THE INDIANA ECONOMETRIC MODEL:
2012 Economic Forecast

Michael J. Hicks, Ph.D.
MHICKS@BSU.EDU

A Review of Indiana's Economy

The Hoosier state began 2011 on a strong note, with optimistic forecasts and several months of job growth. However, as gasoline prices quickly rose through the 2nd quarter, the economy slowed and remained sluggish through the summer and early autumn of 2011. Exacerbating the state's economic performance were the slowly recovering labor markets throughout the United States and a tendentious national policy debate. Internationally, fears regarding the solvency of European banks due to concerns over sovereign debt in EU countries combined to stagnate the U.S. economy, which, in turn, slowed net job growth in Indiana. Table 1 provides a review of last year's forecast performance.

The 2012 Forecast

Indiana's economy begins 2012 in a period of ongoing slow growth. While gasoline prices have declined recently, there are continued risks of volatility and higher prices for both petroleum commodities and retail gasoline throughout the coming year. Likewise, sovereign debt risk in EU member nations continues to dampen expectations of future economic growth internationally.

As a consequence, this year offers two forecasts, predicated on differing assumptions about gasoline prices through 2012. We label these the low and high gasoline price forecasts (see Table 2). We assume gasoline prices either decline to $3.00 by early summer or rise to $4.00 by early summer, and then remain at these respective levels through 2012.

These alternative low and high forecast scenarios offer predictions regarding aggregate personal income growth and personal income in ten industrial sectors in the state. Finally, we predict the unemployment rate through 2012 (see Table 3, next page).

Table 1: Evaluation of the 2011 Indiana Forecast

SECTOR	FORECASTED	ACTUAL	ERROR
Personal income	1.4%	1.3%	0.1%
Construction	2.0%	-0.1%	2.1%
FIRE*	1.2%	1.5%	-0.3%
Health care	0.8%	0.9%	0.1%
Manufacturing	1.9%	1.7%	0.2%
Retail	0.9%	0.7%	0.2%
TCPU**	1.8%	0.5%	1.3%
Wholesale trade	1.5%	1.0%	0.5%

 * FIRE: Finance, insurance, and real estate.

** TCPU: Transportation, communications, and public utilities.

Under the more rosy scenario, we forecast personal income to rise by 1.2 percent in Indiana, with stronger growth in construction; retail; wholesale trade; and transportation, communications and public utility sectors. We anticipate continued slow growth in services and health care, while we anticipate declines in personal income in finance, insurance and real estate; state and local government; and manufacturing.

A more austere environment with higher gasoline prices affecting the cost of production and the demand for non-petroleum products and services we expect growth to hover at a paltry 0.5 percent in the state, with declines in personal income affecting finance, insurance and real estate; state and local government; and manufacturing at nearly double the losses experienced under the low gasoline estimate. We see expanded output in transportation, communications and public utilities and in construction as government, businesses and consumers shift their purchases towards higher cost utilities, transportation and construction of information technology.

These two scenarios also have differing effects on the unemployment rate in Indiana, and for different reasons. The unemployment rate under the low gasoline

Table 2: Forecasted 2012 Indiana Sector Growth Per Quarter, Based on Gas Prices

SECTOR	2012 Q1		2012 Q2		2012 Q3		2012 Q4		ANNUAL	
	LOW GAS PRICE ($3.00)	HIGH GAS PRICE ($4.00)	LOW GAS PRICE ($3.00)	HIGH GAS PRICE ($4.00)	LOW GAS PRICE ($3.00)	HIGH GAS PRICE ($4.00)	LOW GAS PRICE ($3.00)	HIGH GAS PRICE ($4.00)	LOW GAS PRICE ($3.00)	HIGH GAS PRICE ($4.00)
Personal income	1.2% ▲	1.2% ▲	1.0% ▲	0.7% ▲	1.1% ▲	0.2% ▲	1.4% ▲	0.0% •	1.2% ▲	0.5% ▲
Construction	3.3% ▲	3.3% ▲	4.1% ▲	3.5% ▲	1.0% ▲	0.9% ▲	2.0% ▲	-7.7% ▼	2.6% ▲	0.0% •
FIRE*	0.8% ▲	0.8% ▲	2.5% ▲	-1.2% ▼	-5.0% ▼	-6.7% ▼	-6.0% ▼	-8.5% ▼	-1.9% ▼	-3.9% ▼
State and local government	1.9% ▲	1.9% ▲	-5.7% ▼	-7.0% ▼	2.4% ▲	0.3% ▲	-2.0% ▼	-4.2% ▼	-0.9% ▼	-2.3% ▼
Health care	2.2% ▲	2.2% ▲	-0.9% ▼	-1.2% ▼	0.8% ▲	0.4% ▲	-1.8% ▼	-1.3% ▼	0.1% ▲	0.1% ▲
Manufacturing	2.0% ▲	2.0% ▲	-0.2% ▼	-0.5% ▼	1.7% ▲	0.5% ▲	-4.5% ▼	-4.6% ▼	-0.3% ▼	-0.7% ▼
Retail	3.8% ▲	3.8% ▲	2.6% ▲	1.3% ▲	-0.5% ▼	-2.1% ▼	-0.8% ▼	-0.6% ▼	1.3% ▲	0.6% ▲
Services	4.4% ▲	4.4% ▲	-0.5% ▼	0.0% •	-0.6% ▼	-0.7% ▼	-0.4% ▼	-1.1% ▼	0.7% ▲	0.7% ▲
TCPU**	7.9% ▲	7.9% ▲	3.3% ▲	2.3% ▲	1.0% ▲	0.6% ▲	-2.5% ▼	-0.7% ▼	2.4% ▲	2.5% ▲
Wholesale trade	5.4% ▲	5.4% ▲	4.3% ▲	4.1% ▲	6.1% ▲	5.4% ▲	4.8% ▲	4.1% ▲	5.1% ▲	4.8% ▲

