Forging Industry leaders have chosen STEEL PLANT SPECIALITIES as their only supplier of cost saving coatings & lubricants. SINCE 1985.

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- Excessive scaling on ingots, billets
- Quench cracks, scale pits, rejections
- Smoky polluted forge shop
- Fast die wear
- Oily shop floor

SOLUTIONS

- Anti-scale coating
- Low scaling & rejections
- Water based lubricants that increase die life, no pollution
- Die spray system for effective die lubrication
- Oil cleaning liquid
- EP grease for smooth centralised lubrication

Many problems. One solution provider dedicated to increase productivity, reduce costs.

Steel Plant Specialities was established by metallurgists from IIT in 1985. With industrial experience of over 25 years, they manufacture cost saving coatings and lubricants as per customers' forging process requirements.
FOCUS

Issue 1, 2016

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Another year has gone by. Let us welcome the new year with new hopes and aspirations. Let us hope that 2016 will usher in a better and successful year for the forging industry. Let us hope that the next budget brings good tidings for the industry. Let us hope that “achchhe din” means 2016. Let us aspire to lift the Indian forging industry from its slumber. Let us aspire to be known as a country with a quality forging industry.

In the last issue I had mentioned that the industry's directory was in the final round of making. It was indeed so. By the end of January 2016 the new directory should be in your hands.

I like to appeal once again to all of you to contribute articles to the Focus.

Amitabh Chandra
Secretary General
9 January 2016
Outokumpu produces consistently high quality billets, blooms, slabs, and ingots in an industry-leading variety of shapes and grades for use in forging and further processing.

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New Members:

1. **Ambar Auto Engineers Pvt. Ltd., Nashik** - Incorporated in the year 2006, the company manufactures upsetper forgings and machining. The company has a turnover of Rs. 16 crores as on year 2013-14.

2. **Ambar Forge Ltd., Nashik** - The company was established on 29th May, 1998. It is engaged in ferrous and non-ferrous forging. This private limited company has sales turnover of Rs. 1397 lacs in 2014-15.

3. **Kalimata Forging Pvt. Ltd., Kolkata** - Incorporated in 2007, Kalimata Forging Pvt. Ltd. is a leading manufacturer of steel forgings – machined or un-machined products as per IS, BS, & DIN standard and customer drawing & specifications. The list of products include shafts, roller, gear couplings, flanges, blanks, gears, heavy foundation bolt, & tension bar, support roller as sly, hooks, shackles and so forth. The company comprises in-house facility of chemical, physical, impact test, hardness, ultrasonic test, magnaflux test and D.P. test under the supervision of qualified persons. The company is also equipped with latest heat treatment facilities for its products.

4. **SMS Group GmbH, Germany** - Headquartered in Mönchengladbach, Germany, SMS Group GmbH was established in 1872. SMS Meer is a global leader in plant and machine for steelworks and continuous casting technology(long products), tube plants, rolling mills, blacksmith, NE equipment (aluminium and copper), cooling technology and services. Products manufactured include open die forging presses, rail bound manipulators, radial forging machines, closed die forging presses and ring and wheel rolling machines.

5. **Outokumpu India Pvt. Ltd., New Delhi** - The history of Outokumpu traces back to a rich copper ore deposit that was discovered in Eastern Finland in 1910. Over the years Outokumpu, has evolved from a mining and multi-metal company to the global leader in stainless steel. The division in India was incorporated in 2006. The group is a global leader in stainless steel with cold-rolling capacity of 2.6 million tonnes.
TRIBUTE TO LATE BRIJMOHAN LALL MUNJAL:
'HERO' OF INDIA'S TWO-WHEELER INDUSTRY

Brijmohan Lall Munjal (July 1, 1923-November 1, 2015)

Born on 1st July, 1923, in undivided India, Brijmohan Lall Munjal spent his early years in Kamalia, a small tehsil now in Pakistan. His family moved from Lahore to Amritsar prior to Independence. In 1944, Munjal, along with his brothers, set up a new business of trading bicycle components.

The mega milestone in the history of Hero group was the decision to form a joint venture-Hero Honda- with Japan's Honda in 1984. Hero Honda kick-started their journey with the first 100cc motorcycle, that came off the assembly line in 1985. With it came the unforgettable slogan - Fill it, shut it, forget it. In the 90s, Hero Honda had already emerged as the number one manufacturer of motorcycles in India. The partnership with Honda ended in 2011 and the company was renamed as Hero MotoCorp. Although it now competes with Honda, Hero MotoCorp has managed it position as the largest manufacturer of motorcycles in India.

Munjal was amongst the earliest Indian industrialists to implement JIT (Just-in-Time) as well as backward integration and is acknowledged to be a trend-setter in this area. Munjal received, in 2005, the third-highest civilian honour from the Government of India, Padma Bhushan, for his contribution to trade and industry. Besides Hero Group, Munjal held leadership positions in many national associations, such as, Confederation of Indian Industry (CII), Society of Indian Automobile Manufacturers (SIAM), and others and has also served as a member of the Regional Board of the Reserve Bank of India.

In October 2015, BML Munjal featured on Forbes Asia's Indian rich list at 27th position, with his 35 per cent stake in Hero. As a philanthropist, Munjal helped establish numerous medical, educational and infrastructural facilities. His notable contributions include Ludhiana Stock Exchange, Ludhiana Aviation Club, the Ludhiana Management Association and the Dayanand Medical College & Hospital (of which he was the chairman emeritus at the time of his death).

BML Munjal left for his heavenly abode after a brief tryst with illness. He is survived by his wife, Santosh Munjal, three surviving sons and a daughter. In June 2015, he had handed over the baton of Hero MotoCorp to his son Pawan Munjal. He took over as the chairman emeritus and non-executive director.

The year 2015 witnessed the loss of one of India's revolutionary entrepreneurs and trailblazers. His loss would be irreplaceable within India's automobile community.

By Shrabana Mukherjee, Management Trainee, AIFI
Economic Growth

The Indian economy continued to exhibit resilience and the strength of its domestic absorption to register a growth of 7.2 per cent during the first half (H1) of 2015-16. That this has been attained, despite the highly tentative global economic environment that has not shown credible signs of improvement and despite sub-par monsoon rains that for the second year in succession resulted in low growth in agriculture sector, is an encouraging development.

Economic growth, measured in terms of growth in GDP at constant market prices (real GDP), improved from 7.0 per cent in the first quarter (Q1) of 2015-16 to 7.4 per cent in Q2 2015-16. In addition to robust growth, the year thus far has witnessed macro-economic stability aided by favourable factors such as comforting inflation indicators, benign fiscal situation and improving external current account balance. All these have resulted in India emerging as the fastest growing economy among the large economies, and, most agencies have predicted that it will continue to remain so in the medium term.

With the reforms process gathering momentum, along with low inflation which should help in keeping a benign interest rate regime, one can expect the full year growth of real GDP to be in the range of 7 and 7.5 per cent. Growth in consumption expenditure, particularly private final consumption expenditure, has been the major driver of the overall real GDP growth in the last few quarters. Gross fixed capital formation (GFCF) has also contributed to the growth in real GDP. This could be seen in Table 1.

Table 1: Growth of GDP and its components (in percentage)

<table>
<thead>
<tr>
<th></th>
<th>2014-15</th>
<th>2015-16</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Q1</td>
<td>Q2</td>
</tr>
<tr>
<td>Total Consumption</td>
<td>5.3</td>
<td>7.4</td>
</tr>
<tr>
<td>Gross Final Consumption Expenditure (GFCE)</td>
<td>1.6</td>
<td>8.9</td>
</tr>
<tr>
<td>Private Final Consumption Expenditure (PFCE)</td>
<td>6.2</td>
<td>7.1</td>
</tr>
<tr>
<td>Gross Fixed Capital Formation (GFCF)</td>
<td>8.7</td>
<td>3.8</td>
</tr>
<tr>
<td>Exports of Goods and Services</td>
<td>9.1</td>
<td>-2.0</td>
</tr>
<tr>
<td>Imports of Goods and Services</td>
<td>-3.6</td>
<td>1.1</td>
</tr>
<tr>
<td>Gross Domestic Product (GDP)</td>
<td>6.7</td>
<td>8.4</td>
</tr>
</tbody>
</table>

Source: Central Statistics Office
The growth rate of Gross Value Added (GVA) at basic prices for the first half of the current year is also estimated to be 7.2 per cent. At the sectoral level, manufacturing sector has registered robust growth clocking over 7 per cent growth in five of the last six quarters ending Q2 2015-16. The current growth scenario with its sectoral disaggregation is presented in Table 2.

Table 2: Growth in GVA and GDP at constant (2011-12) prices (in per cent)

<table>
<thead>
<tr>
<th>Item</th>
<th>2014-15</th>
<th>2015-16</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Q1</td>
<td>Q2</td>
</tr>
<tr>
<td>Agriculture, forestry &amp; fishing</td>
<td>2.6</td>
<td>2.1</td>
</tr>
<tr>
<td>Mining &amp; quarrying</td>
<td>4.3</td>
<td>1.4</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>8.4</td>
<td>7.9</td>
</tr>
<tr>
<td>Electricity, gas, water supply, etc.</td>
<td>10.1</td>
<td>8.7</td>
</tr>
<tr>
<td>Construction</td>
<td>6.5</td>
<td>8.7</td>
</tr>
<tr>
<td>Trade, hotels, transport, communication</td>
<td>12.1</td>
<td>8.9</td>
</tr>
<tr>
<td>Financial, real estate &amp; professional services</td>
<td>9.3</td>
<td>13.5</td>
</tr>
<tr>
<td>Public administration, defence &amp; others</td>
<td>2.8</td>
<td>7.1</td>
</tr>
<tr>
<td>GVA at Basic Prices</td>
<td>7.4</td>
<td>8.4</td>
</tr>
<tr>
<td>GDP</td>
<td>6.7</td>
<td>8.4</td>
</tr>
</tbody>
</table>

Source: Central Statistics Office

In agriculture and allied sectors, the production of cereals, pulses and oil seeds had declined during the last Rabi season which ended in June 2015. During the current Kharif season, the production of cereals and pulses again contracted by 1.8 per cent and 1.1 per cent respectively, while oilseeds grew by 8.5 per cent. Nonetheless, the livestock products, forestry and fisheries which together constitute more than one-third of the GVA of the agriculture and allied sectors grew by 6 per cent each in Q1 and Q2 2015-16, providing support to raising rural incomes.

