Without Inflation"); Essentially, Nominal GDP Is The Reported Revenues Of All Companies

Nominal GDP Growth Has Averaged 6.2%

Earnings As Represented By Earnings Per Share ("EPS") Has Grown By 4.8% Over The Past Century

Strong Relationship Over: Correlation $r = 0.94$

Relationship Is Fundamentally Based; Earnings Emanate From Revenues
Note: EPS and profit margins are at business cycle highs and are distorting the EPS growth rate for the decade of the 2010s; the backside of the business cycle (upcoming) should return the average toward historical levels.
Since The Relationship Between GDP And EPS Is Strong And Fundamentally-Based, Estimates Of Future GDP Can Be Used To Determine Expected EPS

Despite The Uncertainty About Future GDP Growth, Future Growth Of Near 3% (A Midrange Value) Can Be Assumed To Estimate Future EPS Based Upon The Historical Average

A Regression Formula Can Be Developed To Use The Value Of GDP To Predict EPS

Historical Real GDP Growth Scenarios And Estimated Inflation Can Be Used To Predict Average Future Nominal GDP

The Estimated Future Nominal GDP Predicts A Gravity Line Around Which EPS Will Cycle Above And Below
Note: The EPS Prediction is the gravity line for historically consistent EPS; Actual EPS will cycle above and below the gravity line depending upon aggressive accounting, recessions, recoveries, etc.
RECAP

- Economic Growth (GDP-Real), Excluding Inflation, Has Been Relatively Consistent Over Long Periods Of Time

- EPS Is Relatively Consistent With Economic Growth Including Inflation (GDP-Nominal)

- Extending Economic Growth (GDP-Nominal) Provides A Basis To Predict EPS
Contrary to conventional wisdom, P/E ratios are not driven by interest rates; P/E ratios are driven by the inflation rate.

Conventional wisdom implicitly assumes positive inflation; deflation produces low interest rates and low P/E ratios due to expected declines in future nominal earnings (EPS).

The next slide reflects the inconsistent relationship between interest rates and P/E ratios over the past century.

In addition, the slide reflects the inconsistency between inflation and interest rates over the past century.
**P/E RATIOS & INTEREST RATES HAVE A MIXED RELATIONSHIP BEFORE THE 1960s**  
... AS DO INTEREST RATES & INFLATION

### P/E Ratios & 20-Year Bond Spread

<table>
<thead>
<tr>
<th>By Decade</th>
<th>E/P Ratio</th>
<th>20-Year Bonds</th>
<th>Spread</th>
</tr>
</thead>
<tbody>
<tr>
<td>1900s</td>
<td>5.8%</td>
<td>3.2%</td>
<td>2.6%</td>
</tr>
<tr>
<td>1910s</td>
<td>9.8%</td>
<td>3.8%</td>
<td>6.0%</td>
</tr>
<tr>
<td>1920s</td>
<td>10.8%</td>
<td>4.2%</td>
<td>6.6%</td>
</tr>
<tr>
<td>1930s</td>
<td>7.3%</td>
<td>3.1%</td>
<td>4.2%</td>
</tr>
<tr>
<td>1940s</td>
<td>6.7%</td>
<td>2.2%</td>
<td>4.5%</td>
</tr>
<tr>
<td>1950s</td>
<td>7.1%</td>
<td>3.0%</td>
<td>4.1%</td>
</tr>
<tr>
<td>1960s</td>
<td>4.9%</td>
<td>4.6%</td>
<td>0.2%</td>
</tr>
<tr>
<td>1970s</td>
<td>8.3%</td>
<td>7.5%</td>
<td>0.8%</td>
</tr>
<tr>
<td>1980s</td>
<td>9.4%</td>
<td>10.5%</td>
<td>-1.1%</td>
</tr>
<tr>
<td>1990s</td>
<td>4.3%</td>
<td>6.9%</td>
<td>-2.6%</td>
</tr>
<tr>
<td>2000s</td>
<td>3.9%</td>
<td>5.0%</td>
<td>-1.1%</td>
</tr>
<tr>
<td>2010s</td>
<td>4.6%</td>
<td>3.3%</td>
<td>1.2%</td>
</tr>
</tbody>
</table>

**Average:** E/P Ratio: 6.3%, 20-Year Bonds: 6.3%, Spread: 0.1%

*Note: Average represents the simple annual average of the decades from 1950-2000.*

