## 2015 Forecast Results

<table>
<thead>
<tr>
<th>Duration</th>
<th>2015 Forecast</th>
<th>Result</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>US GDP</td>
<td>$16.632 Trillion</td>
<td>$16.442 Trillion</td>
<td>98.9%</td>
</tr>
<tr>
<td>US Ind. Prod.</td>
<td>108.3 (12MMA)</td>
<td>107.1</td>
<td>98.9%</td>
</tr>
<tr>
<td>Eur Ind. Prod.</td>
<td>100.4 (12MMA)</td>
<td>103.3</td>
<td>97.1%</td>
</tr>
<tr>
<td>Canada Ind Prod</td>
<td>361.2 (12MMA)</td>
<td>C$351.2</td>
<td>97.2%</td>
</tr>
<tr>
<td>China Ind Prod</td>
<td>607.0 (12MMA)</td>
<td>598.3</td>
<td>98.6%</td>
</tr>
<tr>
<td>US Housing</td>
<td>1.090 Mils. Units</td>
<td>1.111 Mils. Units</td>
<td>98.1%</td>
</tr>
<tr>
<td>US Retail Sales</td>
<td>$2.248 Trils deflated</td>
<td>$2.244 Trils deflated</td>
<td>99.8%</td>
</tr>
<tr>
<td>US Employment</td>
<td>147.7 Million</td>
<td>148.8 Million</td>
<td>99.3%</td>
</tr>
</tbody>
</table>

**ITR Economics provides the best economic intelligence to reduce risk and drive practical and profitable business decisions.**
Real Gross Domestic Product

Source: BEA

3MMA

Sep-15

GDPCON 3MMA

First in Forecasts Since 1948

Source: BEA
US Industrial Production Index

- Annual Trend: 104.4
- Phase: D
- Year-over-Year: -1.2%

Source: FRB
US Total Industrial Production

Source: FRB
US Total Manufacturing Production Index

1. Near–Sourcing
2. Technology
3. Capital vs. Labor
4. Energy
5. Consumer base

2012 = 100, Raw Data
Source: FRB

First in Forecasts Since 1948
# 2016 Global Manufacturing Competitiveness Index

## 2016 (Current)

<table>
<thead>
<tr>
<th>Rank</th>
<th>Country</th>
<th>Index Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>China</td>
<td>100.0</td>
</tr>
<tr>
<td>2</td>
<td>United States</td>
<td>99.5</td>
</tr>
<tr>
<td>3</td>
<td>Germany</td>
<td>93.9</td>
</tr>
<tr>
<td>4</td>
<td>Japan</td>
<td>80.4</td>
</tr>
<tr>
<td>5</td>
<td>South Korea</td>
<td>76.7</td>
</tr>
<tr>
<td>6</td>
<td>United Kingdom</td>
<td>75.8</td>
</tr>
<tr>
<td>7</td>
<td>Taiwan</td>
<td>72.9</td>
</tr>
<tr>
<td>8</td>
<td>Mexico</td>
<td>69.5</td>
</tr>
<tr>
<td>9</td>
<td>Canada</td>
<td>68.7</td>
</tr>
<tr>
<td>10</td>
<td>Singapore</td>
<td>68.4</td>
</tr>
</tbody>
</table>

## 2020 (Projected)

<table>
<thead>
<tr>
<th>Rank</th>
<th>Country</th>
<th>Index Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>United States</td>
<td>100.0</td>
</tr>
<tr>
<td>2</td>
<td>China</td>
<td>93.5</td>
</tr>
<tr>
<td>3</td>
<td>Germany</td>
<td>90.8</td>
</tr>
<tr>
<td>4</td>
<td>Japan</td>
<td>78.0</td>
</tr>
<tr>
<td>5</td>
<td>India</td>
<td>77.5</td>
</tr>
<tr>
<td>6</td>
<td>South Korea</td>
<td>77.0</td>
</tr>
<tr>
<td>7</td>
<td>Mexico</td>
<td>75.9</td>
</tr>
<tr>
<td>8</td>
<td>United Kingdom</td>
<td>73.8</td>
</tr>
<tr>
<td>9</td>
<td>Taiwan</td>
<td>72.1</td>
</tr>
<tr>
<td>10</td>
<td>Canada</td>
<td>68.1</td>
</tr>
</tbody>
</table>

*Talent* is the most important driver of a country’s ability to compete on the global stage.