In case of mining and quarrying, the major listed mining companies in the private corporate sector grew by 8 per cent and 5.4 per cent respectively at current prices in Q1 and Q2 2015-16. The key constituents of mining sector, namely, production of coal, crude oil and natural gas grew by 0.9 per cent, 1.7 per cent and 0.5 per cent during Q2 2015-16. Coal had grown by 7.3 per cent in Q1 2015-16. The mining sector, thus, needs to gain momentum to keep pace with the increasing requirements of the economy.

Within the manufacturing sector, the factory sector has achieved encouraging results in H1 2015-16. IIP manufacturing registered growth rates of 3.6 per cent and 4.6 per cent respectively during Q1 and Q2 2015-16.
Industry and Infrastructure

The eight core infrastructure supportive industries (coal, electricity, cement, fertilisers, steel, natural gas, refinery products and crude oil), registered a year-on-year growth of 2.3 per cent during April-September, 2015-16 as against a growth of 5.1 per cent during the same period in the previous financial year. The decline is due to the lower growth in electricity, coal and cement sectors and negative growth in steel and natural gas sectors. Refinery products have registered a positive growth, crude oil sector has shown marginal increase in growth and fertiliser sector has shown impressive growth from April to September 2015 as compared to the same period in the previous year.

The use-based classification facilitates further decomposition of the industrial output data. Capital goods and consumer goods sectors performed comparatively better, intermediate goods, basic goods and non-durables segment of consumer goods registered lower growth during April-September 2015-16 as compared to the corresponding period of the previous year. Capital goods segment recovered mainly in the second quarter of 2015-16.

The contributors to the growth of capital goods are commercial vehicles, plastic machinery, transformers (small), earth moving machinery and aluminium conductor. The growth in the intermediate goods segment slowed down to 2.0 per cent in the first half of the current financial year as compared to 2.3 per cent in the corresponding period of previous year. The slow growth in intermediate segment can be mainly attributed to the lower growth in cotton yarn, steel structures and negative growth in fasteners (High Tensile)/Bolts & Nuts, synthetic yarn, furnace oil and bearings (Ball/Roller).

Services

Services sector performance shows a mixed picture. While it is performing well in terms of GVA on the export front the slowdown is more pronounced. The growth rate of services sector during Q1 and Q2 of 2015-16 was at 8.9 per cent and 8.8 per cent respectively compared to 8.7 percent and 10.4 per cent respectively recorded in the same period of previous year. Among the major broad categories of services, the combined growth of ‘trade, hotel, transport, communication & services related to broadcasting’ achieved the highest growth rate at 10.6 per cent during Q2 of 2015-16 followed by financial, real estate & professional services’ with growth rate at 9.7 per cent. But services export growth has slowed down to 2.6 per cent in 2014-15 from 4.0 per cent in 2013-14 and to 1.3 per cent in Q1 2015-16 (it was at 14.2 per cent in 2011-12 and 29.8 per cent in 2010-11).

Prices

High and persistent inflation was a major concern between 2010 and 2013. The secular decline in Whole Price Index (WPI) inflation, which began in 2014-15, continued through 2015-16 (H1), with all three major groups- primary articles, fuel and power and manufactured products contributing to low inflation.

Consumer Price Index (CPI)-based inflation which remained sticky around 9-10 per cent during 2012-14 moderated to 5.9 per cent in 2014-15 and further to 4.6 per cent in 2015-16 (April-October). CPI-based inflation declined to an all-time low of 2.7 per cent in 2015-16 (Q2) mainly due the fall in the prices of cereals within the consumer food basket and vegetables.

There has been significant divergence between CPI and WPI in the last one year. WPI inflation has remained in the negative territory since November 2014, while CPI averaged 4.6 per cent in the same period. The gap between the two indices was as high as 9 percentage points in September 2015.
Money, Banking and Financial Markets

The Reserve Bank of India (RBI) implemented a shift in its monetary policy stance in January, 2015 with a reduction in repo rate by 25 basis points (bps) to 7.75 per cent to control inflationary pressures. This process continued through this financial year and a total reduction by 100 bps was effected through a reduction by 25 bps each on March 4, 2015 and June 2, 2015 and another 50 bps to 6.75 per cent on September 29, 2015. RBI has kept the policy repo rate unchanged at its 5th Bi-monthly statement on December 1, 2015.

As per the 5th Bi-monthly monetary policy statement, the RBI continues to expect inflation in January 2016 to be 5.8 per cent. The statement also noted that the step-up in public capital spending and the easing stance of monetary policy provide the enabling environment for a revival in private investment demand, supported by easing input prices and improving conditions for doing business.

The first half of 2015-16 was marked by negative returns on indices around the world, barring only a few. Nifty recorded a negative growth of 7.2 percent with the index closing at 7883.8 as on November 26, 2015 as compared to 8491.0 as on March 31, 2015 whereas over a one year period from November 28, 2014 it declined by 8.2 percent.

Trade

International trade has been affected in recent years by the global economic slowdown and since the second half of 2014-15, also been affected in value terms by the decline in global commodity prices. India's exports (on customs basis) reached a peak level of US$ 314.4 billion in 2013-14 and decelerated marginally to US$ 310.3 billion in 2014-15, mainly on account of subdued global demand. During 2015-16 (April-November), exports declined by 18.5 per cent on account of subdued global demand coupled with falling commodity prices, particularly crude oil prices. Merchandise imports into India (customs basis) declined in 2013-14 to US$ 450.2 billion partly driven by import restrictions placed then and the sharp depreciation of the rupee. After remaining at about the same level in 2014-15 (US$ 448.0 billion), even after import restrictions were lifted during the course of the year, this year's imports declined by 17.2 per cent to US$ 261.9 billion in 2015-16 (April-November), as against US$ 316.3 billion in the corresponding period of last year.

During 2015-16 (April-November), import of Petroleum, Oil and Lubricants (POL) declined by 42.4 per cent, mainly due to the decline in average crude petroleum oil price from US$ 101.9 per barrel in 2014-15 (April-November) to US$ 52.9 per barrel in 2015-16 (April-November). Non-POL imports also declined by 4.4 percent in 2015-16 (April-November). However, gold and silver imports were US$ 25.4 billion in 2015-16 (April-November) as against US$ 27.8 billion in 2014-15 (April-November). Growth of Non-POL non-gold and silver imports (which reflects the import of capital goods and inputs needed for exports and industrial activity) was at (-) 3.8 per cent in 2015-16 (April-November) reflecting continued weak global demand.

The upshot of the above developments was that during 2015-16 (April-November), trade deficit decreased to US$ 87.5 billion as compared to US$ 102.5 billion in the corresponding period of previous year.

Climate Change

An agreement to combat climate change was agreed by 195 nations on 12th December, 2015 in the 21st Conference of Parties (CoP) to the United Nations Framework Convention on Climate Change (UNFCCC) held in Paris. The Paris Agreement for the first time brings all nations into a common cause based on their historic, current and future responsibilities. The universal agreement’s main aim is to keep the global temperature rise this century well below 2 degrees Celsius and to drive efforts to limit
the temperature increase even further to 1.5 degrees Celsius above pre-industrial levels. Additionally, the agreement aims to strengthen the ability to deal with the impacts of climate change. The Paris Agreement underwrites adequate support to developing nations and establishes a global goal to significantly strengthen adaptation to climate change through support and international cooperation. Governments decided that they will work to define a clear roadmap on augmenting climate finance to USD 100 billion by 2020, while also setting a new goal on the provision of finance from the USD 100 billion floor before 2025.

Social Sector

The Government has adopted a multiprolonged approach by focusing its interventions on human development issues like education, health, sanitation, gender equality and social security in both rural and urban areas. In this context, investments, especially in social infrastructure that build up human capital, are crucial which is evident from the consistent rise in the levels of social sector expenditure by the government (centre+state) in absolute terms. The results of the qtlly quick employment surveys in the selected labour-intensive and export-oriented sectors by the Labour Bureau for the period March, 2015 over March, 2014 shows that the employment at overall level increased by 5.21 million.
The other day I got a call from my friend Imtiaz to inform that he was going on a vacation. I asked him his destination; he said “Istanbul”. I repeated “Istanbul!” only to reassure myself that I had heard him correct. He said, “yes”. Then I remembered that only a few months back my son had visited Peru.

Turkey, Peru, Norway, Iceland, Mongolia and many such countries have emerged as the new destination points for us Indians. No more fashionable are the USA, the UK, Switzerland, Australia, France and Italy. Indians have become more adventurous. May be we have exhausted the traditional tourists spots; may be, we want to do something different. But one thing is certain we want to go out of the country and explore new places.

And that brings to my mind the following English- translated poem of Rabindranath Tagore.

It took me many days, it took me many miles;  
I spent a great fortune, I travelled far and wide,  
To look at all the mountains,  
And all the oceans, too.  
Yet, I did not see, two steps away from home,  
Lying on a single stalk of rice:  
A single drop of dew.

