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Economic Research
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Special Report

Introducing J.P. Morgan's EM nowcasters

- **We replicate across emerging markets (EMs) the framework used in our global nowcasters, which efficiently extracts a single time series from a range of monthly activity indicators, reflecting common movements across the data. This series offers an accurate gauge of current-quarter GDP growth in real time as data are released.**
- **Our EM nowcaster explains 91% of the variation in EM GDP growth from 1Q05 to 4Q16. This is a clear improvement upon equations that use only the PMI, while also having a significant timeliness advantage over IP/hard data-based trackers.**
- **The nowcasting framework is better at tracking final GDP outturns than the first official estimates of GDP, making it a useful gauge of what is actually underway in the economy.**
- **In practice, the nowcaster's primary value lies in signaling risks around official J.P. Morgan forecasts through the quarterly data cycle. For example, the nowcaster correctly flagged upside risks to our 1Q17 GDP forecast early in the quarter.**
- **The nowcaster points to 5.3%q/q saar EM GDP growth in 2Q17, above our 4.4% official J.P. Morgan forecast; according to the nowcaster, EMEA EM accounts for the bulk of the upside risk.**

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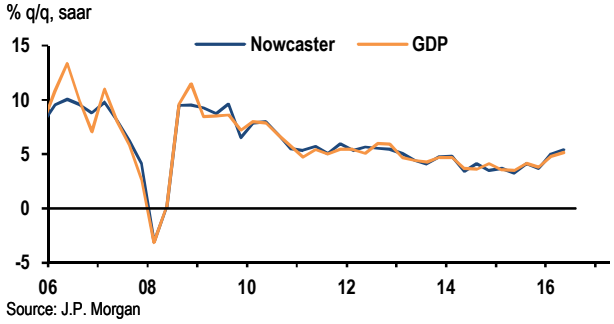
Introduction

Since first producing a nowcast of global growth in 2012, J.P.Morgan has introduced several country-level nowcasters to track current-quarter GDP growth. In emerging markets (EMs), we first introduced a nowcaster for EM Asia in 2014 covering four of the region's more cyclical economies. In this note, we expand our suite of EM nowcasters to Latam and EMEA EM and update our EM Asia nowcaster. We take stock of the nowcaster's performance, comparing it to other tracking methods across the three EM regions. We also assess how the nowcaster performed in real time in recent quarters and what it is telling us about risks around our 2Q GDP growth forecasts. The main results of our analysis are:

- The J.P. Morgan EM nowcaster delivers an accurate gauge of EM GDP growth. Over our full sample from 1Q05 to 4Q16, the EM nowcaster explains 91% of the variation in quarterly EM real GDP growth, with a standard error of 0.9%-pts, saar (Figure 1 and Table 1).This is a clear improvement on tracking equations that only use the PMI or IP.
- Our nowcaster performs best in Latam, where it explains 91% of the variation in quarterly GDP growth, followed by EM Asia and EMEA EM (both 77%).
- The J.P. Morgan EM nowcaster appropriately signalled upside risks to the J.P. Morgan EM GDP forecast for 1Q17 early on in the quarter and points to upside risks to our current 2Q17 GDP forecasts.

Figure 1: EM Nowcaster and EM real GDP



Source: J.P. Morgan

Why and how we nowcast

Our efforts in tracking/forecasting current-quarter EM GDP growth so far have relied primarily on two approaches: the "adding up" approach which produces a GDP estimate by adding up estimates of both production- or expenditure-side GDP components, using measures of activity from various sectors of the economy. The second approach uses historical relationships between hard data (e.g.; IP, retail sales, construction) or surveys (e.g.: PMI) and GDP. The J.P. Morgan nowcaster is different from these approaches in several important respects. First, it incorporates both "hard" data (including spending and output) and "soft" data (including surveys and sentiment measures). Second, it employs a statistical model to consolidate (or filter) the information from a wide range of indicators. This statistical filtering is based on a dynamic stochastic factor method that allows for serial correlation in the underlying common movement (the "factor"), as well as in the errors in mapping the factor to the actual data (see Box 1 on page 6 for a detailed explanation of the methodology). The factor recovered from the movements in the observed data aligns well with real GDP growth as it gleans the underlying common movement in a broad range of indicators. This method makes the nowcaster a **qualitatively superior** method for tracking growth.

The usefulness of the nowcaster also owes much to its **timeliness**, as it provides a growth estimate for the current quarter in the absence of any hard data. The manufacturing PMI reports are often the first important input into our nowcasters, as they become available in the first week of the second month of the reference quarter. In some cases, our first nowcast estimate is available even sooner as some domestic economic sentiment indices become available the week before the first month of the reference quarter ends. Hard data are published with significant lags; the first IP release of the quarter tends to be published more than a month after the first PMI. And by the time GDP reports for the previous quarter begin to be released-- the PMI is already available for the first month of the next quarter.

In practice, the real value of the nowcaster lies in its ability to provide a **reliable signal of the direction and magnitude of risks around the J.P. Morgan official forecasts**. Indeed, as we show in the real-time tracking exercise below, the nowcasters often accurately signal upside/downside risks long before we start moving our official GDP forecasts. Still, for many EMs, tracking estimates based on hard activity data or the "adding up" approach will still continue to be the best predictor of the numbers reported in the first official GDP releases. First estimates of GDP growth suffer from measurement errors in the hard data which are directly incorporated in GDP reports, but because the nowcaster relies on more information from a wide variety of data series, it places less weigh on mismeasured data. It is therefore a more effective method of gauging underlying trends in economic activity than the official first estimates of actual GDP growth. Indeed, as shown here, the J.P. Morgan nowcaster does a significantly better job at tracking the path of final GDP growth estimates than the initial GDP prints.

We would like to thank Milinda Gunasinghe for his contribution in the preparation of this note.

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Construction of the EM Nowcaster

Our EM nowcaster is built from the bottom up: it is a GDP-weighted aggregate of three regional nowcasters, which are in turn GDP-weighted aggregates of 17 country-level nowcasters that use country-level data inputs. This contrasts with J.P.Morgan's global nowcaster which uses global aggregates of economic indicators as inputs. Our EM Asia nowcaster includes four countries: (China, Korea, Taiwan and Singapore) and accounts for 63% of the aggregate EM nowcaster; Latin America includes six countries (Brazil, Mexico, Argentina, Colombia, Peru and Chile) accounting for 21% of the aggregate; EMEA EM comprises seven countries (Czech Republic, Hungary, Poland, Romania, Russia, South Africa and Turkey) and accounts for 16%. Our aggregate EM nowcaster currently encompasses 82% of J.P.Morgan's EM universe covered in the *Global Data Watch.*

Inputs into our nowcaster vary slightly across regions and countries, but generally include a broad range of surveys, production gauges and demand-side indicators. As most EMs do not report composite PMIs, we complemented the manufacturing PMIs with local surveys to capture economic sentiment in the broader economy and used the composite PMI where available. In terms of hard data, we mostly captured the production side of the economy by IP and construction, while retail sales mostly represent demand conditions. A couple of EM countries also report an all-economy activity index which is a proxy for monthly GDP growth and this was included where appropriate. Exports were included for most EMs considering their strong reliance on external demand, while imports, especially of capital goods, are a good indicator of business equipment spending and hence overall investment.

A good fit for EM

The J.P. Morgan EM nowcaster delivers an accurate gauge of EM GDP growth, explaining as much as 91% of the variation in quarterly EM real GDP growth over our full sample from 1Q05 to 4Q16, with a standard error of 0.9%-pts, saar (Table 1). This contrasts with our PMI-based estimate, which explains 65% of the variation in EM growth with a standard error of 1.82%-pts, saar. Industrial production alone provides a more accurate gauge of GDP growth than the PMI estimate but less so than the nowcaster, explaining 85% of the variation in GDP growth with a standard error of 1.18%-pts saar. The nowcaster also has a clear timeliness advantage; IP/hard data are released on average a month later than the PMI data for the reference month become available.

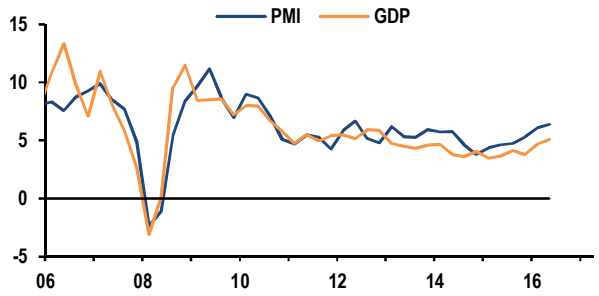
Table 1: J.P. Morgan Nowcaster fit vs. PMI and IP-based estimates
%q/q saar, sample: 1Q05-4Q16

	Nowcaster	IP	PMI
Global EM			
R^2	**0.91**	0.85	0.65
Standard error	**0.90**	1.18	1.82
EM Asia			
R^2	**0.77**	0.68	0.61
Standard error	**1.75**	2.05	2.25
Latam			
R^2	**0.91**	0.83	0.50
Standard error	**1.14**	2.62	2.12
EMEA EM			
R^2	**0.77**	0.63	0.70
Standard error	**2.06**	2.64	2.38

Source: J.P. Morgan

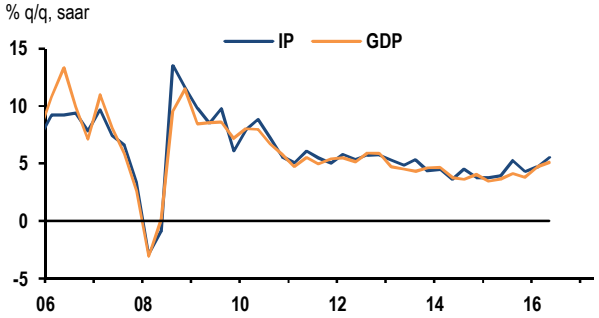
A simple graphical examination shows that the nowcaster tracks economic activity noticeably better than the PMI. In particular, the nowcaster does a better job of capturing sharp breaks in economic growth. For example, the PMI underpredicted the strength of the post-financial crisis recovery in 2009-10. In addition, the PMI has over-estimated EM GDP growth since 2015 (Figure 2). The IP series has done a much better job than the PMI in tracking EM growth over the past few years on average but exaggerated the volatility in GDP growth due to its relatively narrow coverage and overreliance on manufacturing (Figure 3).

Figure 2: EM PMI and EM real GDP
% q/q, saar



Source: J.P. Morgan

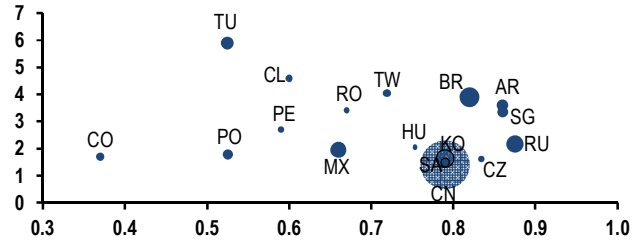
Figure 3: EM IP and EM real GDP
% q/q, saar



Source: J.P. Morgan

At the regional level, the EM nowcaster performs best in Latam, where it explains 91% of the variation in quarterly GDP growth, followed by EM Asia and EMEA EM (both 77%). The nowcasters offer a superior fit to the PMIs in all three regions and also have better forecasting accuracy as measured by the standard errors. The IP data alone do a good job of explaining GDP growth but are, again, much less timely. IP explains less of the variation in GDP growth in EMEA EM than in the other two EM regions. Figure 4 compares the fit metrics of the nowcasters at the country level. It is reassuring to see that many of the EM heavyweights by GDP weight, including China, Brazil and Russia, are located in the lower right quadrant which indicates good fit and high forecast accuracy. Among the major EM countries, only Turkey's fit looks relatively poor.

