

**Iowa Leading Indicators Index: Third Annual Assessment and Update**  
Tax Research and Program Analysis Section  
Iowa Department of Revenue  
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In 2006, the Iowa Department of Revenue (IDR) created the Iowa Leading Indicators Index (ILII) as a tool to predict turning points in Iowa employment. Because individual income and sales tax revenues are closely linked with employment, it was also hoped that the ILII could help predict State revenues. IDR has issued monthly ILII reports since the start of fiscal year 2007 and posted the reports on the IDR Web site (<http://www.state.ia.us/tax/taxlaw/econindicators.html>).

Annually the Department assesses how well the ILII has met the goals behind its development, gauges the validity of the existing components, considers additional components that have been suggested, and carries out the necessary annual updates. This paper documents the third annual assessment and update to the index. A step-by-step presentation of how the ILII is computed can be found in appendix A. The calculation of the diffusion index is discussed in appendix B.

***Assessment of the Iowa Leading Indicators Index for Fiscal Year 2009***

The ILII experienced drops in each of the months of fiscal year 2009, falling from 107.0 in July 2008 to 97.8 in June 2009 (see Figure 1). In August 2008, the six-month annualized change in the index and the six-month diffusion index together gave a contraction signal for Iowa employment, a point reached only one previous time in the series' ten year history. The non-farm employment coincident index, tracking the 12-month moving average of non-seasonally adjusted, non-farm employment, began to contract a few months later. After 0.03 percent growth in July 2008, the employment index flattened and began to fall in November 2008, with the drops accelerating to 0.25 percent in June 2009.

With a lag in reporting, it is too early to know if gross domestic product (GDP) for Iowa will follow employment downward in 2009, but State revenues have already made the turn into negative growth. GDP for the state experienced steady growth in the last two years, increasing a real 4.4 percent in 2007 and 2.2 percent in 2008 (see Figure 2). State revenues, measured using 12-month moving averages and adjusted using the Consumer Price Index (CPI) to 2008 dollars, increased through the first nine months of fiscal year 2009, driven by the sales and use tax rate increase which was effective July 2008 (see Figure 3). Despite that 20 percent increase in the rate of the sales and use taxes, which comprise over one-third of State revenues, total receipts began to drop in April 2009 as corporate and individual income tax and cigarette excise tax receipts weakened.

In order to remove the impact of the recent tax law change and focus on a net revenue stream that more directly relates to Iowa employment, the ILII is plotted against net individual income tax revenues (see Figure 4). Net individual income tax revenues are a 12-month moving average of withholding plus estimates plus final return payments minus refunds, all adjusted to 2008 dollars using the CPI. Note that individual income taxes comprise over 50 percent of total State revenues. The initial drop in individual income tax revenues in 1999 reflects the individual income tax cut implemented during the 1998 tax year. Individual income tax revenues were strong in the spring of 2000, but fell in 2001 and 2002 with the national recession. Revenues began to rise again in 2004 and remained relatively strong through 2008, with a slight dip in 2005 and 2006. Net individual income tax revenues turned down in February 2009, following the ILII drop that started in April 2008. In April and May 2009, final return payments filed with 2008 tax returns decreased compared to prior years while refund claims increased, further pulling down net revenues.

The main goal for the Iowa Leading Indicators Index is to serve as an additional tool in predicting the direction of the State economy. Indeed, the ILII began to decline in April 2008 and showed a contraction signal in August 2008. Three months later, the Iowa non-farm employment index began to show declines, catching up with the slowing national economy and presaging the slowing tax revenues in 2009. Results over the past year suggest that the ILII has indeed proved to be a helpful tool in predicting a turning point in Iowa non-farm employment.

### ***Validity of Existing Components***

When the leading indicators index was established in 2006, one method used to select components was to identify series of Iowa data that were equivalent to those used as leading economic indicators by other states and regions. Such components include unemployment insurance claims, average manufacturing hours, and the new orders index. A second method used to select components was to identify series that predicted economic activity in the key sectors of the Iowa economy: agriculture, manufacturing, and finance. Those sectors continue to stand out as the most important in terms of employment and economic activity in the State. Agriculture comprised 6.4 percent of Iowa gross domestic product (GDP) in 2008, bolstered by the growing bio-energy sector and increases in commodity prices. Manufacturing accounted for 20.8 percent of GDP and 15.0 percent of non-farm employment while the finance sector accounted for 10.5 percent of GDP and 6.8 percent of non-farm employment in 2008. To capture the agriculture sector, it was necessary to create an index of futures prices for the four leading commodities in the state, corn, hogs, soybeans, and cattle. Along with average manufacturing hours, diesel fuel consumption was added to the index to measure demand for the transport of manufacturing goods within and through the state. The finance sector is heavily represented in the index of Iowa stocks compiled to serve as another component in the index.

During the development of the ILII, all potential indicators were weighed against six desired attributes of leading indicators that are known as the Moore-Shiskin criteria. It is useful to annually consider if the index and all of the individual components continue to display these same attributes:

1. conformity – series must conform well to the business cycle
2. consistent timing – series must exhibit a consistent timing pattern over time as a leading indicator
3. currency – series must be published on a reasonably prompt schedule and not be subject to major revisions
4. economic significance – cyclical timing of the series must be economically logical
5. statistical adequacy – data must be collected and processed in a statistically reliable way
6. smoothness – month-to-month movements in the series must not be too erratic.

Iowa economic activity experienced a slowdown during fiscal year 2009. The year began with recovery efforts after the nearly statewide flooding in June 2008. At the same time, the economic slowdown affecting both the East and West coasts began to reach the Midwest, slowing economic activity in Iowa throughout the fall and into the winter. The ILII predicted the weakness as drops that began in April 2008 continued, reaching the benchmarks for a contraction signal in August. In November through April, the index fell by nearly one percent each month, pushing annualized six-month changes well beyond the -2.0 percent of a recession signal and dropping the six-month diffusion index to zero in April and May. In June 2009, the index experienced its smallest drop since October 2008, -0.4 percent, but that drop was tempered by the comparison to the previous June when the floods pushed down several components. Estimates suggest that without the flood, the June 2009 ILII drop would have been -0.5 percent.

In line with the negative signs from the ILII, state non-farm employment growth tapered from over 0.07 percent average monthly growth in FY 2008 to 0.02 percent average growth during the first four months of FY 2009. Beginning in November 2008, non-farm employment began to fall, with average drops of 0.09 percent for November through February, accelerating to an average 0.22 percent drop during the last four months of FY 2009. Likewise, State revenues grew just 3.0 percent in FY 2009 over FY 2008, where 5.1 percentage points of that growth can be attributed to the increase in the sales and use tax rate in FY 2009. In other words, without the shift from the local option tax to the statewide sales tax, State revenues would have decreased an estimated 2.1 percent in FY 2009. Therefore, it appears the ILII demonstrated conformity with the current business cycle.

All components of the ILII likewise experienced large declines throughout FY 2009, each contributing to the drop in the ILII, with the exception of the national yield spread (see Table 1). The largest contribution was made by the twelve-month moving average of average manufacturing hours which fell from above full-time at 41.3 hours in June 2008 to below full-time at 38.5 hours in June 2009. Another large negative contribution was made by the unemployment insurance claims which increased 88 percent during the year, where the contribution from that component is inverted when added to the index. The smallest negative contribution was made by the agricultural sector as the corn and soybean prices began their drop in late fall 2008, slightly lagging behind the other components, reflecting the delayed slump in the agricultural sector.

A similar conclusion can be drawn regarding the consistent timing of the components and index after FY 2009. The additional year of data confirmed prior views that the components and index exhibit a consistent timing pattern as a leading indicator of future economic activity, where the indicators

signaled a contraction in employment, beginning in August 2008, three months prior to the realization of that contraction, beginning in November 2008.

Currency of the ILII's components proved to be very reliable during FY 2009. All data series were available within four weeks after the close of the month for all months except January. In that month, labor force data including average manufacturing hours and non-farm employment were delayed by several weeks because the Bureau of Labor Statistics (BLS) was undertaking annual benchmarking. During FY 2009, only three months, December 2008, February 2009, and April 2009, experienced any revision to the level of the index, rising 0.1 percent in December after revisions, and falling 0.1 percent in the latter two months. The December revision reflected changes to average manufacturing hours because of the annual BLS benchmarking. The change in February was caused by a lag in updating stock market shares outstanding. The change in April was caused by an update to average manufacturing hours data in the following month.

It was necessary to make a revision to the construction of the Iowa stock market index during the year. In December, the Iowa stock market index was updated to account for the move of Nationwide Financial Services (NFS) to a privately-held company during the month of November. In prior years when a stock has stopped trading publicly, the price and shares were frozen at the last available values and the company was only removed from the index during the annual update. However, all of those companies were minor components in the stock index. Last year, it was established that the index need only be recalculated during the fiscal year if a stock that comprised more than two percent of the total index value stopped being publicly traded in the U.S. Because NFS was one of only nine companies in the index that met that two percent threshold, the stock was removed immediately and the entire stock

index recalculated. The change was not significant enough to alter the values of the ILII for the first half of FY 2009.

Nothing in the past twelve months has changed previously stated opinions about the economic significance of the eight components. The majority of the components were negative contributors each month as the Iowa economy continued to slow. The only consistent exception was the yield spread which contributed positively nine of twelve months, reflecting the efforts by the Federal Reserve to revive the credit markets by pushing down short-term rates to near zero. It should be noted that the negative yield spread that was seen from August 2006 to May 2007 appears to have again provided a clear leading signal of the national recession that was officially declared to have begun in December 2007. For the first three months of FY 2009, the Agricultural Futures Price Index remained in positive territory as corn and soybean markets remained high; however, by the end of FY 2009, the AFPI was recording the largest negative contributions.

Views about the statistical adequacy of the data are likewise unchanged for the components as sources for all the data series continue to be reliable. Tracking the stock value for the companies in the stock market index sometimes requires additional research. When stock prices were no longer available for NFS, some searching identified the move by the company to privately-owned. Shares outstanding for the companies are pulled from quarterly SEC filings. Several times during the year significant increases in the number of shares outstanding for various companies were noted, requiring research into the causes for the changes. Arts Way Manufacturing completed a two-for-one stock split in July 2008 which requires an adjustment to historical shares outstanding such that the value of one share of the stock is comparable over time. Green Plains Renewable Energy also experienced a three-fold increase in shares outstanding as the company merged with another energy company during the fall of

2008, a legitimate increase in the value of the company. In the midst of the financial crisis during the winter, Wells Fargo Corporation undertook a large stock sale to raise capital to finance the purchase of Wachovia, again potentially raising the value of the company. The latter two changes were incorporated during the annual update, increasing the Iowa stock market index values as far back as October 2008. The final change to the Iowa stock market index was the removal of First Federal Bankshares (FFSX). Vantus Bank, and its holding company FFSX, was ordered by the Office of Thrift Supervision to be sold or liquidated by September 30, 2009, due to insufficient capital. In anticipation that the company will no longer be publicly-traded within the next month, it was removed from the index. This update to the index increased the series between 0.03 and 0.05 in each month.

Assessments of the components' smoothness did not change with the additional 12 months of data. The standard deviation of month-to-month changes in the components (measured for all but the yield spread using 12-month moving averages) increased for all eight components as the economy experienced some volatility (see Table 2). The largest increase, 30.1 percent, was observed for the Iowa stock market index reflecting swings in investor sentiment in the midst of the financial crisis. The next largest change was 27.5 percent observed for average manufacturing hours which experienced a few swings in the past year, although the series still remains the least volatile in the index. Initial unemployment insurance claims and diesel fuel consumption experienced nearly a 25 percent increase in volatility. Recall that the ILII is computed by weighting changes in the individual series by the standardization factors presented in Table 2, calculated as the inverse of the standard deviation normalized across all the components to one.

Another method for assessing the ILII and its components is to consider the sensitivity of the overall index to the exclusion of each separate component (see Figure 5). Each panel in the figure presents the



non-farm employment coincident index and ILII as seen in Figure 1, with an additional series, the dotted line, showing what the path of the ILII would have been if the listed component were not included in the index. For example, Panel A indicates that the ILII would have had much lower values in the last year if the AFPI were not one of the components, although the steep fall would persist. Conversely, Panel D indicates that the ILII would have had higher values over the last year if building permits were not one of the components, although, again, the recent fall would persist. The impacts of the AFPI and building permits on the ILII are expected, but less obvious are the large impacts from average manufacturing hours, Panel F, and diesel fuel consumption, Panel H. Although these indicators did have a distinct and consistent impact on the index over the past year, pulling down the index in the case of manufacturing hours and pushing up the index in the case of diesel fuel, the large change in the level of the index when either indicator is dropped reflects their high standardization weights. Because both of the series have relatively low volatility, their standardization weight, which is based on the inverse of the series' historical standard deviation, is larger. Removing either indicator shifts a share of its large weight onto the remaining indicators (the sum of the standardization weights must equal one), thus having a significant impact on the level of the index.

