Executive Summary: ITR OUTLOOK THROUGH 2017

So far this year, we have seen leading indicators rise, fall, and rise again (think S&P 500 and the Purchasing Managers Index). Some indicators that had previously been overtly positive (i.e. Housing Starts) are now showing signs of cyclical weakening. One venerable longer-term indicator, Corporate Bond Prices, has turned more decidedly negative of late even though the S&P 500 recovered from its June demise to set record highs in July. Our commentary on all of these changes and their possible implications may have created some confusion or uncertainty over the last two quarters.

The projected timing of the cyclical peak has been pushed out by one quarter based on the actual timing of the actual leading indicator trend reversals (versus our projection of when those indicators would peak).

Despite the above, our projections published in the ITR Trends Report™ have not changed from what we presented utilizing February 2013 data. Using US Industrial Production as the benchmark for the US economy:

- 2013 would come in about 3.0% higher than 2012. We are on track for a 2.6% increase with data through midyear.
- 2014 will come in at -0.6%.
- 2015 will be up 2.2%.
- 2016 will be up 3.4%.
- 2017 will be up 3.3%.

Since the Feb 2013 data we have been projecting a June 2014 12MMA high. This has not changed. Referencing our previous standing forecast, generated with data through January 2011, we were also calling for 2013 to come in 3.0% higher than 2012. In other words, our quantitative forecast for 2013 has not changed at all since February 2011.

Our outlook for the magnitude of the 2014 decline has been moderated when compared to the forecast we had in place from 2011 through 2012, but it is unchanged from February 2013 to date. We moderated the projected decline for this business cycle because we stopped expecting consumers to become economically pinched by inflation; however, we continue to expect that the economic weakness in 2014 will be consumer driven for other reasons (see the Disposable Personal Income and S&P 500 discussion that follows).
Timing of the forthcoming business cycle low: there is a trend in our thinking to push the timing of the low out by one to two quarters from what we had previously been espousing. The thinking is driven by the range of "normal" for the economy. Theory suggests we use a period of decline that is shorter than median and that is what is built into the forecast. No official change has been made by us. Our analysis suggests that a potential shift in timing to a slightly longer rate-of-change recession will not result in a material change to our 2015 outlook. The current outlook calls for 2015 to be up 2.2% year-over-year, the alternate scenario yields a 1.7% gain instead. Either way, 2015 is projected to come in better than 2014 but not as strong as 2016 and 2017.

S&P 500 update: The S&P 500 rebounded from a rough June and established a record high by the end of July. From a timing point of view, this does not impact the timing of our projected business cycle weakness in 2014 since a May 2013 S&P 500 high would have been “early” relative to our macro forecast. Early is in quotes because the S&P 500 is not very reliable as a leading indicator so there is quite a broad range to what is normal.

Take a look at the chart below. Notice that the Corporate Bond Prices 3MMA trend peaked in September 2012. As the chart illustrates, decline in the Corporate Bond Prices 3MMA is a long-term harbinger of a decline in the S&P 500. We are still in the period where the stock market is overbought, but the trend correction is coming and we expect a downward trend in the S&P 500 will characterize most of 2014. As a side note, our analysis of "taking profits off the table" etc. is not based on tax implications. Each person's tax situation tends to be unique, so our views are tax neutral. Whether to sell at this time or not is also a matter of whether a person is thinking long term or short term. We think the S&P 500 will come storming back for 2015 - 2017, easily erasing the decline of 2014. The question becomes whether you want compounded growth off a higher level or a lower equity baseline level.

One other note regarding the business cycle trend probabilities for 2014: Disposable Personal Income (DPI) is not growing fast enough to keep the economy moving in a positive direction. DPI over the last 12 months is up 0.6% and the trend is weakening. The Consumer Price Index (CPI) is up 1.8% and accelerating. With after-tax income not keeping up with inflation (even very modest inflation), the consumer is going to be hard pressed to keep Retail Sales growing in 2014 at the needed 2.5% pace or better.
Summary

Three major sectors of the US economy, Financial, Housing, and Retail, are in Phase C, Slower Growth, of the business cycle. They are the first of our “train cars” to begin the journey toward the 2014 slowdown.

The Medical benchmark is virtually even with year-ago levels. Expect a transition into Phase B, Growth, imminently.

Recovery in Europe and Brazil has helped lift the Foreign benchmark into Phase A, Recovery.