How familiar are we with the innumerable tourists’ spots within the country? How many of us have visited the hills, rivers and the greens of the north-east, which includes the Seven Sisters (Arunachal Pradesh Assam, Manipur, Meghalaya, Mizoram, Nagaland and Tripura) apart from Sikkim? More on this later.

How many of us have visited the place of the famous Battle of Plassey (Palashi village in Murshidabad District, West Bengal)? That battle in 1757, between the forces of the British East India Company and the Nawab of Bengal, Siraj-ud-Daula, aided by the French allies where the latter were defeated, led to the establishment of the British rule in India.

How many of us have explored the forts of Jaisalmer (Rajasthan), the forests of Madhya Pradesh, Tadoba sanctuary and the Glory of Allapalli in Maharashtra, the deserted village of Lakhpat in Gujarat, not to mention places like Chitrakoot, Madhubani and Gonda,

Back to the north-east part of India. There are so many beautiful places for the tourists here; some names we are familiar with, but there are others that we might not even heard of. I can illustrate only a few.

There is the Namdapha National Park in Arunachal Pradesh which is one of the richest areas in biodiversity in the country. How about visiting Tawang situated at an altitude of approximately 10,000 feet; the monastery there is the largest in India and said to be the second largest in the world.

If one is interested in wild life, how can one not visit the Kaziranga National Park in the Golaghat and Nagon districts of Assam? A world heritage site, the park hosts two-thirds of the world’s great one-horned rhinoceroses. It also has the highest density of tigers among protected areas in the world. Equally interesting is Majuli or Majoli, a large river island, with a total area of about 1,250 square kilometres in the Brahmaputra River, and is the largest river island in the Indian subcontinent.

Manipur, with its cascading rapids, tripling rivers, varieties of flowers, exotic blooms and lakes is often referred to as the Switzerland of the East. Keibul Lamjao National Park of the state is the only floating National Park in the world. In the Manipur Zoological Garden apart from various endangered species, one can see the graceful brow antlered deer (Sangai), one of the rarest and endangered species in the world. Then there is the Khwairamband Bazar or Ima Market which is a unique all women's market, having 3,000 or more "Imas" or mothers who run the stalls.
Meghalaya or “the abode of clouds” is the wettest place on earth. The town of Cherrapunji in the Khasi Hills south of capital Shillong holds the world record for most rain in a calendar month, while the village of Mawsynram, near Cherrapunji, holds the record for the most rain in a year. Meghalaya also offers many adventure tourism opportunities in the form of mountaineering, rock climbing, trekking and hiking, and water sports. Meghalaya has some of the thickest primary forests in the country and therefore constitutes one of the most important ecotourism circuits in India. The state has two National Parks and three Wildlife Sanctuaries.

Mizoram offers a wide array of festivals, dances, handicrafts, flora and fauna and natural scenic beauty. The state is rich in bird diversity and has some wild elephants besides a rare variety of the wild water buffalo.

With a pleasant climate almost throughout the year, Nagaland, the land of the warrior Naga clan, has sixteen officially recognized tribes that vary greatly in their customs and traditions. The festivals here revolve around the agricultural cycles and are celebrated with song and dance. It was in Kohima, the state capital, that the Battle of Kohima was fought in 1944 between the combined British and Indian forces on one side and the Japanese on the other. The War Cemetery in Kohima lies on the slopes of Garrison Hill, in what was once the Deputy Commissioner’s tennis court. The epitaph carved on the memorial of the 2nd British Division in the cemetery has become world-famous as the Kohima Epitaph. It reads:

*When you go home, tell them of us and say,
For your tomorrow, we gave our today.*

Tourists like to trek to Dzukou Valley with an altitude of 2438 metres. Kohima also houses India’s largest crucifix (the largest crucifix in the world is in Michigan, USA). Handcrafted baskets of Nagaland using strips of cane and bamboo, are both aesthetically pleasing and useful.

Sikkim is another state with many natural scenic spots. Here you can view the Kangchenjunga, the third highest mountain in the world with an elevation of 8,586 metres. Also on view is the Gurudongmar Lake, one of the highest lakes in the world, located at an altitude of 5,210 metres. Perhaps more picturesque is the Lake Tsongmo or Changu Lake, a glacial lake about 40 kilometres away from Gangtok, the state capital city. Located at 3,780 metres above sea level, the lake is surrounded by mountains which are covered with snow during winter; during summer the snow cover melts and forms the source for the lake. The lake remains frozen in winter season.

Tripura offers plenty of attractions for the tourists in the form of magnificent palaces, splendid rock-cut carvings and stone images, important temples of Hindus and Buddhists including the famous Mata Tripureswari temple (one of the 51 Pithasthans as per Hindu mythology), vast natural as well as artificial lakes, the beautiful hill station of Jampui bordering Mizoram, and wild life sanctuaries at Sepahijala, Gumti, Rowa and Trishna.

That brings us to the main thesis of this article. It is not to promote tourism in the north-east, attractive as it is. Why is it that the foot-loose and well-heeled Indians are reluctant to tour to the lesser visited places of India? Is it pure ignorance that such places exist? Is it lack of interest? Or is it pure snobbery? Why visit Mizoram when one can visit Madrid? Why go to Tripura if one can go to Turkey? Or, Nagaland in place of the Netherlands?

It appears there are essentially three reasons for this. First, not many are aware of places beyond the usual tourist destinations like Delhi, Agra, Jaipur, Kerala and Goa, and of course the religious places. Second, even if one is aware and wants to visit the lesser known but exotic spots, one is not sure how to reach these places. And finally, one always wonders whether minimum comforts, a suitable place to stay and local transport facilities, would be available.

To conclude: as a sequel to “Make in India” can we not have “Travel in India”? 
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E-mail: jagen.zhong@cfms.cn; jagenzhong@outlook.com Skype: forginghammer
How many forging units are there in India and what is the percentage of the large, medium-sized and small units?

Mr. Pasricha: There are 419 units identified in existence, by AIFI, which have been classified into five categories as per their installed capacity, in line with classification criteria followed globally, which is very large, large, medium, small and very small. As is the case the world over, a very high percentage of units around 85% are either small or very small, with only 5% being very large and large units as per the classification criteria, with the balance being medium in size. The very large, large and medium size units though consisting of 15% of units currently in operation contribute 65-70% of the production of forgings produced in India.

How will the government’s thrust on infrastructure help the forging industry?

Mr. Pasricha: The government’s announcement in the union budget 2015-16 to boost infrastructure growth will provide the much needed impetus and hopefully address the urgent need for sustainable infrastructural development in India. The overall economic growth of any country hinges on sustained and continued investments in infrastructure, to meet the requirements of a growing economy, we in India have experienced the implications of a drop in investments in infrastructure, wherein our growth rate dropped from near 9.5% to below 5% over the last 5 years.

Currently the industrial and general sentiment is positive on account of the BJP and its allies getting an absolute majority in the last Lok Sabha elections, and their strong reform announcements made periodically in addition to the direction of reforms, stated during the presentations of both the railway and union budgets. Unfortunately though the on-ground implementation/roll out of the projects/measures announced have been very slow, due to which one gets the impression that industry in general is waiting and watching from the sidelines waiting for progress on environmental clearances on pending projects, land acquisition, taxation and mining reforms. Apart from these, major focus and fund allocations are required for expansion and refurbishment of existing infrastructure. The government must permit expansion of existing ports and power plants within the available land banks without restriction as this would be less damaging than building new facilities both to the people nearby and the aquatic life.

Till such a time that these measures are rolled out with definite timelines, expecting an upswing in investment and the manufacturing would be very optimistic.

Does the industry continue to be labour intensive?

Mr. Pasricha: The industry is and will remain labour intensive. It is estimated that this industry provides direct employment to about 95000 people in the country when compared to global standards. However the scarcity and increasing employment costs in addition to general manufacturing cost increases, enhanced quality requirements have forced the industry to look automation at different levels to remain economically viable. The small-scale units too are investing in simple automation too in an effort to keep their manufacturing costs in control.

This though is not a very good sign for a country with high unemployment as well as under employment, it’s my personal opinion that the medium and small scale sector could sustain economically if they were to be given freedom to take appropriate disciplinary measures.

Have any new technologies been introduced in the Indian forging companies?

Mr. Pasricha: The automotive industry consumes around 70% of the forging produced, the industry has maintained its investment’s towards technology upgradation and in diversification of its product profile, into the non-automotive sector, both for the domestic and international requirements including
Aerospace, Power, Energy, Oil & Gas and Heavy Marine Engine Parts. The organized sector continues efforts to acquire latest technologies with added emphasis on CAD/CAM, simulation, semi-automatic and automatic manufacturing lines and other forms of Computer based technologies to improve productivity to international standards including better yield ratios.

**What is the capacity utilisation of the Indian forging companies?**

**Mr. Pasricha:** The industry’s total production capacity was about 37.7 Lakh in FY 2012-13 (According to the survey conducted by Association of Indian Forging Industry). At present the automotive forgings segment has only 61 per cent of capacity utilisation and further demand could still be met with existing capacities. As far as the industrial applications are concerned, these account for about 39% per cent of the industry and the sector would see fresh capacities kicking in the fiscal 2012-13.

**What is the value of exports?**

**Mr. Pasricha:** India exported forgings valued at around INR 5400 crore. The exports could have been much higher if Europe had not continued to face volume pressures in the automotive sector, and investments in Shale Gas extraction had not slowed to all but a trickle in the US on account of the declining prices of crude.