An additional way to consider sensitivity is to focus on six-month percentage changes in the index and six-month diffusion index values (see Table 3). The Conference Board, who publishes the National Leading Economic Indicators after which the ILII was modeled, identifies a contraction signal as the point when the annualized six-month percentage change declines by over two percent and the six-month diffusion index falls below 50.0. The ILII reached that point in August, with a -3.1 percent annualized six-month change and 25.0 six-month diffusion index. Without the yield spread or the AFPI, the contraction signal would have appeared as early as July (as seen in last year's assessment, dropping the AFPI would have caused a contraction signal to appear in June 2008). Without building

permits, the signal would not have been realized until September. With just a one or two-month change in the signal's timing, it does not appear that any one component drove the index to signal the coming contraction. In September through June 2009, the ILII continued to linger in contraction territory, regardless of whether any one component is removed from the index.

### ***Changes and Additions to ILII Components***

During the past year, it was determined that accounting for input costs in the production of corn and soybeans was necessary to better track the profitability of farming in Iowa. In addition, IDR continued to evaluate a series first considered as a potential ninth component during the update in 2007, new retail business starts.

### ***Change to the AFPI***

During the summer and fall of 2008, prices for both corn and soybeans experienced large increases; however, input costs for those crops rose as well. By considering only the increase in the corn and soybean futures prices, the Agricultural Futures Price Index (AFPI) essentially assumed that all of the higher prices received for these crops remained in the pockets of Iowa farmers. However, to the extent that those farmers paid out-of-state vendors higher prices for the inputs necessary to produce these crops, the AFPI overstated the gains for the Iowa farm economy.

In order to better account for the contribution of Iowa grain producers to the economy, it was determined that the corn and soybean futures price series must incorporate the costs of production. Since the inception of the AFPI the hog and cattle price series have netted out production costs, where corn and soybeans are a major component of the feed costs, resulting in a measure of expected profits. Thus the AFPI, comprised of grain prices and livestock profits, captured the fact that rising grain prices

benefit some farmers but harm others. Production costs for grains were assumed to be relatively stable and thus not as important when calculating changes in economic activity in the agricultural sector.

However, during 2008, grain production costs jumped dramatically as higher energy prices pushed up fertilizer, herbicide, and fuel costs, and rents rose sharply as landowners attempted to capture some of the gains from rising grain prices.

For the livestock series, breakeven costs calculated by Professor John Lawrence from Iowa State University are subtracted from the respective futures price to capture the profits of livestock producers. Donald Hofstrand and Ann Johanns, Extension Specialists at Iowa State University, produce similar breakeven costs series for corn and soybean production. The series are available at:

<http://www.extension.iastate.edu/agdm/cdcostsreturns.html#profitability>. The publicly-available series originally began in September 2006; however, they were extended back to September 2000 in response to a request from IDR. Because the ILII begins in January 1999, where each Iowa component is a 12-month backward moving average, IDR assumed that costs in prior years grew at the average growth rate observed for the earliest three years of the data (2000-2003) to extend the series to January 1998.

Three input cost series are available for both corn and soybeans: renter, landowner, and partial renter/landowner (see Tables 4 and 5). The obvious difference is whether any rent costs are included as an input cost; for the 2008 marketing year, the average per bushel cost of corn is 94.8 cents higher for the renter compared to the landowner while the average per bushel cost of soybeans is 362.9 cents higher. Note that average corn yields are approximately 3.5 times average soybean yields, explaining the differential in rental costs per bushel, where most cash rent contracts are set on a per acre basis.

The third series assumes the farmer cash rents 60 percent of tilled land and owns 40 percent, where \$500 per acre farmland debt is assumed. Under this mixed ownership series, the average per bushel

cost of corn is 63.7 cents higher than the landowner series and 31.1 lower than the renter series for the 2008 marketing year. Similarly, for soybeans the per bushel cost of the mixed ownership series is 249.5 cents higher than the landowner series and 113.4 cents lower than the renter series. A survey of farmland ownership conducted by Iowa State during 2008 reveals that approximately 46 percent of land is owned by the farmer tilling the land and the remaining 54 percent is rented. Therefore, the mixed renter/landowner series seems the best representation of the costs facing an average farmer in the state.

The grain breakeven series reflect the input costs for typical grain farming operations that represent farms in central and northern Iowa. Grain production costs considered in the series include input costs such as seed, fertilizer and lime, herbicide, crop insurance, fuel, drying, and labor; machinery costs such as depreciation and debt; and land costs such as real estate taxes, cash rent for rented land, and debt financing for owned land. Government price support payments are subtracted from total costs to calculate a net breakeven cost per bushel of corn or soybeans that can be compared directly to the crop's selling price.

The production cost series are reported on a marketing year basis, September through August. The costs are estimated at the start of the calendar year for the crop that will be harvested in the fall, using information on rental agreements established in the prior fall and input purchases finalized in advance of the growing season. Although the input costs are mostly locked in during the fall and winter, those costs are not reflected in the breakeven series until the following September when the crop is physically ready to be marketed. For example, the corn crop produced in the spring and summer of 2009 will be delivered to market between September 2009 and August 2010. The breakeven costs increase during the marketing year due to accrued interest on production costs. It is possible that

production costs will be revised at the close of a marketing year as projections are changed to actuals; however, no data from prior years are subject to revision. Thus the series meets the currency and statistical adequacy criterion.

While the breakeven series are dated on a September to August marketing year, the futures prices for grains used in the AFPI are based on a June to May pricing year (see Tables 4 and 5). Starting in June, the December futures contract is used to track “new crop” corn prices and the November futures contract is used to track “new crop” soybean prices. In December/November the future price series followed changes to the following July futures contract to track “old crop” prices, that is, the price that farmers can receive for any grain remaining in their possession after the harvest. Therefore, in order to have the breakeven and price series track the same crop, the breakeven series is shifted up three months; September 2009 breakeven costs are subtracted from the June 2009 futures prices to get the June 2009 profitability of corn or soybeans. Fortunately the breakeven series are projected a year in advance, making it possible to use data from future months.

The profitability of producing corn and soybeans varies greatly from year to year as input costs fluctuate and within each year as futures prices change. Crop yields, which vary each growing season and across the state, also drive profitability, but cannot be incorporated into the AFPI. Accounting for input costs does have a significant impact on the level and path of the corn and soybean components of the AFPI (see Figure 6). The futures price series for soybeans always exceeds that of corn; however, the estimated profit series are of similar magnitude, reflecting the higher input cost per bushel of soybeans. This confirms that including input costs creates a better comparison between the profitability of the two crops. In most months, the profits line closely mimics the futures price line,

except for some dips during 2002 and 2003 for the soybean series. Note that both crops experienced high profitability during 2008 when futures prices spiked.

Because input costs could exceed the futures price, i.e., expected profits can be negative, the profit series must be transformed to eliminate those negatives in order to include month-to-month changes in the profitability of corn and soybeans. The exponent of the series is used to consider changes in corn and soybeans profits when calculating the AFPI, the same technique used for hog and cattle profits. This transformation increases the volatility of the grain series, thus the standardization weights used within the calculation of the AFPI are decreased for the grain series relative to the livestock series. Overall, the index is more balanced between the four commodities than in the past.

The standardization weight for the AFPI used to calculate the ILII also changes with the introduction of grain input costs. Moving to grain profits raises the standard deviation of the monthly changes in the AFPI by 186 percent from its value without the grain input costs. With the higher standard deviation, the standardization weight on the AFPI drops from 0.117 to 0.052, falling from the fourth highest to the sixth highest (see Table 6). Despite the drop in its weight, the overall impact of the AFPI on the ILII is still substantial. This can be seen by comparing the ILII with and without the AFPI component before and after the addition of grain breakevens. Without crop breakevens, excluding the AFPI lowers the ILII level for most months (see Figure 7). With crop breakevens, excluding the AFPI raises the ILII during 2002 and has more months when the level is relatively unchanged (see Figure 8). Both figures show the strength that the AFPI has added to the index since 2007, although the gap is narrower with the grain breakevens.

Adding input costs to the corn and soybean price series and updating the weights used to compute the AFPI does have an impact on the path of the ILII (see Figure 9). The level of the FY 2010 ILII is lower than under the FY 2009 components, reflecting the level shift down in the corn and soybean profit series compared to the corn and soybean futures price series (see Figure 6). The largest impact is seen during the boom in commodity prices during 2008. While the ILII peaked at a value of 108.4 in March 2008 under the FY 2009 components, the ILII peaked at a lower 107.3 under FY 2010 components. Note that the value of the index is not by itself meaningful, rather it is the direction and magnitude of changes in the series that provide the signals of future economic activity. Overall, it is believed that this change to the AFPI has improved the ability of that index, and in turn the ILII, to capture the true impact of the agricultural sector on the Iowa economy.

#### *Considering Retail Business Starts*

In the previous two annual assessments of the ILII, new retail business starts were considered as a possible additional leading indicator based on the economic significance of the series and conformity seen since 1998 (see Figure 10). It is reasonable to believe that individuals who have a negative outlook on the economy would be less likely to start businesses with a retail component, thus the number of starts could serve as a leading indicator of a downturn. Indeed, the series rose in 1999 and into 2000, but started to drop one year prior to the fall in employment seen in July 2001. It turned up again in November 2001 and rose through January 2003, two years in advance of the rise in employment that began in December 2003. Starts were roughly flat for 2003 and 2004 but began to fall in early 2005. That decline has continued unabated through June 2009. Although it is possible the decline was providing a leading signal of the current recession, there is some concern that a nearly four year lead is too long to be meaningful.

Concerns also remain about the statistical adequacy and currency of retail business starts given that in any month the series, compiled by the Iowa Department of Revenue, can be revised as far back as three years. In a given month, the largest revisions occur for the most recent months as registrations are filed late with IDR or are entered into the electronic system with a lag. The latter is becoming less of a problem as more registrations are completed online, but paper forms continue to exist. During fiscal year 2009, monthly observations for the series were repeatedly collected to assess the magnitude of those revisions. If the monthly count of new starts available in the following month are used to construct the series beginning with July 2008, the starts series would drop dramatically in FY 2009, see the dashed line in Figure 10. Given the tendency for revisions, the initial monthly tally is not a good representation of the final data, see bold line. The average revision in the monthly starts after six months was 17.3 percent, excluding January. Each year, starts spike in January, reflecting a clustering of business starts at the beginning of the calendar year, although much of that spike does not appear in the data until several months later. Indeed, the average increase in January starts between the initial numbers tallied in February and six months later is 62.4 percent.

Given this information, it is possible to forecast the monthly retail business starts series relatively accurately. For example, in November 2008, October 2008 starts were 763. Using the average revision, the forecast for October 2008 starts is 895 starts. Actual October 2008 starts reported six-months later in May 2009 were 907. Using a 12-month moving average of starts further smooths out the impact of using forecasted numbers. The 12-month moving average of business starts for January 2009 using forecasted monthly numbers for July 2008 through January 2009 is 863 compared to 855 if actual numbers reported in August 2009 are used for all months. Applying these forecasts would shift the series up to the dotted line starting July 2008, which matches quite well with the actual series, the bold line shown through January 2009 (see Figure 10).



With the above forecasting methods to account for repeated revisions in the series, the ILII was recomputed with new retail business starts as a ninth indicator. Adding a component to the index requires an adjustment to the standardization factors used to compile the ILII along with simply adding the change in the new component to the calculation of the ILII. Retail business starts increases the steepness of the ILII in 2001, strengthening the signal of the recession experienced later that year (see Figure 11). It has no impact on the timing of the contraction signal in 2008, but it does create a false recession signal in July and August 2007. This reflects the steady drop in starts that began in 2005 and continued through today, even as the Iowa economy boomed in 2007 and 2008.

After two years of tracking new retail business starts, the data were finally sufficient to make a final assessment about the series as a potential indicator. Because it was determined that the raw series was not useful as an indicator given the regular upward revisions, average revision factors were estimated to use for forecasting monthly numbers. None of the original eight components of the ILII require any similar forecasting adjustment, thus concerns about the currency and statistical adequacy of the starts series remain. When the series was added to the ILII, it triggered a false recession signal, weakening the overall consistent timing of the index. In light of these weaknesses, it was decided that new retail business starts should not be added to the ILII.

### ***Updates for the Fourth Year***

Given that the original eight components continue to meet the Moore-Shiskin criteria while no new series did, the only major revision to the ILII for FY 2010 was the change to the Agricultural Futures Price Index discussed in the previous section. The annual update to the AFPI incorporating the most recent cash income data was also completed.