New Orders has shifted into Phase B, Growth, this month. The quickening growth in New Orders will help lift Production in the second half of 2013.

Wholesale Trade and Nonresidential Construction are lagging through this business cycle. They remain in Phase C.

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 the second negative phase of the business cycle.

The ITR Trends 10 compares the current cyclical status of 10 major benchmarks of macroeconomic activity as they move through this business cycle and into the next. Think of the Trends 10 as a train with 10 cars. The majority of the “cars” have gone through a soft landing for the 2012-2014 cycle. Please note that not all of the remaining cars will go down into a hard landing. Many are likely to pass through a low between Phase C and Phase B without going into Phases D and A. This is the essence of the soft landing we are projecting for this business cycle.
The ITR Leading Indicator increased once more in July to 5.2 but remains below the January 2013 high. The lack of a definitive cyclical trend in the indicator suggests that US Industrial Production growth will remain steady through early 2014.

Nice upturn in the monthly US Industrial Production index for June. The gain is partly seasonal and partly cyclical. The 3.11% gain in Production from May was better than the historical median gain of 2.97%, lifting the Index to a level 1.8% higher than June 2012. The rising trend has been decelerating through the first half of 2013. We are likely to see the trend status stabilize or even improve slightly in the second half of 2013 based on the recent rise in the Purchasing Managers Index and ITR Leading Indicator. An improved trend status will get the 12MMA centered within our forecast range.

There is no change to our outlook of decline in Industrial Production in the second half of 2014. When each company will feel the shift in the business cycle will depend on whether they tend to reverse before or after US Industrial Production and whether they are actively gaining or losing market share.
Metalworking Machinery New Orders

Billions of Dollars, N.S.A.

HIGHLIGHTS
- New Orders in Phase B
- Accelerating exports helping drive New Orders higher

SUMMARY

Metalworking Machinery New Orders transitioned into Phase B of the business cycle following the best second quarter on record, necessitating an upward revision to the forecast. The upward trajectory for Annual New Orders will extend into early 2014 and rise at a more robust pace than previously anticipated to finish the year 11.7% ahead of 2012. A mild decline will then take hold and persist throughout 2014.

The strong second quarter in New Orders was largely attributable to a surge in exports. Annual Metalworking Machine Tool Exports have regained a sustainable rising trend and jumped back into Phase B of the business cycle. Annual Exports increased to the highest level in nearly six years in May (most recent data available) and New Orders during the month alone registered 11.4% ahead of May 2012. With economic recovery underway in Europe, and reacceleration for the Chinese economy on the horizon (the world’s largest consumer of machine tools), exports will likely continue to trend higher through year-end, boosting New Orders.

FORECAST
2013: 11.7%  2014: -2.0%

MANAGEMENT NOTE

Check distribution systems for readiness to accommodate increased activity; especially the growth expected in post-2014.
HIGHLIGHTS
- Highest Industrial Production in over 5 years
- Mid-2014 12MMA high projected

SUMMARY
The Industrial Production rate of rise is less than stellar at 2.6% over the last 12 months (increase in the annual average index) but at least it compares favorably with the 1.8% average 12/12 amplitude for the period between the 2002 recession low and the 2008 cyclical peak. Indications are that the 12MMA data trend will rise through the first half of 2014 before slipping into a minor downturn in the second half of 2014. This means we should expect the first half of 2014 to be stronger than the second half of the year. This is a timing shift of one quarter from what we were saying one year ago. The year-end estimates for US Industrial Production are unchanged from what we have been presenting through the ITR Trends Report since the February 2013 US Industrial Production data.

Please note that we are now using the not seasonally adjusted data for US Industrial Production. This does not change the trends for the 12/12 and the 12MMA, but it demonstrates the seasonality of production. The June seasonal surge in production left activity 1.8% higher than a year ago.

FORECAST
2013: 2.6%  
2014: -0.6%

MANAGEMENT NOTE
Hiring over the next 12 months should be restricted to critical positions in current business areas and finding the talent needed to enter new markets.
**HIGHLIGHTS**

- Price pressure to remain modest through 2014
- Moderate wage growth limiting price increases

**SUMMARY**

Consumer Prices are edging upwards, albeit at a moderate rate of 1.7% (annual average basis). Look for overall price pressures to remain modest through 2014.

