Emerging Markets Research
17 September 2015

China

Alternative activity indicators

- As China is experiencing a structural slowdown and cyclical headwinds, many activity indicators have dropped more dramatically than China's official GDP, leading to intensified market scepticism of the GDP data.
- In our recent *Global Macro Survey*, the vast majority of clients believe the official Chinese growth data are overstated; of that majority, more than 60% think the GDP overstatement may be 2pp or more.
- Using a model-based approach based on monthly data releases, we estimate that economic activity started to deviate from the official headline GDP numbers in early 2014 with the gap ranging from 50-150bp.
- Based on historical correlations, China's latest economic activity growth may have only been 5.5-5.6% y/y in Q1-Q2 2015, compared with official GDP growth of 7.0%.
- We forecast H2 GDP to be 6.1-6.2% y/y, slowing further from H1 2015. Consequently, we recently lowered our 2015 GDP growth forecast to 6.6% y/y (from 6.8%) and our 2016 forecast to 6.0% (from 6.6%).
- We continue to look for more fiscal and monetary easing in the coming months, though we do not expect that to change the economy's structural softening trend.

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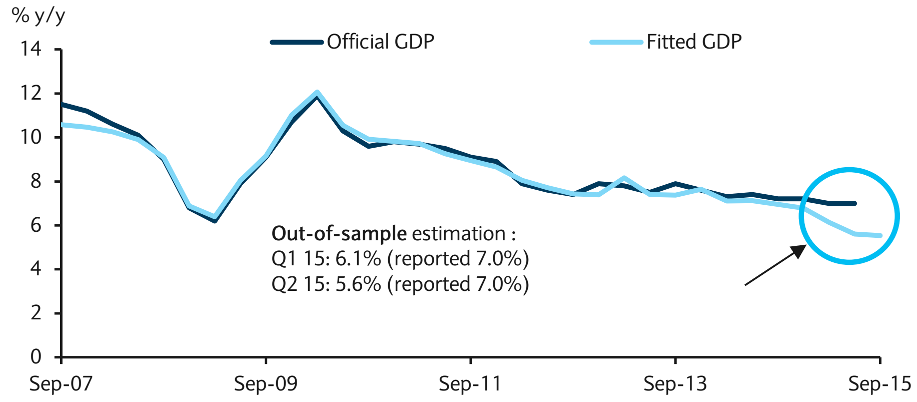
FIGURE 1

Official and model-implied underlying growth



Source: Wind, Barclays Research

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How slow is the slow down?

China's slowing economy raises concerns about official GDP growth…

China's official GDP data have long been viewed in the market as being an inadequate indicator of economic activity. While the quality of the GDP series produced by the National Bureau of Statistics (NBS), starting from a very low quality base, has improved, this has happened only gradually (see Box 1). Scepticism of the GDP data was such a given and so pervasive that Li Keqiang, the current Premier, reportedly said in 2007 that he uses the NBS GDP series "for reference only" and instead focused on alternative activity indicators.

The lack of market confidence in China's official GDP data has come into more focus recently as economic activity has clearly slowed, due to strong headwinds from a structural shift away from investment-led growth as well as challenging cyclical conditions. In our recent *Global Macro Survey: Bearish on China*, 15 September 2015, the vast majority of clients believe that the official Chinese growth data are overstated; of those, more than 60% think the GDP overstatement may be 2pp or more. Even though consumption and service-sector data continue to hold up well, as one would expect amid China's growth rebalancing, clearly investors do not feel that the official numbers capture the depth of the current slowdown.