*Cost competitiveness* is the second most influential driver.

Source: Deloitte Touche Tohmatsu Ltd and US Council on Competitiveness
### Data Preparation

<table>
<thead>
<tr>
<th></th>
<th>Raw</th>
<th>3MMT</th>
<th>3/12</th>
<th>12MMT</th>
<th>12/12</th>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Dec-14</td>
<td>1.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jan-15</td>
<td>1.5</td>
<td>4.4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feb-15</td>
<td>1.4</td>
<td>4.4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mar-15</td>
<td>1.5</td>
<td>4.4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apr-15</td>
<td>1.3</td>
<td>4.2</td>
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<td></td>
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</tr>
<tr>
<td>May-15</td>
<td>1.3</td>
<td>4.1</td>
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<tr>
<td>Jun-15</td>
<td>1.6</td>
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<tr>
<td>Jul-15</td>
<td>1.6</td>
<td>4.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aug-15</td>
<td>1.5</td>
<td>4.7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sep-15</td>
<td>1.7</td>
<td>4.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oct-15</td>
<td>1.6</td>
<td>18.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nov-15</td>
<td>1.7</td>
<td>5.0</td>
<td>15.9%</td>
<td>18.2</td>
<td></td>
</tr>
<tr>
<td>Dec-15</td>
<td>1.7</td>
<td>5.0</td>
<td>15.9%</td>
<td>18.4</td>
<td></td>
</tr>
<tr>
<td>Jan-16</td>
<td>1.7</td>
<td>5.1</td>
<td>15.9%</td>
<td>18.6</td>
<td></td>
</tr>
<tr>
<td>Feb-16</td>
<td>1.6</td>
<td>5.0</td>
<td>13.6%</td>
<td>18.8</td>
<td></td>
</tr>
<tr>
<td>Mar-16</td>
<td>1.7</td>
<td>5.0</td>
<td>13.6%</td>
<td>19.0</td>
<td>26.7%</td>
</tr>
<tr>
<td>Apr-16</td>
<td>1.5</td>
<td>4.8</td>
<td>14.3%</td>
<td>19.2</td>
<td>25.5%</td>
</tr>
<tr>
<td>May-16</td>
<td>1.5</td>
<td>4.7</td>
<td>14.6%</td>
<td>19.4</td>
<td>25.2%</td>
</tr>
<tr>
<td>Jun-16</td>
<td>1.9</td>
<td>4.9</td>
<td>16.7%</td>
<td>19.7</td>
<td>22.4%</td>
</tr>
<tr>
<td>Jul-16</td>
<td>1.7</td>
<td>5.1</td>
<td>13.3%</td>
<td>19.8</td>
<td>20.0%</td>
</tr>
<tr>
<td>Aug-16</td>
<td>1.7</td>
<td>5.3</td>
<td>12.8%</td>
<td>20.0</td>
<td>18.3%</td>
</tr>
<tr>
<td>Sep-16</td>
<td>1.9</td>
<td>5.3</td>
<td>10.4%</td>
<td>20.2</td>
<td>15.4%</td>
</tr>
<tr>
<td>Oct-16</td>
<td>1.7</td>
<td>5.0</td>
<td>10.4%</td>
<td>20.3</td>
<td>12.7%</td>
</tr>
</tbody>
</table>

#### 3/12 Rate-of-Change

\[
\text{Rate-of-Change} = \frac{\text{October 2016 3MMT}}{\text{October 2015 3MMT}} \times 100 - 100
\]

\[
= \frac{5.3}{4.8} \times 100 - 100 = 10.4\%
\]