Figure 4: EM country nowcaster fit metrics
Y-axis: Standard error, %-pts %q/q saar growth, X-axis: R-sq % variation explained



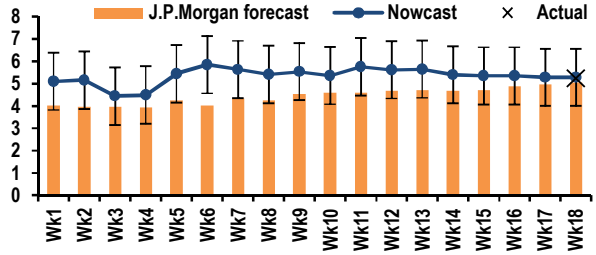
Source: J.P. Morgan. Sample: 1Q05-4Q16. Note: Bubble size represents GDP weight in EM agg.
CN = China KO = Korea TW = Taiwan SG = Singapore AR = Argentina BR = Brazil
CL = Chile CO = Colombia MX = Mexico PE = Peru CZ = Czech Republic HU = Hungary
PO = Poland RO = Romania RU = Russia SA = South Africa TU = Turkey

A real-time test of the nowcaster

To test the usefulness of the EM nowcaster, we conducted a real-time tracking exercise of 1Q17 GDP growth to see if the nowcaster would have provided an accurate signal of risks around our official GDP forecasts. Our nowcasting exercise generally begins in the first week of the second month of each quarter, when we get the PMIs for the first month of the quarter. The exercise then runs through the second month of the subsequent quarter for a total of 18 weeks, when all countries in our nowcaster will have typically reported official GDP estimates for the reference quarter.

Using just the information from the January PMI released in the first week of February (i.e., week 1 in Figure 5), the nowcaster pointed to 5.6%q/q, saar GDP growth (68% confidence interval of 4.3%-6.9%), above the 4.1% J.P. Morgan forecast. The nowcaster slipped in week four, narrowing the positive gap with our official forecast, but subsequently stabilized and steadily signaled upside risks for the remainder of the tracking exercise. Around week seven of the exercise, the J.P. Morgan forecast began to be revised up.

Figure 5: Nowcasting EM GDP, 1Q17 GDP
% q/q, saar, Std error is over sample 1Q05 to 4Q16

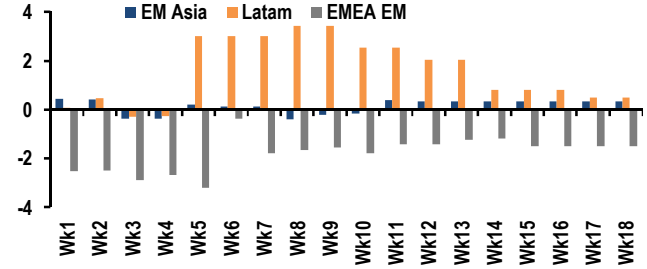


Source: J.P. Morgan. Actual is first official estimate of GDP. Week 1 = first week of the second month of the quarter (i.e.: 3 February 2017), corresponding to the first PMI for the quarter.

Although the nowcaster ended up overestimating the *first* official print of EM growth, which came in at 5.0%q/q saar vs. the 5.3% nowcast, the nowcaster correctly flagged upside risk to the J.P. Morgan forecast very early in the quarter. Moreover, as the official GDP prints for 1Q17 were revised 0.3%-pts higher since, to 5.3%q/q saar, the nowcaster's forecast error fell to zero. This is consistent with our global economics team's earlier finding that the construct of the J.P. Morgan nowcasters make them much better at tracking the final path of GDP growth (i.e.: once the dust settles following several revision rounds) than the initial GDP prints.

Decomposing the nowcaster forecast error by region reveals that Latam was responsible for much of the nowcaster's over-prediction of 1Q17 EM GDP (Figure 6), with a much smaller over-prediction in EM Asia. In contrast, in EMEA EM, the nowcaster *under*estimated 1Q17 GDP growth. Interestingly, the EM nowcaster's smallest forecast error (0.18%-pts) occurred in Week 4. This, again, suggests that it provides a reliable indication of risks around our forecasts early on in the quarter and implies little improvement in tracking accuracy as more new data become available over the quarter. The LatAm forecast error widened sharply during the middle of the tracking cycle due to a temporary January jump in activity in Brazil. Subsequent weakening in activity narrowed the gap again before the advance GDP prints were released.

Figure 6: Nowcast error in 1Q17 by EM region
% -pts %q/q saar, nowcast minus actual GDP growth (current vintage)



Source: J.P. Morgan. Week 1 = first week of the second month of the quarter (i.e.: 3 February 2017), corresponding to the first PMI for the quarter.

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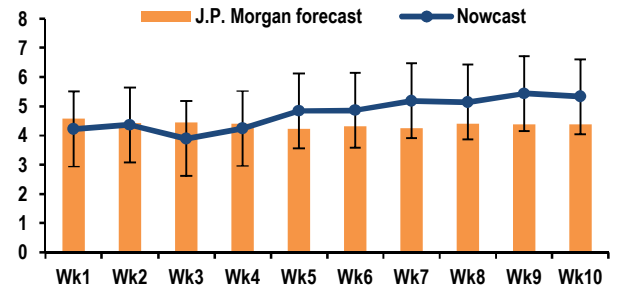
Nowcaster signals upside risks to 2Q GDP

The EM nowcaster for 2Q17 again points to upside risk to the J.P. Morgan forecast. The official J.P. Morgan EM GDP growth forecast, weighted only by the countries included in our nowcaster, stands at 4.4%q/q saar, while the nowcaster points to acceleration to 5.3% growth (Figure 7). The official J.P. Morgan forecast has remained essentially unchanged since the start of the quarter, while the nowcaster has moved steadily higher since the beginning of June (week 5 in Figure 7). In fact, the J.P. Morgan forecast has now slipped towards the bottom of the nowcast's 68% confidence interval, flagging considerable upside risk.

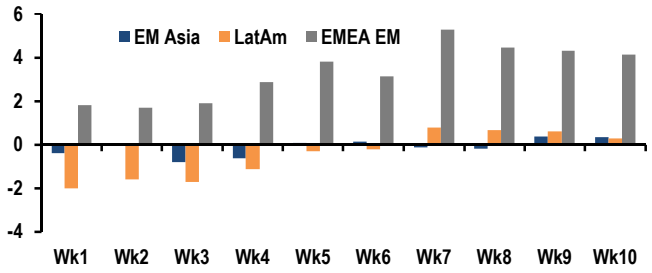
Figure 7: Nowcasting EM GDP, 2Q17 GDP
% q/q, saar, Std error is over sample: 1Q05 to 4Q16



Source: J.P. Morgan. Week 1 = first week of the second month of the quarter (i.e.: 5 May 2017), corresponding to the first PMI for the quarter.

By region, EMEA EM accounts for the lion's share of the upside risk to our 2Q17 EM GDP forecasts, with the regional nowcaster flagging considerable upside risks (4%-pts). Risk to our official forecast in the rest of EM is modest by comparison, with the nowcaster showing small upside risk in both EM Asia (0.4%-pts) and Latam (0.3%-pts; Figure 8).

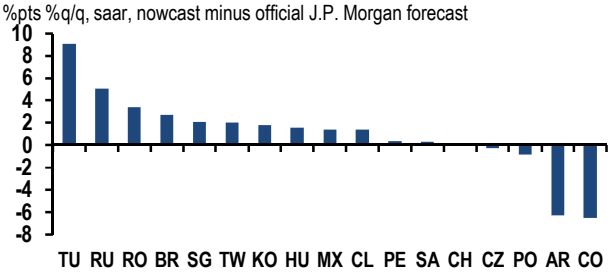
Figure 8: Risks to our 2Q17 GDP forecast by region
% -pts %q/q, saar, nowcast minus official J.P. Morgan forecast



Source: J.P. Morgan. Week 1 = first week of the second month of the quarter (i.e.: 5 May 2017), corresponding to the first PMI for the quarter.

A country-level inspection shows that high-yielders Turkey, Russia and Romania account for much of the flagged upside risk to our in EMEA EM forecast (Figure 9). In EM Asia, upside risks stem mostly from Singapore and Taiwan, while in Latin America, considerable upside risk in Brazil, Mexico and Chile is largely counterbalanced by downside Argentina and Colombia. Despite our nowcaster pointing to upside risk relative to our official 2Q17 forecast, we still expect a significant downshift in sequential growth momentum as payback from the 1Q jump in activity. We downplay the upside risks in EMEA EM because the standard error of the Turkey nowcaster is rather high (Figure 4), while in Russia we already adjusted higher our 2Q GDP forecast recently. In Brazil, the dataflow has remained quite positive, but we expect political uncertainty related to fate of the Temer presidency and the much-anticipated reform agenda to hit growth in June.

Figure 9: Risks to our 2Q17 GDP forecasts by country
%pts %q/q, saar, nowcast minus official J.P. Morgan forecast



Source: J.P. Morgan. Nowcast estimates as of 7 July 2017 CN = China KO = Korea TW = Taiwa
CL = Chile CO = Colombia MX = Mexico PE = Peru CZ = Czech Republic HU = Hungary
PO = Poland RO = Romania RU = Russia SA = South Africa TU = Turkey

Box 1: The Dynamic Factor Model

Dynamic factor models (DFM) have been widely used in econometrics to extract the common component (or factor) of various time series. J.P. Morgan's global nowcaster (i.e.: the DFM-Eco model) discussed in more detailed here is based on this approach. Our EM nowcasters replicate across emerging markets the DFM-Eco framework used in our global nowcasters, which efficiently extract a single time series reflecting common movements across a range of monthly activity indicators.

The common factor is obtained by applying a Kalman filter to the framework written in state space form. For the individual country-level nowcasters, the state space form involves two steps. In the first step, a measurement equation links the observed variables, y(i,t), to the unobserved common factor to be estimated, c(t), where *i* is the number of variables and *t* is the time period. Note that the common factor is the same across each observed variable:

$$y(i,t) = A(i) * c(t) + e(i,t)$$

The relationship between the common factor and the observed variables is given by the factor loading coefficient, A(i). The error terms, e(i,t), reflect idiosyncratic movements in the observed variables that are independent of the common factor. The second step describes the dynamics of the common factor and the residuals of the measurement equation. This is accomplished by setting the transition equations:

$$c(t) = B * c(t-1) + v(t) \qquad \text{where v(t) is i.i.d } N(0,1)$$

$$e(i,t) = H(i) * e(i,t-1) + n(i,t) \qquad \text{where n(i,t) is i.i.d } N(0,s(i))$$

In this setting, both the common factor and the residuals of the measurement equation evolve as autoregressive processes. Once the equations are written in state space form, the Kalman filter is applied to extract the common factor. Country-specific quarterly real GDP growth is regressed on the 3-month average of the country-specific common factor.

In the case of the EMEA EM and EM Asia country nowcasters, in addition to the common factor, we also include idiosyncratic error terms of specific observed variables that are deemed to have statistically significant explanatory power.

For a more detailed description of the econometrics behind applying the dynamic factor method to a GDP growth tracking exercise, see Banbura, Giannone, and Reichling, "Nowcasting: Working Paper Series, No. 1275", ECB, December 2010 and "The time is always now: Introducing J.P. Morgan's global nowcasters", Special Issues, Sep. 5 2012.