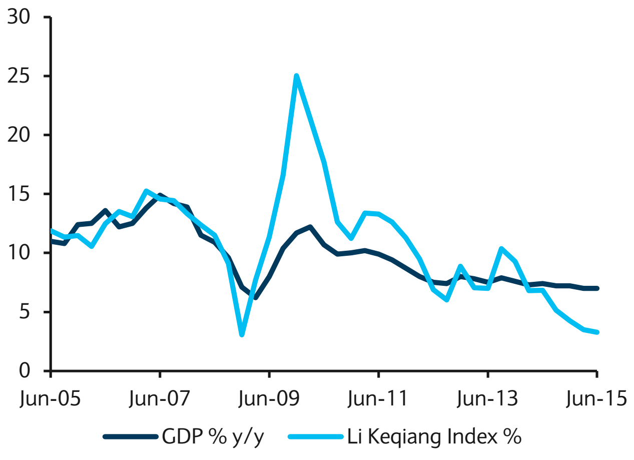
… as supported by many monthly indicators

Indeed, ample evidence supports such scepticism. For example, demand growth in China for a number of commodities (ie, coal, diesel, crude oil, iron ore, etc) slowed sharply in recent quarters (see *China's commodity demand: Turbulence ahead*, 19 March 2015). For instance, crude steel output/usage, which held a loose correlation to the official GDP series for a time, has actually been contracting recently, while reported GDP remains 7%. Other examples include electricity output and rail freight volume, two components of the so-called "Li Keqiang Index," which have also shown sharp declines recently, in contrast to the steady behaviour of the official GDP series (Figure 2 and Figure 3).

To better understand the underlying trend of China's growth moderation in recent quarters, we discuss the set of monthly indicators used to track growth momentum, apply different models using these indicators to form the growth forecast, and elaborate on the assumptions underlying the latest forecast revision.

FIGURE 2

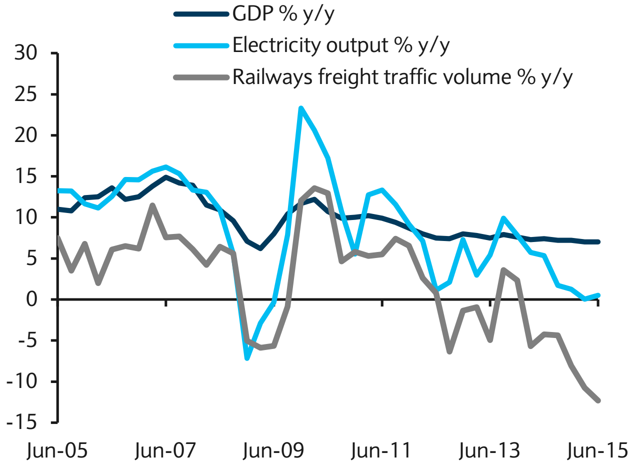
Official GDP and the Li Keqiang Index



Source: Bloomberg, Barclays Research

FIGURE 3

Official GDP and two other activity variables



Source: Wind, Barclays Research

Monthly growth indicators and benchmark models

We applied a model-based approach to estimate growth contributions

The monthly indicators we track and apply to estimations are industrial production (IP), exports and imports, fixed asset investment (FAI), railway freight volume (Freight), retail sales including auto, steel and electricity output, and manufacturing PMIs (see Box 2 for model and data descriptions). These indicators are released on a monthly basis, and we apply a model-based approach to estimate growth contributions using these series. The model can also help to forecast quarterly GDP growth.

We start with a benchmark model using only IP, FAI, net exports, and retail sales – the so-called "hard indicators" (Figure 4). Overall, it shows that the economy could be moderating at a faster pace than expected, with estimated growth starting to deviate from headline growth as early as Q1 2014. The gap widened to 140bp in Q2 2015 from 30bp in Q1 2014. More importantly, the contribution of IP and FAI to GDP growth has declined gradually to c.3pp y/y in Q2 2015, reflecting an investment-driven slowdown.