#### 12/12 Rate-of-Change

\[
\text{Rate-of-Change} = \frac{\text{October 2016 12MMT}}{\text{October 2015 12MMT}} \times 100 - 100
\]

\[
= \frac{20.3}{18.0} \times 100 - 100 = 12.7\%
\]
Real Gross Domestic Product

Source: BEA

3/12 Rate-of-Change

First in Forecasts Since 1948

GDP 3/12

Republican Democrat

3/12 Rate-of-Change
Source: BEA
State Gross Domestic Product

Billions of Dollars, Q1 2016

Source: BEA

First in Forecasts Since 1948

Alaska $50.6

Oregon $221.3

Idaho $65.9

Montana $45.8

Wyoming $36.2

South Dakota $47.2

North Dakota $51.5

Minnesota $336.7

Wisconsin $311.2

Michigan $478.8

Indiana $341.1

Illinois $784.4

Ohio $619.0

West Virginia $37.8

Kentucky $197.6

Virginia $492.8

Tennessee $322.9

North Carolina $510.2

South Carolina $203.6

Florida $911.0

Georgia $508.4

Mississippi $109.0

Arkansas $125.8

Louisiana $240.0

Oklahoma $174.8

New Mexico $91.0

Arizona $296.6

Utah $150.6

Nevada $144.0

California $2,513.8

Hawaii $81.6

Maine $58.1

New Hampshire $74.9

Massachusetts $485.5

Rhode Island $58.3

New York $1,474.5

New Jersey $80.4

Delaware $69.1

Connecticut $262.2

Vermont $31.2

Billions of Dollars

$31.2 to $2,513.8
US States Renamed for Countries with Similar GDPs

Data Sources: BEA; IMF
Percent of 2015 World GDP by Country

- United States: 24.5%
- China: 15.0%
- Rest of World: 5.6%
- Japan: 4.6%
- Germany: 3.9%
- France: 3.3%
- U.K.: 2.9%
- Brazil: 2.5%
- Italy: 2.1%
- Canada: 1.9%
- Korea: 1.8%
- Russia: 1.7%
- Australia: 1.6%
- Mexico: 1.6%
- Spain: 1.6%
- Netherlands: 1.2%
- Switzerland: 1.0%
- Turkey: 1.0%
- Saudi Arabia: 0.9%
- Other: 0.9%

*Total 2015 World GDP: $73.171 Trillion, US

Source: IMF, *67% are IMF Estimated Figures
US Trade with China: Exports to Imports

Sources: Census Bureau

Annual Data Trends in Billions of $
US Imports of General & Industrial Machinery Customs Valuation to Metalworking Machine Tool Imports to US Imports of Specialized Machinery Customs Valuation

Sources: Census Bureau, BEA

12MMT, Billions of $
Interest Rates for Long-Term Government Bonds

Source: Trading Economics
Mexico Manufacturing Production Index

Data Trends, 2008 = 100

Source: Mexico National Institute of Statistics and Geography
US Industrial Production to ITR Leading Indicator™

Reported in *ITR Trends Report – ITR Advisor*

Sources: FRB, ITR Economics
US Purchasing Managers Index

Source: Institute for Supply Management

1/12 Rate-of-Change

As seen in Trends Report

First in Forecasts Since 1948

Source: Institute for Supply Management
Nondefense Capital Goods New Orders w/o Aircraft

Source: Census Bureau

Billions of Dollars

-3.9%
-4.4%
$764.6

First in Forecasts Since 1948
Nondefense Capital Goods New Orders (excl. Aircraft) to Manufacturing Capacity Utilization

New Orders

Utilization Rate

'00 '01 '02 '03 '04 '05 '06 '07 '08 '09 '10 '11 '12 '13 '14 '15 '16 '17 '18 '19 '20

First in Forecasts Since 1948

Sources: Census Bureau, FRB

Rates-of-Change
US Industrial Production Index to US Owner Occupied Housing Inventory