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EM Asia

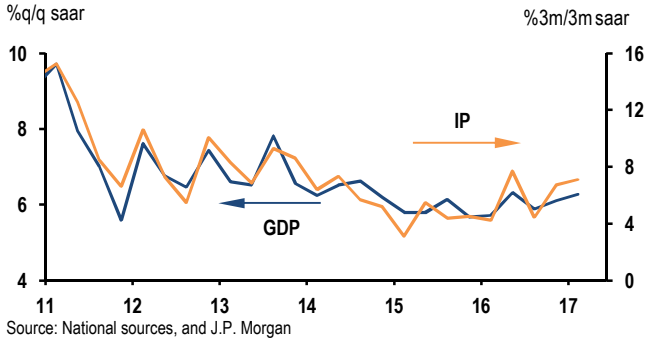
The nowcasting exercise was conducted for four EM Asia countries where manufacturing PMI survey data is available (except Hong Kong, India, and Indonesia). For the explanatory variables, industrial production, demand-side conditions, and survey indicators were used. Specifically for the production side of economy, auxiliary variables were also included when they were available, such as all-industry output in Korea (including service and construction activities). Demand-side conditions were mostly represented by retail sales growth, while export growth was included considering the EM Asian countries' reliance on external demand conditions. Finally, PMI surveys for EM Asia have limited coverage for non-manufacturing sector, thus local surveys were utilized when available.

Table 2: J.P. Morgan EM Asia Nowcaster, PMI and IP frameworks

		DFM-Nowcast	OLS	PMI	IP
EM Asia	R^2	**0.77**	**0.80**	**0.61**	**0.68**
	Standard error	**1.75**	**1.56**	**2.25**	**2.05**
China	R^2	0.79	0.84	0.64	0.73
	Standard error	1.49	1.25	1.89	1.70
Korea	R^2	0.66	0.64	0.53	0.45
	Standard error	1.95	2.00	2.28	2.47
Singapore	R^2	0.82	0.82	0.25	0.76
	Standard error	3.90	3.93	7.93	4.50
Taiwan	R^2	0.60	0.58	0.45	0.33
	Standard error	4.60	4.63	5.37	5.92

Source: National sources, CEIC, Markit, and J.P. Morgan
Note: PMI and IP are simple OLS of q/q saar GDP growth on q/q saar growth in IP or PMI quarterly average. Std errors expressed in %-pts q/q saar.

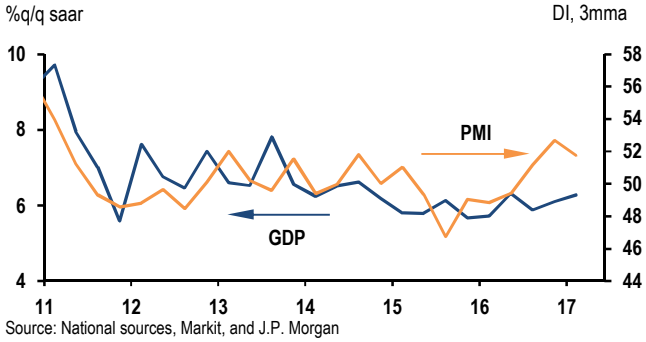
Figure 10: EM Asia GDP and IP growth



Source: National sources, and J.P. Morgan

The EM Asia nowcaster fit is broadly in line with that of the other regions. The adjusted R^2 is 0.77 for the GDP-weighted regional aggregate and the standard error is 1.75%-pts. For the region as a whole and also the individual countries, the PMIs and IP have a slightly weaker—but still strong—relationship with GDP growth (Figure 10 and 11), partly because the coverage focuses on manufacturing sector and often likely overlooks the non-manufacturing side of economy.

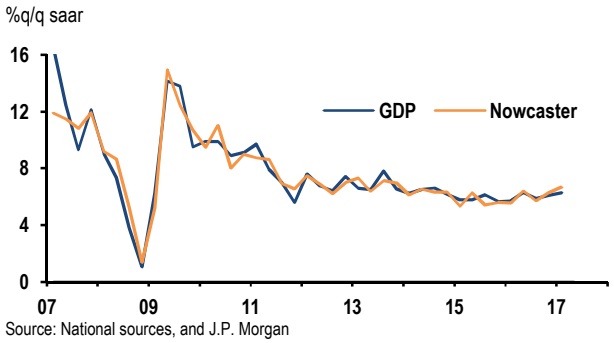
Figure 11: EM Asia GDP and PMI



Source: National sources, Markit, and J.P. Morgan

Aggregating all the available information, the nowcaster model tracks the directional changes in GDP growth well (Figure 12). In recent quarters, the nowcaster model suggested slight upside risk to actual growth, notably with solid performance in Chinese data including IP and the manufacturing PMI. Indeed, the nowcaster model suggested upside risks to our China, Korea, and Taiwan 1Q17 growth forecasts; and the final reading on GDP growth was higher than our forecasts for those economies.

Figure 12: EM Asia GDP and Nowcaster



Source: National sources, and J.P. Morgan

Yet there are caveats for mechanically following nowcaster model for forecasting purposes. One specific example is Singapore in 1Q: the Singapore nowcaster missed the actual GDP contraction in 1Q17, as the non-IP variables in the nowcaster model rose robustly, outweighing a decline in IP so that the dynamic common factor signaled too strong GDP growth. In another example, Korea and Taiwan's IP data may deviate from the historical correlation with GDP growth, reflecting structural changes from overseas production. On balance, the nowcaster model can be a useful input for gauging risks to forecast GDP growth for the current quarter, yet it should be interpreted cautiously as a complementary input to the forecasts in specific EM Asia countries.

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China

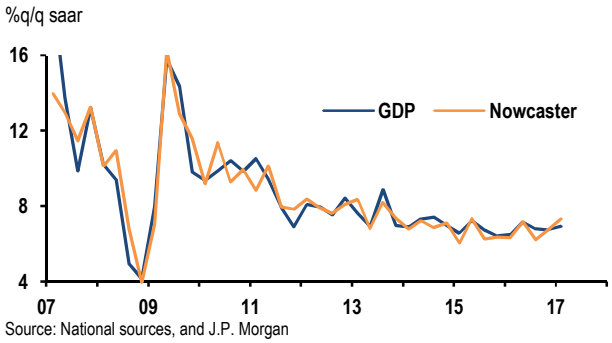
China's nowcaster model includes standard variables (IP, retail sales, exports, and the manufacturing and services PMIs) and electricity consumption and railway freight traffic as auxiliary variables (Table 3). Arguably, IP growth has the best predictive power for GDP growth, while the service PMI also complements the prediction meaningfully. In a long-term perspective, our China nowcaster model tracks the gradual downward trend in GDP growth well (Figure 13).

Table 3: China release of indicators
publication delay from reference period end - number of days

PMI manufacturing	1
PMI service	5
Exports	10
IP	15
Retail sales	15
Electricity consumption	15
Freight traffic	25

Source: National source, Bloomberg

Figure 13: China GDP and Nowcaster

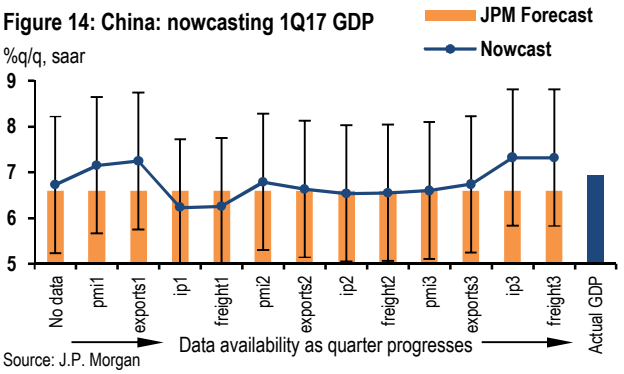


Source: National sources, and J.P. Morgan

The nowcaster model projections indicated a modest upside risk to J.P. Morgan's 6.6%q/q, saar forecast during 1Q, and final GDP growth turned out to be modestly higher at 6.9% (Figure 14). While the manufacturing output PMI fell from the onset of 1Q, dropping from 53.7 in December to 52.5 in January, IP growth accelerated through the quarter (Figure 15), implying that GDP growth accelerated from 4Q16. However, considering the recent quarters' upside bias in the model prediction, the degree of upside risk at the end of 1Q was only modest, justifying maintaining the official forecast. In the 2Q17, the risks to J.P. Morgan's current 6.6% forecast remain balanced, confirming some slowdown from 1Q growth (Figure 16).

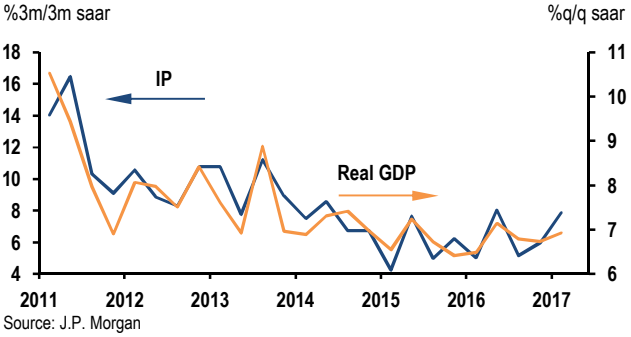
Looking ahead, we expect modest easing in the economy's growth momentum in the coming quarters (from 6.9% q/q saar in 1Q towards a 6.4% average pace during 2H), which should be reflected in the nowcaster readings in 2H.

Figure 14: China: nowcasting 1Q17 GDP



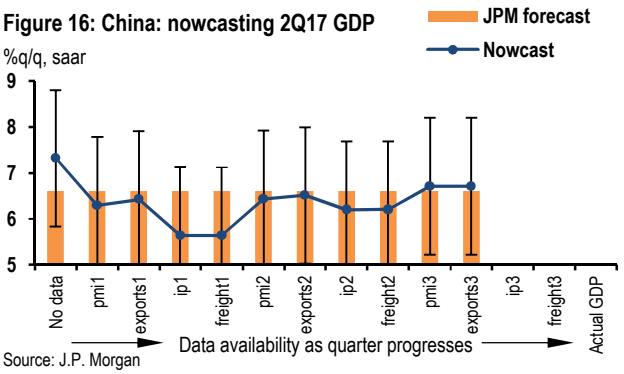
Source: J.P. Morgan

Figure 15: China's GDP and IP growth



Source: J.P. Morgan

Figure 16: China: nowcasting 2Q17 GDP



Source: J.P. Morgan

Korea

In the Korean model, we added all-industry output and composite coincident index to complement IP on non-manufacturing sectors. The Federation of Korean Industry's non-manufacturing current situation index, and the Bank of Korea's economic sentiment index were included as well, since only manufacturing PMI was available (Table 4). Similar to the other countries, IP is an important variable for forecasting, while the manufacturing PMI and FKI's BSI were also significant for estimation. The results show that the nowcaster tracked the actual GDP growth relatively well after 2015, albeit with a modest over-prediction in 3Q16 (Figure 17).