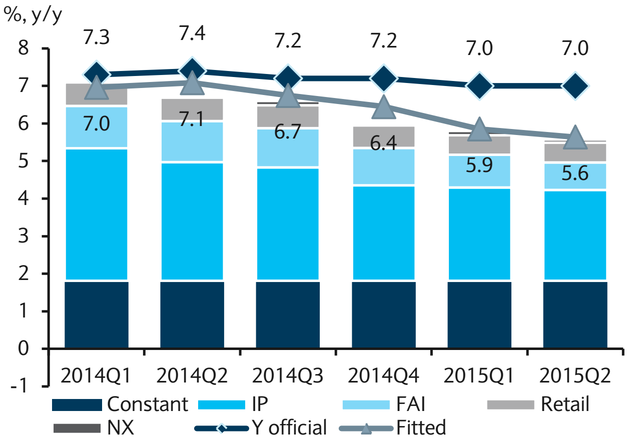
Overall, it suggests underlying GDP could be 50-150bp lower than headline growth numbers

However, the main caveat of the baseline model is that it only captures manufacturing and construction activity, so it is subject to missing variables. Some of the discrepancy between these alternative indicators and the official GDP data might be explained by the rapid growth in China's service sector. For instance, the NBS series reports that since 2012, the services portion of GDP has exceeded that of manufacturing. Nevertheless, given the deserved scepticism regarding China's data on activity, convincing markets that measures of services activity are more credible seems difficult to imagine in the current environment.

To better capture the role of the service sector, we apply an augmented version with all monthly series above, and include the service PMI and an AR(1) error. Under this specification, the fit of the model improves, yielding higher R-squares and reduced serial correlation. With the augmented model, estimated quarterly growth is still 100-150bp below the official 7.0% growth rate if using out-of-sample forecast. The deviation of fitted quarterly GDP growth from official growth rates has become more prominent since Q2 2014, increasing from 50bp in mid-2014 to 100-150bp this year (Figure 5). Overall, China's underlying economic activity growth, based on historical correlations with a basket of indicators whose accuracy is arguably more reliable, may have only been 5.5-6.0% y/y in Q1 and Q2.[1]

FIGURE 4

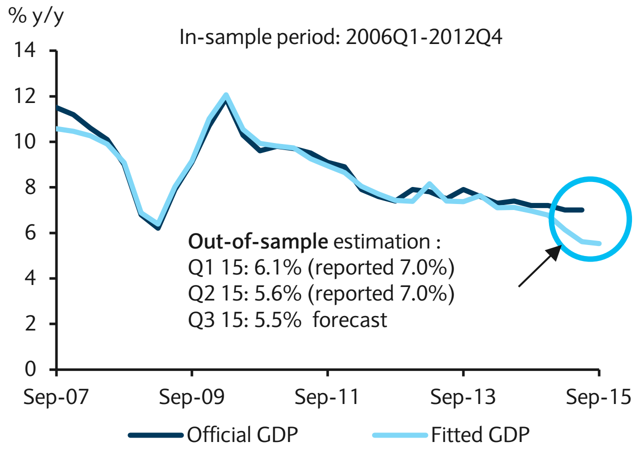
Baseline model and full sample estimation



Source: Barclays Research

FIGURE 5

Augmented model and the out-of-sample forecast



In-sample period: 2006Q1-2012Q4

Out-of-sample estimation :
Q1 15: 6.1% (reported 7.0%)
Q2 15: 5.6% (reported 7.0%)
Q3 15: 5.5% forecast

Source: Wind, Barclays Research

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[1] See additional robustness checks of measuring potential GDP deviations in Box 4.

A simple now-casting framework for China using monthly data releases

Lower growth in Q3 also foreshadowed by a newly developed "now-casting" framework

Building from the baseline models, we also develop a simple "now-casting" framework to track China's GDP growth on a monthly basis, as well as to supplement our baseline forecast. In addition to the variables used in the baseline model, we include non-official data releases such as the Caixin PMIs (both manufacturing and service) and AR(1) errors (see Box 3 for details). The implied Q3 growth using the now-forecasting framework is 6.5-6.6%y/y, assuming the true GDP growth in Q2 was 7.0% y/y as reported. Even with only two months of new information, our now-caster implies a decline in growth of about 40-50bp, from the 7.0% growth rate of the previous quarter.

