HSBC Global Research

Asia Macro
Indian Economics

Indian Industrial Production

Introducing our new lead indicator

- **Lead indicator has worked well in the past and incorporates variables such as vehicle sales, credit growth & yield curve**
- **Suggests growth in industrial production will continue to trend gently lower over the next few months**
- **If correct, this will only complicate the task facing the policy authorities as they attempt to get to grips with inflation**

Industrial implosion?

While economic models, driven by fundamental factors, can give a long-term guide as to how economic growth will pan out, lead indicators often provide useful predictors of shorter-term developments. In our work on India over the last couple of years we have focussed largely on the former (see "*Excess Success?*, August 2007 and "*From Miracle to Myth"*, April 2008) but have now been able to develop a decent-looking lead indicator of industrial production growth in the country.

The detailed properties of the model are set out later in this short report, but suffice to say it has provided an excellent guide to the underlying development of India's industrial cycle over the last couple of years, picking up both the upturn in output growth during 2006 and the subsequent downturn from early 2007.

So what is the lead indicator telling us will happen next in India's industrial cycle? In particular, having seen year-on-year production growth move up to 7% in April from 3.9% in the previous month, can we be confident that the cycle has now turned? Unfortunately, this looks unlikely. The indicator suggests that the April data will prove something of a blip, similar to that we have seen several times over the last eighteen months, in what will remain a downward trend.

If this is right, then it supports the message of our more fundamentally driven models. It will also provide a further headache for the government, which must hold a general election by May next year, while not necessarily preventing the Reserve Bank of India from tightening monetary policy further. The RBI is clearly focussed on controlling inflation expectations right now in the context of double-digit wholesale price rises. We are looking for another 100bps of repo and cash reserve ratio hikes by the end of calendar 2008, taking the respective rates up to 9.5% and 9.75%.

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Modelling production

After testing the relevance of a large number of economic variables, we zeroed in on the following as statistically the most useful lead indicators of industrial production growth in India:

- **Commercial vehicle sales:** Companies seeing a change in the demand for their products will quickly need to adjust their requirement for commercial vehicles, assuming of course their goods are physically transported. This will be true of large parts of domestic trade, commerce and exports.
- **Basic goods output**: This is a component of overall industrial growth but often leads the headline series. If final demand is changing then the production of basic/intermediate goods will tend to be adjusted first.
- **Credit and deposit growth:** Credit growth can also provide an early indication of industrial growth developments, given that to produce a particular good the company will often need to borrow from the banking sector. For our purposes, we found that the best indicators were the growth in non-food credit relative to the increase in deposits, as well as the incremental credit/deposit ratio. By including deposits, we effectively gain an indication of the banks' willingness to lend.
- **Yield curve slope (between 10 years and 1 year):** Interestingly, the change in the slope of the yield curve is statistically significant but with a negative coefficient. In other words, a flattening in the curve is often associated with a future pick-up in activity and vice versa for a steepening. While this appears counterintuitive, other empirical studies have reported similar results (see, for example, "*The yield curve as a predictor and emerging economies*", BOFIT Discussion paper 18, 2006) and could come about for several reasons. For example, a flattening of the curve may reflect a decline in the long-term risk premium as a result of structurally lower inflationary expectations which then serves to lower funding costs and boost demand/production. Also, an increase in the availability of overseas funding during the last decade, has effectively freed up domestic funds, some of which is likely to have been used to purchase government bonds. This in turn may have effectively flattened the curve for a given rate of economic growth.
- **OECD industrial lead indicators:** We found that a weighted average of the OECD leading indicator for India's (seven) major export destinations worked well. This is obviously designed to pick up the impact of external developments on India's exports and hence industrial activity.

All of these factors were identified as statistically significant via multiple regression analysis designed to explain the year-on-year percentage change in Indian industrial production since 1998 using monthly data. The variables in our preferred equation are obviously all lagged, albeit to differing degrees (see table 1).

We have shown the sensitivity of India's production growth to a 1% change in each of the six factors in the table. The equation itself satisfies all the standard statistical tests and explains nearly 70% of the variation in what is a very volatile series.

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1. Impact on industrial growth from a 1% change in the explanatory variables

Variables		Impact on industrial production growth (% points)
Relative credit growth (y-o-y)	(lags 1 & 16)	0.33%
Commercial vehicles sales growth (y-o-y)	(lags 3 & 5)	0.04%
Change in yield curve slope (y-o-y)	(lag 8)	-1.2%
Basic goods output growth (y-o-y))	(lag 7)	0.17%
Incremental credit deposit ratio	(lag 7)	0.01%
Change in y-o-y growth in lead indicator of major export destinations	(lag 9)	0.55%