In the fall, cash farm income numbers for the previous calendar year are reported in the Iowa Agricultural Statistics Bulletin produced by the Iowa office of the National Agricultural Statistics Service. The distribution of total farm income credited to the four commodities included in the AFPI is used to weight the four commodity profits within the agriculture index. With the release of the 2008 cash farm income, all AFPI values for January 2008 and later were revised. The change was significant as high grain prices for the 2008 crops increased the income share of corn from 37.6 percent to 43.8. The income share of soybeans rose from 20.8 to 21.7 and overtook hogs as the second largest component of farm income. The hog share fell from 25.7 to 21.5 percent and the cattle share dropped from 15.9 to 13.0 percent. In addition, the USDA revised 2007 numbers, causing minor revisions to the AFPI values for January 2007 through December 2007.<sup>1</sup>

As a result of the change to the AFPI and updates to the standardization factors for all series, the historical values of the ILII and several of the components will change in the July 2009 report. These changes can be seen by comparing the index levels, percentage changes, and diffusion index values (see Tables 7 and 9). The level of the index is lower with the inclusion of the grain breakevens in the AFPI. However, the monthly changes in the index are also steeper over the last six months. While the index fell 10.6 points between the March 2008 peak and June 2009 under the FY 2009 configuration, the fall is 11.4 points under the FY 2010 configuration. The larger monthly declines in the index also raise the magnitude of the six-month changes in the index, although the appearance of the contraction signal is still August 2008.

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<sup>1</sup> The AFPI also uses standardization factors to equalize the volatility among the four commodities. The standardization factors, computed as the inverse of the standard deviation of the monthly changes in each of the four series, decreased for corn and hogs and rose for soybeans and cattle. Because only one set of factors is used to calculate the full history of the series, this update caused small changes in all AFPI values.

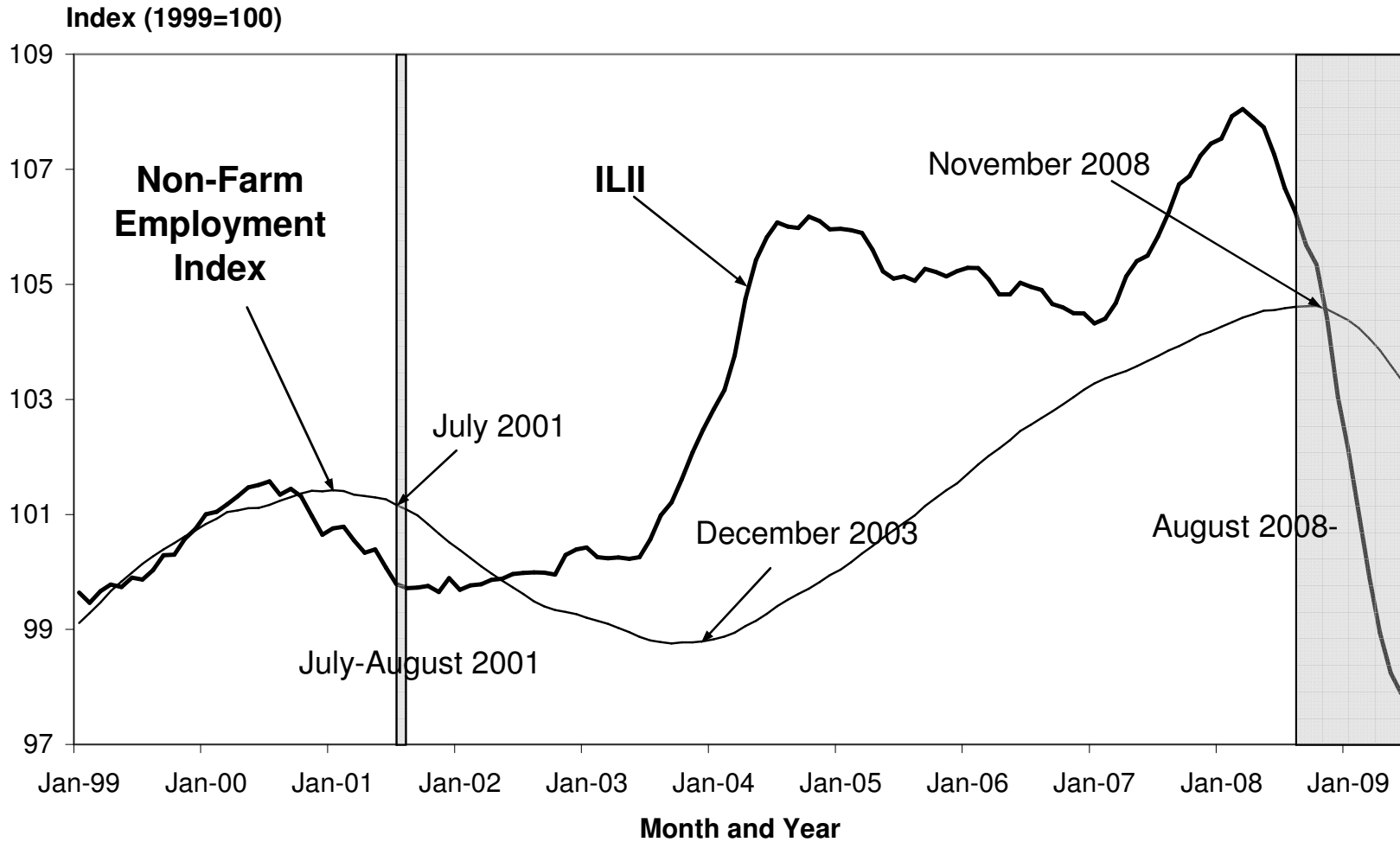
For the values of the components themselves, the largest change is apparent in the components of the AFPI (see Tables 8 and 10). The corn and soybeans data series are now net of input costs, thus the values are much lower than in the past. The order of the agriculture components was changed to reflect the increased share of soybeans relative to hogs according to 2008 cash farm income. The Iowa stock market index values increased because of the rise in the shares outstanding for two companies that occurred during the last quarter of 2008 and the removal of FFSX from the index, as noted above. The June value of manufacturing hours is down slightly reflecting the revised numbers released in August.

### ***Conclusions***

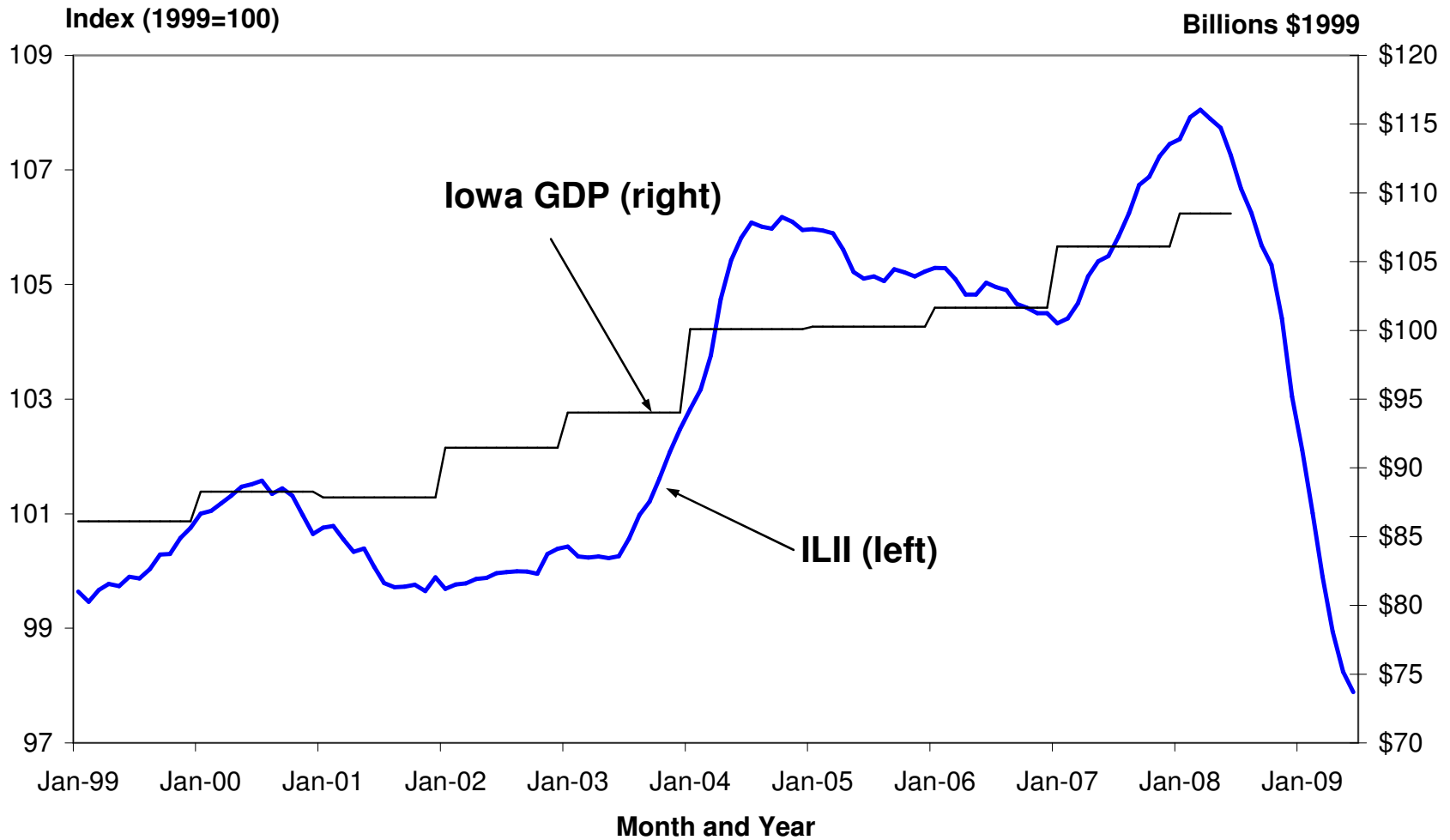
The Iowa Leading Indicators Index is a work in progress. However, after three years, it appears that the ILII can provide guidance in predicting the direction of Iowa non-farm employment. The additional year of data and close observation of the eight component series suggested only one major change was needed. With rising production costs for grain farmers, it was determined that breakeven costs should be included in the corn and soybean components of the Agriculture Futures Price Index. Incorporating the additional data into the AFPI reduced its values over its entire history. The change to the AFPI also led to a sharp increase in its standardization factor. Together these changes altered the contribution of the AFPI to the ILII, particularly over the last four years. The agricultural sector's positive contribution to the index in 2005 and 2006 was reduced, but the largest impact is seen during the boom in commodity prices during 2008. While the ILII peaked at a value of 108.4 in March 2008 under the FY 2009 components, the ILII peak at a lower 107.3 under FY 2010 components. These changes also increased the magnitude of the last six months of downward movements in the ILII. The timing of the contraction signal, first seen in August 2008, was unchanged. Thus the ILII predicted the downturn in employment which the state has been experiencing since November 2008.

The change to the AFPI has improved the ability of that index, and in turn the ILII, to capture the impact of the agricultural sector on the Iowa economy. With the success of the ILII in providing a leading contraction signal, the Department will continue to closely monitor the ILII with the hope that it will continue to inform policy makers about the direction of future economic activity in the State.

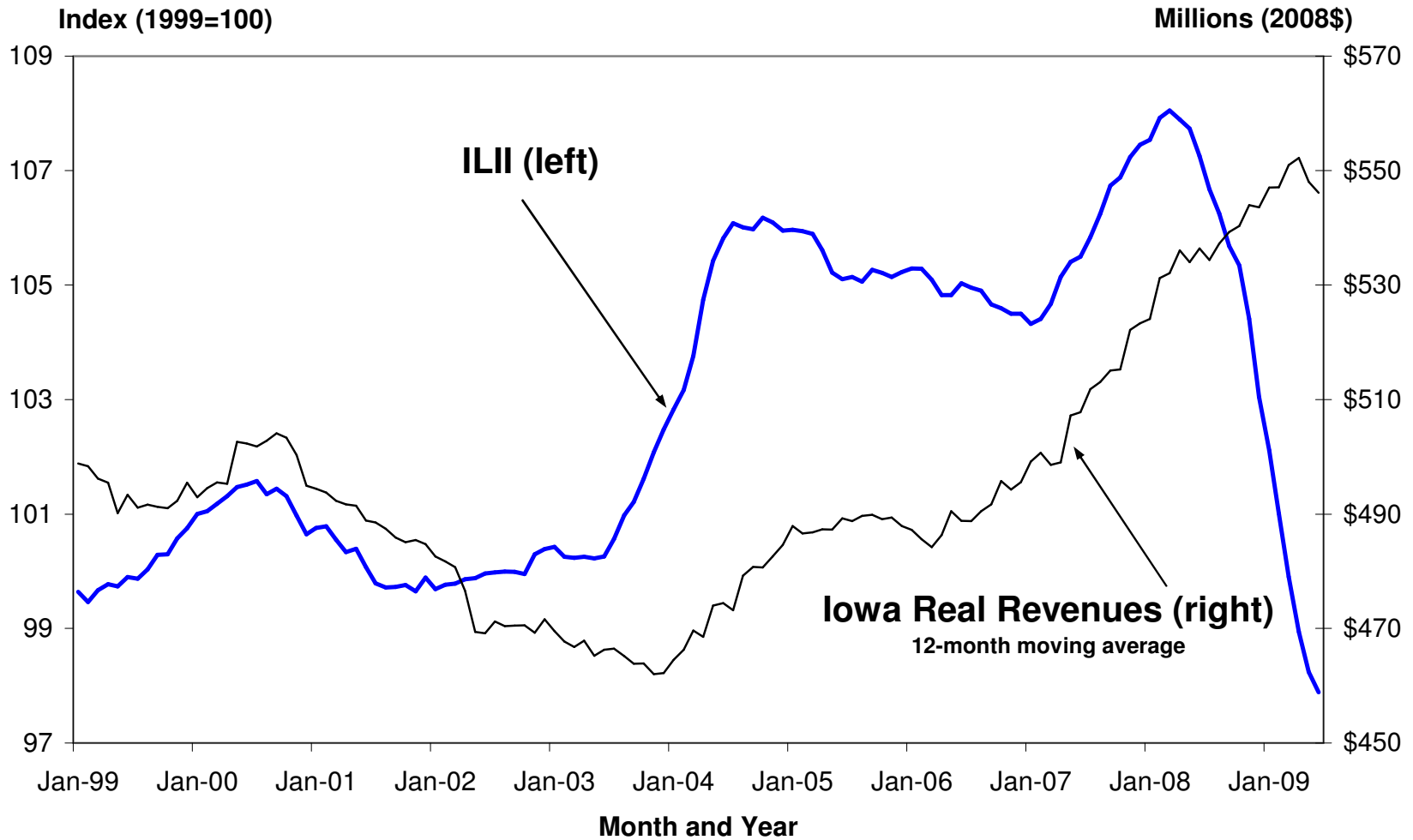
**Figure 1. Iowa Leading Indicators Index and Iowa Non-Farm Employment Coincident Index: January 1999-June 2009**