It is worth noting that the now-casting approach cannot substitute for the forecast derived from our benchmark models, as the former forces the latest observation to be the true value by construction when forecasting. In other words, the now-casting approach is better as a monthly monitor of growth based on past correlations, and it provides more information on the relative contribution by adding one more data point to the sample. Instead, any forecasting exercise should follow an integrated procedure including data developments, policy assumptions, and some judgement.

Implied underlying growth and forecast revisions

Overall, we find the model-based GDP estimates tracked China's quarterly GDP growth well until mid-2014, when the estimated growth rates started to deviate from official releases. The results seem to stay robust after accounting for a rapid-growing service sector.

Our forecast revision is both data-dependent and model-based…

Next, we consider how our recent growth forecast revision reflects both data developments and our model-based GDP forecasts for H2 2015. On the data front, the exports and imports contraction continued in July and August, reflecting soft external and domestic demand. IP growth was 6.1% y/y in August, suggesting weaker IP growth in Q3 than Q2's 6.3% and Q1's 6.4%. FAI growth declined further to 10.9% y/y YTD, led by a continued slowdown in real estate investment (3.5% y/y YTD, a 6-year low) and manufacturing investment, though partially offset by rebounding infrastructure investment (18.4% y/y YTD). Meanwhile, consumption remains the bright spot, with real retail sales edging up to 10.4% from 10.3% and online sales standing strong at 36.5% y/y YTD.

… with continued headwinds expected in the next 12 months

On the other hand, the median forecast we derive from all models will be 6.0-6.2% y/y for H2 2015, a further slowdown from H1. In addition, the new (and lower) base following the NBS 2014 GDP revision on 9 September added c.10bp to the 2015 forecast. Based on all of the above, we recently lowered our 2015 GDP growth forecast to 6.6% y/y (from 6.8%) and our 2016 forecast to 6.0% (from 6.6%) (see *China: Lowering 2015-16 growth forecasts following recent soft data,* 14 September 2015). We believe the three major headwinds highlighted in the medium term – excess capacity in many industries, oversupply in the housing market, and high debt burdens (especially among local governments) – together with anti-corruption and policy uncertainties, will continue to weigh on growth.

A few bright spots: private consumption and the service sector

Private consumption and the service sector would be important supporting factors

Despite challenging cyclical conditions in the near term, there are a number of supporting factors to China's underlying growth. Private consumption in general held up with rapid growth in rural (and, to a lesser extent, urban) consumption (Figure 6). Survey-based consumption indicators have been volatile, but are trending up from their low levels in 2012. This has been reflected in buoyant growth of upgrading consumption items such as jewellery, mobile devices, and electronics. Consumption growth is also supported by new technology such as e-commerce. Online retail sales of goods and services now account for about 10% of total retail sales, and are growing at about 40% y/y. Despite a softening manufacturing sector and a relatively cooler summer season, electricity output growth just started to rebound in August, showing signs of stabilisation after the weakness in July.

The service sector, including financial services, has been an important pillar of growth since 2012 (rising to 50% of GDP and growing at 8.4% YTD in Q2 2015). For example, financial services contributed 1.4pp to growth in H1 2015, though the trend is unlikely to continue in H2 given the stock market correction. Nevertheless, the latest trend in the service sector suggests there is more willingness for Chinese consumers to spend on leisure-related services (e.g., travel) as income rises. This is supported by considerable growth in tourism spending, both domestically and abroad.