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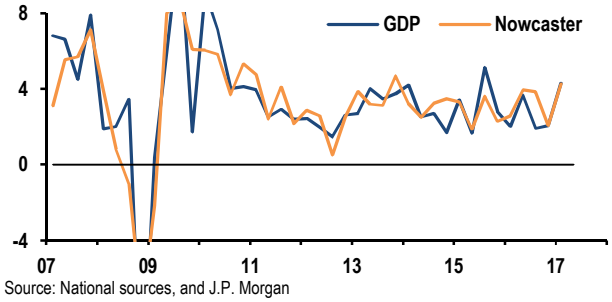
Table 4: Korea release of indicators
publication delay from reference period end (number of days)

Economic sentiment index	-5
Business confidence, non-manufacturing	-3
PMI manufacturing	1
Exports	1
IP	30
Retail sales	30
All-industry output	30
Composite coincident index	30

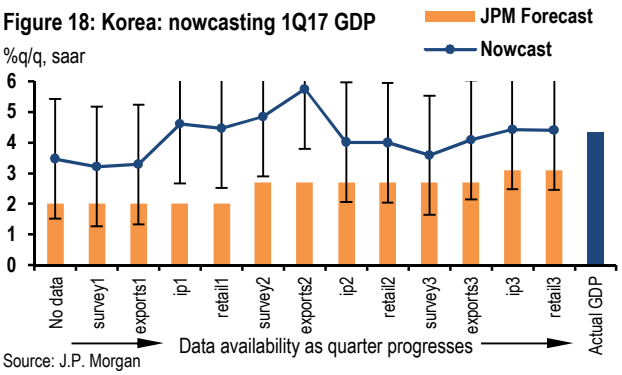
Source: National source, Bloomberg

Figure 17: Korea GDP and Nowcaster
%q/q saar



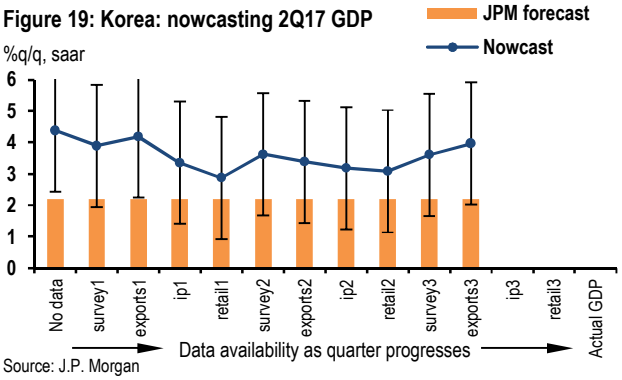
Source: National sources, and J.P. Morgan

Figure 18: Korea: nowcasting 1Q17 GDP
%q/q, saar



Source: J.P. Morgan

Figure 19: Korea: nowcasting 2Q17 GDP
%q/q, saar



Source: J.P. Morgan

For 1Q17, robust data flow notably in IP and exports posed upside risk to the initial J.P. Morgan official forecast of 2.0%q/q saar. Later, the forecast was revised to 2.7% and again to 3.1%; then the first print of 1Q17 GDP growth marked 3.6%. Meanwhile, as the Bank of Korea revised up 1Q growth to 4.3% in its final estimate, the 4.4% nowcaster prediction was closely aligned with the actual outcome (Figure 18). The 2Q17 nowcaster tracks modest upside risk to the 2.2% J. P. Morgan forecast, but the upside bias decreased as IP weakened sequentially in May (Figure 19). If we are correct in forecasting that all-industry output and IP sequentially slowed down further in June, then the nowcaster would be broadly in line with the current J.P. Morgan forecast. To be sure, an OLS regression with IP as the only explanatory variable currently signals 2Q growth close to 1%, slowing down significantly from the 1Q fitted value at 3.8%.

Given the relatively high data quality in Korea, the nowcaster model can usefully complement the bottom-up GDP growth forecast. However, we should note a caveat arising from changes in the structural relationship between IP and GDP growth (see "Gap between Korea's IP and goods GDP becomes structural," *GDW*, August 8, 2014) as overseas processing has increased; thus we should not apply the model results mechanically.

Singapore

Our Singapore nowcaster model utilizes a standard set of variables, including IP, retail sales, exports, and PMI survey indicators. Notably, the PMI index for the whole economy is available since 2012, to complement the non-manufacturing side of the survey data (Table 5). Similar to the other EM Asia countries, IP growth is the best predictor of GDP growth as the PMIs were not statistically significant once IP growth was taken into account.

Table 5: Singapore release of indicators
publication delay from reference period end - number of days

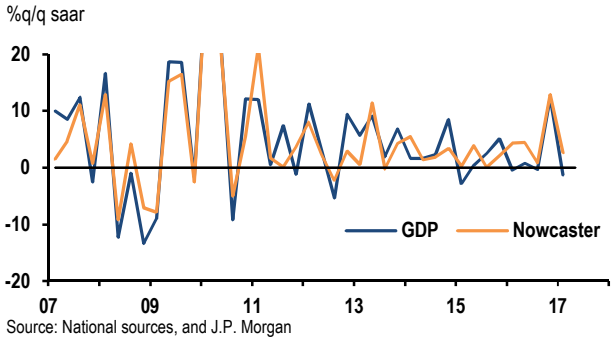
PMI manufacturing	1
PMI whole economy	17
Exports	24
IP	42
Retail sales	60

Source: National source, Bloomberg

While the nowcaster generally well traces the actual GDP growth outcome through quarterly volatility (Figure 20), the 1Q17 nowcaster missed to the upside (Figure 21). That is, although the nowcaster had adjusted down through 1Q (mostly reflecting weak IP readings), the final nowcaster marked 2.6%, whereas GDP declined 1.3%. Thus, IP was more useful to gauge the GDP pullback, and the official J.P.

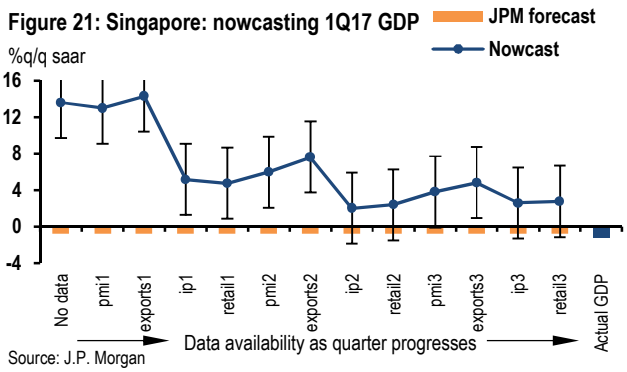
Morgan forecast (-0.8%) was correct in envisaging a contraction. To be sure, a prediction based solely on IP growth signaled a sharp slowing from 14.5%q/q saar in 4Q16 to 2.5% in 1Q, as IP slumped from 45.3%q/q saar growth to a 3.9% contraction (Figure 22). For the 2Q forecast, as the IP recovered in April-May period, the 2Q nowcaster tracks some upside risk to our 2.6% current forecast, but through some volatility within 2Q data points (Figure 23).

Figure 20: Singapore GDP and Nowcaster



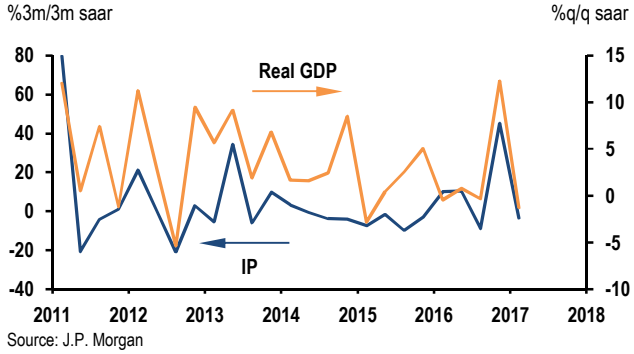
Source: National sources, and J.P. Morgan

Figure 21: Singapore: nowcasting 1Q17 GDP



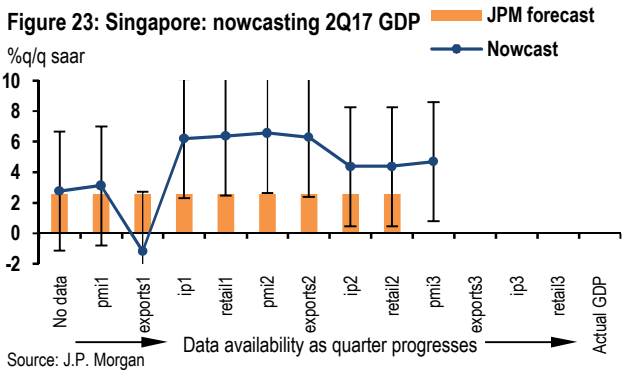
Source: J.P. Morgan

Figure 22: Singapore GDP and IP growth



Source: J.P. Morgan

Figure 23: Singapore: nowcasting 2Q17 GDP



Source: J.P. Morgan

Taiwan

In addition to the standard set of variables such as IP, retail sales and the manufacturing PMI, the Taiwan nowcaster model includes forward-looking export orders (Table 6). While the IP was helpful for generating a reasonable prediction, retail sales growth and the manufacturing PMI index were also significant in the forecasting equation. The recent track record shows that the nowcaster model overpredicted growth in 2H16, as actual GDP growth underperformed the pace implied by IP growth in recent quarters (Figure 24 and 25).

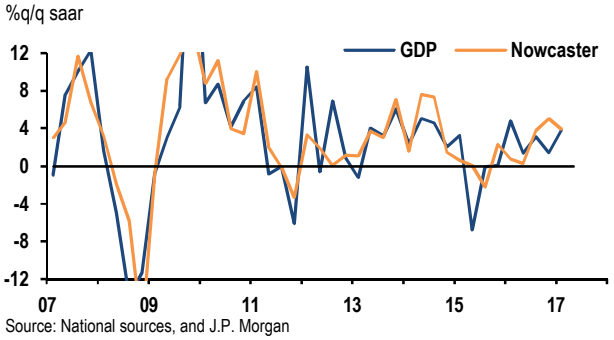
Table 6: Taiwan release of indicators

publication delay from reference period end - number of days

PMI manufacturing	-5
Exports	-3
Exports orders	1
IP	1
Retail sales	30

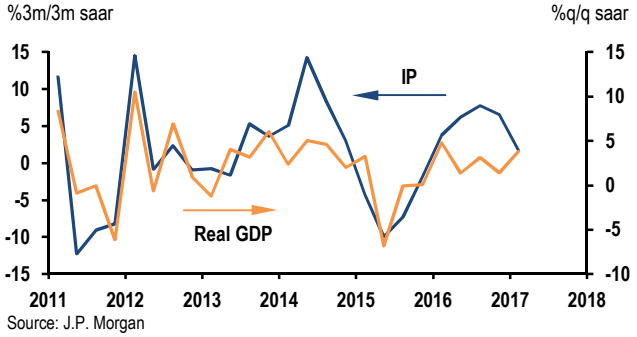
Source: National source, Bloomberg

Figure 24: Taiwan GDP and Nowcaster



Source: National sources, and J.P. Morgan

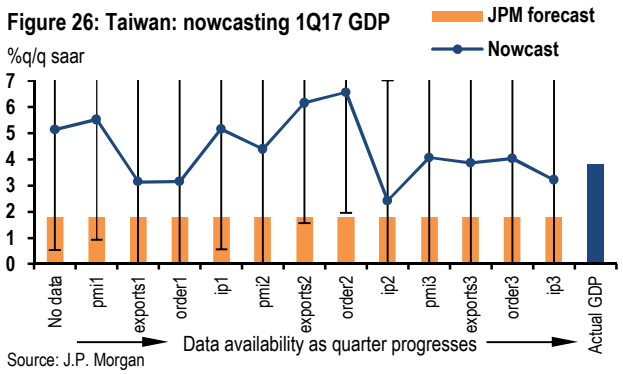
Figure 25: Taiwan GDP and IP growth



Source: J.P. Morgan

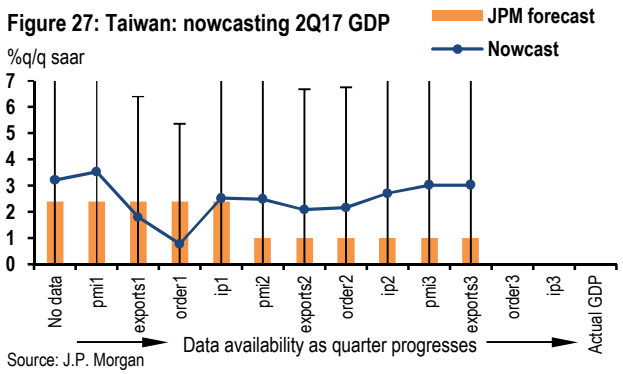
Through 1Q17, the nowcaster signaled upside risk to J.P. Morgan's 1.8%q/q, saar GDP growth forecast, driven largely by a sharp rebound in exports order and a recovery in exports. In the end, the nowcaster marked 3.2% growth, while the advanced GDP reading came in at 2.9%, with the final outcome at 3.8%, higher than the official forecast (Figure 26). In 2Q, the nowcaster forecast drifted down from a 3.2% initial growth estimate to 2.7%, higher than both the 2.7% initial J.P. Morgan forecast and 1.0% current forecast (Figure 27).