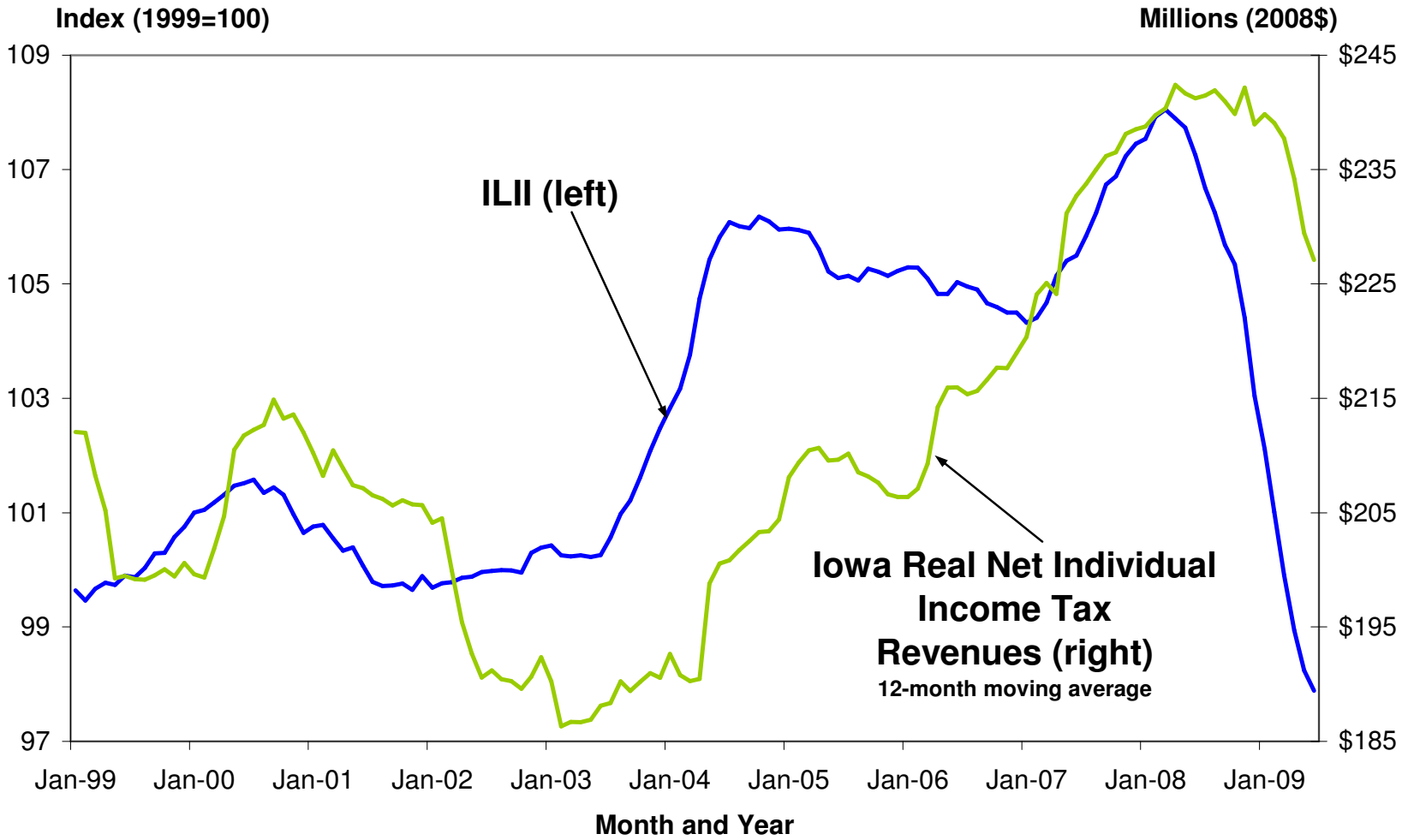
**Figure 2. Iowa Leading Indicators Index and Iowa GDP:  
January 1999-June 2009**



**Figure 3. Iowa Leading Indicators Index and Iowa Real Tax Revenues:  
January 1999-June 2009**



**Figure 4. Iowa Leading Indicators Index and Iowa Real Net Individual Income Tax Revenues Index: January 1999-June 2009**





**Table 1. Iowa Leading Indicators Index Components: Annual Overview**

Component Series <sup>a</sup>		2008	2009	Contribution to ILII
		June	June	Change
AFPI <sup>b</sup>	↓ <sup>c</sup>			-0.39
Corn (cents per bushel)		481.4	448.0	
Hog Profits (cents per pound)		10.3	10.7	
Soybeans (cents per bushel)		1176.2	1055.7	
Cattle Profits (cents per pound)		-3.6	-9.4	
Iowa Stock Market Index (10=1984-86)	↓	65.77	48.71	-1.81
Yield Spread (10-year less 3-month)	↑	2.21	3.54	0.32
Building Permits	↓	747	545	-0.88
Average Weekly Unemployment Claims <sup>d</sup>	↓	3,791	7,114	-2.04
Average Weekly Manufacturing Hours	↓	41.3	38.5	-2.17
New Orders Index (percent)	↓	56.0	34.6	-1.19
Diesel Fuel Consumption (mil gallons)	↓	57.17	52.69	-1.37

Source: Tax Research and Program Analysis Section, Iowa Department of Revenue, produced July 28, 2009.

a. For all component series except for the yield spread (the only national series) the values represent 12-month backward moving averages.

b. The agricultural futures price index is computed as the sum of the standardized symmetric percent changes in the four series, each weighted by the commodity's annual share of Iowa cash farm income (updated August 15, 2008).

c. Arrows indicate the direction of the series' contribution to the ILII over the fiscal year

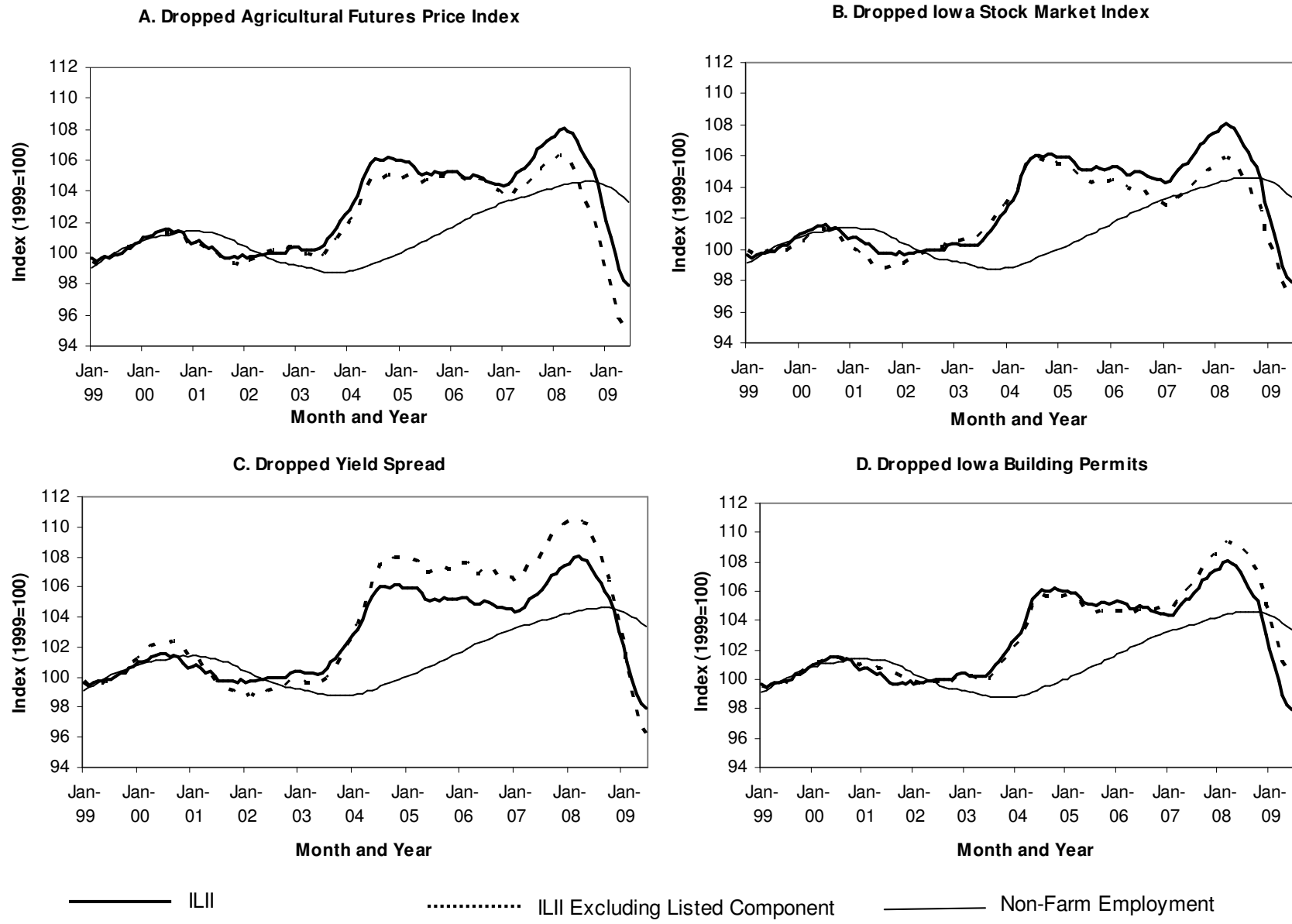
d. Changes in unemployment claims are inverted when added to the ILII, thus a negative change in the series contributes positively to the index.

**Table 2. Changes in ILII Standardization Factors Accounting for FY 2009 Data**

<b>Leading Indicator</b>	Jul-2008 Standard Deviation	Jul-2009 Standard Deviation	Percent Change in Standard Deviation	Jul-2008 Standardization Factor	Rank	Jul-2009 Standardization Factor	Rank	Percent Change in Standardization Factor
Agricultural Futures Price Index	0.548	0.603	10.0%	0.117	4	0.125	4	6.6%
Iowa Stock Market Index	1.067	1.389	30.1%	0.060	5	0.054	6	-9.9%
Yield Spread	0.269	0.283	5.1%	0.239	2	0.266	2	11.5%
Building Permits	2.297	2.382	3.7%	0.028	8	0.032	7	13.0%
Average Weekly Unemployment Claims	1.984	2.473	24.7%	0.032	7	0.030	8	-6.0%
Average Weekly Manufacturing Hours	0.214	0.273	27.5%	0.300	1	0.276	1	-8.1%
New Orders Index	1.158	1.284	10.9%	0.055	6	0.059	5	5.7%
Diesel Fuel Consumption	0.382	0.476	24.6%	0.168	3	0.158	3	-5.9%

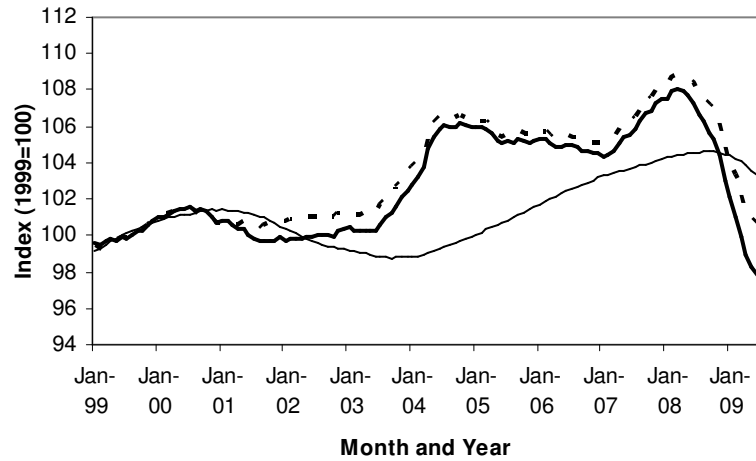
Each data series considers month-to-month changes over January 1999 to June 2008 for July 2008 values and January 1999 to June 2009 for July 2009 values. For all series except for the yield spread, which is the only national series, the changes are based on 12-month backward moving averages. The yield spread and new orders index changes are simple arithmetic changes; changes for the other six components are computed as symmetric percentage changes.