Sources: FRB, Census Bureau

12/12 Rates of Change

Inventory

US IP

US IP Forecast

Inventory
US Industrial Production Index to Wilshire Total Market Cap

US IP

Wilshire

Rates-of-Change

Sources: FRB, Yahoo Finance
First in Forecasts Since 1948

S&P500 Stock Prices Index

Source: Wall Street Journal

Data Trends

Source: Wall Street Journal
Personal Savings

Billions of Dollars, Annual Data Trend SAAR

Source: BEA
## Retail Sales

<table>
<thead>
<tr>
<th>Category</th>
<th>Month 12 Rates of Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jewelry Stores</td>
<td>-0.5</td>
</tr>
<tr>
<td>General Merchandise Stores</td>
<td>0.0</td>
</tr>
<tr>
<td>Clothing Stores</td>
<td>0.5</td>
</tr>
<tr>
<td>Automotive Parts Stores</td>
<td>0.7</td>
</tr>
<tr>
<td>Grocery Stores</td>
<td>2.0</td>
</tr>
<tr>
<td>Beer, Wine &amp; Alcoholic Beverage</td>
<td>3.2</td>
</tr>
<tr>
<td>Sporting Goods</td>
<td>4.0</td>
</tr>
<tr>
<td>Furniture Stores</td>
<td>4.4</td>
</tr>
<tr>
<td>Light Vehicle Sales</td>
<td>4.5</td>
</tr>
<tr>
<td>Bldg Materials, Garden, Supplies</td>
<td>6.6</td>
</tr>
<tr>
<td>Health and Personal Care Stores</td>
<td>6.8</td>
</tr>
<tr>
<td>Online Retailers</td>
<td>13.2</td>
</tr>
</tbody>
</table>

Source: US Census Bureau

12/12 Rates of Change
US Housing Starts to US New Homes Sold

Source: Census Bureau

12/12 Rates-of-Change

Housing Starts

Homes Sold

'96  '98  '00  '02  '04  '06  '08  '10  '12  '14  '16  '18  '20

-60  -45  -30  -15  0  15  30  45

11.1%  4.5%

First in Forecasts Since 1948
US Housing Starts

**US Housing Starts**
12-Month Moving Total

- Annual Trend: 1.1 million units
- Phase: C
- Year-over-Year: 8.6%

**Year-over-Year Growth Rate**
12/12 Rate-of-Change

- Industry Outlook
  - 2016: 8.6%
  - 2017: 6.0%
  - 2018: -2.7%

Source: US Census Bureau
North America Light Vehicle Production

North America Light Vehicle Production
12-Month Moving Total

- Annual Trend: 17.7 million units
- Phase: C
- Year-over-Year: 3.2%

Year-over-Year Growth Rate
12/12 Rate-of-Change

2016: 3.9%
2017: 5.7%
2018: 0.4%

Source: Wards Auto
North America Big Three Passenger Car Production to North America Big Three Light Truck Production

Source: Wards Auto

12/12 Rates-of-Change

-10.3%
6.7%
North America Transplant Passenger Car Production to North America Transplant Light Truck Production

12/12 Rates-of-Change

Source: Wards Auto
North America Heavy Duty Truck Production

12-Month Moving Total

- Annual Trend: 278.7 thousand units
- Phase: D
- Year-over-Year: -13.4%

Year-over-Year Growth Rate
12/12 Rate-of-Change

Industry Outlook

2016: -25.1%
2017: 26.7%
2018: 3.7%

Source: Wards Auto
US Heavy Duty Truck Retail Sales

Source: Wards Auto

Thousands of Units

First in Forecasts Since 1948

-17.1%
-31.7%
208.7
US Medical Equipment & Supplies Production Index

**US Medical Equipment & Supplies Production Index**
12-Month Moving Average

**Year-over-Year Growth Rate**
12/12 Rate-of-Change

- **Annual Trend:** 104.2
- **Phase:** B
- **Year-over-Year:** 3.4%

**Industry Outlook**

- **2016:** 6.6%
- **2017:** 0.8%
- **2018:** 0.8%

Source: FRB
Medical Equipment & Supplies Production Index

First in Forecasts Since 1948

Source: FRB

2012 = 100, N3391
Nondefense Capital Goods New Orders to Electromedical, Measuring, and Control Instruments New Orders

Source: Census Bureau
US Industrial Machinery New Orders

- Annual Trend: $28.7 billion
- Phase: B
- Year-over-Year: 2.7%

Industry Outlook
- 2016: 0.2%
- 2017: 18.0%
- 2018: -0.1%

Source: US Census Bureau
US Industrial Production to Industrial Machinery New Orders

Sources: FRB; US Census Bureau
US Nondefense Aircraft & Parts New Orders

Source: US Census Bureau
US Air Carrier System Revenue Passenger Miles
(Domestic & International)

Source: Bureau of Transportation Statistics
World Aircraft Production Index

Source: ITR Economics

2012 = 100

2012

-4.0%

-5.4%

243.5

Source: ITR Economics

First in Forecasts Since 1948
U.S. Dependence on Foreign Oil Declining
Net imports as a share of domestic consumption