**Have there been any collaborative ventures with foreign forging companies?**

**Mr. Pasricha:** There have been a few collaborative ventures between Indian and foreign companies, examples is Sona Koyo Steering Systems Ltd. which is the result of a joint venture between the Sona Group and JTEKT Corporation of Japan, Mahindra Forging and CIE Automotive of Spain, also some foreign companies have also invested in manufacturing facilities in India such as Hirschvogel in Chakan Pune and CIE Automotive through the acquisition of Mahindra Forging. Indian forging companies like Amtek Auto, Bharat Forge, Sundaram Fasteners, Mahindra Forging and some others, rather than collaborating with foreign companies, Indian forging companies have been investing in mergers and acquisitions (M&As) overseas primarily in Europe and to some extent in the US.

**What about technology sharing with foreign companies?**

**Mr. Pasricha:** Technology sharing and absorption is primarily through international acquisitions of companies

**How supportive is the Indian government of the forging sector?**

**Mr. Pasricha:** AIFI, has been seeking the creation of an a Technology Upgradation Scheme to enable quicker and more so an economically upgradation of technology within the Industry, primarily for the medium and small scale units, through periodic representations to the Government of India, granting of incentives in line with those given to the exporters of forged products by our neighbouring countries to their forging industry, unfortunately we have had no progress that we are aware on these fronts.

Apart from the above AIFI appreciates the announcement of definite timeline to introduce GST, the scrapping MAT, alignment of gas prices with international prices, improved blue color manpower training through upgradation of the ITI’s, would be welcome measures to boost manufacturing on the whole.

**Which other sectors will add to the growth of the forging industry in India?**

**Mr. Pasricha:** The Indian forging industry is consciously making efforts towards upgrading technologies and diversifying product range to expand its customer base to emerging sectors including aerospace, energy, oil & gas, heavy engine parts, defence, construction equipment, power generation, transmission and distribution.

At the same time the industry is increasingly tapping opportunities arising out of the growing trend among global automotive OEMs to outsource components from manufacturers in low-cost countries. As a
result, the Indian forging industry has been making significant contributions to the country’s growing exports.

How are the low-cost Chinese imports affecting the industry? Is there an anti-dumping duty levied by the government?

Mr. Pasricha: No there is no imposition of Anti-Dumping Duty by the Government of India. However imports from China have been stagnant for some time now on account of the depreciation of the rupee viz the dollar; this could however turn dramatically on account of currency rate fluctuations. The Government has announced a “Make in India” initiative, as the Indian Forging Industry is more than capable of meeting our requirements of forgings, the Government must impose import duties on the import of forgings irrespective of the country of origin.

What is the Association of Indian Forging Industry’s current focus on in order to improve the status of the forging industry?

Mr. Pasricha: The Association of Indian Forging Industry has been the voice of the industry, actively communicating with the government bodies on various issues being faced by its members. AIFI is focused on providing avenues to its members to provide exposure and training on the best of practices being followed internationally towards productivity improvement, by organizing of training programs for middle level management personal upwards through solution providers to the global forging industry.

Recently the Association has proposed to the government that persons scrapping their passenger or commercial vehicles should be eligible replace such vehicles with either zero excise duty or at most 50% of the prevailing excise duty. Scrapping of relatively old vehicles would not only give a fillip to the automotive industry and in turn to the forging industry but also have a positive effect on the environment. The Association has also been constantly raising with the Government to look into two aspects of piped natural gas (PNG) used by the forging industry; first, the price at which PNG is made available should be in tandem with the international price, and second, there should be more than one supplier of PNG in a particular area so that the units have a choice of supplier.

In addition it continues to play its role of representing the industry with various Government and Quassi Government Ministries / Departments.

What is your outlook for the forging industry in the coming years?

Mr. Pasricha: Going forward the outlook definitely looks brighter than the last 5 to 7 years, the Government has announced its intention of revival of investments in Infrastructure, and the methodology that would be used, yes there is slow implementation at the moment, but movement is there. The issues facing the mining industry also are behind us, with the successful completion of the auction of the mines. I would not be surprised if the forging industry sees growth rates of upwards of 10% from FY 16 –17 onwards.
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Abstract

Japanese cold welding technique of electronically overlaying protective carbide layer on metal-forming dies and tools holds promises of increased die & tool life, reduced maintenance downtime, convenience of operation and better productivity.

[This article is an update of a previous one on the same subject which was an introduction to Japanese cold-welding technique.]

Die, mould and tool wear are major reasons for production downtime and increased costs in most industries. Apart from using strong base metals for making dies, a few effective treatments can be administered to dies to increase their service life. Conventional methods to increase the life of dies or repair forging dies include nitriding, PVD (Physical Vapour Deposition) & CVD (Chemical Vapour Deposition), and welding. Usually, conventional welding is a ‘Repair-oriented’ technique carried out after the dies are damaged or worn out.

Japanese cold-welding technique

Now a new Japanese cold-welding technique is available that enables appropriate surface-hardening of dies, moulds and tools to increase their service life. The technique involves electronic coating of tungsten carbide on selective wear-prone areas of dies/ moulds / tools through the special Japanese cold welding technique.

Cold welding is carried out as a ‘Preventive Maintenance’ technique on new dies. It is a surface hardening technique, similar to nitriding and PVD, but is administered using a completely different methodology. Hardness of tungsten carbide layer deposited by cold-welding on dies can surpass nitriding to reach hardness of more than 70 HRC.

Pre-requisites of using this technique are:
1. Accurate history of die life to monitor the increased die life.
2. Correct understanding of wear pattern of dies.

Especially in the case of small to medium automotive forgings, selective areas of dies wear out faster compared with rest of the die. If these areas are protected with carbide coating using Japanese cold-welding technique, the die wear will be delayed, thereby increasing service life of die.

Die wear begins from small, critical areas. Due to wearing out of such small areas, processes like repair welding, grinding or die sinking need to be carried out. These processes require the die to be unloaded from forging press leading to loss of production. If these small, critical areas are protected with carbide coating using Japanese cold-welding technology, die wear can be delayed and its life increased substantially.

Characteristics of carbide coating

1. Wear resistant: Due to inherent strength of tungsten carbide, the wear resistance is high. If the die is hard and heat treated well, a good forging die life can be expected after carbide protective coating.
2. Heat resistant: The coating is heat resistant and will not cause heat checks. Excessive heat leading to die wear will be prevented in protected areas.
3. Scuffing resistant: Scuffing and bruising is the initial stage of having serrations on die. This scuffing will be prevented or substantially delayed.
4. Lubricity: Many times, due to very smooth finish of new dies, the forging / casting die lubricant does not adhere to the die. This problem is not faced in the case of carbide coated dies. It is observed that die can be lubricated better than before.

**Actual Use of the Technique**
The use of the Japanese Cold Welding technique has been studied in a number of Indian Metal forming companies which have tried out carbide coating on wear-prone areas of the dies and tools.

**Shown below are some photographs of carbide-coated dies.**
The table below indicates that there has been substantial increase in die-life after cold-welding:

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Description of die / tool</th>
<th>Metal Forming Equipment</th>
<th>Not coated die life (No of parts formed)</th>
<th>Japanese cold-welded die life (No of parts formed)</th>
<th>Percentage of increase in die life</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Punching tool</td>
<td>220 ton hot forging press</td>
<td>13000</td>
<td>17000</td>
<td>23.5%</td>
</tr>
<tr>
<td>2</td>
<td>Sheet metal pressing die &amp; tool set</td>
<td>Sheet metal press (cold pressing)</td>
<td>18500</td>
<td>25900</td>
<td>40%</td>
</tr>
<tr>
<td>3</td>
<td>Hot forging die</td>
<td>1000 ton hot forging press</td>
<td>4000</td>
<td>5400</td>
<td>35%</td>
</tr>
<tr>
<td>4</td>
<td>Hot forging die</td>
<td>1000 ton hot forging press</td>
<td>8000</td>
<td>12000</td>
<td>58%</td>
</tr>
<tr>
<td>5</td>
<td>Hot forging die</td>
<td>1600 ton hot forging press</td>
<td>10000</td>
<td>15900</td>
<td>62%</td>
</tr>
<tr>
<td>6</td>
<td>Hot forging die</td>
<td>1600 ton hot forging press</td>
<td>10000</td>
<td>22000</td>
<td>120%</td>
</tr>
</tbody>
</table>

Till date, no negative result is observed in any of the trials of this technique carried out in various metal forming operations. Hence, there is absolutely no risk in terms of die/ tool breakage or reduced life. The increase in die and tool life has varied from as low as 14% in initial trials to as high as 120% in the latest trials.

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This study aims to find out the effectiveness of the monetary transmission mechanism, that is, what effect does the change in repo rate by RBI has on the Indian industry. Or in simple terms, whether the interest rate change by the central bank is actually successful in affecting industrial production in the economy. The variables under consideration here are Repo rate and Index of Industrial Production (IIP). The IIP is an indicator which measures the short-term changes in the volume of production of a basket of industrial products with respect to that in a chosen base period.

The recent slashing of repo rate by the Reserve Bank of India (RBI) in the month of September 2015 from 7.25% to 6.75 % (50 basis points) was welcomed by the industry. A repo rate is the rate charged by the RBI on loans given to the commercial banks. This rate in turn influences the interest rate charged by the commercial banks against the loans taken by individuals or business. How does the repo rate affect our economy? A lower repo rate ideally implies a lower cost of borrowing capital. One may therefore expect a boost in private investment, and increase in production. A higher repo rate would have an opposite impact. The impact of increasing/decreasing the repo rate on the real economy is known as the monetary transmission mechanism.