**Figure 5. Iowa Leading Indicators Index: Sensitivity to Exclusion of Individual Components**

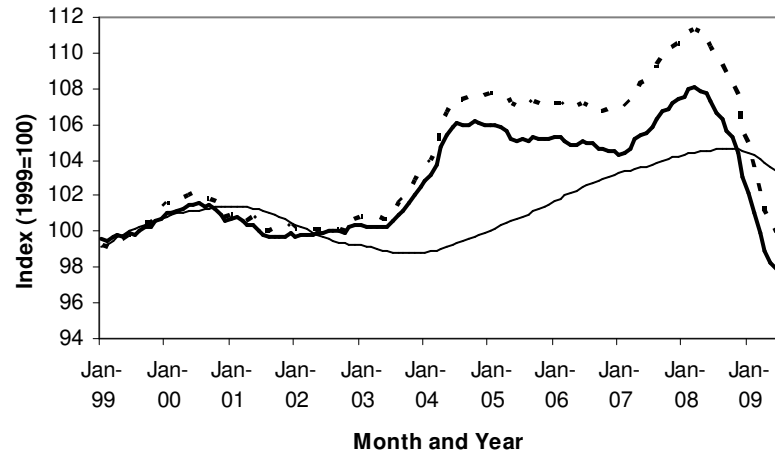


**Figure 5 cont. Iowa Leading Indicators Index: Sensitivity to Exclusion of Individual Components**

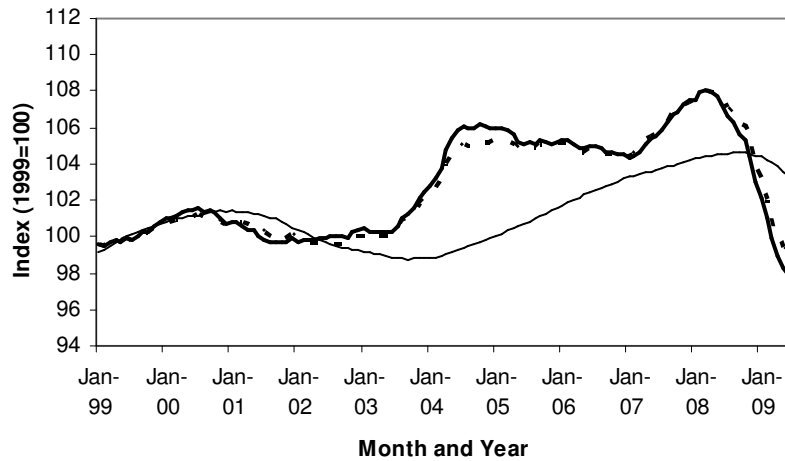
**E. Dropped Unemployment Insurance Claims**



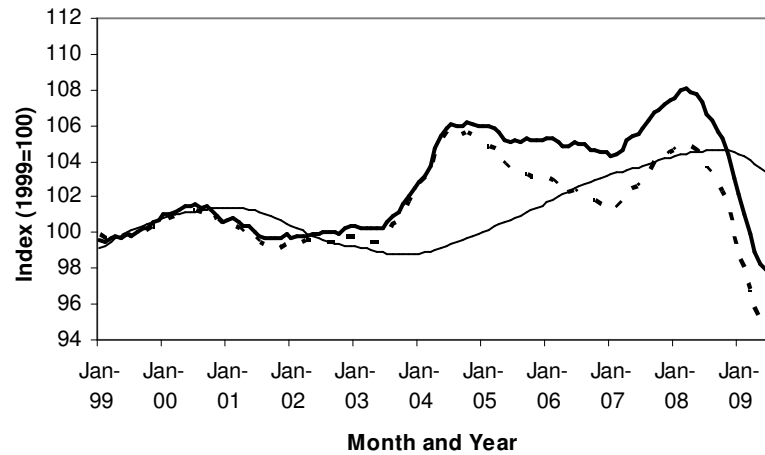
**F. Dropped Average Manufacturing Hours**



**G. Dropped New Orders Index**



**H. Dropped Diesel Fuel Consumption**



———— ILII

..... ILII Excluding Listed Component

———— Non-Farm Employment

**Table 3. Iowa Leading Indicators Index Component Sensitivity**

<b>Six-Month Values</b>	Jan to July	Feb to Aug	Mar to Sept	Apr to Oct	May to Nov	June to Dec	July to Jan	Aug to Feb	Sept to Mar	Oct to Apr	Nov to May	Dec to June
<b>ILII</b>												
Percentage Change (Annualized)	-1.6%	-3.1%	-4.4%	-4.7%	-6.2%	-7.9%	-8.6%	-9.9%	-10.9%	-12.1%	-11.8%	-10.0%
Diffusion Index	25.0	25.0	25.0	25.0	25.0	25.0	18.8	12.5	12.5	0.0	0.0	12.5
<b>ILII without Yield Spread</b>												
Percentage Change (Annualized)	-3.2%	-4.6%	-6.2%	-6.9%	-9.2%	-10.8%	-11.6%	-13.6%	-14.8%	-16.1%	-15.8%	-14.3%
Diffusion Index	14.3	14.3	14.3	14.3	14.3	14.3	14.3	0.0	0.0	0.0	0.0	0.0
<b>ILII without Average Manufacturing Hours</b>												
Percentage Change (Annualized)	-1.7%	-3.4%	-4.6%	-4.7%	-6.1%	-8.0%	-8.9%	-10.4%	-12.0%	-13.6%	-13.4%	-11.2%
Diffusion Index	28.6	28.6	28.6	28.6	28.6	28.6	21.4	14.3	14.3	0.0	0.0	14.3
<b>ILII without Diesel Fuel</b>												
Percentage Change (Annualized)	-1.9%	-3.4%	-4.6%	-5.0%	-6.3%	-7.9%	-9.1%	-10.2%	-11.3%	-12.7%	-12.3%	-10.3%
Diffusion Index	28.6	28.6	28.6	28.6	28.6	28.6	21.4	14.3	14.3	0.0	0.0	14.3
<b>ILII without AFPI</b>												
Percentage Change (Annualized)	-3.6%	-5.4%	-6.9%	-7.0%	-8.2%	-9.6%	-9.9%	-10.8%	-11.7%	-12.8%	-12.2%	-9.9%
Diffusion Index	14.3	14.3	14.3	14.3	14.3	14.3	7.1	14.3	14.3	0.0	0.0	14.3
<b>ILII without New Orders Index</b>												
Percentage Change (Annualized)	-0.8%	-2.1%	-3.2%	-3.4%	-4.9%	-6.7%	-7.4%	-8.8%	-10.1%	-11.4%	-11.1%	-9.7%
Diffusion Index	28.6	28.6	28.6	28.6	28.6	28.6	21.4	14.3	14.3	0.0	0.0	14.3
<b>ILII without Building Permits</b>												
Percentage Change (Annualized)	-0.1%	-1.5%	-2.9%	-3.6%	-5.2%	-7.1%	-8.0%	-9.4%	-10.5%	-11.4%	-11.0%	-9.3%
Diffusion Index	28.6	28.6	28.6	28.6	28.6	28.6	21.4	14.3	14.3	0.0	0.0	14.3
<b>ILII without Iowa Stock Market</b>												
Percentage Change (Annualized)	-1.5%	-3.1%	-4.3%	-4.4%	-5.7%	-7.2%	-7.7%	-8.7%	-9.5%	-10.6%	-10.2%	-8.4%
Diffusion Index	28.6	28.6	28.6	28.6	28.6	28.6	21.4	14.3	14.3	0.0	0.0	14.3
<b>ILII without Unemployment Claims</b>												
Percentage Change (Annualized)	-0.6%	-2.0%	-3.1%	-3.5%	-4.7%	-6.4%	-6.9%	-8.0%	-8.9%	-9.9%	-9.8%	-8.2%
Diffusion Index	28.6	28.6	28.6	28.6	28.6	28.6	21.4	14.3	14.3	0.0	0.0	14.3

Source: Tax Research and Program Analysis Section, Iowa Department of Revenue, produced August 19, 2009 using updated standardization factors through June 2009.

A diffusion index measures the proportion of components that are rising based on the actual changes (not the standardized contributions to the ILII). Components experiencing increases greater than 0.05 percent are assigned a value of 1.0, components that experience changes less than an absolute value of 0.05 percent are assigned a value of 0.5, and components experiencing decreases greater than 0.05 percent are assigned a value of 0.0. The Conference Board considers a contraction signal to be reliable when an index declines by at least two percent over a six month period (using an annual rate) and a majority of the individual components also decline over those six months (six month diffusion index less than 50.0).

**Table 4. Calculation of Corn Profit Series for June 2007 through July 2009**

Month and Year	Corn Breakeven (cents per bushel)			Month and Year	Corn Futures Price (cents per bushel)		Month and Year	Price	Breakeven	Profit	12-Month Moving Average
	Renter	Landowner	Mixed		Dec Futures	July Futures					
2007 Marketing Year				2007 Pricing Year			ILII Report				
Sep-2007	262.9	190.2	241.7	Jun-2007	391.3		Jun-2007	391.3	241.7	149.6	108.7
Oct-2007	264.7	191.5	243.3	Jul-2007	343.2		Jul-2007	343.2	243.3	99.9	114.5
Nov-2007	266.4	192.7	244.9	Aug-2007	347.9		Aug-2007	347.9	244.9	103.0	122.0
Dec-2007	268.2	194.0	246.5	Sep-2007	358.6		Sep-2007	358.6	246.5	112.1	130.4
Jan-2008	269.9	195.3	248.1	Oct-2007	357.9		Oct-2007	357.9	248.1	109.8	134.0
Feb-2008	271.6	196.5	249.7	Nov-2007	381.5		Nov-2007	381.5	249.7	131.9	135.3
Mar-2008	273.4	197.8	251.3	Dec-2007		433.5	Dec-2007	433.5	251.3	182.2	139.1
Apr-2008	275.1	199.0	252.9	Jan-2008		509.8	Jan-2008	509.8	252.9	256.9	146.7
May-2008	276.9	200.3	254.5	Feb-2008		539.9	Feb-2008	539.9	254.5	285.5	154.8
Jun-2008	278.6	201.6	256.1	Mar-2008		565.4	Mar-2008	565.4	256.1	309.3	166.2
Jul-2008	280.3	202.8	257.7	Apr-2008		606.0	Apr-2008	606.0	257.7	348.3	184.6
Aug-2008	282.1	204.1	259.3	May-2008		603.0	May-2008	603.0	259.3	343.8	202.7
2008 Marketing Year				2008 Pricing Year							
Sep-2008	323.2	231.2	293.0	Jun-2008	730.4		Jun-2008	730.4	293.0	437.4	226.7
Oct-2008	325.0	232.5	294.6	Jul-2008	665.1		Jul-2008	665.1	294.6	370.5	249.2
Nov-2008	326.8	233.8	296.3	Aug-2008	568.7		Aug-2008	568.7	296.3	272.5	263.3
Dec-2008	328.6	235.1	297.9	Sep-2008	546.3		Sep-2008	546.3	297.9	248.4	274.7
Jan-2009	330.4	236.4	299.5	Oct-2008	412.6		Oct-2008	412.6	299.5	113.1	275.0
Feb-2009	332.2	237.7	301.2	Nov-2008	373.8		Nov-2008	373.8	301.2	72.6	270.0
Mar-2009	334.0	239.0	302.8	Dec-2008		373.8	Dec-2008	373.8	302.8	71.0	260.8
Apr-2009	335.8	240.3	304.5	Jan-2009		412.2	Jan-2009	412.2	304.5	107.7	248.3
May-2009	337.6	241.6	306.1	Feb-2009		381.4	Feb-2009	381.4	306.1	75.3	230.8
Jun-2009	339.4	242.8	307.7	Mar-2009		390.5	Mar-2009	390.5	307.7	82.8	212.0
Jul-2009	341.2	244.1	309.4	Apr-2009		396.1	Apr-2009	396.1	309.4	86.8	190.2
Aug-2009	343.0	245.4	311.0	May-2009		421.6	May-2009	421.6	311.0	110.6	170.7
average	333.1	238.3	302.0								
2009 Marketing Year	31.1	-63.7		2009 Pricing Year							
Sep-2009	392.3	294.5	359.6	Jun-2009	433.9		Jun-2009	433.9	359.6	74.3	140.5
Oct-2009	394.5	296.1	361.6	Jul-2009	337.4		Jul-2009	337.4	361.6	-24.2	107.6