*Energy Costs* rose 3.2% in June from the year-earlier level as instability in Egypt increased prices at the pump. Ongoing tension in the Middle East, combined with an improving economy will lead to higher oil and gasoline prices through year-end.

The US economy is growing, but relatively high unemployment has kept the wage growth trend noticeably mild (see page 22 for more detail). *Wages for the Private Workforce* have increased 2.2% in the last year, the highest year-over-year since 2009, but still a full percentage point lower than the 3.2% average wage increase in 2008. Small wage increases are limiting the amount retailers are able to raise prices as consumers show heightened sensitivity to the cost of goods. *Apparel and Food at Home Prices* have only increased 0.8% and 0.9% in the last 12 months, respectively, confirming the hesitancy felt by retailers.

**FORECAST**

- 2013: 1.6%
- 2014: 1.2%

**MANAGEMENT NOTE**

While high unemployment and low wage growth are falling in the employers favor, it is important to retain your top performers by adequately rewarding them.
ITR Economics – Four Phases of a Business Cycle

12/12 Rate-of-Change Rising

Phase A:  
* Data trend is slowing in its rate of decline.  
* Data trend usually reaches a low and begins to rise before the end of this phase.

Phase B:  
* Data trend is experiencing the strongest part of the business cycle rise.

12/12 Rate-of-Change Declining

Phase C:  
* Data trend becomes progressively milder in the business cycle rise.  
* Data trend usually reaches a peak and begins to decline before the end of this phase.

Phase D:  
* Data trend is experiencing the steepest part of the business cycle decline.

Phase Management Objectives™

Phase Late A - Recovery:

1. Positive leadership modeling (culture turns to behavior)
2. Establish goals: tactical goals which lead to strategic achievement
3. Develop a system for measurement and accountability re:#2
4. Align compensation plans with #2 and #3
5. Be keenly aware of the BE (Break Even) point and check it regularly
6. Judiciously expand credit
7. Check distributions systems for readiness to accommodate increased activity
8. Review and uncover competitive advantages
9. Invest in customer market research (know what they value)
10. Improve efficiencies with investment in technology and software
11. Start to phase out marginal opportunities
12. Add sales staff
13. Build inventories (consider lead time and turn rate)
14. Introduce new product lines
15. Determine capital equipment needs and place orders
16. Begin advertising and sales promotions
17. Hire "top" people
18. Implement plans for facilities expansion
19. Implement training programs

Phase Early B - Growth:

1. Accelerate training
2. Check the process flow for possible future bottlenecks
3. Continue to build inventory
4. Increase prices
5. Consider outside manufacturing sources if internal pressures becoming tight
6. Find the answer to “What next?”
7. Open distribution centers
8. Use improved cash flow to improve corporate governance
9. Use cash to create new competitive advantages
10. Watch your debt-to-equity ratio and ROI
11. Maintain/pursue quality: don’t let complacency set in

Phase Late B  Early C - Prosperity:

1. Stay in stock on A items, be careful with C items
2. Consider selling the business in a climate of maximum “goodwill”
3. Penetrate new selected accounts
4. Develop plan for lower activity in traditional, mature markets
5. Freeze all expansion plans (unless related to “what is next”)
6. Spin off undesirable operations
7. Consider taking on subcontract work if the backside of the cycle looks recessionary
8. Stay realistic – beware of linear budgets
9. Begin missionary efforts into new markets
10. Communicate competitive advantages to maintain margins

Phase Late C - Warning:

1. Begin work force reductions
2. Set budget reduction goals by department
3. Avoid long-term purchase commitments late in the price cycle
4. Concentrate on cash and balance sheet
5. Reduce advertising & inventories
6. De-emphasize commodity/services in anticipation of diminishing margins
7. Weed out inferior products (lose the losers)
8. Encourage distributors to decrease inventory
9. Identify and overcome any competitive disadvantages
10. Make sure you and the management team are not in denial
11. Cross train key people
12. Watch Accounts Receivable aging
13. Increase the requirements for justification of capital expenditures
14. Evaluate vendors for strength (don’t get caught honoring their warranties with no one to accept returned goods)
15. Manage the backlog through pricing and delivery, try to fill the funnel

Phase Early D - Recession:

1. Continue force reduction
2. Reduce advertising – be very selective
3. Continue to avoid long-term purchase commitments
4. Review all lease agreements
5. Increase the requirements for justification of capital equipment
6. Eliminate all overtime
7. Reduce overhead labor
8. Combine departments with like capabilities and reduce management
9. Select targets of opportunity where price will get the business
10. Tighten credit policies – increase scrutiny
11. Look for opportunistic purchases
12. Grab market share as your competitor dies

**Phase Late D - Recession / Early A - Early Recovery**

1. Prepare training programs
2. Negotiate union contracts if possible
3. Develop advertising & marketing programs
4. Enter or renegotiate long-term leases
5. Look for additional vendors
6. Capital expenditures & acquisitions considered in light of market-by-market potential
7. Make acquisitions – use pessimism to your advantage
8. People will be scared – lead with optimism and “can do” attitude

**Checking Points of Cyclical Progress:**

As the rate-of-change cycle moves from the beginning low point through the peak and down to the final low, it passes through several Checking Points. The progress of the rate-of-change through each checking point during the cycle helps to establish whether a cyclical trend is just beginning, is about to reverse, or is in the steepest part of the trend. A 1/12 may be substituted for a 3/12.

**Positive Checking Points**

1. 3/12 low
2. 3/12 passes above the 12/12
3. 12/12 reaches a low
4. 3/12 crosses above 0%
5. 12/12 crosses above 0%

The rate-of-change is making the transition from the previous cycle's decline to rise in the current business cycle. Checking points #1 and #2 reflect this activity.

The onset of business cycle rise is observed.
The entry of the cycle into its steepest part of the rising trend is observed

**Negative Checking Points**

6. 3/12 reaches a high
7. 3/12 downward passes the 12/12
8. 12/12 reaches a high
9. 3/12 crosses below 0%
10. 12/12 value crosses below 0%

Checking points #6 and #7 indicate that the business cycle is making the transition from rise to decline. Business cycle decline begins with checking point #8.
The entry of the cycle into its steepest part of the decline is with checking points #9 and #10.
Definitions of the Series Included in ITR Trends Report

All data is not seasonally adjusted (NSA) unless otherwise noted (SA)

**ITR Leading Indicator:** Monthly composite indicator established by ITR to track cyclical turning points in the overall economy as early as 12 months in advance. This indicator includes financial, manufacturing, construction, and consumer components. A reading of zero or lower is indicative of recession.

**US Leading Indicator:** Composite index published by the Conference Board. The USLI is made up of 10 components: average weekly hours, manufacturing; average weekly initial claims for unemployment insurance; manufacturers' new orders, consumer goods and materials; ISM® new orders index; manufacturers' new orders, nondefense capital goods excluding aircraft orders; building permits, new private housing units; stock prices, 500 common stocks; Leading Credit Index™; interest rate spread, 10-year Treasury bonds less federal funds; and average consumer expectations for business conditions.

**Purchasing Managers Index:** Composite index published by the Institute For Supply Management which includes five components: New Orders (seasonally adjusted), Production (seasonally adjusted), Employment (seasonally adjusted), Supplier Deliveries (seasonally adjusted), and Inventories. A PMI reading above 50 percent indicates that the manufacturing economy is generally expanding; below 50 percent indicates that it is generally declining.

**Consumer Expectations Index:** Composite index published by the Conference Board based on responses to three questions included in a survey: respondents expectations regarding business conditions six months hence; respondents expectations regarding employment conditions six months hence; and respondents expectations regarding their total family income six months hence.

**Chicago Fed National Activity Index (CFNAI):** The CFNAI is a weighted average of 85 monthly indicators of national economic activity. Historical movements in this index closely track periods of economic expansion and contraction, as well as periods of increasing and decreasing inflationary pressure.

**Corporate Bond Prices:** Corporate AAA Rated Bond Yields, inverted to reflect prices. Corporate Bond Prices act as a leading indicator to general economic change.

**Stock Prices:** Standard and Poor 500 Industrials, 1941-43 = 10.

**US Government Long-Term Bond Yields:** 10-year maturity, percent yield.

**Housing Starts:** Total number of housing units started, including farms, private and public, NSA.

**Office Buildings Construction Spending:** Private construction of all sizes of office buildings. Spending measured in billions of dollars, NSA.

**Commercial Buildings Construction Spending:** Private construction of commercial buildings, shopping centers, and warehouses. Spending measured in billions of dollars, NSA.