Implications for macro policies

We continue to look for more easing to support growth

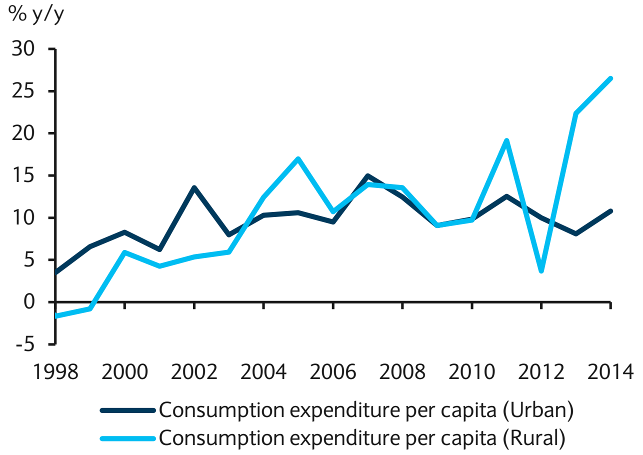
The weakness in recent data confirms that growth is losing momentum despite a fast-growing service sector. This suggests more fiscal support and monetary easing are required to stabilise growth. Indeed, to cushion the growth slowdown, the central government has recently announced a series of measures to support infrastructure investment such as underground pipes, water and clean energy. These measures include bond issues and PBoC capital injection to policy banks, a third round of local government debt swap (CNY3.2trn in total), and accelerated project approval by the NDRC.

In terms of monetary policy, our base case remains one more interest rate cut in Q4 to lower real cost of funding and two RRR cuts to offset liquidity drain from capital outflows. Despite the intensifying capital control measures after the 11 August FX regime shift and PBoC's heavy intervention in the FX markets, we expect capital outflows to persist in the coming quarters. That said, to stabilise the USDCNY in the near term, the PBoC will likely remain reactive rather than pre-emptive in monetary easing. A stronger USDCNY target set by the PBoC will imply more RRR cuts in the near term.

Overall, the revision of forecast does not change our broad view of policy support to cushion the slowdown. Our baseline forecast is based on existing policy calls, including the "reluctant easing" by the PBoC and a moderate fiscal expansion in 2015 as a whole. If the government still targets 7.0% annual growth, we expect more fiscal and monetary easing in the coming months, though we do not expect that to change the economy's structural softening trend.

FIGURE 6

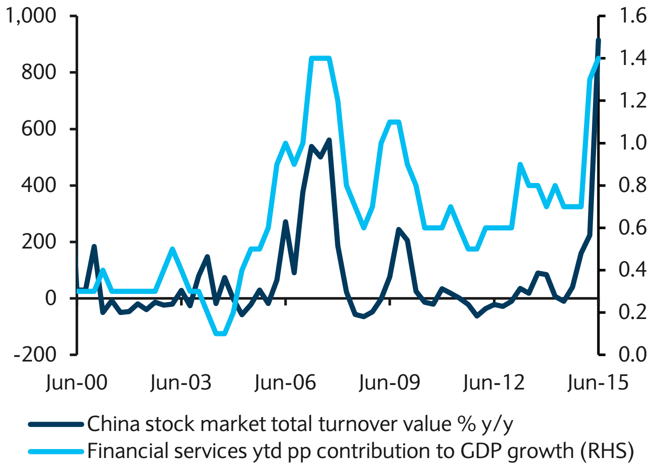
Consumption expenditure growth



Source: NBS, Wind, Barclays Research

FIGURE 7

Financial service contributions to GDP



Source: NBS, Wind, Barclays Research

Box 1: Some background on economic statistics and recent developments

It should go without saying that: (1) improving the quality of economic statistics is an ongoing process in every economy; (2) China, despite its rapid growth over the past three decades, is still a developing economy, so it is not surprising that the quality of its economic statistics remains well below that of OECD countries.

From a low base, China has making undeniable progress in improving the quality and transparency of its economic and financial statistics. For example, since 2012, much of the data on industrial production are reported directly to Beijing, bypassing local government agencies. To do so is clearly in China's interest as achieving the difficult transition to what President Xi calls the "new normal" will require active management of the economy and, in turn, a more robust system of statistics and data standards.

Historically, however, this has not been the case. It was not long ago that Chinese data was largely classified as confidential and its dissemination blocked from domestic, let alone international, eyes. In terms of data collection, in the past, information on economic activity was collected directly and exclusively from Chinese state-owned enterprises. Very much related to this method of data collection is the fact that, historically, advancing one's career in the Communist Party depended on an official's performance as measured by the output of his company, municipality, province, or other state entity. The clear incentive, therefore, was to overstate performance.