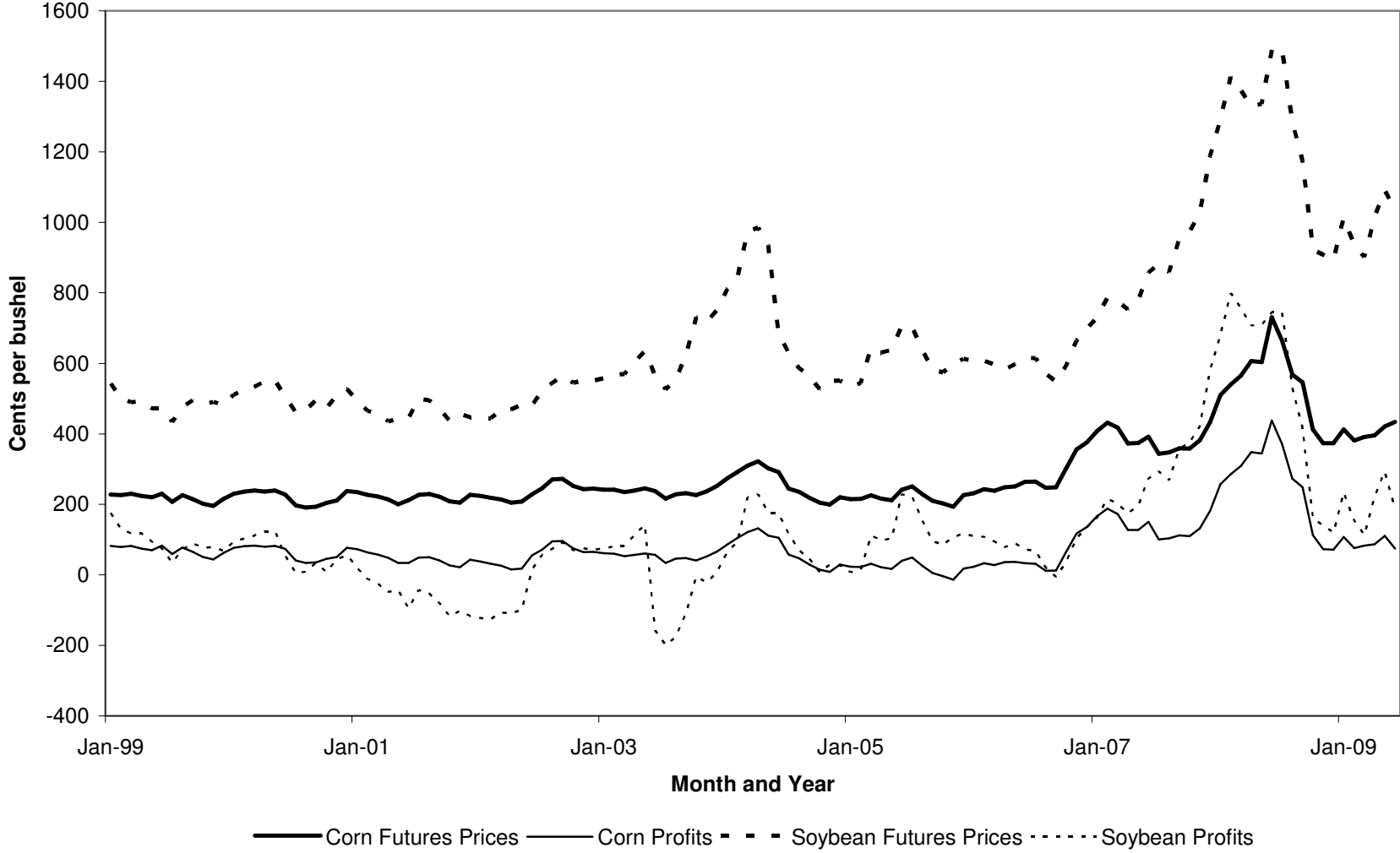
Sources: A1-85 Corn Profitability, Ag Decision Maker, Iowa State University, University Extension; CME Group/Chicago Board of Trade; Iowa Department of Revenue

**Table 5. Calculation of Soybeans Profit Series for June 2007 through July 2009**

Month and Year	Soybeans Breakeven (cents per bushel)			Month and Year	Soybeans Futures Price (cents per bushel)		Month and Year	Price	Breakeven	Profit	12-Month Moving Average
	Renter	Landowner	Mixed		Nov Futures	July Futures					
2007 Marketing Year				2007 Pricing Year			ILII Report				
Sep-2007	657.3	405.6	583.7	Jun-2007	857.3		Jun-2007	857.3	583.7	273.5	108.7
Oct-2007	661.7	408.3	587.6	Jul-2007	881.4		Jul-2007	881.4	587.6	293.8	114.5
Nov-2007	666.0	411.0	591.5	Aug-2007	859.3		Aug-2007	859.3	591.5	267.8	122.0
Dec-2007	670.4	413.7	595.3	Sep-2007	952.7		Sep-2007	952.7	595.3	357.3	130.4
Jan-2008	674.7	416.4	599.2	Oct-2007	974.6		Oct-2007	974.6	599.2	375.4	134.0
Feb-2008	679.1	419.1	603.1	Nov-2007	1,024.4		Nov-2007	1,024.4	603.1	421.4	135.3
Mar-2008	683.4	421.8	606.9	Dec-2007		1,187.0	Dec-2007	1,187.0	606.9	580.0	139.1
Apr-2008	687.8	424.4	610.8	Jan-2008		1,293.0	Jan-2008	1,293.0	610.8	682.2	146.7
May-2008	692.1	427.1	614.7	Feb-2008		1,413.4	Feb-2008	1,413.4	614.7	798.7	154.8
Jun-2008	696.5	429.8	618.5	Mar-2008		1,374.0	Mar-2008	1,374.0	618.5	755.5	166.2
Jul-2008	700.8	432.5	622.4	Apr-2008		1,329.8	Apr-2008	1,329.8	622.4	707.4	184.6
Aug-2008	705.2	435.2	626.3	May-2008		1,336.0	May-2008	1,336.0	626.3	709.7	202.7
2008 Marketing Year				2008 Pricing Year							
Sep-2008	853.5	503.3	744.0	Jun-2008	1,488.9		Jun-2008	1,488.9	744.0	744.9	557.8
Oct-2008	859.1	506.7	749.0	Jul-2008	1,491.9		Jul-2008	1,491.9	749.0	742.9	595.3
Nov-2008	864.8	510.0	753.9	Aug-2008	1,285.0		Aug-2008	1,285.0	753.9	531.1	617.2
Dec-2008	870.4	513.3	758.8	Sep-2008	1,175.1		Sep-2008	1,175.1	758.8	416.3	622.1
Jan-2009	876.1	516.7	763.8	Oct-2008	922.0		Oct-2008	922.0	763.8	158.3	604.0
Feb-2009	881.7	520.0	768.7	Nov-2008	908.0		Nov-2008	908.0	768.7	139.3	580.5
Mar-2009	887.4	523.3	773.6	Dec-2008		893.2	Dec-2008	893.2	773.6	119.6	542.2
Apr-2009	893.0	526.7	778.5	Jan-2009		1,011.9	Jan-2009	1,011.9	778.5	233.4	504.8
May-2009	898.7	530.0	783.5	Feb-2009		936.8	Feb-2009	936.8	783.5	153.4	451.0
Jun-2009	904.3	533.3	788.4	Mar-2009		901.3	Mar-2009	901.3	788.4	112.9	397.4
Jul-2009	910.0	536.7	793.3	Apr-2009		1,014.4	Apr-2009	1,014.4	793.3	221.1	356.9
Aug-2009	915.6	540.0	798.2	May-2009		1,091.0	May-2009	1,091.0	798.2	292.8	322.2
average	884.6	521.7	771.1								
2009 Marketing Year	113.4	-249.5		2009 Pricing Year							
Sep-2009	962.6	610.3	849.9	Jun-2009	1,037.8		Jun-2009	1,037.8	849.9	188.0	275.8
Oct-2009	969.0	614.3	855.5	Jul-2009	929.0		Jul-2009	929.0	855.5	73.5	220.0

Sources: A1-85 Corn Profitability, Ag Decision Maker, Iowa State University, University Extension; CME Group/Chicago Board of Trade; Iowa Department of Revenue