The banking sector of a country is regulated by its monetary authority or the central bank (RBI in case of India) using its monetary policy. It is the policy by which the central bank controls the supply of money in the economy using interest rates or other operations (like printing money) in order to maintain price stability and facilitate higher economic growth. One of the monetary policy tools used by the Reserve Bank of India (RBI) is the Liquidity Adjustment Facility (LAF). It comprises of the repo and reverse repo rates. Repo or repurchase option is a collaterised lending; commercial banks borrow money from Reserve bank of India to meet short term needs by selling securities to RBI with an agreement to repurchase the same at predetermined rate and date. Repo operations therefore inject liquidity into the system. Reverse repo operation is used by the RBI to borrow money from banks by lending securities; the interest rate paid by RBI in this case is the reverse repo rate. Reverse repo operation therefore absorbs liquidity from the system.

The collateral used for both these operations are Government of India securities. The reverse repo rate is linked to the repo rate and it is usually less than the repo rate by 100 basis points. Basis point is a common unit of measure used to denote the percentage change in the value or rate of financial instruments like interest rates or bond yields. One basis point is equivalent to one hundredth of one percentage point). The spread between the repo rate and reverse repo rate is known as the liquidity adjustment facility corridor. Therefore the repo rate has become the key rate determining the monetary policy stance of the RBI.

Monetary Transmission Mechanism
The efficacy of a monetary policy lies in the speed and magnitude with which it achieves its final objectives. With the increasing sophistication of present day financial system, most monetary authorities use indirect instruments like policy interest rates and open market operations instead of rudimentary measures like credit allocation. Adjustment in policy rates (Repo rate in this case) is said to directly affect the short term money market rates or the fuller spectrum of interest rates in the financial system. This in turn affects the lending and deposit rates. The deposit and lending rates influence investment and savings decision of the economic agents eventually affecting aggregate demand and output and inflation.

The monetary transmission mechanism works with a lag which depends on the efficiency of the financial system to transmit its benefit to the targeted section. Monetary policy therefore has limited effects on productive capacity of firms. However, an expansionary monetary policy would boost a firm's ability expand its capacity by increasing credit allocation. According to a RBI report¹, monetary...

policy in India impacts output with a lag of 2-3 quarters with interest channel having the strongest transmission effect.

Traditionally, four key channels of monetary policy transmission are identified, viz., interest rate channel, credit channel, asset price channel and exchange rate channels. Interest rate channel and credit channel are the dominant channels of transmission for emerging market economies like India. The interest rate channel works by impacting the cost of capital. Well-functioning capital market for debts and equities is a prerequisite for interest rate channel transmission. Though India is a bank-dominated economy, in recent years the role of equity and debt markets as sources of financing of economic activities has increased.

The credit channel transmission works through both the bank lending channel (by increasing/decreasing the supply of bank loans) and the balance sheet channel (increases/decreases collateral valuation and net worth of firms, agency costs and affects firms' activity levels through the financial accelerator). In the case of many EMEs, especially where bank-oriented financial systems exist, the credit channel is strong. The share of banks in domestic corporate borrowing has remained high. High-dependence on bank finance makes the bank lending and the balance sheet channels particularly important for monetary transmission.

Impediments to the monetary transmission mechanism

With financial sector reforms and progressive deregulation of the financial sector, interest rate change is being increasingly used as a policy instrument for monetary transmission in India. However the effectiveness remains constrained by a number of factors as discussed below.

Banks in India are required to invest a certain portion of their specified liabilities in government securities and/or maintain a statutory liquidity ratio (SLR). It is used to maintain liquidity in the financial system to meet short term obligations. Till 2012-13 the SLR had been on a higher side. (SLR maintained has been 28% of NDTL whereas prescribed by RBI 23% of NDTL) Data from past decades reveal that as the share of investment by banks in government securities have gone up, the share of credit for investing in the private sector has gone down thereby dampening the effect of monetary transmission. However the SLR has currently gone down to 21.50% thereby creating more room for allocation of funds to the private sector.

Despite the growing reach of the formal banking and non-banking network, informal finance still caters to the financing requirements of the major part of India's population. The recourse to non-institutional sources is relatively high, both in rural and urban areas, particularly by lower income groups. Also, the cost of borrowing from informal/semi-formal sources is significantly higher than that of borrowing from banks. This high cost of borrowing acts as an impediment to the monetary transmission because the benefit is not being passed on equally. This creates a scope for promoting financial inclusion in order to reach out to the people who are in more need of capital than their other privileged counterparts.

On the lending side, banks determine their interest rates with reference to the base rate. While banks are free to decide their base rates, they are required to take into consideration factors like cost of funds, Cash Reserve Ratio (CRR) and Statutory Liquidity Ratio (SLR), overhead cost and a profit margin. The policy repo rate does not directly affect the determination of base rate of banks, except at the margin where wholesale funding is used. Even this role has greatly diminished, since wholesale funding (including borrowing from the Reserve Bank) constitute barely 10 per cent of the total funds raised by banks. This raises a question on the efficiency of the repo rate in acting as a tool of for monetary transmission.

2 Addressing Impediments to Transmission of Monetary Policy, RBI Publication, 2014

3 NDTL Net Demand and Time Liability is the sum of demand and time liabilities (deposits) of banks with public and other banks wherein assets with other banks is subtracted to get net liability of other banks. Deposits of banks are its liability and consist of demand and time deposits of public and other banks.
Statistical Analysis

In the above context a time-series analysis has been carried out to assess the impact of repo rate on the overall Index of Industrial Production. This has been done by running a regression considering the Repo rate as the explanatory or independent variable, and taking the IIP (general) and each of its various sectors as the dependent variables respectively. Data used for this study has been retrieved from Reserve Bank of India-Database of Indian Economy. The time period under consideration stretches from October 2005 to September 2015 with the data in quarterly figures (Q3 2005 to Q2 2015). 2004-05 has been considered as the base year for the indices as per CSO standards.

Our statistical analysis reveals that there is a negative relationship between repo rate and Index of Industrial Production or IIP (General). Further it is found that, one unit fall in the repo rate would lead to 25% increase in the Index of Industrial Production with a lag of two quarters. (Detailed analysis provided in the appendix) This implies that the monetary transmission mechanism in India works with a lag of approximately six months.

Appendix

Time series data is a collection of random variables ordered over time. A time series is said to be stationary if its mean and variance are constant over time and the value of the covariance between the two time periods depends only on the distance or gap or lag between the two time periods and not the actual time at which the covariance is computed. In simpler terms, this is basically eliminating the fluctuations and outliers in the data and helps in building and analyzing models better. This is a prerequisite to carry out any time-series analysis (for example to find a relationship or establish causality) in order to avoid inappropriate results. In this case the variables Repo Rate, IIP (Manufacturing), IIP (Mining & Quarrying), IIP (Electricity) and IIP (General) have undergone a stationarity check. After running the Augmented Dickey Fuller Test, Repo Rate and IIP-Electricity were stationarised at their first difference. IIP-Manufacturing; IIP-Mining & Quarrying and IIP-General were stationarised after taking their second difference. Time series \{x_t\} when converted to its first difference would be \{x_t - x_t-1\} and when converted to second difference \{[x_t - x_t-1] - [x_t-1 - x_t-2]\}.

Table 1: Regression using observations 2006:1-2015:2 (T = 38)

<table>
<thead>
<tr>
<th>Dependent variable: 2nd difference_IIP (General)</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-ratio</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-0.00249758</td>
<td>0.013062</td>
<td>-0.1912</td>
<td>0.84944</td>
</tr>
<tr>
<td>1stdifference_RepoRate</td>
<td>0.0786314</td>
<td>0.162033</td>
<td>0.4853</td>
<td>0.63042</td>
</tr>
</tbody>
</table>

Absolutely no significant result is found. Repo rate does not affect IIP General. Value of t (t-test shows the individual significance of the independent variable) is lower than what it should be ideally. That is computed \(t = 0.4853 < \text{critical } t= 1.69\). Therefore we accept the null hypothesis of the model: “First difference of repo rate does not explain the second difference of IIP (General).”

Although regression analysis deals with the dependence of one variable on other variable(s), it does not necessarily imply causation. In other words, the existence of a relationship between two variables does not prove causality or the direction of influence. If variable (Repo Rate in this case) causes variable IIP General, then changes in Repo rate should precede changes in IIP General. Therefore in a regression of IIP General (including its own past values) if we include past or lagged values of IIP.
General and it significantly improves the prediction of IIP General then we can say Repo Rate (Granger) causes IIP General. Therefore to check whether past values of Repo rate are successful in explaining the IIP General, the Granger causality test is conducted by undertaking the following steps.

1. Current IIP General is regressed on all lagged terms of IIP General. This is a restricted regression.

2. Next regression is run using lagged Repo rate terms. This is an unrestricted regression.

3. Next the overall significance of the model is calculated based on these results. This depends on the number of lagged terms considered (four quarters in this case) and also number of observations (34) and parameters estimated in the regression (8). A test statistic F denoting the overall significance of the model is calculated. It was found that the computed value of F is 2.93 exceeds the critical F value 2.74. Hence the following model 3 holds true.