To ameliorate the tendency to overstate growth, the government has been moving away from using economic performance as a support for advancement. This year, for example, the Shanghai the government announced that it would not be setting a GDP growth target. In addition, President Xi's anti-corruption drive clearly makes data manipulation potentially perilous. That said, clear alternative performance measures have not be laid out, implying that the old system, with its skewed incentives, still largely remains in place

Nevertheless, on the basic issue of inputs for the GDP calculation, even today, data collection still depends on SOEs and other direct monitoring methods, despite the fact that growth is now dominated by the non-state sector. This is reflected in the fact that, up until the present moment, of the 94 sectors tracked in China's annual GDP statistics, only 17 sectors report activity on a quarterly basis. Note that China only started to release quarterly GDP data in 1992 and only in 2011 did the NBS report a quarter-on-quarter GDP growth rate. Given still severe data limitations, quarterly GDP is only available at current prices, and calculated using the so-called “accumulation-deduction”. For example, Q2 GDP data takes the accumulated available data reported by mid-year, then subtracts the data that was in hand in Q1.[2]

The state of play for the GDP statistics is the following: The National Bureau of Statistics (NBS) compiles annual GDP using the production approach in current and constant prices. It also releases quarterly GDP levels on a year-to-end basis, as well as real growth rates (q/q and y/y). GDP by expenditure is compiled at current and constant prices, but the latter estimates are not published. Data on the expenditure components of GDP are not available on a quarterly basis.

Last week, the NBS announced that for 3Q it will directly collect primary data for that single quarter. With the new reporting system, the NBS revised the GDP growth rate for 2014 to 7.3%. Overall, the discrete quarterly basis reporting system requires China to make more improvements to the range and quality of national accounts. Specifically, from Q3 2015 onwards, China will report: 1) quarterly GDP at current and constant price; 2) y/y GDP growth at constant price; and 3) q/q GDP growth at a constant price. The Q3 15 GDP data are expected to be released on 19 October.

This latest announcement of further improvements in China's economic statistics follows the release, starting also in Q3 2015, of monthly foreign exchange reserves data. All of this is consistent with President Xi's stated commitment at the G-20 summit in 2014 to bring the country's data in line with the IMF's Special Data Dissemination Standard.

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[2] See, "GDP will now rely on single-quarter data," Xinhuanet, 10 September 2015, and “China moves toward greater transparency," Stratfor Geopolitical Diary, 9 September 2015.

Box 2: Model and data descriptions

To identify a long-term relationship between China's real GPD growth and other macro and micro variables while exploring the short-term dynamics, we apply an ordinary least squares (OLS) model to China's real GDP growth as follows:

$$\begin{aligned} GDP\ growth\ _t = {} & electricity\ output\ growth_t + railway\ freight\ volume\ growth_t + industrial\ production_t \\ & + fixed\ asset\ investment\ growth_t + NBS\ manufacturing\ PMI_t + NBS\ service\ PMI_t \\ & + exports\ growth_t + imports\ growth_t + retail\ sales\ growth_t + auto\ sales\ growth_t \\ & + crude\ steel\ output\ growth_t + \mu^t \end{aligned}$$

In general, the micro data (e.g., electricity output, crude steel usage) are more reliable despite less information, while the macro data contain more information but are less reliable. Our 11 explanatory variables cover the service and non-service sectors, which could capture most of the forces driving GDP growth. Monthly data series are reported by the NBS and Bloomberg and are released in the first half of each month (except for Jan-Feb when it is bundled into one release). Quarterly data from 2000 to 2015 are applied (monthly series are transformed to quarterly % y/y except for PMIs).