Source: Energy Information Administration

<table>
<thead>
<tr>
<th>Year</th>
<th>Net Imports as a Share of Domestic Consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>60.4%</td>
</tr>
<tr>
<td>2006</td>
<td>59.9%</td>
</tr>
<tr>
<td>2007</td>
<td>58.2%</td>
</tr>
<tr>
<td>2008</td>
<td>57.0%</td>
</tr>
<tr>
<td>2009</td>
<td>51.5%</td>
</tr>
<tr>
<td>2010</td>
<td>49.2%</td>
</tr>
<tr>
<td>2011</td>
<td>44.7%</td>
</tr>
<tr>
<td>2012</td>
<td>40.0%</td>
</tr>
<tr>
<td>2013</td>
<td>32.9%</td>
</tr>
<tr>
<td>2014</td>
<td>26.6%</td>
</tr>
<tr>
<td>2015</td>
<td>24.0%</td>
</tr>
</tbody>
</table>
US Consumption of Crude Oil & Petroleum Products to Real Gross Domestic Product

Sources: EIA, BEA

Data Trends

First in Forecasts Since 1948

Oil Bils Barrels

GDP Trils C2009$

Oil Consumption - Raw Data
GDP - 3MMA
US Crude Oil Production

Millions of Barrels per Day

Source: EIA
US Crude Oil Inventories Since January 2014

Million Barrels

Source: EIA
Weekly Oil Price & Rig Count

Rigs: Weekly Count
WTI: Average Weekly Price

Sources: EIA, Baker Hughes

First in Forecasts Since 1948
US Carbon Dioxide Emissions

Dec 2012: 5232.0 MMT

Feb 1995: 5219.7 MMT

Dec 2012: 5126.5

Source: EIA.gov
US Consumer Price Index to US Producer Price Index

Source: BLS
Commodity Prices

Source: WSJ, London Metal Exchange, Metalprices.com, Steel Market Update

3/12 Rates-of-Change

-7.9% Copper
3.6% Alum
9.3% Lead
22.3% Tin
29.0% Zinc
32.8% Steel

First in Forecasts Since 1948
Employment – Private Sector

Private Sector Employment Growth 2.1% C
Job Openings 8.8% C
Involuntary Part Time Employment -9.0% A
Quit Rate – Rising

Employment Mills of Jobs

Source: BLS

Source: The Council of Economic Advisers
US Overall Wage Growth

Source: FRB Atlanta
Average Weekly Hours of US Manufacturing Production Workers to Average Annual Wage of US Manufacturing Production Workers

Source: BLS

Weekly Hours

Annual Wage, Ths $

$54.6

41.833

First in Forecasts Since 1948

Annual Data Trends

Source: BLS
US Total Manufacturing Job Openings

Source: Bureau of Labor Statistics

First in Forecasts Since 1948
First in Forecasts Since 1948

Employer Cost for Employee Health Insurance (private sector)

Source: BLS

Annual Data Trends

Source: BLS
Minimum Wage and Supply & Demand

Source: Principles of Macroeconomics by Dr. N. Gregory Mankiw
US Industrial Production to Non-Residential Construction

Private Chemical: +8.6%
Warehouse: +17.4%
Private Manufacturing: +3.5%
National Defense Expenditures to Defense Capital Goods New Orders

Expenditures vs. Orders over time, showing trends and rates of change from 1975 to 2020 under different administrations (Carter, Reagan, Bush, Clinton, Bush, Obama). The graph includes data from the Bureau of Economic Analysis, US Census Bureau.
1. Budget for the rise…do you have enough….
2. Invest in customer market research to reduce price sensitivity
3. Make sure your training and retention programs are top notch
4. Marketing and advertising spending increasingly effective
5. Drive efficiencies with technology
6. Hire sales people and leaders
7. Lock in costs
8. Expand credit offerings to garner market share
9. What are you going to do to avoid 2019?
Household Distribution by Income Level

<table>
<thead>
<tr>
<th>Income by Household</th>
<th>% in 1967</th>
<th>% in 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than $35,000</td>
<td>38.7%</td>
<td>32.1%</td>
</tr>
<tr>
<td>$35,000 to $200,000</td>
<td>60.3%</td>
<td>61.8%</td>
</tr>
<tr>
<td>Over $200,000</td>
<td>1.0%</td>
<td>6.6%</td>
</tr>
</tbody>
</table>

Source: Census Bureau
Join our email list!