**Water & Sewer Facilities Construction:** Public construction spending measured in billions of dollars, NSA.

**Educational Buildings Construction Spending:** Public construction of buildings for educational purposes. Spending measured in billions of dollars, NSA.

**Power Facilities Construction Spending:** Total construction of power facilities including distribution systems. Spending measured in billions of dollars, NSA.

**Retail Sales:** Excluding automobiles and parts, trillions of 1982-84 (constant) dollars, NSA.

**US Light Vehicle Retail Sales:** Retail sales of new passenger cars & light duty trucks, includes transplants, in millions of units.

**Wholesale Trade Durable Goods:** Merchant wholesalers to retailers, contractors, or other types of businesses of goods with an estimated useful life of three years and greater, measured in trillions of dollars, NSA.
**Wholesale Trade Nondurable Goods:** Merchant wholesalers to retailers, contractors, or other types of businesses of goods with an estimated useful life of less than three years, measured in trillions of dollars, NSA.

**Employment:** Civilian labor force, measured in millions, NSA.

**Nondefense Capital Goods New Orders w/o Aircraft:** Capital Goods New Orders exclusive of defense orders and aircraft and parts, measured in billions of dollars, NSA.

**Metalworking Machinery New Orders:** NAICS Code 3335. Metal forming and metal cutting tools; patterns; dies, tools, jigs, fixtures; rolling mill machinery; welding apparatus, measured in billions of dollars, NSA.

**Industrial Machinery New Orders:** NAICS Code 3332. Machinery used for saw mills and woodworking, plastics and rubber, paper, textiles, printing, food, and semiconductor industries, measured in billions of dollars. NSA.

**Construction Machinery New Orders:** NAICS Code 33312. Construction machinery and equipment; elevators; conveyors; moving stairways; hoists; cranes; industrial trucks. Billions of dollars, NSA.

**Electrical Equipment New Orders:** NAICS Code 333531. Power, distribution, and specialty transformers; electric motors, generators; switchgear; relays, and controls, in billions of dollars, NSA.

**Computers & Electronics New Orders:** NAICS 334. Mainframes, personal computers, workstations, laptops, computer servers, and computer peripheral equipment and components. Measured in billions of dollars, NSA.

**Defense Capital Goods New Orders:** Goods New Orders contracted by the Department of Defense or by foreign governments through the DOD Foreign Military Assistance Program, billions of dollars, NSA.

**US Total Industrial Production:** Manufacturing, mining, and utility output, measured in physical units and/or inferred from data on input to the production. Index, 2007 = 100, NSA.

**NA Light Vehicle Production:** Passenger car and light duty truck production (classes 1-4), including transplants. US, Canada and Mexico. Measured in millions of units.

**Mining Production (w/o oil & gas):** NAICS 212. Includes; Metal Mining, Coal Mining, and Nonmetallic Minerals Mining. Index, 2007 = 100, NSA.

**Chemicals & Products Production:** NAICS 325. Basic chemicals, resins. Synthetic rubber & fibers, pharmaceuticals and paint. Index, 2007 = 100, NSA.

**Civilian Aircraft Equipment Production:** NAICS 336412.3. Aircraft engines and engine parts, propulsion system conversion, overhaul and rebuilding. Index, 2007=100, NSA.

**Medical Equipment and Supplies Production:** NAICS 3391. Manufacturing laboratory apparatus and furniture, surgical and medical instruments, appliances and supplies, dental equipment and supplies, eyeglasses and protective wear. Index, 2007 = 100, NSA.

**Heavy Duty Truck Production:** Class 8 trucks, US, Canada and Mexico. Measured in thousands of units.

**Consumer Price Index – All items:** Urban population sample. Index 1982-84 = 100, NSA.

**Natural Gas Futures Prices:** Dollars per MMBtu. NYMEX, following month delivery.

**Crude Oil Futures Prices:** Light, sweet. Dollars per barrel. NYMEX, following month delivery.

**Steel Scrap Price Index:** #1 Heavy Melt, Pittsburgh, dollars per gross ton, FOB delivered, index.

**Foreign Economies:** Measures of industrial production, indexes with varying years equaling 100. Some are NSA.
Definition of Terms

Moving Totals

Moving totals are used to smooth out the volatility inherent to monthly data, particularly at the product or company level. An annual moving total goes one step further in that it also removes seasonal change from the data series under consideration. This is desirable when the objective is to discern and forecast the underlying cyclical trend for the subject data series.