**Figure 6. Corn and Soybean Futures Prices and Estimated Profits**



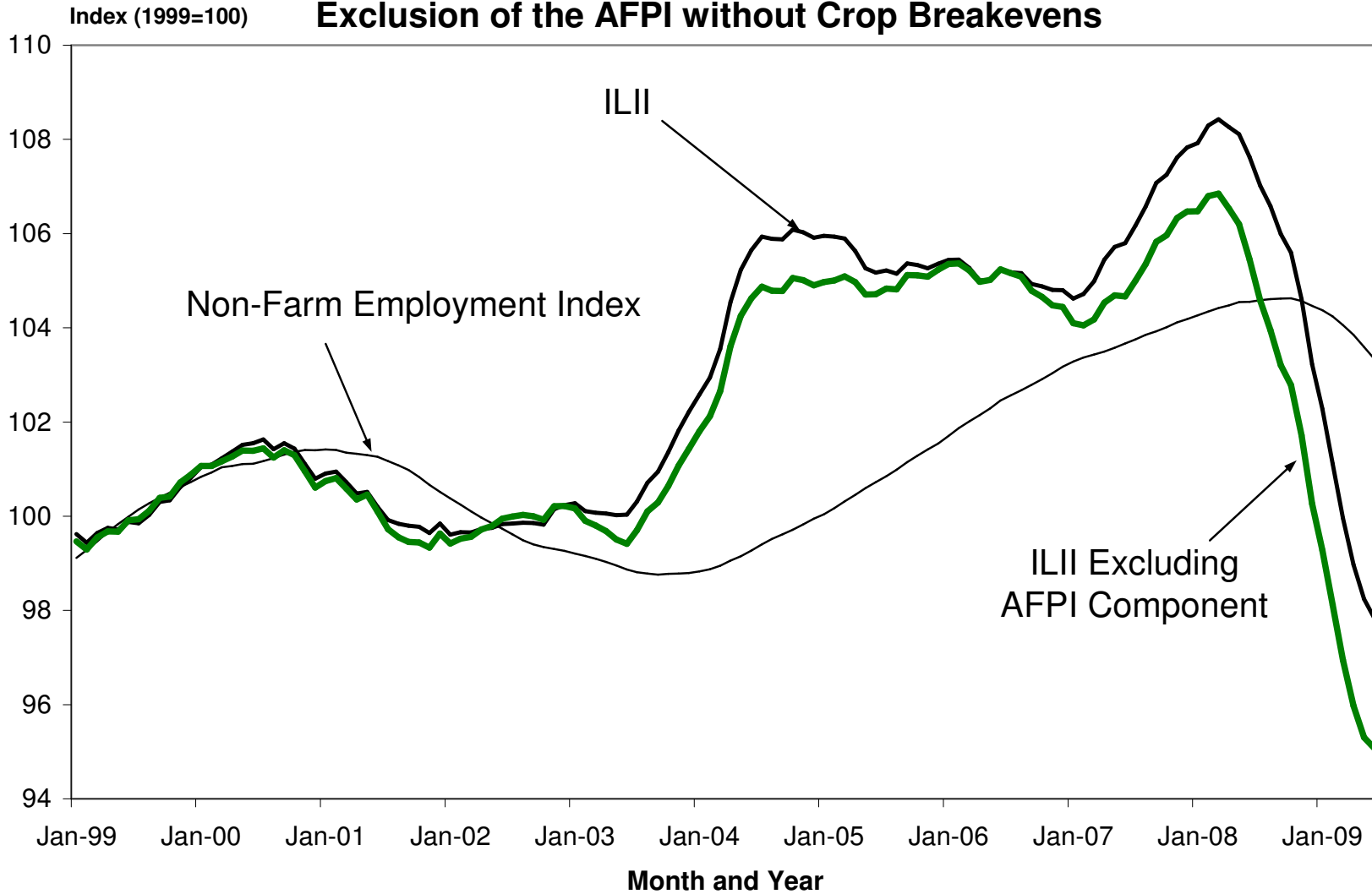


**Table 6. Changes in ILII Standardization Factors Accounting for FY 2009 Data and AFPI Update**

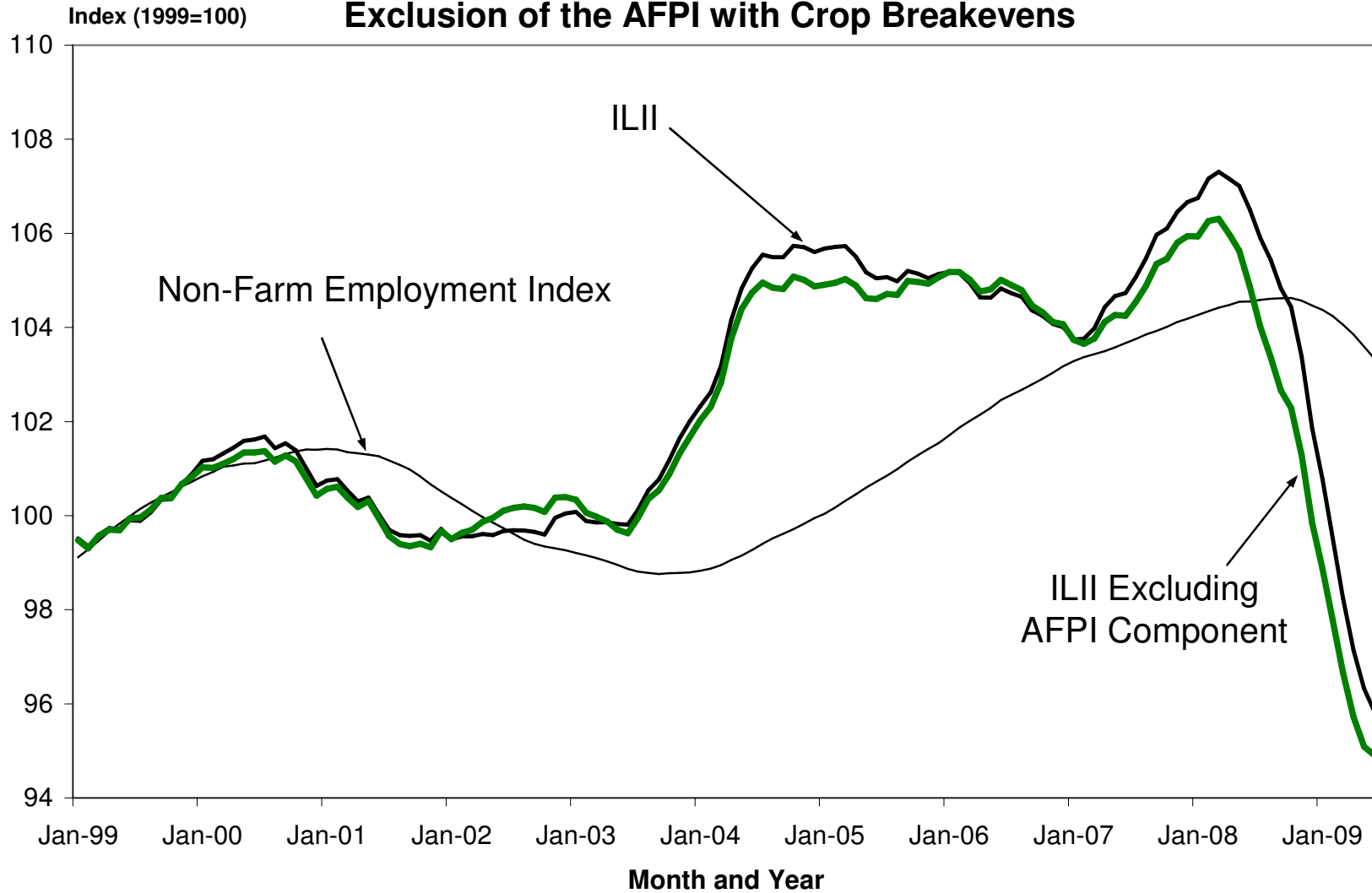
<b>Leading Indicator</b>	Jul-2008 Standard Deviation	Jul-2009 Standard Deviation	Percent Change in Standard Deviation	Jul-2008 Standardization Factor	Rank	Jul-2009 Standardization Factor	Rank	Percent Change in Standardization Factor
Agricultural Futures Price Index	0.548	1.568	186.2%	0.117	4	0.052	6	-55.6%
Iowa Stock Market Index	1.067	1.389	30.1%	0.060	5	0.059	5	-2.4%
Yield Spread	0.269	0.283	5.1%	0.239	2	0.289	2	20.8%
Building Permits	2.297	2.382	3.7%	0.028	8	0.034	7	22.5%
Average Weekly Unemployment Claims	1.984	2.473	24.7%	0.032	7	0.033	8	1.9%
Average Weekly Manufacturing Hours	0.214	0.273	27.6%	0.300	1	0.298	1	-0.5%
New Orders Index	1.158	1.284	10.9%	0.055	6	0.064	4	14.6%
Diesel Fuel Consumption	0.382	0.476	24.6%	0.168	3	0.171	3	1.9%

Each data series considers month-to-month changes over January 1999 to June 2008 for July 2008 values and January 1999 to June 2009 for July 2009 values. For all series except for the yield spread, which is the only national series, the changes are based on 12-month backward moving averages. The yield spread and new orders index changes are simple arithmetic changes; changes for the other six components are computed as symmetric percentage changes.

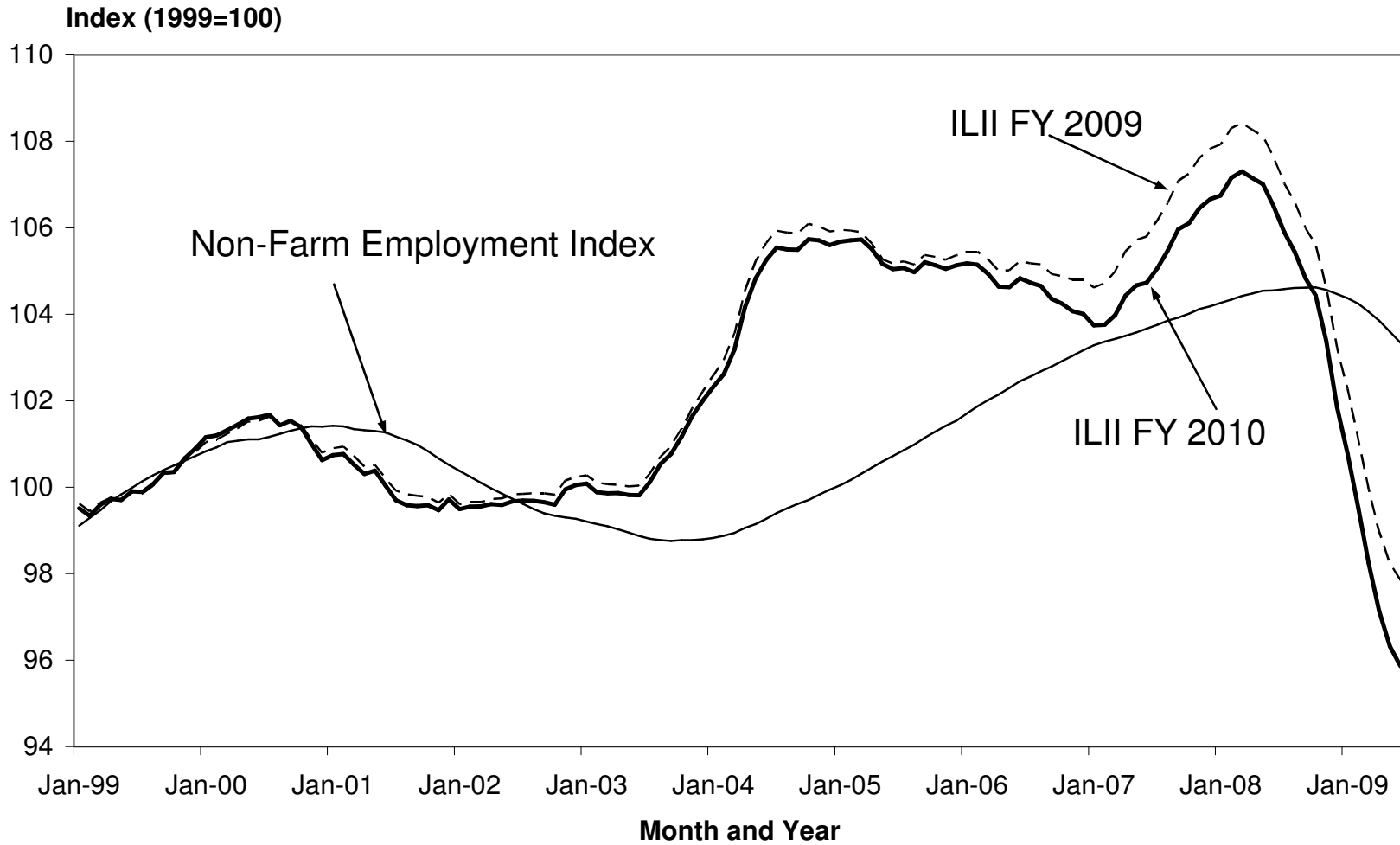
**Figure 7. FY 2009 Iowa Leading Indicators Index Sensitivity to the Exclusion of the AFPI without Crop Breakevens**



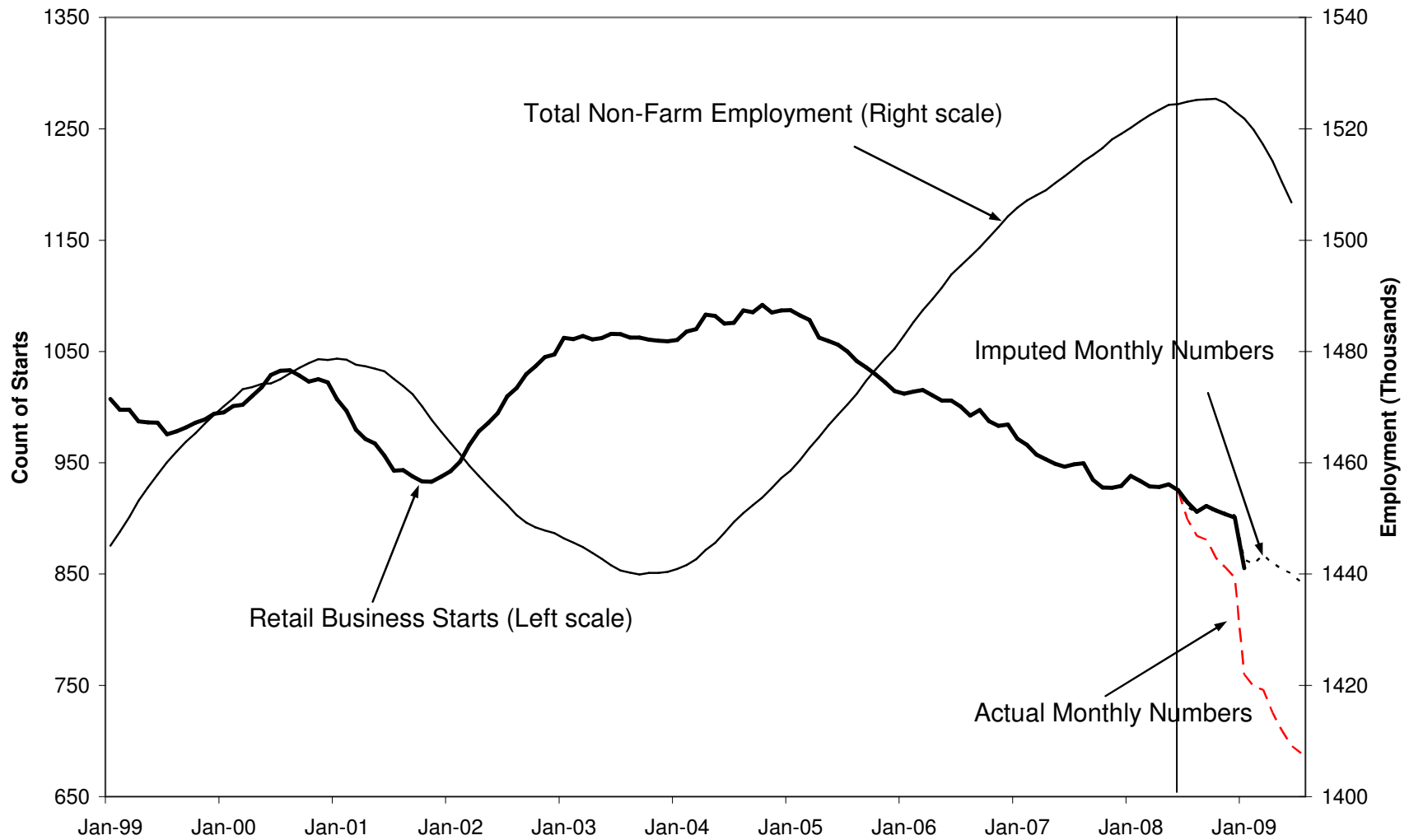
**Figure 8. FY 2010 Iowa Leading Indicators Index Sensitivity to the Exclusion of the AFPI with Crop Breakevens**