People may be concerned about the correlation between macro and micro data (e.g., IP and electricity output). In our opinion, this is not an issue because we are interested in estimating accurate GDP growth for an out-of-sample period, not each individual predictor. That is, a multiple regression model with correlated predictors can indicate how well the entire bundle of predictors predicts the GDP, but it may not give valid results about any individual predictor, or about which predictors are redundant with respect to others.

To test the predictive power of our model, it is beneficial to reserve a time period of historical data for testing purposes. Specifically, we treat the sample before Q4 2012 as the in-sample period, and use data after Q1 2013 as the out-of sample period. The key assumptions for our model to be valid are: 1) the relationship between 11 explanatory variables and GDP growth before Q4 2012 still holds after Q1 2013; and 2) government officials are less likely to manipulate the explanatory variables after Q1 2013.

We find that the fitted China's GDP growth follows reported GDP growth before Q2 2014 closely, but it starts to diverge after Q3 2014, with model-implied GDP growth falling short of reported GDP growth by 100-150bp in H1 2015. Our model suggests that GDP growth in Q3 2015 will remain modest, growing at 5.5%.

Box 3: A simple now-casting framework for China using monthly data releases

Building from the baseline models, we develop a simple now-casting framework to track China's GDP growth on a monthly basis, as well as to supplement to our baseline forecast. In addition to the variable used in the baseline model, we included Caixin PMIs (both manufacturing and service) and AR(1) errors in improve fitness and serial correlation.

The key difference between the now-casting approach and the baseline estimation is the former uses monthly variables to form the one-step-ahead forecast. Also, the latest official GDP is used as the starting point, assuming all information (including statistic errors) is included. That said, the now-casting approach is purely data-dependent, and it can assess the effect of any new information added on economic growth. In best practice, a large number of models should be developed using different monthly series, and the forecast from different models needs to be pooled with weights in order to minimise RMSE (Root Mean Square Error), with weights updated by comparing the actual performance of each model. In the context of China, only two benchmark models are applied due to limitations in the number of variables released monthly, particularly given the lack of labour market information.

Figure summarises the model output and the one-step-ahead "now-cast" using August 2015 monthly data. Assuming Q2 2015 is 7.0% y/y, the model suggests Q3 GDP is expected to be 6.5-6.6% y/y, with most headwinds coming from Caixin PMI, IP, steel, and railway freight, while partially offset by robust growth in retail sales.

Nevertheless, it is important to note that the now-casting approach cannot substitute for the forecast derived from our baseline model. The now-casting approach may not capture the underlying trend of slowdown as it forces the latest observation to be the true value. In other words, the now-casting approach is better as a monthly monitor of growth tracking based on past correlations. Instead, any forecasting exercise should follow an integrated procedure including data developments, policy assumptions, and judgement.

FIGURE 8

Summary of now-casting results and contribution of indicators for Q3 2015 GDP tracking

Variables	August	Implied Q3 values	Contribution to changes in Q3 GDP growth (pp)
Electricity output	1.0	-0.5	0.0
IP	6.1	6.0	-0.1
Railway freight volume	…	-10.0	-0.1
Auto	-3.4	-5.0	0.0
Retail sales	10.8	10.7	0.1
NBS manufacturing PMI	49.7	49.7	0.0
FAI	10.9	10.9	0.0
Exports	-5.5	-6.9	0.0
Imports	-13.8	-11.0	0.0
Steel output	-3.5	-4.1	-0.1
NBS services PMI	53.4	53.4	0.0
Caxin manufacturing PMI	47.3	47.3	-0.2
Caixin service PMI	51.5	51.5	0.0

Source: Bloomberg and Barclays Research

Box 4: An alternative measure of China's GDP growth using EM ex-China PMIs

As part of our robustness checks, our New York-based colleagues, Juan Prada and Andres Jaime Martinez, performed an exercise to estimate China's GDP growth by using inputs that are relatively independent from official Chinese data releases. In particular, they estimate GDP growth rates for a set of emerging market economies ex-China (Brazil, India, Indonesia, Korea, Malaysia, Mexico, Russia, Singapore, South Africa, Taiwan, and Turkey), as a function of their Markit manufacturing PMI, using a panel-regression approach:

$$g_{i,t} = \alpha_i + \sum_{k=0}^{2} \beta_k PMI_{i,t-k} + \epsilon_{i,t}$$

Where i denotes country and t denotes time period. The structure is dynamic, allowing for lags of PMI to affect growth, and permits GDP growth predictions based on observed PMIs. Annualized real GDP growth (quarterly frequency) and the average manufacturing Markit PMI for each quarter are applied for the estimation.