Source: HSBC lead indicator model for industrial production growth

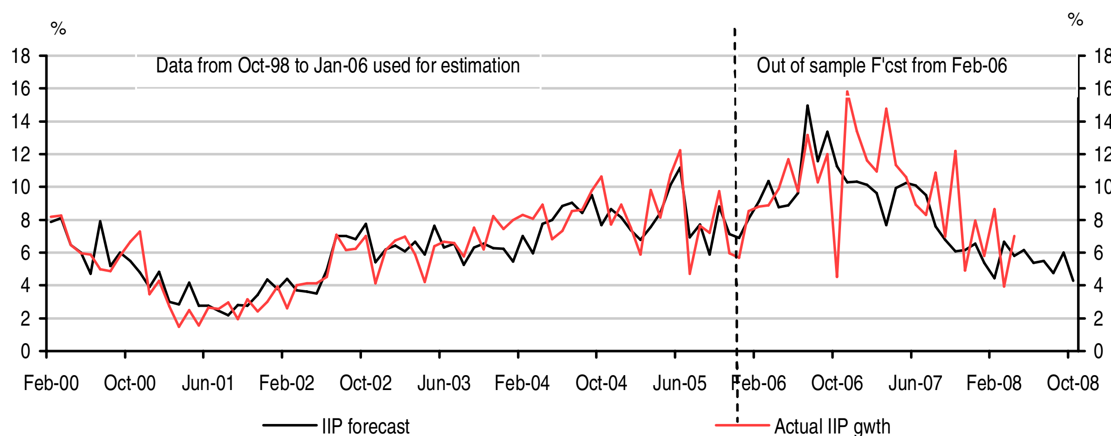
As an indication of how accurate the model has been in the past we ended the estimation in January 2006 and then let it forecast the remaining period, with the results shown in chart 2. Clearly, these so-called "out of sample" projections, while failing to pick up every single blip in the series, have provided an excellent guide to the underlying trend in industrial growth over the last over the last couple of years, both in terms of the upturn through 2006 and the subsequent downturn.

As hinted earlier, the nature of the lead indicator means that we can use it to provide shorter-term forecasts without having to project any, or hardly any, of the explanatory variables, while longer-term forecasts will obviously require us to make some assumptions. More specifically, a one-month ahead projection necessitates no assumptions, while to get a three-month ahead view requires forecasts for one of the eight factors (bearing in mind that there is more than one lag included in the equation for a couple of the variables). A six-month ahead view requires us to make projections for only two of the eight variables involved.

What next?

Chart 2 shows the results of the lead indicator up until October of this year, while we have provided the precise numbers, both in year-on-year terms and as a three-month moving average, in table 3. For the reasons already mentioned, it is probably best to focus on the latter as a means of getting a better idea of the underlying trend. Where necessary, we have assumed that the explanatory variable is unchanged at its last actual value in order to generate the forecasts. Although not perfect, this only involves a couple of variables even to get the October number.

2. The lead indicator has done a good job in predicting India's industrial cycle over the last 2 years



Source: HSBC, CEIC

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3. Industry outlook according to the lead indicator

Industrial Production	April*	May	June	July	August	September	October
% Year-on-Year	7.0	6.2	5.4	5.5	4.8	6.0	4.3
3 month moving average of % y-o-y	6.5	5.7	6.2	5.7	5.2	5.4	5.0

Source: HSBC. * Actual

The lead indicator suggests that the improvement in April industrial production is likely to prove something of an aberration, with output growth lower in May and trending gently down over the next few months.

On this basis, therefore, it looks too early to call the turn in the industrial cycle yet. This certainly fits with the conclusions of our more fundamentally driven GDP growth model, which suggests that it takes 12 to 24 months for the full effects of interest rate changes to be felt in the economy. In other words, there is likely to be more damage to be done to the economy (including the industrial sector) from the rate rises of 2006/07, let alone the renewed phase of monetary tightening currently underway.

Appendix

The following two tables show the breakdown of industrial production in India, indicating the relative importance of the different sectors (broken down in two ways) and how they have performed since the middle of the 2007/08 fiscal year.

4. Three-month moving average of the year-on-year growth in the main components of industrial production

	Weights	Overall industrial prod 1000	Mining 104.73	Manufacturing 793.58	Electricity 101.69
FY08	Oct-07	10.0	8.3	10.6	6.0
	Nov-07	8.0	5.5	8.6	4.9
	Dec-07	8.4	5.5	9.0	4.6
	Jan-08	6.3	4.7	6.7	4.4
	Feb-08	7.6	5.2	8.0	5.8
	Mar-08	6.3	5.1	6.4	5.7
FY09	Apr-08	6.5	7.0	6.7	4.9

Source: HSBC,CEIC

5. Three-month moving average of the year-on-year growth in the "use-based" classification of industrial production

	Weights	Basic goods 355.12	Capital goods 96.87	Intermediate goods 264.39	Consumer goods 283.62
FY08	Oct-07	8.6	24.2	12.6	4.5
	Nov-07	6.1	22.0	9.8	3.5
	Dec-07	5.0	20.9	9.0	6.5
	Jan-08	4.0	14.8	7.0	4.7
	Feb-08	4.7	10.2	7.8	8.9
	Mar-08	4.7	8.0	6.7	6.3
FY09	Apr-08	5.1	11.9	5.5	6.5

Source: HSBC,CEIC

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Disclosure appendix

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