Figure 26: Taiwan: nowcasting 1Q17 GDP



Source: J.P. Morgan

Figure 27: Taiwan: nowcasting 2Q17 GDP



Source: J.P. Morgan

Meanwhile, it is worth noting that the trend in nowcaster directions has diverged rather notably from the trend in GDP growth in recent quarters: while the nowcaster has suggested slowing growth momentum since late 2016, actual GDP prints marked a solid growth pickup. In addition, the GDP manufacturing sector data may diverge from the monthly IP data, with the dichotomy partly reflecting offshore production by Taiwan manufactures.

Latin America

The aggregate nowcaster for Latin America is useful both for its timeliness, providing a forecast ahead of hard data releases, and strong fit. The R-squared of the nowcaster is even larger than those obtained in univariate regressions using IP or sentiment indicators.

Our LatAm nowcaster is built from the aggregation of six country-level nowcasters, including Brazil, Mexico, Argentina, Colombia, Peru and Chile. Of the other countries we forecast in our regional GDP sample, we exclude Uruguay and Ecuador, which together account for just 3% of the GDP in our aggregate regional forecast. (Neither JPM's aggregate Latin America GDP data nor the nowcaster include Venezuela, Bolivia, Paraguay and the Central American/Caribbean countries.) Importantly, the country-level nowcasters perform very well for the two largest economies in the region—Brazil and Mexico—which account for two-thirds of J.P. Morgan's regional GDP. Going forward, the nowcaster should provide us another tool to track our individual country forecasts and gauge momentum in the region as a whole.

The explanatory variables differ across countries, but generally have a few indicators in common, usually gauging supply-side growth. For instance, we use the main hard monthly activity data series for all countries: industrial production, retail sales and an economic activity index (proxy of monthly GDP). For most countries, we also include one or more measures of sentiment depending on data availability. For Brazil, we use one consumer sentiment indicator and five business sectors indexes (including the PMI), while for Chile, we have only the monthly business confidence. In addition, we added imports and exports for all countries, particularly since imports of capital goods are an important measure of investment for the LatAm countries.

For 1Q17, our nowcaster pointed to 3.6%q/q saar GDP growth with all the monthly activity data available (Figure 29), while actual growth in the quarter was 3.0%. The LatAm nowcaster also overestimated GDP growth by 1%-pt in 4Q16 and by 0.5%-pt in 3Q16.

For 2Q GDP growth, the J. P. Morgan forecast stands at 1.3%q/q saar growth, while our nowcaster points to a 1.6% expansion (Figure 30). The main difference here is on the Brazil estimate, where the nowcaster does not capture, in our view, the prospect of a late-quarter deterioration brought on by the recent political scandals.

Table 7: Latin America: J.P. Morgan Nowcaster, PMI and IP frameworks

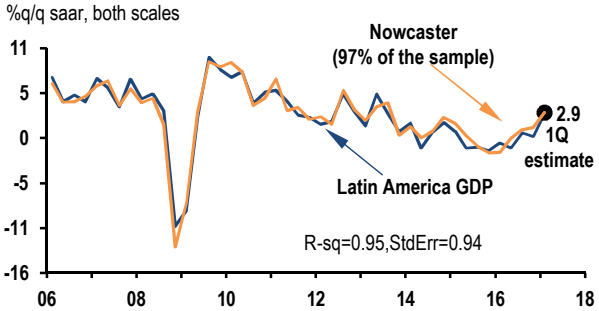
%q/q saar, sample: 1Q05-4Q16

		DFM-Nowcast	Fitted OLS	PMI	IP
Latin America	**R^2**	**0.91**		**0.50**	**0.83**
	Standard error	**1.14**		**2.12**	**2.62**
Brazil	R^2	0.88	0.89	0.57	0.76
	Standard error	1.86	1.75	3.76	2.55
Mexico	R^2	0.72	0.79	0.70	0.52
	Standard error	2.02	1.71	3.54	2.74
Argentina*	R^2	0.86	0.88	0.07	0.30
	Standard error	3.60	1.92	9.24	8.02
Colombia*	R^2	0.76	0.50	0.15	0.19
	Standard error	1.70	2.45	3.17	3.10
Chile*	R^2	0.69	0.65	0.32	0.49
	Standard error	2.37	2.54	3.53	2.59
Peru*	R^2	0.59	0.55	0.06	0.51
	Standard error	2.71	2.45	4.14	3.77

Source: J.P. Morgan
*Local confidence indicators instead of PMI
Note: PMI and IP are simple OLS of q/q saar GDP growth on q/q saar growth in IP or PMI quarterly average.

Figure 28: Latin America nowcaster

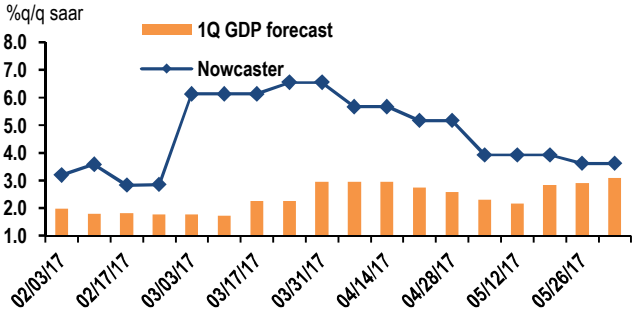
%q/q saar, both scales



Source: J.P. Morgan

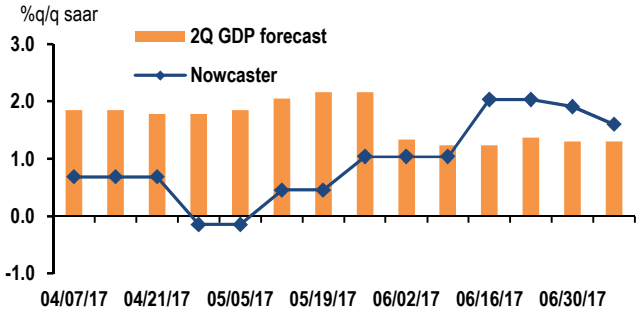
Figure 29: Latin America nowcasting 1Q17 GDP growth

%q/q saar



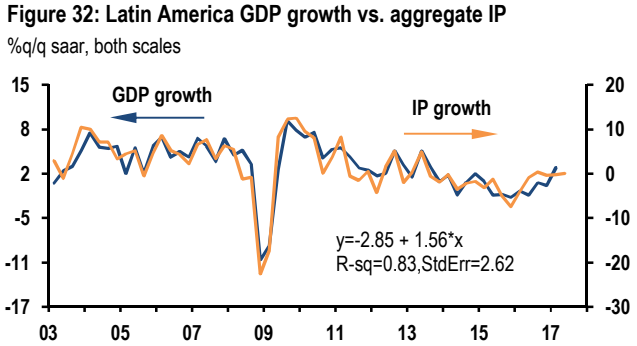
Source: J.P. Morgan

Figure 30: Latin America nowcasting 2Q17 GDP growth



Source: J.P. Morgan

Figure 32: Latin America GDP growth vs. aggregate IP



Source: J.P. Morgan

Brazil

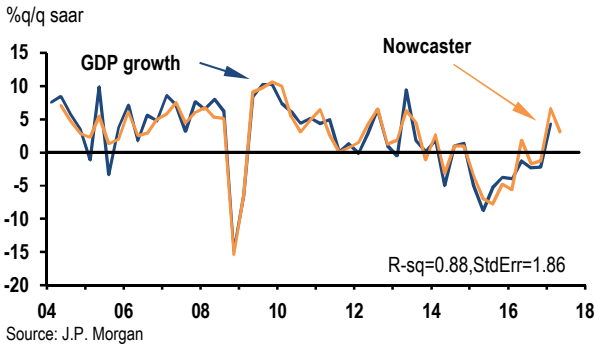
For Brazil, the nowcaster performs rather well: the R-squared of the model is 0.88, similar to the model we use to fine-tune our forecasts, and significantly above the predictive power of univariate equations using PMI or IP as explanatory variables (Figure 33). The advantage of this nowcasting framework relative to the standard models is that it gives a good estimate even before any hard data are available. Interestingly enough, the fit of all models (nowcaster and univariate) deteriorates in recent quarters, particularly last year. This may be due to political noise affecting sectors that are difficult to track with the available monthly indicators.

The nowcaster projected 1Q GDP growth at 6.6%q/q, saar, far above the 4.3% GDP release (Figure 34). Throughout the quarter, however, our forecasts—and the nowcaster prediction— changed significantly. At first, the nowcaster pointed to growth around 4%, but after the release of the upwardly revised January activity data, particularly services volume, it jumped to more than 10%q/q saar. The subsequent weak figures for February and March eased the estimated growth to 6.6%.

The nowcaster also over-predicted GDP growth in the previous three quarters. Nevertheless, the nowcaster correctly signaled upside risk to our official forecast for 1Q, which was revised first from 0.7% to 1.9%, and then to 3.8% after the release of all main activity data.

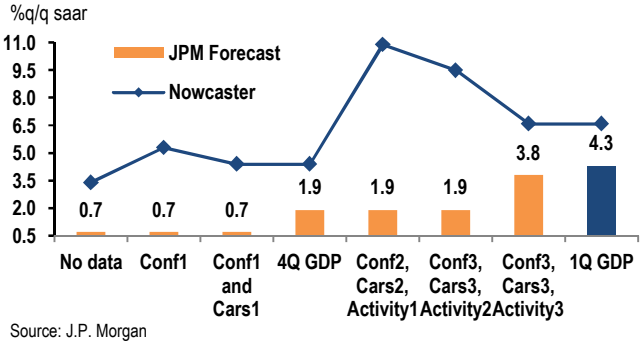
According to the nowcaster, GDP increased 1.7%q/q, saar in 2Q, far from our forecast of a 1.0% contraction (Figure 35). We still have reasons to believe that activity declined during the quarter. One of the reasons is that 1Q GDP growth was solely based on inventory accumulation. Second, political uncertainty related to fate of the Temer presidency and the much-anticipated reform agenda is expected to have hit growth in June.