Receive monthly updates on the economy

Email updates@itreconomics.com with the subject line PMPA
Definition: the possibility that something bad or unpleasant will happen
Levels of Application

Global
Regional
National
Market
Product
Company
Division
Generating a Quantitative Forecast

Step 1: Internal Trends

Step 2: Leading Macro & Market Indicators

Step 3: News and Market Observations

Underlying: ITR Long Term Business Cycle Theory
4 Reasons

1.) Economy

2.) Industry

3.) Random Event

4.) The company
Series A Data Trends

Types of Data…

Millions of Dollars
## Data Preparation

<table>
<thead>
<tr>
<th>Raw</th>
<th>3MMT</th>
<th>3/12</th>
<th>12MMT</th>
<th>12/12</th>
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<tbody>
<tr>
<td>Nov-14</td>
<td>1.4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dec-14</td>
<td>1.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jan-15</td>
<td>1.5</td>
<td>4.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feb-15</td>
<td>1.4</td>
<td>4.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mar-15</td>
<td>1.5</td>
<td>4.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apr-15</td>
<td>1.3</td>
<td>4.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>May-15</td>
<td>1.3</td>
<td>4.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jun-15</td>
<td>1.6</td>
<td>4.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jul-15</td>
<td>1.6</td>
<td>4.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aug-15</td>
<td>1.5</td>
<td>4.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sep-15</td>
<td>1.7</td>
<td>4.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oct-15</td>
<td>1.6</td>
<td></td>
<td>18.0</td>
<td></td>
</tr>
<tr>
<td>Nov-15</td>
<td>1.7</td>
<td>5.0</td>
<td>18.2</td>
<td></td>
</tr>
<tr>
<td>Dec-15</td>
<td>1.7</td>
<td>5.0</td>
<td>18.4</td>
<td></td>
</tr>
<tr>
<td>Jan-16</td>
<td>1.7</td>
<td>5.1</td>
<td>15.9%</td>
<td>18.6</td>
</tr>
<tr>
<td>Feb-16</td>
<td>1.6</td>
<td>5.0</td>
<td>13.6%</td>
<td>18.8</td>
</tr>
<tr>
<td>Mar-16</td>
<td>1.7</td>
<td>5.0</td>
<td>13.6%</td>
<td>19.0</td>
</tr>
<tr>
<td>Apr-16</td>
<td>1.5</td>
<td>4.8</td>
<td>14.3%</td>
<td>19.2</td>
</tr>
<tr>
<td>May-16</td>
<td>1.5</td>
<td>4.7</td>
<td>14.6%</td>
<td>19.4</td>
</tr>
<tr>
<td>Jun-16</td>
<td>1.9</td>
<td>4.9</td>
<td>16.7%</td>
<td>19.7</td>
</tr>
<tr>
<td>Jul-16</td>
<td>1.7</td>
<td>5.1</td>
<td>13.3%</td>
<td>19.8</td>
</tr>
<tr>
<td>Aug-16</td>
<td>1.7</td>
<td>5.3</td>
<td>12.8%</td>
<td>20.0</td>
</tr>
<tr>
<td>Sep-16</td>
<td>1.9</td>
<td>5.3</td>
<td>10.4%</td>
<td>20.2</td>
</tr>
<tr>
<td>Oct-16</td>
<td>1.7</td>
<td>5.0</td>
<td>10.4%</td>
<td>20.3</td>
</tr>
</tbody>
</table>

### 3/12 Rate-of-Change

\[
\text{Rate-of-Change} = \frac{\text{October 2016 3MMT}}{\text{October 2015 3MMT}} \times 100 - 100
\]

\[
= \frac{5.3}{4.8} \times 100 - 100 = 10.4\%
\]

### 12/12 Rate-of-Change

\[
\text{Rate-of-Change} = \frac{\text{October 2016 12MMT}}{\text{October 2015 12MMT}} \times 100 - 100
\]

\[
= \frac{20.3}{18.0} \times 100 - 100 = 12.7\%
\]
Series A Rates-of-Change
Phase A
12/12 is rising and the data trend is either heading toward a low or is in the early stages of recovery. This is the first positive phase of the business cycle.