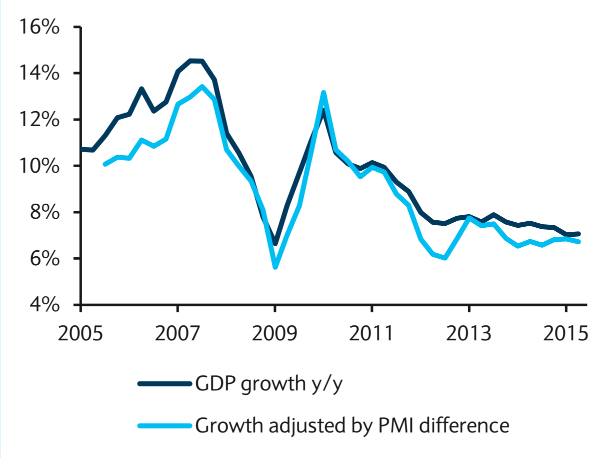
Next, the implied growth rate for China can be derived using both China's Caixin PMI and the official NBS PMI. We assume the implied growth obtained using the Caixin PMI better reflects actual economic conditions, while the implied growth rate obtained using the NBS PMI should correspond to the official reported GDP growth rate. The difference between the two PMI-generated measures allows for an assessment of us to assess how much the implied growth rate may deviate from the official statistics (assuming China's country fixed effects cancel out when taking differences of the two estimates).

Figure 9 presents the official growth and the GDP adjusted by the difference in PMI-implied growth rates. For most of the sample, official figures are above the level implied by this methodology. Since 2005, the average difference is 77bp. Figure 10 presents the difference between official and adjusted growth since 2012. Currently, under this metric, we estimate GDP to be 70bp below the figure reported by the NBS, with an average value of 60bp during 2014 and H1 2015, a result explained by the recent increasing divergence between the NBS and Caixin PMIs.

Finally, we consider the cumulative effect of the growth difference year to date, which lets us magnify current divergence in PMIs (last reading represents a divergence in the 85th percentile) without assuming any level of GDP growth. While official figures show flat growth, with practically no change this year, this PMI-based measure indicates a deceleration in growth of around 80bp. Overall, the estimated divergence is within the range of 50-150bp suggested by the other models in this paper.

FIGURE 9

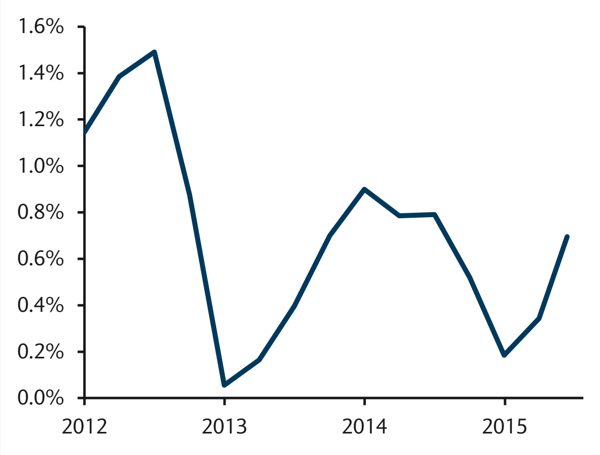
Official and PMI-adjusted GDP growth rates



Source: Haver and Barclays Research

FIGURE 10

Difference between official and PMI-adjusted GDP growth



Source: Barclays Research

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