Figure 33: Brazil nowcaster and GDP growth



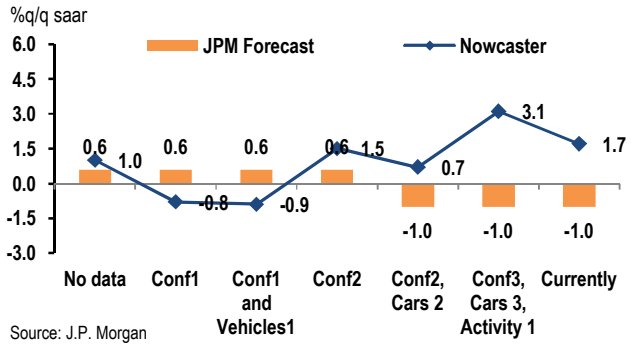
Source: J.P. Morgan

Figure 34: Brazil nowcasting 1Q17 GDP growth



Source: J.P. Morgan

Figure 35: Brazil nowcasting 2Q17 GDP growth



Source: J.P. Morgan

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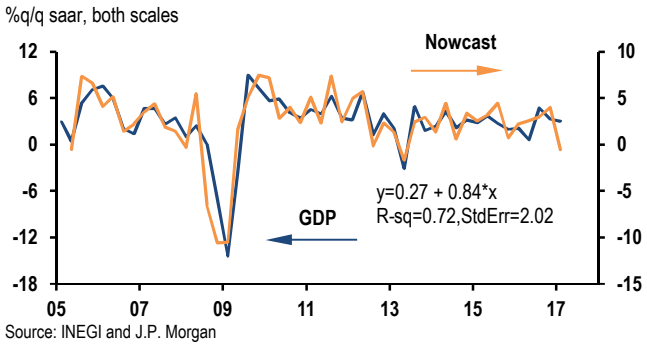
Mexico

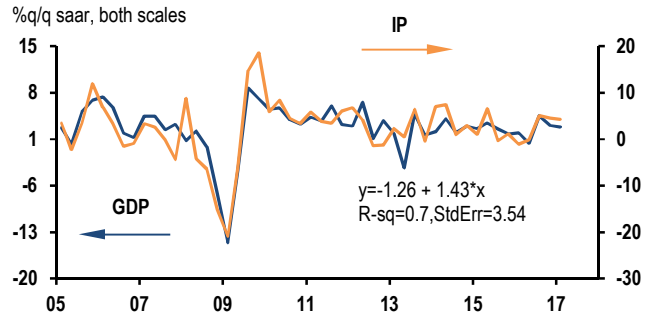
Mexico's nowcaster model adds little to our existing tracking frameworks when it comes to forecasting actual GDP. The nowcaster's fit is looser than that of our OLS framework and similar to that obtained when regressing GDP solely on IP, although the nowcaster's standard error is significantly lower than that of GDP regressed solely on IP (Figures 36 and 37).

Figure 36: Mexico Nowcaster and GDP growth



Source: INEGI and J.P. Morgan

Figure 37: Mexico GDP and IP

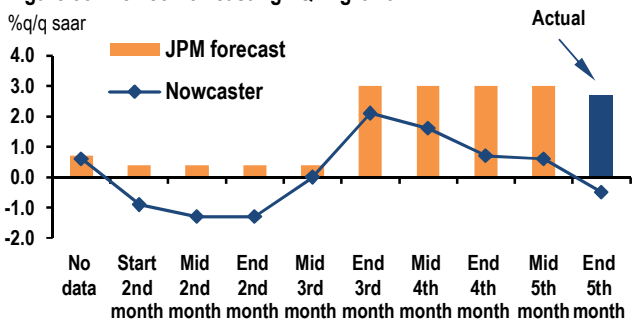


Source: INEGI

These results do not imply that the nowcaster model lacks value; quite the contrary. While the nowcaster's fit is no better than that of other tracking frameworks, its value rests on its ability to signal risks around our modal forecast, particularly early in the data cycle, but also well into it. For example, though the nowcaster point estimate of 1Q growth far undershot the final outcome (-0.5% saar vs 2.7%), the model did reflect downside risks early in the quarter and accurately shifted higher as hard data panned out much better than the soft data had signaled.

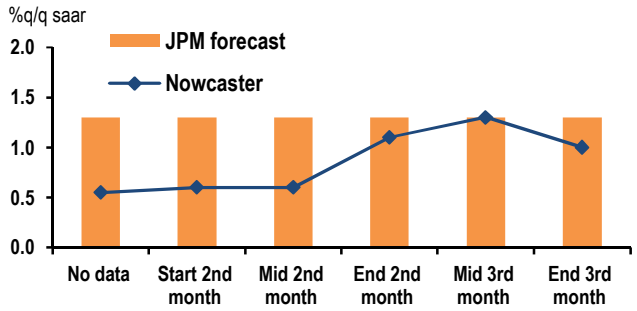
Similarly, although the degree of the nowcaster's undershoot of actual GDP growth was large, it accurately predicted the loss of economic momentum toward the end of 1Q (Figure 38). Both IP and the GDP proxy downshifted toward the end of the last quarter, leaving activity on a weak footing going into 2Q.

Figure 38: Mexico nowcasting 1Q17 growth



Source: J.P. Morgan

Figure 39: Mexico nowcasting 2Q17 growth



Source: J.P. Morgan

As soft data rolled in early in 2Q, the nowcaster held at low levels, forecasting virtually no growth in 2Q. Again, while the nowcaster pointed to growth below our forecast early in the quarter, it did signal, in accordance with our call, that activity weakened going into 2Q. Hard data since then have been encouraging, with manufacturing output jumping in April, followed by gains in retail sales and monthly GDP data more recently. The nowcaster was prompt to adjust the balance of risks, pointing to virtually no risk to our 1.3% saar growth forecast for this quarter (Figure 39). Following the impressive surge in both the manufacturing and the non-manufacturing PMIs, the nowcaster jumped to signal growth at 2.7% through June. But the nowcaster, as it did in 1Q, tends to overact to shifts in the PMIs which are not necessarily reflected in hard data later on. At any rate, the jump in the nowcaster adds credence to our view that growth might have downshifted in 2Q but did not fall apart.

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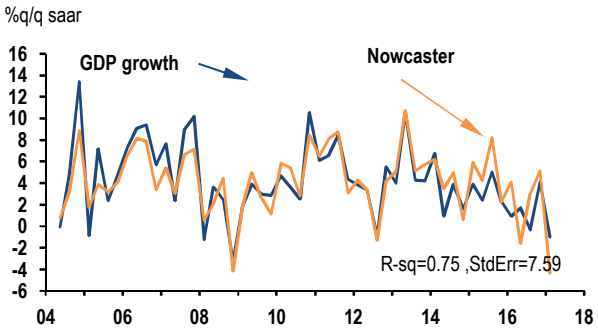
Colombia

Colombia's GDP growth slumped to a 0.9%q/q, saar contraction in 1Q17, closely in line with J.P. Morgan's -1% call. The nowcaster is the better model-based predictor of Colombian GDP growth with an R^2 of 0.75, compared to 0.49 for the multivariate OLS regression and extremely low predictive value for estimates based on industrial production or confidence (Figure 40). Interestingly, the nowcaster correctly suggested a sequential contraction after incorporating January's consumer confidence index, the first input to the 1Q nowcast (Figure 41). At that point, our growth forecast could have been marked down. In general, we concur that confidence indicators have limited predictive value and rely on activity data to provide a better gauge on GDP (Figure 42). Nonetheless, the sharp drop-off in confidence this month likely led the weak performance of other indicators.

Before any hard data releases, the nowcast predicted 1%q/q, saar growth, in line with J.P. Morgan's initial forecast. However, as the quarter progressed, the nowcaster gradually slipped to a 3% contraction, eventually finishing the quarter's data cycle at -4.3%q/q, saar significantly weaker than the 0.9%q/q, saar realized and J.P. Morgan -1% point forecast. The nowcast also misjudged growth for most of 2016.

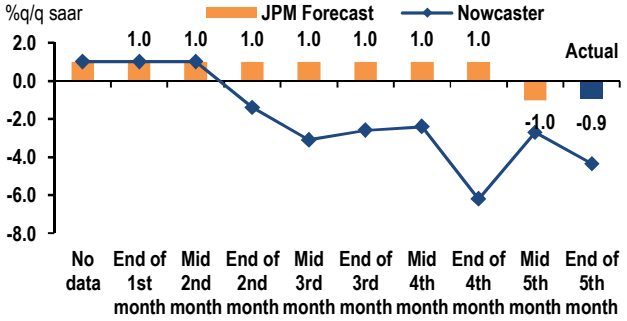
For 2Q17, the nowcaster forecasts another quarterly contraction at -3.5%q/q, saar after incorporating April's economic data, while we look for 3% growth (Figure 43). April's activity data were particularly weak, biasing the model projection downwards. We deviate from the nowcaster, first because of the large miss in 1Q and the implication that the model seems to be misjudging 2Q momentum. Second, we attributed disappointing 1Q growth to the shock to consumption from the 3%-pt VAT hike that took effect during the quarter. Since the VAT impact should have passed, we expect growth momentum to increase. With that said, the downward movement in the nowcaster forecast could signal downside risks to our forecast, suggesting a less robust pick-up in 2Q.

Figure 40: Colombia Nowcaster and GDP growth



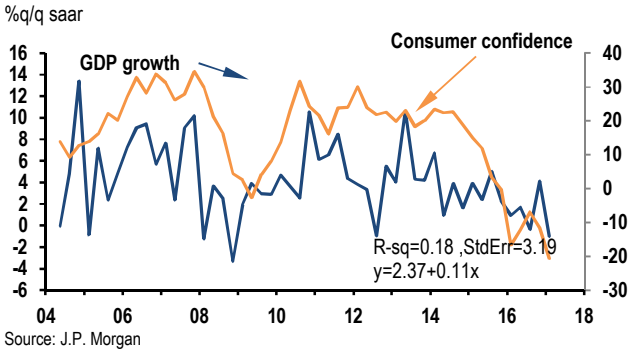
Source: J.P. Morgan

Figure 41: Colombia nowcasting 1Q17 GDP growth



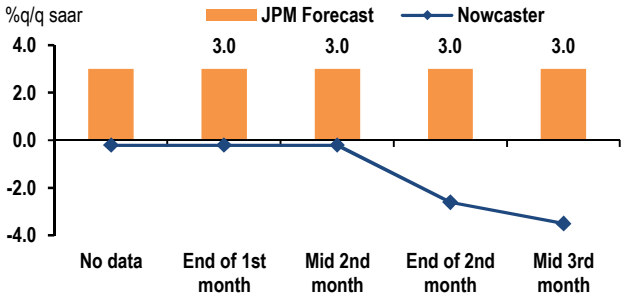
Source: J.P. Morgan

Figure 42: Colombia consumer confidence and GDP growth



Source: J.P. Morgan

Figure 43: Colombia 2Q17 GDP growth nowcast



Source: J.P. Morgan

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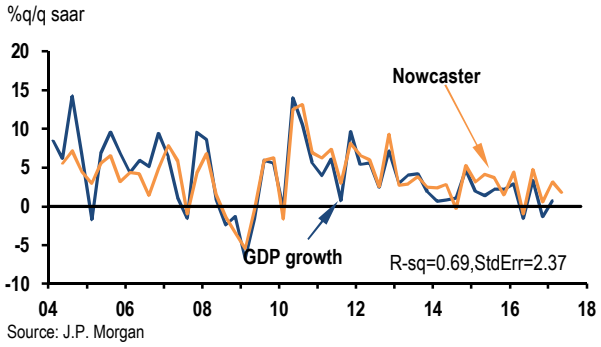
J.P.Morgan

Chile

As in most of the LatAm countries, the nowcaster outperforms others as a predictor for quarterly GDP growth in Chile among the selected equations. However, the nowcaster R^2 is on a 0.70 handle (Figure 44). An OLS regression with selected explanatory variables has an R^2 0.65, while IP alone explains less than 50% of the variation in GDP growth. There is no manufacturing PMI for the country, but if we use a local confidence indicator—the monthly business confidence (IMCE)—in a univariate equation, the predicting power is even lower.