A moving total is simply the total of the monthly data for the stated number of months. For example, the 3 month moving total (3MMT) for November 2011 would be the total of the September 2011, October 2011, and November 2011 monthly data. When December 2011 data becomes available, you simply drop September from the calculation and add December. The December 2011 3MMT is thus comprised of the activity recorded in October, November, and December 2011. 3MMTs are used to illustrate the seasonal changes inherent to the data series. They are also used when forecasting specific product activity on a quarterly basis.

Example: Housing Starts 3MMT

<table>
<thead>
<tr>
<th>Month</th>
<th>2011</th>
<th>3MMT</th>
</tr>
</thead>
<tbody>
<tr>
<td>September</td>
<td>.133</td>
<td></td>
</tr>
<tr>
<td>October</td>
<td>.140</td>
<td></td>
</tr>
<tr>
<td>November</td>
<td>.121</td>
<td></td>
</tr>
</tbody>
</table>

A 12 month moving total (12MMT) is derived by adding 12 consecutive months of activity together. The 12MMT for November 2011 is the total derived when adding the Housing Starts (or bookings or sales) figures for December 2010 through November 2011. To ease the calculation process, as each new month of data becomes available, add the newest figure and drop the previous oldest figure. In our example, the November 2011 12MMT can be quickly derived by adding the November 2011 monthly figure to the October 2011 12MMT, and then subtracting the November 2010 number from the subtotal. 12MMTs are used to define the business cycle trend inherent to the subject time series. When ITR refers to a data trend, it is referring to the 12MMT trend.

Example: Housing Starts 12MMT

<table>
<thead>
<tr>
<th>Month</th>
<th>2010</th>
<th>3MMT</th>
<th>12MMT</th>
</tr>
</thead>
<tbody>
<tr>
<td>November</td>
<td>.117</td>
<td></td>
<td></td>
</tr>
<tr>
<td>December</td>
<td>.101</td>
<td></td>
<td></td>
</tr>
<tr>
<td>January</td>
<td>.106</td>
<td></td>
<td></td>
</tr>
<tr>
<td>February</td>
<td>.108</td>
<td></td>
<td></td>
</tr>
<tr>
<td>March</td>
<td>.133</td>
<td></td>
<td></td>
</tr>
<tr>
<td>April</td>
<td>.151</td>
<td></td>
<td></td>
</tr>
<tr>
<td>May</td>
<td>.154</td>
<td></td>
<td></td>
</tr>
<tr>
<td>June</td>
<td>.155</td>
<td></td>
<td></td>
</tr>
<tr>
<td>July</td>
<td>.155</td>
<td></td>
<td></td>
</tr>
<tr>
<td>August</td>
<td>.141</td>
<td></td>
<td></td>
</tr>
<tr>
<td>September</td>
<td>.133</td>
<td></td>
<td></td>
</tr>
<tr>
<td>October</td>
<td>.140</td>
<td></td>
<td></td>
</tr>
<tr>
<td>November</td>
<td>.121</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3MMT = .394 12MMT = 1.595
3MMT = .414 12MMT = 1.594
3MMT = .394 12MMT = 1.598
There are times when it is desirable to calculate a 12 month moving average (12MMA). A
12MMA is calculated in the same way as the 12MMT, with the additional step of the sum of the
12 months of activity will be divided by 12 to reflect the monthly average level of activity over the
preceding year. A 12MMA will look exactly like a 12MMT when plotted on a chart. 12MMAs are
used instead of 12MMTs when one of the following is being observed: an index; percentages (for
interest rates or inflation); inventories.

**Rate-of-Change**

Rate-of-change comparisons are utilized for various purposes, all of which relate to the data
trend. A 12/12 rate-of-change (discussed below) is more sensitive to changes in cyclical trends
and can be used to anticipate trend reversals, often before the data trend even begins to show
signs of weakening. An understanding of the timing relationship between a 12/12 rate-of-change
and the particular data trend allows for the development of dependable timing estimates for data
trend highs and lows. The rate of rise or decline in the rate-of-change is often indicative of the
recovery or recession expected in the data series. In general, the rate-of-change provides a
reflection of change in a data trend before the change becomes apparent in either the 3MMT or
12MMT.