* FIRE: Finance, insurance, and real estate.   ** TCPU: Transportation, communications, and public utilities.

Table 3: Forecasted 2012 Indiana Quarterly Unemployment Rate*

QUARTER	LOW GAS PRICE ($3.00)	HIGH GAS PRICE ($4.00)
2012 Q1	8.9%	8.9%
2012 Q2	9.1%	9.2%
2012 Q3	8.8%	9.2%
2012 Q4	8.3%	9.3%

* Rate not seasonally adjusted.

price scenario would see Indiana enjoy a lower rate of 8.3 percent by the year's end. However, this rate is boosted by a continued increase in Hoosiers entering the labor force. Under the high gasoline price scenario, we see static or declining labor force, with higher unemployment, resulting in an year's end unemployment rate of 9.5 percent.

In order to estimate the effect on individual metropolitan areas (see Table 4), we follow the same approach. Under the "low gasoline price" scenario, all MSAs except Muncie will see growth. Under the "high gasoline price" scenario, three cities will see declining growth, while all regions will experience lower levels of personal income growth.

How Was This Forecast Made?

These economic predictions are performed through the use of traditional economic models, using data on more than 60 years of economic activity at the federal and state level and more than 50 years of local data.

Initially, I perform a national forecast using a model of the national economy produced by Yale Economist Ray Fair and made publicly available to researchers (the FairModel). This is a well-respected, highly accurate model of the national economy that includes 188 equations and identities that describe the U.S. economy in terms of household and consumer behavior, the behavior of businesses domestically and internationally, financial markets, and governments (domestic and foreign) in matters ranging from marginal tax rates on capital to earnings retain abroad by multi-national corporations.

Once I have derived key variables from this model, I construct a separate model of Indiana's economy, using personal income, personal income by industrial sector and the unemployment rate as a key variables to be predicted. Personal income is the most recently available data at the industry level, and provides a snapshot of the overall employment and earnings pictures in these industries.

The model I use is a derivative of a Vector Autoregression Model, whose developer—Dr. Christopher Sims—received the 2011 Nobel prize in economics. My version of this model predicts quarterly changes to personal income and unemployment rate based upon rates of change, the key national variables derived using the FairModel, and gasoline prices. My model also uses separate equations that capture the unique relationship between the variables I am forecasting.

Table 4: Forecast of Changes to Personal Income by Metropolitan Statistical Area in 2012

METRO AREA	LOW GAS PRICE ($3.00)	HIGH GAS PRICE ($4.00)
Anderson, IN	4.1% ▲	2.5% ▲
Bloomington, IN	5.3% ▲	3.3% ▲
Chicago - Joliet - Naperville, IL - IN - WI	0.6% ▲	-0.6% ▼
Cincinnati - Middletown, OH - KY - IN	4.4% ▲	1.2% ▲
Columbus, IN	3.6% ▲	1.3% ▲
Elkhart - Goshen, IN	1.4% ▲	0.3% ▲
Evansville, IN	4.7% ▲	0.1% ▲
Fort Wayne, IN	4.3% ▲	1.6% ▲
Indianapolis - Carmel, IN	1.9% ▲	1.2% ▲
Kokomo, IN	4.8% ▲	1.4% ▲
Louisville - Jefferson County, KY - IN	3.4% ▲	2.4% ▲
Michigan City - La Porte, IN	4.8% ▲	0.3% ▲
Muncie, IN	-0.8% ▼	-2.9% ▼
South Bend - Mishawaka, IN - MI	3.3% ▲	-1.3% ▼
Terre Haute, IN	3.7% ▲	0.6% ▲

These separate equations (known in economic vernacular as cointegrating equations) provide the key link between such things as personal income and consumption, or earnings and employment.

Finally, I create simulations by altering the price of gasoline through 2012, moving it to $3.00 and $4.00 respectively, and then recalculating the model.

The MSA estimates are performed in a similar fashion, with predictions of Indiana's overall economy in 2012 used to estimate individual city changes to personal income.

A detailed explanation of this modeling process is available in "Forecasting State Level Economic Activity: An Error Correction Model with Exogenous National Structural Forecast Components" *Proceeding of the 101st Annual Conference of the National Tax Association*. 2010.

Michael J. Hicks, Ph.D., is director of the Center of Business and Economic Research at Ball State University and is a professor of economics in the Miller College of Business.

Contact Dr. Hicks at **mhicks@bsu.edu** or visit **www.bsu.edu/cber**.