Table 2: OLS, using observations 2007:1-2015:2 (T = 34)
Dependent variable: d_d_IIP_General (second difference of IIP General)
    d_Repo_Rate (first difference of Repo rate)

<table>
<thead>
<tr>
<th></th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-ratio</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Const</td>
<td>-0.00206465</td>
<td>0.00512522</td>
<td>-0.4028</td>
<td>0.69049</td>
</tr>
<tr>
<td>d_Repo_Rate_1</td>
<td>0.0910723</td>
<td>0.0882881</td>
<td>1.0315</td>
<td>0.31217</td>
</tr>
<tr>
<td>d_Repo_Rate_2</td>
<td>-0.252076</td>
<td>0.109808</td>
<td>-2.2956</td>
<td>0.03036</td>
</tr>
<tr>
<td>d_Repo_Rate_3</td>
<td>0.0345057</td>
<td>0.109974</td>
<td>0.3138</td>
<td>0.75630</td>
</tr>
<tr>
<td>d_Repo_Rate_4</td>
<td>-0.115728</td>
<td>0.0831408</td>
<td>-1.3920</td>
<td>0.17620</td>
</tr>
<tr>
<td>d_d_IIP_General_1</td>
<td>-1.12231</td>
<td>0.196467</td>
<td>-5.7125</td>
<td>&lt;0.00001</td>
</tr>
<tr>
<td>d_d_IIP_General_2</td>
<td>-1.07535</td>
<td>0.193847</td>
<td>-5.5474</td>
<td>&lt;0.00001</td>
</tr>
<tr>
<td>d_d_IIP_General_3</td>
<td>-1.11618</td>
<td>0.199214</td>
<td>-5.6029</td>
<td>&lt;0.00001</td>
</tr>
<tr>
<td>d_d_IIP_General_4</td>
<td>-0.203404</td>
<td>0.199607</td>
<td>-1.0190</td>
<td>0.31795</td>
</tr>
</tbody>
</table>

From the above model we can say that first difference of Repo rate is significantly affecting second difference of IIP (General) with a lag of two quarters. (The individual level of significance test statistic t=2.29 exceeds the critical value of 1.69, absolute values considered). However for the other variables like IIP (Manufacturing), IIP (Electricity) and IIP (Mining and Quarrying) both regression as well as causation results show that Repo rate to be insignificant in affecting all of them.
Forging units occupy a unique position with respect to the energy sector. Forging is both energy-intensive as well as critical to the energy production sector. Forgers are major suppliers to all sectors of the energy market - power generation, oil and gas, pipelines, nuclear reactors, geothermal and wind power. At the same time, most forging work requires to be done at temperatures up to 1260 degrees Celsius (2300 degrees F), followed by heat treatment done at up to 1050 degrees Celsius (1900 degrees F), using oil, natural gas or induction furnaces. Oil is also used as die lubricants. Hence, the fuels and energy sector are an irreplaceable elements of the forging industry.

In the context of the Indian forging industry, energy expenses account for around 12% to 15% of the total cost structure of the forging units. India has been a net importer of crude oil. The country’s dependency on crude oil imports have increased from 99.41 MTs in 2005-06 to 189.24 MTs in 2013-14, which constitutes more than 70% of the total crude oil consumption. Since 2004, India has started importing Liquified Natural Gas (LNG) to meet the rising demand for natural gas. Thus, it necessitates a close look with regard to the price trends of fuels and gas. In this study, crude oil and natural gas prices have been examined.

Objective of the study
The purpose of this study is to determine the existence of any form of causality between the variables under consideration. This study deals with two variables - crude oil prices and natural gas prices. It aims at reviewing the price trends of crude oil and natural gas over the last decade (from 2005-06 to 2014-15). Furthermore, a time-series analysis has been conducted on the two variables. The existence of a relationship between two or more variables does not prove causality or the direction of influence. However, in the cases of time series data, the question of causation poses serious importance. For instance, in this study, the question arises whether crude oil prices determine natural gas prices or whether natural gas prices determine crude oil prices, or both. Hence, it would be difficult to assign one variable as a dependent variable and the other as independent.

Data
Secondary data has been considered for the purpose of this study. The time period under consideration is between 2005-06 and 2014-15. The time-series data for crude oil and natural gas prices have been obtained from the Petroleum Planning and Analysis Cell (PPAC).

Trend
Figure 1 below depicts the trend of the Indian basket of crude oil price for the last ten years. The composition of the Indian basket of crude represents average of Oman & Dubai for sour grades and Brent (Dated) for sweet grade in the ratio of 65:35 (approximately).

Figure 1: Year-wise average price of International Crude Oil (Indian Basket)
Since, at present, oil is traded in US dollars, changes in the value of dollar against other currencies influences OPEC's decision how much oil to produce. When dollar value falls with respect to other currencies, the oil-exporting countries receive lower revenues for their exports. As a result, they produce higher levels of oil to restore their revenue earnings.

There are other reasons which determine international crude oil prices. For instance, the sharp increase in price of crude oil during 2005-06 to 2007-08 was due to the adverse impact of hurricane Katrina on the US refineries. As a result, international oil prices shot up. Rising oil prices and India's dependence on oil imports led to an increase in the rate of inflation to as high as 12.91 per cent in August, 2008.

The ascent in the crude oil price till the first half of 2008 was a result of the significant fall in the supply from the non-OPEC countries since 1973 and an unprecedented surge in global demand. Although Organisation of Petroleum Exporting Countries (OPEC) increased their production, lack of sufficient capacity failed to bridge the gap between demand and supply for crude oil. Moreover, the falling dollar value put pressure on the oil exporting nations as they price their most revenue-earning commodity in dollars. The international crude oil price (Indian basket) reached a peak of USD 142 per barrel in July 2008.

However, the second half of 2008 witnessed a collapse in the oil price primarily due to economic deterioration. One major reason of the fall in the economic growth was the the bankruptcy of Lehman Brothers.

Crude oil prices once again started declining since 2012. International crude oil prices hit its lowest point in the last five years in December, 2014. Four factors have been influencing the present picture. Firstly, demand is low due to slow economic activities, better efficiency and a growing switch away from oil to other fuels. Secondly, Iraq and Libya continue to produce 4 million barrels a day combined, despite their political turmoil. Thirdly, America has started importing much less crude oil after becoming world's largest oil producer. Lastly, Saudi Arabia and its allies decided not to sacrifice their market share and continued to produce at same or higher levels even at a lower price Although they could reduce production but this would reduce their market share benefit their prime foes- Iran and Russia. More importantly, Saudi Arabia is capable of tolerating lower oil price with USD900 billion in reserves. Hence, the crude oil prices are likely to continue to fall in fiscal year 2016. This, in turn, has affected the price of Indian basket as well.

The declining trend in the crude oil prices is encouraging for the Indian economy to some extent. As stated earlier, most of India's imports constitute energy. Hence, a fall in crude oil price would imply a reduction in the current account deficit and hence lower inflation. However, there is another side of the same coin. Declining crude oil prices is likely to have adverse effects on the fortunes of oil exporters. As a result, there is a risk of reduction in remittances from workers abroad. India is the largest recipient of cross-border private remittances. A World Bank report (released on April 15, 2015) estimated that India received USD 70.39 billion in remittances in 2014-15, which constitutes 14.75 per cent of India's total export revenues. 60 per cent of India's total remittances come from the six Gulf Co-operation Council (GCC) countries, such as, Bahrain, Kuwait, Saudi Arabia and the United Arab Emirates (UAE). More alarmingly, this slowdown in the energy sector is predicted to not just be a temporary cyclical downturn, but a more structural slowdown affecting investment.

Figure 2 represents the price trends of natural gas in India from 2005-06 to 2014-15.
Figure 2: Consumer Price of Natural Gas (Off-shore and On-shore)

From the above figure it could be seen that natural gas price have remained quite stable in the last decade, rising more or less steadily. However, the price rose by 57.32 per cent in 2011-12 over 2010-11. This was due to the significant policy changes that were carried out in the USA that influenced the international prices. In May 2010, the administered price of gas was doubled from its previously subsidised level. The policy intention was to provide subsidy on the consumers or end-users rather than the continuation of low-priced gas inputs. As a result of this, price of natural gas in India also shot up. And since then, the natural gas prices have been on a constantly rising trend.

Analysis:
Using the Granger Causality test, it is observed that natural gas price does not influence crude oil price. However, crude oil price influences natural gas prices (see Appendix for the test results and findings).

Coal and crude oil are two major fuels used by the manufacturing sector in India. Natural gas has recently come up as an alternate fuel. Theoretically, crude oil and natural gas are substitutes. Hence, when crude oil prices fall, the fuel-intensive industries are expected to shift to crude oil and its other variants for production. Hence, demand for natural gas must fall. As a result, price of natural gas must decline. The situation reverses when price of crude oil rises. Industries are likely to shift to relatively cheaper option, such as natural gas and other alternate fuels. Price of natural gas must go up.

However, in the Indian scenario, this argument does not seem to hold since 2012-13. It could be seen from Figures 1 and 2 that while crude oil price is falling, natural gas price is going up. The main reason for such a situation is price manipulation by the Government. The introduction of the new gas pricing formula has resulted in a shift from market-determined to government-administered natural gas price. Currently, the domestic gas price is the weighted average price of four global benchmarks — the US-based Henry Hub, Canada-based Alberta gas, the UK-based NBP, and Russian gas.

Before 1987, ONGC and Oil India Ltd fixed gas prices. But from January-end 1987 the government began regulating prices on a cost-plus basis. The last revision under this so-called administered price mechanism was effective July 2005. When the government began bidding out oil and gas blocks under the New Exploration and Licensing Policy (NELP), it opted for market-determined rates for gas. With the expiry of the pricing formula in March 2014, the Cabinet Committee on Economic Affairs approved a new formula based on recommendations of committee headed by C. Rangarajan, Chairman of the Economic Advisory Council to the Prime Minister. Then, the weighted average price at major trading hubs in the UK, the US and Japan was also calculated. Finally, a simple average of the prices of imported LNG and the average international price was calculated. However, due to the Lok Sabha elections in 2014, the implementation of the new formula was deterred. Under the new NDA
government, the gas pricing formula was further revised and a new formula was implemented since October 2014. According to the new formula, domestic prices are a function of the prices of locally produced gas in four key markets of the world: National Balancing Point (UK), Henry Hub (US), Alberta Hub (Canada) and Federal Tariff of the Russian government.