### 20-Year Bond Spread & GDP Inflation

<table>
<thead>
<tr>
<th>By Decade</th>
<th>20-Year Bonds</th>
<th>GDP Inflation</th>
<th>Spread</th>
</tr>
</thead>
<tbody>
<tr>
<td>1900s</td>
<td>3.2%</td>
<td>1.4%</td>
<td>1.8%</td>
</tr>
<tr>
<td>1910s</td>
<td>3.8%</td>
<td>7.1%</td>
<td>-3.3%</td>
</tr>
<tr>
<td>1920s</td>
<td>4.2%</td>
<td>-0.4%</td>
<td>4.6%</td>
</tr>
<tr>
<td>1930s</td>
<td>3.1%</td>
<td>-2.1%</td>
<td>5.2%</td>
</tr>
<tr>
<td>1940s</td>
<td>2.2%</td>
<td>5.7%</td>
<td>-3.5%</td>
</tr>
<tr>
<td>1950s</td>
<td>3.0%</td>
<td>2.5%</td>
<td>0.5%</td>
</tr>
<tr>
<td>1960s</td>
<td>4.6%</td>
<td>2.4%</td>
<td>2.2%</td>
</tr>
<tr>
<td>1970s</td>
<td>7.5%</td>
<td>6.7%</td>
<td>0.8%</td>
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<tr>
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<td>2.7%</td>
</tr>
<tr>
<td>2010s</td>
<td>3.3%</td>
<td>1.6%</td>
<td>1.5%</td>
</tr>
</tbody>
</table>

**Average:** 20-Year Bonds: 6.3%, GDP Inflation: 3.5%, Spread: 2.8%

*Note: Average represents the simple annual average of the decades from 1950-2000.*

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**P/E Ratio & Interest Rates**

**Interest Rates & Inflation**

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P/E RATIO (cont.)

- A Trend Toward Price Stability Drives Increasing P/E Ratios
- Rising Inflation Decreases P/E’s; Deflation Decreases P/E’s
- **Crestmont Designates The Impact Of Inflation On P/E’s As The “Y Curve Effect”**
- Slide 21 Reflects A Sideways “Y” Created By The Impact Of Rising Inflation Or Deflation On The P/E Ratio; A Fork Occurs As Inflation Departs From Price Stability
- The Chart Indicates Future Trends In The Inflation Rate Are Likely To Drive P/E Ratios Lower
RELATIONSHIP OF INFLATION & PRICE/EARNS RatioS (1900 - 2014)

HISTORY OF INFLATION TRENDS (CPI; left scale) AND THE PRICE/EARNS RATIO (right scale)

AVERAGE P/E RATIO BY RANGE OF INFLATION

<table>
<thead>
<tr>
<th>CPI RANGE</th>
<th>AVG CPI</th>
<th>AVG P/E</th>
<th>AVG CPI</th>
<th>AVG P/E</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00% - 0.99%</td>
<td>-3.8%</td>
<td>14</td>
<td>0.0%</td>
<td>16</td>
</tr>
<tr>
<td>1.00% - 1.99%</td>
<td>1.4%</td>
<td>10</td>
<td>0.8%</td>
<td>16</td>
</tr>
<tr>
<td>2.00% - 2.99%</td>
<td>2.0%</td>
<td>22</td>
<td>1.4%</td>
<td>16</td>
</tr>
<tr>
<td>3.00% - 3.99%</td>
<td>3.4%</td>
<td>13</td>
<td>1.4%</td>
<td>16</td>
</tr>
<tr>
<td>4.00% - 4.99%</td>
<td>4.3%</td>
<td>16</td>
<td>1.4%</td>
<td>16</td>
</tr>
<tr>
<td>5.00% - 5.99%</td>
<td>5.5%</td>
<td>15</td>
<td>1.4%</td>
<td>16</td>
</tr>
<tr>
<td>6.00% - 9.99%</td>
<td>7.3%</td>
<td>13</td>
<td>1.4%</td>
<td>16</td>
</tr>
<tr>
<td>10.00% and more</td>
<td>14.6%</td>
<td>9</td>
<td>1.4%</td>
<td>16</td>
</tr>
</tbody>
</table>

This Methodology of Predicting EPS Trends is Fundamentally-Based and Confirmed Historically

P/E Ratios trend based upon trends in the Inflation Rate toward or away from price stability.

Based upon the prediction of EPS into the intermediate future, an investor needs only a perspective on inflation to determine the return environment available in the stock market over the next 5, 10, or 20 years.

From current low levels of inflation, increases or decreases in the inflation rate are a key risk and could be detrimental to P/E ratios if either occurs.
IMPLICATIONS

- The Economy And Earnings Can Be Expected To Grow At A Healthy Rate Over The Next 5, 10, Or 20 Years
- Relatively Low Inflation, If Sustained, Should Result In The Market P/E Ratio Near 20
- The Direction And Level Of Inflation Is A Significant Driver Of Stock Market Returns Over The Longer-Term
- Eight Secular Periods Driven By The Inflation And P/E Cycle Have Occurred Over The Past Century; Each Secular Cycle Has One Or More Shorter-Term Cyclical Cycles
- Investment Strategies Are Significantly Different For Secular Bull And Secular Bear Markets
The Information In This Presentation Is Explained In Greater Detail In Both Books By Ed Easterling: 
Unexpected Returns: Understanding Secular Stock Market Cycles and 
Probable Outcomes: Secular Stock Market Insights

Group Presentations, Individual Consultations, Or Coordinated Academic Research Regarding This Presentation And Other Financial Market Perspectives Are Available.

Please Contact Info@CrestmontResearch.com