Phase B
12/12 is rising above 0, data trend is accelerating in its ascent, and growth is occurring above year-ago levels. This is the second positive phase of the business cycle.

Phase C
12/12 decline is in place, data trend is decelerating in its ascent or has stopped its rise, but it is still above last year. This is the first negative phase of the business cycle.

Phase D
12/12 is below 0, data trend is in recession at levels below the year-earlier level. This is the final phase and second negative phase of the business cycle.
Example Series

Rates-of-Change
RISING – Momentum is positive
3/12: -11.7% (20 month high)
12/12 - 26.8% (rise for 2nd straight month)

FALLING – Momentum is negative
3/12:  9.4% (11 month low)
12/12:  16.5% (3 month low)

January 2010
• Annual Production: $61.1 million
• 30th consecutive month of decline
• Production at 21 year low

October 2006
• Annual Production: $103 million
• 16th consecutive month of rise
• Production at 70 month high
Example Series
First in Forecasts Since 1948

Trends 10

- Soft Landing
- Hard Landing
- Nonresidential Construction
- Financial
- Medical
- Retail
- Consumer Prices
- New Orders
- Foreign
- Wholesale Trade
- Production

IRTR Economics

RECOVERY A | ACCELERATING GROWTH B | SLOWER GROWTH C | RECESSION D
Step 2 - Leading Indicators

The Indicator has a 12-month lead time to the Company

March 2010
March 2011
June 2014
June 2015
Relating to Your Business

- Discuss with your management team:
  - What Phase are you in now?
  - What Phase are your key customer segments in?
  - What can you watch for in your business to help you know if you are moving into phase X?
  - If the next six months moves from X to Y, what is your plan?
  - Which of your customers are likely to move into X at the same time?
  - What are your plans if Phase C turns into Phase D, or it turns into Phase B?
Annual Subscription

“We Subscribe!”
Series A to US Industrial Machinery New Orders

2 Month Lead
Series A to US Steel Scrap Prices

6 Month Lead

12/12 Rates-of-Change
## Phase A - Recovery

1. Conduct a SWOT review, and know where you need to put your money  
2. Positive leadership modeling (culture turns to behavior)  
3. Start to phase out marginal opportunities (products, processes, people); repair margins  
4. Perform due diligence on customers and extend credit  
5. Be on good terms with a banker; you will need the cash more now than in any other phase  
6. Invest in customer market research; know what they value and market/price accordingly  
7. Hire key people and implement company wide training programs ahead of Phase B  
8. Allocate additional resources to sales and marketing  
9. Invest in system/process efficiencies  
10. Make opportunistic capital and business acquisitions; use pessimism to your advantage
## Phase B - Accelerating Growth

1. Ensure quality control keeps pace with increasing volume
2. Invest in workforce development: Hiring, Training, Retention
3. Ensure you have the right price escalator; space out price increases
4. Maximize your profit margins through differentiation; stand out from the crowd and set yourself apart
5. Expand distribution channels
6. Expand credit to customers
7. Improve corporate governance (Rent a CFO, establish a board of advisors, or board of directors)
8. Communicate competitive advantages; build the brand
9. What’s next? Products less than seven years old can help buck the business cycle trend
10. Sell business in climate of maximum goodwill
## Phase C - Decelerating Growth

1. Know if your markets are headed for a soft landing or a hard landing
2. Cash is king: beware of linear budgets and ensure you are not in denial
3. Stay on top of aging receivables
4. Revisit capital expenditure plans
5. Lose the losers: if established business segments are not profitable during this phase, eliminate them
6. Use competitive pricing to manage your backlog through the coming slowdown
7. Avoid committing yourself to long-term expenses at the top of the price cycle, but lock in revenue
8. Go entrepreneurial and/or counter-cyclical
9. Evaluate your vendors for financial strength; if needed look for additional vendors as a safety net
10. If the cycle looks recessionary, cross train key people to prepare for workforce reduction
## Phase D - Recession