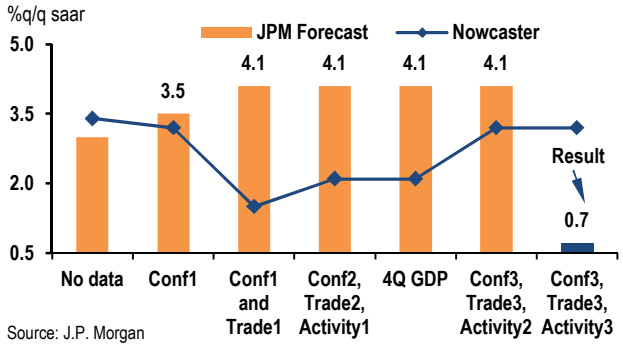
Figure 44: Chile nowcaster and GDP growth



Source: J.P. Morgan

The nowcaster's performance in tracking 1Q GDP, however, was disappointing. This framework pointed to a 3%q/q saar GDP increase in 1Q, when, in fact, the result was 0.7% (Figure 45). It is true that the nowcaster overestimated GDP growth during 2016, but the 1Q17 print was even lower than the minimum of the nowcaster's estimate through last quarter's data cycle.

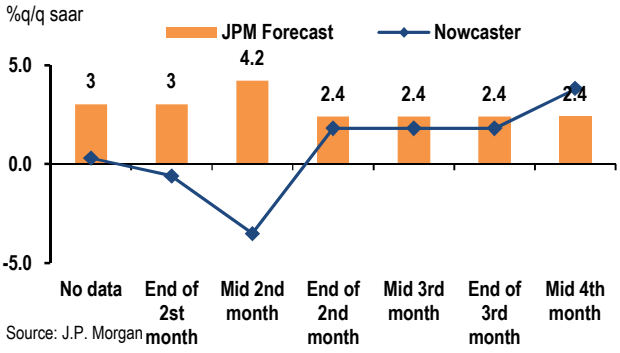
Figure 45: Chile nowcasting 1Q17 GDP growth



Source: J.P. Morgan

For 2Q, the nowcaster is sending mixed messages (Figure 46). At the start of the data cycle, it projected a GDP contraction. But, after the recent hard activity data were released, it is running at 3.8%. This estimate is once again above the 2.4%q/q saar J.P. Morgan forecast incorporating a rebound from the weak print of 1Q.

Figure 46: Chile nowcasting 2Q17 GDP growth

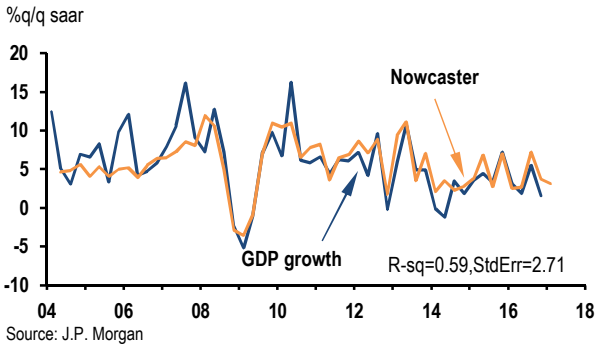


Source: J.P. Morgan

Peru

The predictive power of the various tracking frameworks for Peru is relatively low in all cases. The nowcaster stands above the rest with a 0.59 R^2, followed closely by the multivariate OLS and univariate IP-based model at 0.55 and 0.51, respectively. In general, the tracking frameworks capture the growth trend but misses on the magnitude of GDP swings. Confidence indicators have very low predictive power for growth, according to our analysis.

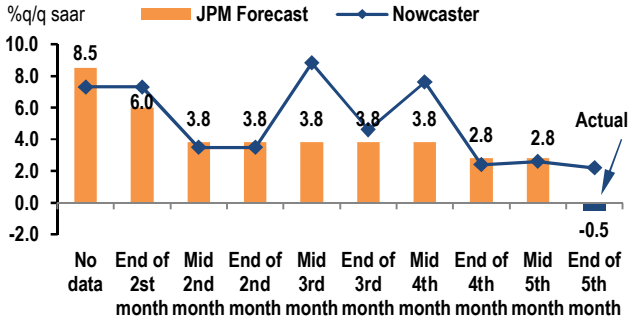
Figure 47: Peru nowcaster and GDP growth



Source: J.P. Morgan

Peru's growth slowed significantly in 1Q17, on the back of two unforeseen, powerful shocks that buffeted the economy: the fallout of corruption allegations that stalled several public investment projects and, even more so, El Niño-related weather that damaged transport networks. The nowcaster with no hard data started the quarter at 7.3%q/q, saar GDP growth, close to our own call at 8.5%. Yet, as the quarter progressed and both shocks began to weigh down activity, both our forecast and the nowcaster tracked downwards. The nowcast and our forecast finished relatively in line: the nowcast looked for 2.2%q/q, saar and we forecast 2.8%. Both, however, significantly missed the 0.5% contraction due to the drag from the dual shocks (Figure 48).

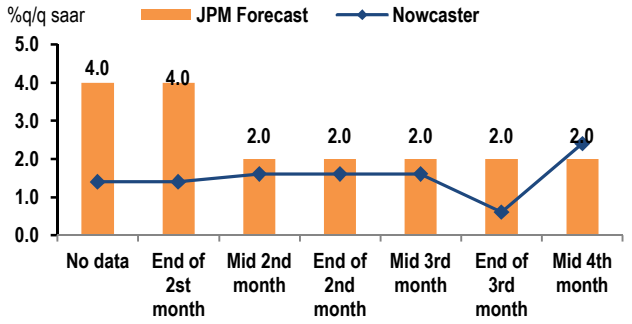
Figure 48: Peru nowcasting 1Q17 GDP growth



Source: J.P. Morgan

Our nowcaster forecasts an improvement in growth to 2.4%q/q saar in 2Q17, a touch above our 2% forecast (Figure 49). The main shock to 1Q growth, the coastal El Nino, has begun to fade, and we expect a tepid recovery to take hold in 2Q, in part capturing a base effect. A lingering impact from El Nino dampened the pick-up in April's activity data. April's slow start, combined with our expectation that reconstruction projects are delayed until 2H, leads us to look for a limited rebound in 2Q17.

Figure 49: Peru 2Q17 GDP growth nowcast



Source: J.P. Morgan

EMEA EM

The EMEA EM nowcaster tracks seven key economies in the region. We use data from industries and survey indicators to produce estimation-based frameworks for GDP growth. The regional nowcaster captures 77% of the variation in EMEA EM GDP growth from 2004Q1 to 2016Q4 (Table 8 and Figure 50), notably more than our PMI- and IP-based estimates—this increases to 92% if we exclude Turkey.

In addition to the real-time signaling of direction of risks, the regional nowcaster captures the underlying trend from country-specific high-frequency data. The availability of extensive high-frequency data for both South Africa, with an all-economy PMI, and Russia, with a five-sector output index, results in the respective country nowcasters explaining 86% and 88% of the variation in their GDP growth, higher than the other countries in the region (Table 8). Most countries lack a reliable service sector indicator, and thus, we use several confidence indicators for services as substitutes. All EMEA country nowcasters tend to outperform our PMI/IP frameworks, with the added timeliness advantage.

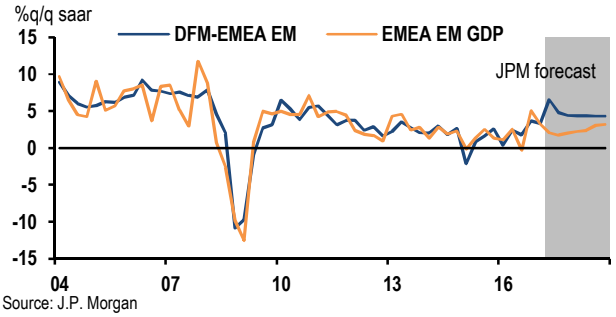
Looking back at 1Q17, the nowcaster tracked EMEA EM GDP growth at 2%q/q saar, below the 3.2% outturn (Figure 51). However, the nowcaster currently points to regional growth picking up to 6.9%q/q saar for 2Q17, signaling considerable upside risk to our 2.8% forecast (Figure 52). This is on the back of all country nowcasters in our region, except Czech Republic and Poland, signaling higher growth. According to the nowcasters, the most significant upside risks to our forecasts are in Russia, Turkey and Romania.

Table 8: EMEA EM: J.P. Morgan Nowcaster, PMI and IP frameworks

		Nowcast	Multivariate OLS	PMI	IP
EMEA EM	R-sq	**0.77**	-	0.70	0.63
	Standard error	**2.06**	-	2.38	2.64
Czech Rep	R-sq	**0.79**	0.72	0.62	0.36
	Standard error	**1.82**	2.18	2.46	3.19
Hungary	R-sq	0.77	**0.84**	0.37	0.59
	Standard error	2.00	**1.76**	3.31	2.66
Poland	R-sq	**0.53**	0.37	0.20	0.31
	Standard error	**1.79**	2.11	2.32	2.17
Romania	R-sq	**0.67**	0.67	-	0.19
	Standard error	**3.42**	3.63	-	5.44
Russia	R-sq	**0.88**	0.84	0.69	0.65
	Standard error	**2.16**	2.47	3.39	3.63
S Africa	R-sq	**0.86**	0.72	0.34	0.45
	Standard error	**1.04**	1.51	2.27	2.09
Turkey	R-sq	**0.52**	0.40	0.18	0.35
	Standard error	**5.90**	3.85	9.00	7.98

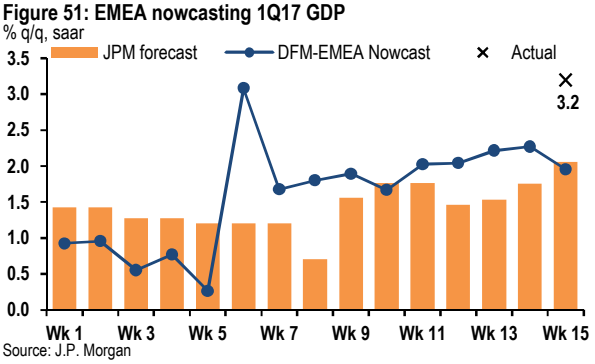
Note: PMI and IP are simple OLS of q/q saar GDP growth on q/q saar growth in IP or PMI quarterly average. Std errors expressed in %q/q saar. Sample: 2004Q1-2016Q4

Figure 50: EMEA EM GDP and nowcaster



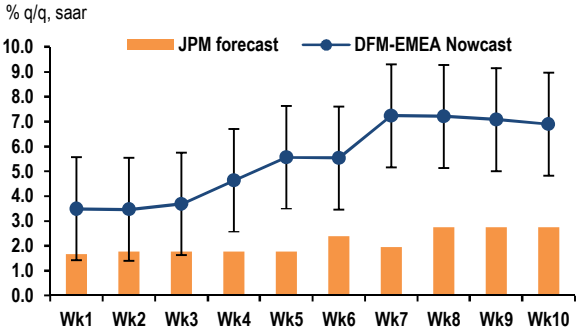
Source: J.P. Morgan

Figure 51: EMEA nowcasting 1Q17 GDP



Source: J.P. Morgan

Figure 52: EMEA nowcasting 2Q17 GDP



Source: J.P. Morgan

Czech Republic

In the case of Czech Republic, the nowcaster tracks growth better than our other three frameworks: explaining 79% of the variation in GDP growth from 1Q04 to 4Q16. The Czech Republic nowcaster extracts the movement that is common across several monthly indicators, including retail sales, German IFO business confidence, and the PMI, and gives additional weight to idiosyncratic indicators with high explanatory power (Table 9).