**Calculating Rate-of-Change:**

A rate-of-change figure is simply the ratio of a number in a data series to a preceding number in
that data series. The time interval between the numbers is fixed. One rate-of-change figure can
tell you instantly whether activity is running below or above this time last year, and by how much.
Consecutive rates-of-change will reveal whether activity levels are getting progressively better or
worse compared to last year. It is the rate-of-change of a data series which is used to illustrate
and measure cyclical change and identify trends.

The most common rate-of-change is the 12/12. As is the case for all rates-of-change, the
numerator denotes the data aggregation involved; the denominator indicates the time intervals.
The 12 in the numerator of the 12/12 designation specifies that a 12MMT comparison is being
made. The 12 in the denominator signifies that the time interval is 12 months (for all of our work
represented by this text, the time interval will be fixed at 12 months). The 12/12 rate-of-change
for July 2011, expressed as a percent, would be calculated as follows:

\[
\left( \frac{July\ 2011\ 12MMT}{July\ 2010\ 12MMT} \times 100 \right) - 100 = -1.7\% \quad July\ 2011\ 12/12
\]

The July 2011 12MMT was 1.7% below the July 2010 12MMT. What we would next want to see
is if this figure were trending upward or downward. By doing so, we could begin to give definition
to change specifically relating to the *business cycle*.

Of course it is possible that when a 12/12 calculation is made the result will be positive.

\[
\left( \frac{November\ 2011\ 12MMT}{November\ 2010\ 12MMT} \times 100 \right) - 100 = +1.1\% \quad November\ 2011\ 12/12
\]
The 1.1% rate-of-change figure reflects the fact that activity for the 12 months ending November 2011 was 1.1% above the level of activity posted for the 12 months ending November 2010. The 12/12 is providing a snapshot of a given month. It shows where business stands today in relation to the annual total of one year ago. What becomes paramount to anticipating future change is whether this figure is moving upward (i.e. 3.0%) or downward (i.e. -1.7%).

The 12/12 is used to define business cycle change for the subject data series. ITR research has shown that business cycle change for any given data series is going to be most measurable and forecastable when using the rate-of-change for the series as opposed to the actual data. Repetitive trend characteristics (timing and dynamics) can more easily be observed, measured, and utilized for anticipating change when using the 12/12 rate-of-change.

Another rate-of-change frequently used in measuring cyclical change is the 3/12. As the numerator indicates, the figures being compared are MMTs. The time interval is fixed at 12 months. The MMT is not used to define the business cycle of the data series per se, but rather is utilized as a tool to better enable us to anticipate shifts in the business cycle trend (changes in the cyclical momentum). The MMT is calculated as follows:

\[
\left( \frac{\text{January 2011} \quad \text{MMT} \quad .324}{\text{January 2010} \quad \text{MMT} \quad .345} \times 100 \right) - 100 = -6.1\% \quad \text{January 2011} \quad 3/12
\]

Sales for the 3 months ending January 2011 were down 6.1% from the year before. Monitor to see if this figure is improving (approaching 0.0%) or decreasing (falling further below -6.1%) to gauge what the business cycle momentum is for the subject data series. The 3/12 and the 12/12 are the two most frequently used rates-of-change when analyzing company or market data.

There are times when a 1/12 rate-of-change will be employed. Dividing the most recent monthly figure by the monthly figure of one year ago derives the 1/12. The 1/12 is frequently too volatile for use at the company level. It is used primarily for aggregate, macroeconomic data series, which are not prone to significant swings from one month to the next. The 1/12 is calculated as follows:

\[
\left( \frac{\text{February 2011} \quad \text{monthly data} \quad .108}{\text{February 2010} \quad \text{monthly data} \quad .120} \times 100 \right) - 100 = -10.0\% \quad \text{February 2011} \quad 1/12
\]

Business is down 10.0% from this same time one year ago. What we need to know next is whether this figure is part of an upward trend or downward trend. We can also observe if the February 2011 1/12 rate-of-change is higher or lower than the February 2011 3/12. If it were higher and part of a sustainable trend, then we would have empirical evidence that the 3/12 trend is approaching a cyclical low. If the 3/12 is approaching a low, the 12/12 trend is also moving closer and closer to the low. In other words, we would have our first empirical indication of impending business cycle rise. All this refers to a system of Checking Points developed by ITR, which provides for the orderly observation and anticipation of relatively near-term reversals in predominant business cycle trends.