1. Implement cost cutting measures
2. Offer alternative products with a lower cost basis
3. Perform due diligence on acquisitions while valuations are falling
4. Reduce advertising as consumers become more price conscious
5. Enter or renegotiate long-term leases
6. Negotiate labor contracts
7. Consider capital equipment needs for the next cycle
8. Tighten credit policies
9. Develop programs for advertising, training, and marketing to implement in Phase A
10. Lead with optimism, remembering that Phase D is temporary
Depression Drivers

• Demographics

• Inflation

• Health Care Costs / Entitlements

• US National Debt
Total U.S. Public Debt

The Long View…

(% of GDP)
## Estimated Percent of Total Population in 2030

<table>
<thead>
<tr>
<th>Age Group</th>
<th>US</th>
<th>China</th>
<th>India</th>
<th>Ger</th>
<th>Mex</th>
<th>Braz</th>
<th>Japan</th>
<th>Can</th>
</tr>
</thead>
<tbody>
<tr>
<td>65 &amp; older</td>
<td>19.6</td>
<td>17.2</td>
<td>8.9</td>
<td>27.9</td>
<td>11.5</td>
<td>12.2</td>
<td>32.2</td>
<td>24.8</td>
</tr>
<tr>
<td>40-64</td>
<td>29.0</td>
<td>37.9</td>
<td>28.9</td>
<td>32.9</td>
<td>29.7</td>
<td>32.7</td>
<td>32.8</td>
<td>30.8</td>
</tr>
<tr>
<td>20-39</td>
<td>25.4</td>
<td>24.0</td>
<td>31.0</td>
<td>21.5</td>
<td>28.9</td>
<td>29.1</td>
<td>19.5</td>
<td>23.7</td>
</tr>
<tr>
<td>less than 20</td>
<td>25.9</td>
<td>21.0</td>
<td>31.4</td>
<td>17.6</td>
<td>29.9</td>
<td>25.9</td>
<td>15.6</td>
<td>20.6</td>
</tr>
</tbody>
</table>
Cumulative Scheduled Old-Age, Survivors, and Disabilities Insurance Income Less Cost, from Program Inception through Years 2013 – 2089

Present value as of January 1, 2015, in trillions

Source: 2015 OASD Trustee Report, page 60
## CBO Projection Statistics

<table>
<thead>
<tr>
<th>Year</th>
<th>B+C+D/E (%)</th>
<th>Net Interest</th>
<th>Healthcare</th>
<th>Social Security</th>
<th>Total Spending</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>56%</td>
<td>234</td>
<td>936</td>
<td>882</td>
<td>3,690</td>
</tr>
<tr>
<td>2030</td>
<td>69%</td>
<td>1,176</td>
<td>2,251</td>
<td>2,049</td>
<td>7,896</td>
</tr>
<tr>
<td>2035</td>
<td>71%</td>
<td>1,602</td>
<td>3,041</td>
<td>2,589</td>
<td>10,110</td>
</tr>
</tbody>
</table>

Source: CBO, 2015
Hope

- Drastic Alterations to Social Security
  - Extend retirement age
  - Means testing
- Technology
  - Usually an effect, not a cause
- Reduce Government Spending
  - Really, it can be done
- The Life – Death Continuum
  - Culture shift
Look for More Opportunities in These Sectors

- Energy Distribution
- Water Distribution/Conservation
- IT/AI
- Vocational Education
- Health Care
- Food
- Mexico
- Pets
- Printed Electronics
- Robotics
- Security
- 3-D Printing
- Natural Resources (Harvesting/Conserving)
- Entertainment
Should you ask a Question during Seminar?

- Do you actually HAVE a question? 
  - No: Are you trying to show off? 
    - Yes: Go for it. 
    - No: Are you sure it’s not a dumb question or that the speaker already answered it? 
      - Maybe: I don’t think so… 
        - No: Proceed with caution. 
        - Yes: Do you really need to ask the question in public or could you follow up with him/her later? 
          - Doesn’t matter: Proceed with caution. 
          - Yes: Are you the Seminar organizer asking a question because no one else is and the awkward silence is making everyone uncomfortable? 
            - Yes: Thank God. Please ask the question and let’s get out of here! 
            - No: Ok, you have a legitimate question. Do you actually care about the answer? 
              - Yes: FINE, ASK YOUR QUESTION.
              - No: Not really. I just want to show off.

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