The gas price, under the new guidelines, would be determined as:

\[ P = \frac{V_{HH}P_{HH} + V_{AC}P_{AC} + V_{NB}P_{NB} + V_{R}P_{R}}{V_{HH} + V_{AC} + V_{NB} + V_{R}} \]

Where,

(i) \( V_{HH} \) = Total annual volume of natural gas consumed in USA & Mexico
(ii) \( V_{AC} \) = Total annual volume of natural gas consumed in Canada
(iii) \( V_{NB} \) = Total annual volume of natural gas consumed in European Union (EU) and Former Soviet Union (FSU) countries, excluding Russia
(iv) \( V_{R} \) = Total annual volume of natural gas consumed in Russia.
(v) \( P_{HH} \) and \( P_{NB} \) are the annual average of daily prices at Henry Hub (HH) and National Balancing Point (NBP), respectively, less the transportation and treatment costs
(vi) \( P_{AC} \) and \( P_{R} \) are the annual average of monthly prices at Alberta Hub and Russia (as published by Federal Tariff of the Russian Government or equivalent source) respectively, less the transportation and treatment charges

The price and volume data used for calculation of applicable price shall be the trailing four quarter data with one quarter lag. The first price, therefore, was determined on the basis of price prevailing between 1st July, 2013 and 30th June, 2014. This price would come into effect from 1st November, 2014 and would be valid till 31st March, 2015. A revision of price would be mandatory after every six months so that domestic price of natural gas is at par with the global market price. Since the introduction of this new formula, the natural gas price in the domestic market has been constantly falling. The Government has reduced the price of the locally-produced gas by 18% to USD 3.82 per mmBtu on Gross Calorific Value (GCV) for six months, following a global slide in the commodity prices.

Since the Indian price of natural gas is an average of all of the afore-stated gas prices, prices of natural gas and crude oil have shown a deflection from the theory in the recent years. When the price of crude oil has been falling, price of natural gas in major locations have been rising between 2012-13 and 2014-15. For instance, the natural gas price in Henry Hub (USA & Mexico), Alberta Hub (Canada) and Russia rose between 2012-13 and 2014-15. Only price of natural gas at NBP (UK) has fallen between 2012-13 and 2014-15. When combined together, this led to an increase in natural gas price in India during the same period.

This study reflects that one percent increase (or decrease) in the rate of growth of the growth rate of the crude oil prices leads to an increase (or decrease) in the natural gas prices by a rate of 6.45 percent (as depicted the Table 3 in Appendix).

**Forecasting:**

For the purpose of forecasting, the method of ARIMA modelling is used. In ARIMA modelling, the past values of the variable under consideration are studied. Based on this the future values are predicted. Table 1 below shows the original as well the forecasted values of crude oil prices.
Table 1: Crude Oil Prices (Original vs. Forecasted)

<table>
<thead>
<tr>
<th>Year</th>
<th>Crude Oil Prices (USD/bbl)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005-06</td>
<td>55.72</td>
</tr>
<tr>
<td>2006-07</td>
<td>62.46</td>
</tr>
<tr>
<td>2007-08</td>
<td>79.75</td>
</tr>
<tr>
<td>2008-09</td>
<td>83.57</td>
</tr>
<tr>
<td>2009-10</td>
<td>69.76</td>
</tr>
<tr>
<td>2010-11</td>
<td>85.09</td>
</tr>
<tr>
<td>2011-12</td>
<td>111.89</td>
</tr>
<tr>
<td>2012-13</td>
<td>107.97</td>
</tr>
<tr>
<td>2013-14</td>
<td>105.52</td>
</tr>
<tr>
<td>2014-15</td>
<td>84.20</td>
</tr>
<tr>
<td>2015-16</td>
<td>66.79</td>
</tr>
<tr>
<td>2016-17</td>
<td>54.72</td>
</tr>
<tr>
<td>2017-18</td>
<td>39.91</td>
</tr>
</tbody>
</table>

Similarly, Table 2 displays the original and forecasted values of Natural Gas Prices till 2017-18.

Table 2: Natural Gas Prices (Original vs. Forecasted values)

<table>
<thead>
<tr>
<th>Year</th>
<th>Natural Gas Prices (Rs./000 cubic metres)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005-06</td>
<td>2850</td>
</tr>
<tr>
<td>2006-07</td>
<td>3200</td>
</tr>
<tr>
<td>2007-08</td>
<td>3200</td>
</tr>
<tr>
<td>2008-09</td>
<td>3200</td>
</tr>
<tr>
<td>2009-10</td>
<td>3200</td>
</tr>
<tr>
<td>2010-11</td>
<td>3200</td>
</tr>
<tr>
<td>2011-12</td>
<td>7499</td>
</tr>
<tr>
<td>2012-13</td>
<td>8387</td>
</tr>
<tr>
<td>2013-14</td>
<td>9067</td>
</tr>
<tr>
<td>2014-15</td>
<td>11230</td>
</tr>
<tr>
<td>2015-16</td>
<td>14041.30</td>
</tr>
<tr>
<td>2016-17</td>
<td>16655.15</td>
</tr>
<tr>
<td>2017-18</td>
<td>19575.27</td>
</tr>
</tbody>
</table>
From the above tables, Table 1 and 2, it could be estimated that with regards to absolute values, crude oil price is likely to decline further and natural gas price is likely to increase.

In its recent commodity update of October 2015, the World Bank has further reduced the forecast for international crude oil prices from USD 57 per barrel to USD 52 per barrel. The revised forecast is due to sluggishness in global economic performance, high current oil inventories and anticipation of rise in Iranian oil exports. This is likely to reduce international crude oil prices (Indian basket) as well. Moreover, the forecasts also predict a rise in oil prices 2017-18 onwards. This prediction deviates from the ARIMA forecasts in the study due to its nature of forecasting based on past values.

As discussed earlier, natural gas price in India is determined by the Government. Hence, forecasting natural gas price becomes difficult. According to the reports of the Indian analysts, gas price in India is expected to decline steeply due to the new domestic natural gas pricing formula. Price of gas at Henry Hub, Alberta Hub and NBP started declining in 2015-16. Also, depreciation of rouble would make Russian gas cheaper when measured in dollar values. Together, it would cause the price of natural gas in India to decline. Thus, the discrepancy between the forecasts by analysts and forecasts in this study could be noted. As mentioned in case of crude oil price forecasts, such discrepancy is due to the fact that the forecasts obtained in this study are based on the past values. Since, there is an increasing trend in the previous values of natural gas price the forecasts have also shown an increasing trend. However, considering the changes in the gas pricing formula and other economic factors, an immediate fall in gas prices is more probable.

Although the consumers of CNG and PNG would gain from the lower gas prices, the Indian companies like Oil and Natural Gas Corporation (ONGC) and Oil India Limited (OIL) would suffer a setback due to reduction in revenues from selling. India Ratings and Research estimates that ONGC will see its revenues decline by Rs 10.8 billion-11.5 billion, and OIL by Rs 1.2 billion-1.3 billion. One criticism against the revised natural gas pricing formula is the regarding the decision to peg the price of Indian gas to the afore-mentioned four hubs. Gas prices in Asia are higher. One of the most important issues to do with the price of domestic gas being pegged to global benchmarks is that any gains could be offset by losses on account of the rupee’s movement. Several research agencies say the almost 6 per cent depreciation of the rupee over April-September 2015 will mean the net impact of the fall in the price of gas will actually be significantly lower.

The study concludes a one-way relationship between crude oil price and natural gas price. Crude oil price has shown a fall since 2012-13. Natural gas price, on the other hand, is showing a steady rise. Based on the past time-series data, forecasts of crude oil price show a further dip, whereas, natural gas price forecasts shows a further increase in prices.

But, such a negative relationship between the two prices is only temporary. In 2015-16, the price of natural gas in major international locations (including Henry Hub, Alberta Hub and Russia) has started falling. Natural gas price, in India, has also started to decline as a result. Thus, both prices of crude oil and natural gas are moving in the same direction at present.

Appendix

Typically, regression analysis deals with the dependence of one variable on other variables. However, regression does not necessarily imply causation.

Also there is a popular thumb rule to be followed in time series analysis - stationarity before causality. Empirical work based on time-series assumes that the data considered are stationary. If a time series is stationary, it means that the mean, variance and auto-covariance remain the same no matter at what
point we measure them, that is, they are time invariant. In other words, such time-series will tend to
return to its mean and the fluctuations around the mean value (or, variance) would have broadly
constant amplitude. Hence, irrespective of whether the period of study is 1990-2000 or 2001-2014, the
mean and variance would remain the same. If a time-series is not stationary, in the sense, just defined,
it is called non-stationary time series. The concept of stationarity is crucial because if a time series is
non-stationary, one could study its behaviour only for a particular period of time. It would not be
possible to generalize it to other time periods and forecasting would make no sense.

For the purpose of checking for stationarity, the Augmented Dicky-Fuller test is conducted. The test
results reveal that both the variables, namely crude oil prices and natural gas prices, are both non-
stationary. Hence, the variables are to be stationarised for further analysis.

One method to stationarise non-stationary time series data is to apply difference stationary. The
difference values of a variable smoothen out the fluctuation in the variable. First difference values of a
time series variable is computed by subtracting the value at one time period from the value in the
previous time period. That is, for a variable $Y_t$, first differences ($d_Yt$) would be computed as,
$$d_Yt = Y_t - Y_{t-1}$$
Second difference ($d_d_Yt$) is computed as,
$$d_d_Yt = d_Yt - d_{Yt-1}$$
Similarly, third difference ($d_d_d_Yt$) is computed as,
$$d_d_d_Yt = d_d_Yt - d_{d_Yt-1}$$
In econometrics analysis, computation of more than third difference is very rarely necessary.

The variable 'crude oil prices' is third difference stationary. Third difference stationary implies rate of
growth of the growth rate between two data points. The second variable 'natural gas prices' is second
difference stationary. Second difference stationary implies growth rate between two data points.