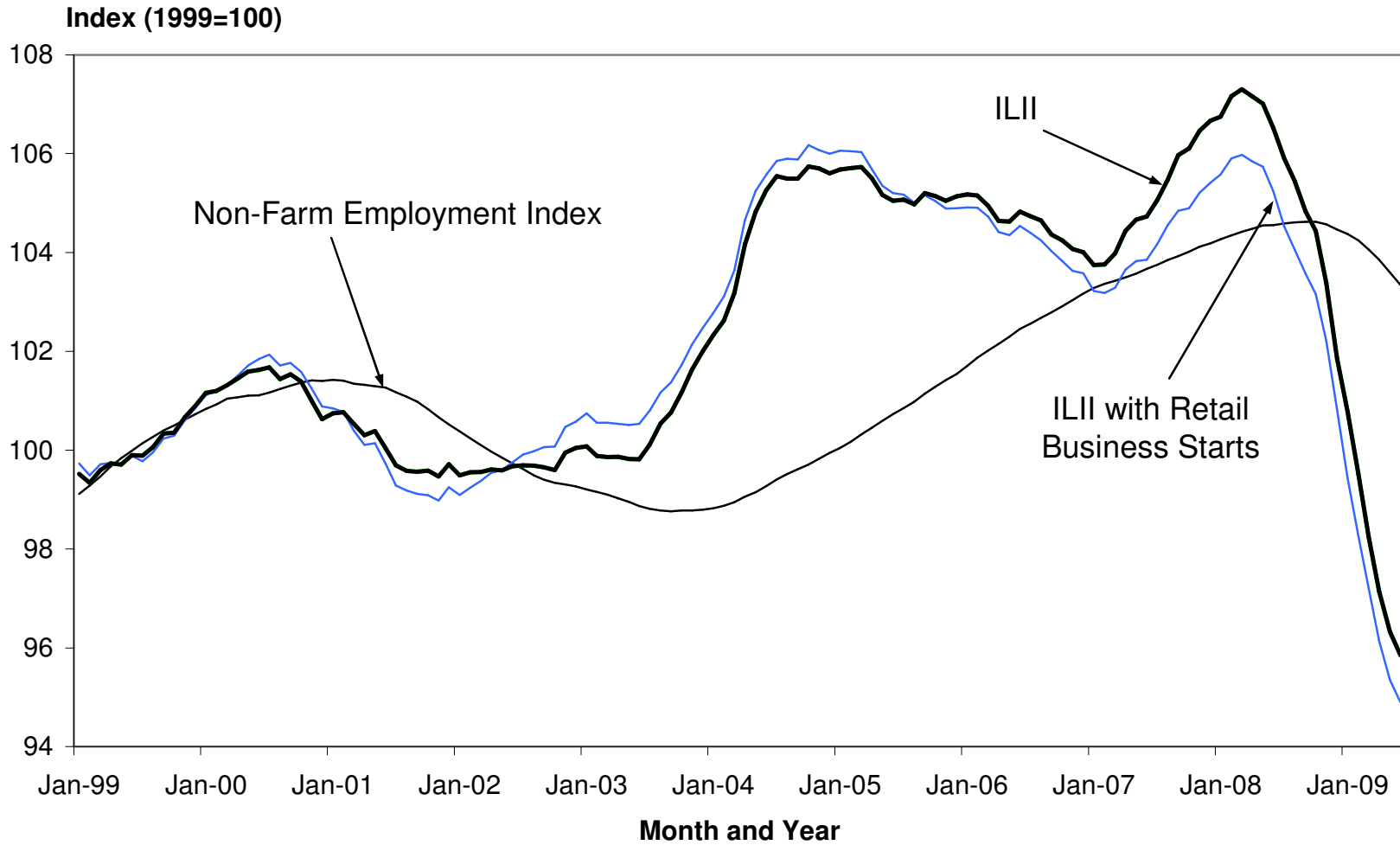
**Figure 9. Comparison of Iowa Leading Indicators Index FY 2009 and FY 2010: January 1999-June 2009**



**Figure 10. Iowa Retail Business Starts and Non-Farm Employment:  
12-Month Moving Averages**



**Figure 11. Impact of Retail Business Starts Component on the Iowa Leading Indicators Index: January 1999-June 2009**



**Table 7. Iowa Leading Indicators Index: Six Month Overview for June 2009  
Prior to the FY 2010 Update**

Monthly Values	2009					
	January	February	March	April	May	June
ILII	102.3	101.1	100.0	99.0	98.2	97.8
Percentage Change <sup>a</sup>	-0.9%	-1.1%	-1.1%	-1.0%	-0.7%	-0.4%
Diffusion Index <sup>b</sup>	18.8	12.5	6.3	12.5	12.5	37.5

Six-Month Values	2009					
	July to January	Aug to February	Sept to March	Oct to April	Nov to May	Dec to June
ILII						
Percentage Change	-4.4%	-5.1%	-5.7%	-6.3%	-6.1%	-5.2%
Annualized Percentage Change	-8.9%	-10.3%	-11.4%	-12.5%	-12.2%	-10.4%
Diffusion Index	18.8	12.5	12.5	0.0	0.0	12.5

Source: Tax Research and Program Analysis Section, Iowa Department of Revenue, produced July 28, 2009.

a. Percentage changes in the ILII do not always equal changes in the level of the ILII due to rounding.

b. A diffusion index measures the proportion of components that are rising based on the actual changes (not the standardized contributions to the ILII). Components experiencing increases greater than 0.05 percent are assigned a value of 1.0, components that experience changes less than an absolute value of 0.05 percent are assigned a value of 0.5, and components experiencing decreases greater than 0.05 percent are assigned a value of 0.0.

**Table 8. Iowa Leading Indicators Index Components: Six Month Overview  
for June 2009 Prior to the FY 2010 Update**

Component Series Monthly Values <sup>a</sup>		2009					
		January	February	March	April	May	June
AFPI <sup>b</sup>	↓ <sup>c</sup>						
Corn (cents per bushel)		533.1	519.9	505.3	487.8	472.7	448.0
Hog Profits (cents per pound)		12.7	12.8	13.3	13.1	11.8	10.7
Soybeans (cents per bushel)		1219.1	1179.4	1140.0	1113.7	1093.3	1055.7
Cattle Profits (cents per pound)		-8.5	-9.2	-9.5	-9.2	-9.2	-9.4
Iowa Stock Market Index (10=1984-86)	↓	57.35	55.00	52.59	50.58	49.36	48.28
Yield Spread (10-year less 3-month)	↑	2.39	2.57	2.60	2.77	3.11	3.54
Building Permits	↑	611	603	582	558	539	545
Average Weekly Unemployment Claims <sup>d</sup>	↓	5,385	5,789	6,273	6,648	6,964	7,114
Average Weekly Manufacturing Hours	↓	39.5	39.2	39.0	38.7	38.5	38.5
New Orders Index (percent)	↑	39.1	37.4	35.2	33.3	32.9	34.6
Diesel Fuel Consumption (mil gallons)	↓	55.25	54.50	53.94	53.65	53.24	52.69

Source: Tax Research and Program Analysis Section, Iowa Department of Revenue, produced July 28, 2009.

a. For all component series except for the yield spread (the only national series) the values represent 12-month backward moving averages.

b. The agricultural futures price index is computed as the sum of the standardized symmetric percent changes in the four series, each weighted by the commodity's annual share of Iowa cash farm income (updated August 15, 2008).

c. Arrows indicate the direction of the series' contribution to the ILII for the latest month.

d. Changes in unemployment claims are inverted when added to the ILII, thus a negative change in the series contributes positively to the index.

**Table 9. Iowa Leading Indicators Index: Six Month Overview for June 2009 After the FY 2010 Update**

Monthly Values	2009					
	January	February	March	April	May	June
ILII	100.8	99.5	98.2	97.1	96.3	95.9
Percentage Change <sup>a</sup>	-1.1%	-1.3%	-1.3%	-1.1%	-0.8%	-0.5%
Diffusion Index <sup>b</sup>	18.8	12.5	6.3	12.5	12.5	37.5

Six-Month Values	2009					
	July to January	Aug to February	Sept to March	Oct to April	Nov to May	Dec to June
ILII						
Percentage Change	-4.8%	-5.6%	-6.3%	-7.0%	-6.8%	-5.9%
Annualized Percentage Change	-9.7%	-11.2%	-12.6%	-14.0%	-13.7%	-11.8%
Diffusion Index	6.3	12.5	12.5	0.0	0.0	12.5

Source: Tax Research and Program Analysis Section, Iowa Department of Revenue, produced August 26, 2009.

a. Percentage changes in the ILII do not always equal changes in the level of the ILII due to rounding.

b. A diffusion index measures the proportion of components that are rising based on the actual changes (not the standardized contributions to the ILII). Components experiencing increases greater than 0.05 percent are assigned a value of 1.0, components that experience changes less than an absolute value of 0.05 percent are assigned a value of 0.5, and components experiencing decreases greater than 0.05 percent are assigned a value of 0.0.

**Table 10. Iowa Leading Indicators Index Components: Six Month Overview for June 2009 After the FY 2010 Update**

Component Series Monthly Values <sup>a</sup>		2009					
		January	February	March	April	May	June
AFPI <sup>b</sup>	↓ <sup>c</sup>						
Corn Profits (cents per bushel)		248.3	230.8	212.0	190.2	170.7	140.5
Soybean Profits (cents per bushel)		504.8	451.0	397.4	356.9	322.2	275.8
Hog Profits (cents per pound)		12.7	12.8	13.3	13.1	11.8	10.7
Cattle Profits (cents per pound)		-8.5	-9.2	-9.5	-9.2	-9.2	-9.4
Iowa Stock Market Index (10=1984-86)	↓	57.84	55.49	53.07	51.06	49.84	48.75
Yield Spread (10-year less 3-month)	↓	2.39	2.57	2.60	2.77	3.11	3.54
Building Permits	↑	611	603	582	558	539	545
Average Weekly Unemployment Claims <sup>d</sup>	↓	5,385	5,789	6,273	6,648	6,964	7,114
Average Weekly Manufacturing Hours	↓	39.5	39.2	39.0	38.7	38.5	38.4
New Orders Index (percent)	↑	39.1	37.4	35.2	33.3	32.9	34.6
Diesel Fuel Consumption (mil gallons)	↓	55.25	54.50	53.94	53.65	53.24	52.69

Source: Tax Research and Program Analysis Section, Iowa Department of Revenue, produced August 26, 2009.

a. For all component series except for the yield spread (the only national series) the values represent 12-month backward moving averages.

b. The agricultural futures price index is computed as the sum of the standardized symmetric percent changes in the four series, each weighted by the commodity's annual share of Iowa cash farm income (updated August 21, 2009).

c. Arrows indicate the direction of the series' contribution to the ILII for the latest month.

d. Changes in unemployment claims are inverted when added to the ILII, thus a negative change in the series contributes positively to the index.



## Appendix A: Computation of the Iowa Leading Indicators Index

The ILII was computed following the five step process presented in the *Business Cycle Indicators Handbook* by The Conference Board.

1. Calculate month-to-month changes for each component. For the components already in percent form (including the yield spread and the new orders index) simple arithmetic differences are calculated. For the other components, a symmetric percent change formula is used because this formula will return the original value if equal positive and negative changes occur in consecutive months.

$$= 200 * (\text{current month value} - \text{last month value}) / (\text{current month value} + \text{last month value})$$

2. Multiply each component's month-to-month changes by the standardization factor.

Standardization factors, the inverse of the standard deviation of the changes in the series normalized across all series to sum to one, equalize the volatility of each component in the index (see Table 4 for the standardization factors currently being used).

3. Add the standardized month-to-month changes across all eight indicators to compute each monthly ILII change.

4. Compute preliminary values of the index using a cumulative symmetric percent change formula. The initial month's value is set to 100, then to compute the cumulative change of the index, each of the index's value is multiplied by the following monthly change:

$$ILII_0 = 100$$

$$ILII_1 = ILII_0 * (200 + \text{month one ILII change}) / (200 - \text{month one ILII change})$$

5. Rebase the index to average 100 in the base year (1999). The preliminary levels are multiplied by 100 and divided by the average preliminary value over the 12 months in 1999.

Because many of the series are subject to a lot of variation, before calculating month-to-month changes all series except the yield spread, the only national series, are smoothed by taking 12-month backward moving averages.

The standardization factors are recalculated and any revisions to historical data (beyond the previous two months) are incorporated annually during the summer.

The Non-Farm Employment Coincident Index is computed following this same method; however, with only one component, steps 2 and 3 are unnecessary.

## **Appendix B: Computation of the Diffusion Index**

A diffusion index measures the proportion of components rising in a given time period. Components experiencing an increase of more than 0.05 percent are assigned a value of 1.0; components experiencing a change in absolute value of 0.05 percent or less are assigned a value of 0.5; components experiencing a decrease of more than 0.05 percent are assigned a value of 0.0. These assigned values are then summed over all of the components. The sum is multiplied by 100 and divided by the number of components. Thus a value below 50 indicates more than half of the components declined in value during the period of interest.

The diffusion index is based on the actual changes in the components, not the standardized contributions used to compute the ILII. A diffusion index is computed for one-month and six-month symmetric percent changes in the components (see Figure B1).

**Figure B1. Iowa Leading Indicators Index One-Month and Six-Month Diffusion Indexes: Jan. 1999-June 2009**