The stationarised variables could be used to check for existence of causality. Existence of causality is
studied by applying the Granger Causality Test. This test could result into one of the following
conclusions:

(i) Unilateral Causality: This would imply that either crude oil prices is influences natural gas
prices or natural gas prices is influences crude oil prices.

(ii) Bilateral Causality: This implies that both are Granger-causes the other.

(iii) Independence: This implies that neither crude oil prices is influenced by the natural gas prices
nor the natural gas prices is influenced by the crude oil prices.

Next, regression is run, using ordinary least squares (OLS) method to find the extent of the influence of
crude oil price on natural gas price. This is depicted in the following table.
The test results depict that one per cent change in the rate of growth of growth rate of crude oil prices changes the growth rate of natural gas prices by 6.45 per cent. The positive sign implies a direct relationship that is both the prices are likely to move in the same direction.
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S&S: Could you please tell us about your childhood?
Mr. Ranbir Singh (RS): I was born in Bundala in Jalandhar, Punjab. I have completed my schooling from New Public School in Phagwara, Punjab. Post school, I pursued engineering from Ramgharia College of Engineering in Phagwara, Punjab.

S&S: What are your hobbies?
RS: My hobbies include golf and flying.

S&S: If not forging, what would have been your other career options?
RS: I would have aimed to be an airline pilot or Indian Air Force pilot.

S&S: What management/entrepreneurial tips did you learn from your father and your grandfather?
RS: I have imbibed family values, business ethics and discipline from my father and my grandfather.

S&S: What has been your biggest challenge and achievement in your career till now?
RS: I have been successfully able to implement cost reductions, product improvement and new business development techniques in my company.

S&S: What does “GNA” stand for?
RS: Guru Nanak Auto Engineering & Foundry Works was originally founded 69 years ago, in 1946, by my grandfather, Late S. Amar Singh. Later on different family-owned businesses were abbreviated as GNA.

S&S: What are the strategic reasons behind choosing this particular location for your company?
RS: The Company was founded by my grandfather, Late S. Amar Singh, in our native districts of Jalandhar & Hoshiarpur in Punjab. From these places we cater our customers all over India and worldwide.

S&S: What forging products does GNA Axles specialise in?
RS: GNA Axles specialises in rear axle shafts, shafts, hollow spindles & steel forgings.

S&S: What are the raw materials and fuels used in the forging process in your company?
RS: Under raw materials, our company uses micro-alloyed, carbon, low and high alloy steels. We mainly use electricity as heating medium in forging process.
S&S: What products does your company export? Which are the export destinations?
RS: Products exported are Rear Axle Shafts, Hollow Spindles & Shafts to Countries such as, USA, Mexico, Brazil, Italy, Sweden, Germany, Spain, Turkey, China, Japan and Australia.

S&S: From where do you import your raw materials? (if any)
RS: We don’t import raw material, all material used are sourced and manufactured in India.

S&S: Does GNA Axles intend to venture in new areas in the near future?
RS: We aspire to manufacture components for speciality vehicles, heavy construction equipment and components related to defence applications.

S&S: What distinctive practices does GNA Axles Ltd. follow to motivate its employees?
RS: We motivate our employees through team work and empowerment.

S&S: How do you retain your employees?
RS: We follow better recruitment policies to retain our employees. Moreover, 95% of our employees are hired within 15 kms of the factory.

S&S: What are your views on the technological upgradation within the forging industry?
RS: People invent to improve the technology. Without technological improvement, competitiveness would not be possible for new businesses and export purposes.

S&S: Do you think the Association has evenly reached out to the other regions of India?
RS: I believe except the Eastern region, the remaining regions (North, South, West and Central) have been successfully reached out by the Association. The members in these regions are very active.

S&S: How can the Association be more useful to the smaller forging units?
RS: By providing training programmes, the Association could benefit the smaller forging units.

S&S: What support do you expect from the Government of India, for the betterment of the forging industry, as the President of AIFI?
RS: The existing structure of duty drawback does not differentiate between forging units located near a port like Mumbai and those located far away at say, Ludhiana. A unit of Ludhiana while exporting from Mumbai port has to incur additional transport cost compared to a unit at Pune. The problem is further aggravated by the imposition of service tax at each state boundary. The government may devise a system of duty drawback where the rate can be directly related to the distance covered by the exported item. Likewise, such exports should not be subjected to multiple layers of payment of service tax to different state authorizes.
# KEY ECONOMIC INDICATORS

## Macroeconomic Indicators (July-September, 2015)

<table>
<thead>
<tr>
<th>Indicator</th>
<th>In Rupees Billion (at 2011-12 Prices)</th>
<th>Q-o-Q Growth (%) (2015-16 Q2 on 2014-15 Q2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross Domestic Product (GDP)</td>
<td>27,570</td>
<td>7.4</td>
</tr>
<tr>
<td>Current Account Deficit (CAD)</td>
<td>-535*</td>
<td>-19.30*</td>
</tr>
<tr>
<td>Foreign Investment</td>
<td>8</td>
<td>-99.33</td>
</tr>
</tbody>
</table>

*Negative sign indicates Current Account Surplus*

## Macroeconomic Indicators (Base: 2012=100)

<table>
<thead>
<tr>
<th>Indicator</th>
<th>M-o-M Growth (%) (October 2015-16 on October 2014-15)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumer Price Index (CPI)</td>
<td>5.00</td>
</tr>
<tr>
<td>Wholesale Price Index (WPI)</td>
<td>-3.81</td>
</tr>
<tr>
<td>Index of Industrial Production (IIP)</td>
<td>9.8</td>
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</table>

## Core Sectors

<table>
<thead>
<tr>
<th>Sector</th>
<th>Q-o-Q Growth (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture, forestry &amp; fishery</td>
<td>2.2</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>9.3</td>
</tr>
<tr>
<td>Mining &amp; quarrying</td>
<td>3.2</td>
</tr>
<tr>
<td>Electricity, Gas, Water supply and other utility services</td>
<td>6.7</td>
</tr>
<tr>
<td>Services</td>
<td>8.9</td>
</tr>
</tbody>
</table>

## Items

<table>
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<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Minerals &amp; Metals</td>
<td>Iron ore 140</td>
<td>2.94</td>
</tr>
<tr>
<td></td>
<td>Coal 544.45</td>
<td>-3.76</td>
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<tr>
<td></td>
<td>Finished Steel 91.46</td>
<td>4.32</td>
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<tr>
<td>Major Crops</td>
<td>Wheat 95.76</td>
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<tr>
<td></td>
<td>Rice 102.56</td>
<td>-3.85</td>
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<td></td>
<td>Pulses 17.38</td>
<td>-13.8</td>
</tr>
<tr>
<td></td>
<td>Oilseeds 19.66</td>
<td>-0.8</td>
</tr>
</tbody>
</table>

Source: Central Statistical Organisation (CSO), Government of India.
UPCOMING EVENTS

The 6th Asiaforge Meeting (AFM) will be held in Chiba-city, Japan during 7th November and 10th November, 2016. The host of the upcoming edition of AFM is Japan Forging Association.

Asiaforge is an organization established in April 2005 by Japan Forging Association, Confederation of Chinese Metalforming Industry, Association of Indian Forging Industry, Taiwan Forging Association and Korea Forging Industry Co-operative, in order to deepen their partnership in the forging industry throughout Asia.

The registration starts from April 2016 (to be posted on the official website). The registration fee is JPY 65,000 per person (inclusive of taxes) and includes participation to the meeting, meeting materials, attendance to welcome party and other provisions of the meeting.

For further details related to registration, sponsorship and exhibition, kindly visit the official website- www.afm2016.com or contact AIFI at info@indianforging.org.

NEWS UPDATE

Leading forging company Bharat Forge plans to set up an integrated auto components hub in Nellore at an investment of around Rs. 1,200 crore. The firm signed an Memorandum of Understanding (MoU) with the Government of Andhra Pradesh at the inaugural of the three-day CII Partnership Summit and Sunrise AP Investment Meet. This will generate employment for around 3,000 people directly and almost similar number of people indirectly according to Bharat Forge Chairman Baba Kalyani. Mr. Kalyani, who is also the chairman of CII National Committee on Defence, said another MoU had also been signed with the State to set up a multi-modal facility for industrial components, defence and aerospace components including a supply chain and this will be located in Anantapur district. With the locations already finalized Bharat Forge is planning to start their work by next few weeks.
The second meeting of the Managing Committee for the year 2015-16 took place on 18th December, 2015 in Hyderabad. For the 6th Asiaforge Meeting, being held during 7th November and 10th November, 2016 in Japan, it was decided that the Association would request for presenting three papers by the Indian companies:

1. Automotive Research Association of India (ARAI), Pune
2. Hirschvogel Components India Pvt. Ltd., Pune
3. Super Auto Forge Ltd., Chennai

Northern Region Meeting was held on 20th November, 2015 in Ludhiana, Punjab.

Central Region Meeting was held on 18th December, 2015 in Hyderabad, Telengana.

During the period October-December 2015 held in Pune, Western Region Meetings were held on 30th October, 27th November and 23rd December.
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2nd Managing Committee Meeting & Central Region Meeting (18.12.2015)

Western Region Meeting
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<table>
<thead>
<tr>
<th>(Die Blocks-Hardness upto 430 BHN)</th>
<th>Hollow Forged Blocks</th>
<th>Profile Blocks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Die Holders  ●  Cassette  ●  Anvil Blocks  ●  Bolsters  ●  RAM  ●  Piston Rods</td>
<td>Casting &amp; Forging Machinery Part - Capacity Up to 150 Metric Tonnes</td>
<td></td>
</tr>
</tbody>
</table>

Die Blocks  Forging  Casting /Machining

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