Table 9: Czech Rep. release of indicators
publication delay from reference period end - number of days

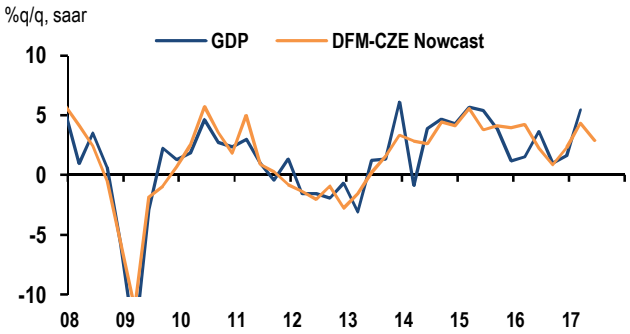
Business confidence indicator *	-5
Consumer confidence indicator *	-5
Service sector confidence indicator *	-5
German IFO business climate index *	-5
PMI (manufacturing) *	1
Retail sales *	36
IP	37
Construction output	37
Exports	45

Source: National source, Bloomberg. Note: * denotes additional weight in nowcaster

The four consecutive upward revisions to the 1Q17 nowcaster estimate helped gauge in real time when and to what extent was there upside risk to our forecast. The upside risk highlighted by the nowcaster reflected strong IP, PMI, and retail trade data released in the three months. After the nowcaster stabilized at around 5% q/q saar, we calibrated our forecast upwards from 2.3% to 4.4%.

A synthetic exercise to account for the information flow in real time provides an estimate as to when the real-time fit converges to the full-sample fit. For the Czech nowcaster, there is little to no improvement on the nowcast estimate after the third release of confidence indicators for the quarter, i.e. seven weeks before the preliminary GDP print. This is observed in the evolution of the 2Q17 nowcast estimate as the forecast did not vary after the second month of data releases (Figures 53 and 54).

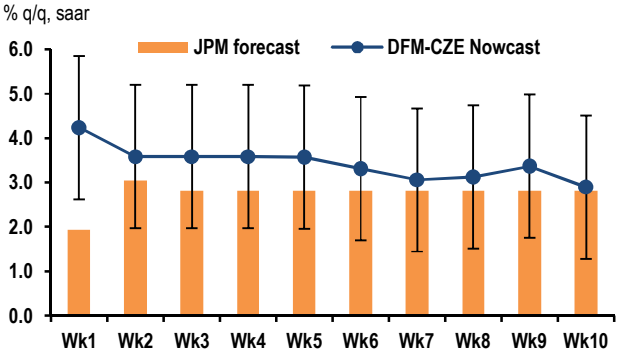
Figure 53: Czech Rep GDP and Nowcaster



Source: National statistic office, J.P. Morgan

Our Czech nowcaster points to 2.6 % q/q saar growth in 2Q17, close to our 2.8% q/q saar estimate (Figure 54). However, after the strong IP and retail sales releases in May, alternative single-equation tracking estimates point to significantly higher numbers, and this, together with strong performance in the German industrial sector, suggests risks are clearly skewed to the upside.

Figure 54: Czech Rep nowcasting 2Q17 GDP

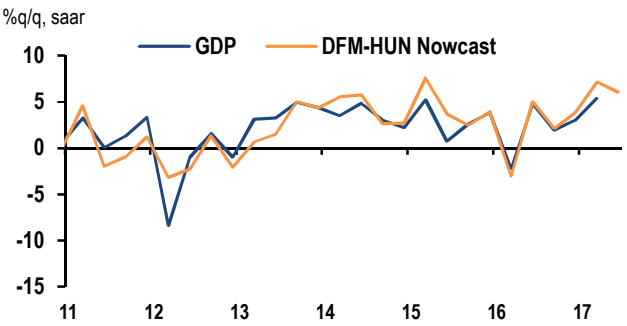


Source: J.P. Morgan

Hungary

Our nowcaster for Hungary tracks growth better than IP or the PMI, explaining 77% of the variation in GDP growth from 1Q04 to 4Q16, but fares worse than our multivariate framework (Figure 55). However, the nowcaster provides an estimate of current growth two months before the first multivariate estimate. The Hungary nowcaster extracts the movement that is common across several monthly indicators, including the GKI economic sentiment index, retail sales, construction output, industrial output and services confidence, and gives additional weight to idiosyncratic error terms judged to have high explanatory power (Table 10).

Figure 55: Hungary GDP and Nowcaster



Source: National statistic office, J.P. Morgan

Table 10: Hungary release of indicators
publication delay from reference period end - number of days

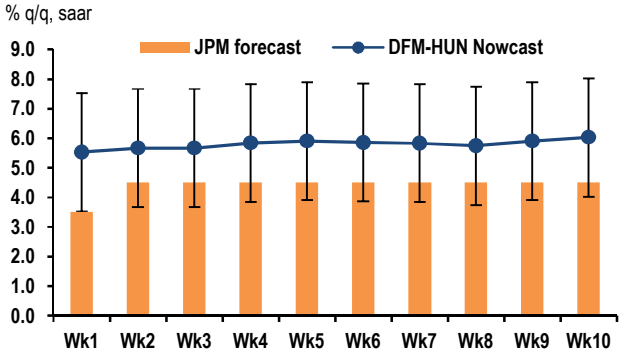
GKI-Erste economic sentiment index	-11
German IFO business climate index	-5
Service sector confidence indicator	-1
Economic sentiment indicator *	-1
PMI (manufacturing)	1
IP *	37
Exports	44
Construction *	46
Retail sales	54

Source: National sources, Bloomberg. Note: * denotes additional weight in nowcaster

Looking back at 1Q17, the nowcaster estimate was above the actual 5.3 %q/q saar outturn. However, it correctly signaled upside risks to our forecast very early on in the quarter. At first the nowcaster pointed to growth slightly below 5% with the projection rising slowly throughout the quarter; our forecasts adjusted in a similar manner. While the nowcaster steadied around 6 %q/q saar, we revised our forecast upwards from 3.5% to 5% on the back of positive spillover from robust growth in Germany as reflected by the jump in the IFO and Germany's manufacturing PMIs.

The nowcaster for 2Q17 signals moderate upside risk to our forecast. We forecast GDP growth to ease to 4.5%q/q, saar in 2Q versus the 6.1% nowcaster projection (Figure 56). The PMI increased over the quarter but the IP data through May were in line with our forecasts, showing mild deceleration in sequential growth after an exceptionally strong 1Q. Considering also that the nowcaster has recently overstated growth and that our forecast is well inside the 68% confidence interval of the nowcast, we are comfortable retaining our forecast.

Figure 56: Hungary nowcasting 2Q17 GDP



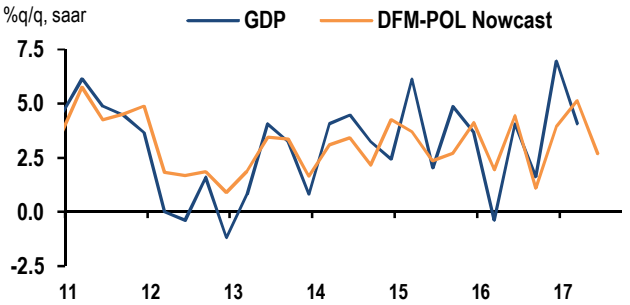
Source: J.P. Morgan

Poland

Our country-level nowcaster for Poland tracks growth better than the PMI, IP and multivariate equations, but still explains only 53% of the variation in sequential GDP growth from 1Q04 to 4Q16. However, the nowcaster provides an estimate of current growth nearly a month before the multivariate equation, which has the next best fit. We believe the inability to capture just under half of the variation in sequential GDP growth through the nowcaster is in part due to the high volatility of the seasonally adjusted data published by the statistical office (Figure 57). Indeed, the fit improves substantially using over-year-ago data. The results are also rather sensitive to the precise estimation sample.

Our Poland nowcaster extracts the trend that is common across the nine monthly indicators listed in Table 11 and gives additional weight to industrial output and service sector confidence data due to their high explanatory power in the sample. Looking back to the 1Q print, the nowcaster overestimated GDP growth. At first the nowcaster pointed to growth slightly above 4.5% q/q saar, then steadied around 5% after the release of strong activity data for the first month of the quarter. We made a smaller upward revision to our forecast to 4% q/q saar as we rightly assessed that the survey data overstated actual growth. The statistical office subsequently revised up 1Q17 GDP growth to 4.5%q/q saar, bringing it even closer to the nowcast estimate.

Figure 57: Poland GDP and Nowcaster



Source: National statistic office, J.P. Morgan

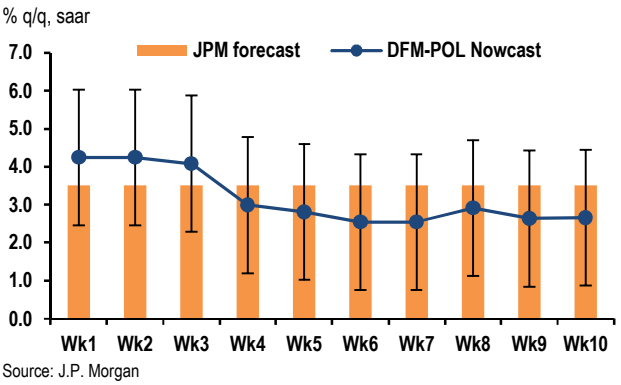
Table 11: Poland release of indicators

publication delay from reference period end - number of days

Consumer confidence indicator	-6
Manufacturing climate	-5
Economic sentiment indicator	-1
Service confidence indicator *	-1
PMI (manufacturing)	1
Construction	19
IP *	19
Retail sales	19
Exports *	43

Source: National source, Bloomberg. Note: * denotes additional weight in nowcaster

Figure 58: Poland nowcasting 2Q17 GDP



Source: J.P. Morgan

Our nowcaster points to a loss of growth momentum to 2.7%q/q, saar in 2Q17, signaling downside risk to our forecast (JPMe: 3.5%, Figure 58). However, we are cautious

about revising our forecast due to the volatility of quarterly GDP and because we expect growth momentum to increase in the rest of the quarter, helped by strengthening momentum in Euro area growth and because investment did not rebound meaningfully in 1Q17, in contrast to the rest of the region.

Romania

Our Romania nowcaster tracks about 67% of the variance in GDP growth from 1Q04 to 4Q16, similar to the multivariate framework though with a 5.5% q/q saar reduction in the standard error. The timeliness benefit of the nowcaster vis-à-vis a multivariate framework is especially notable in Romania as hard data for the respective month is released with over a month and a half of delay (Table 12). As a result, the nowcaster provides a good estimate of growth in the current or most recent quarter without having to wait for all the hard data releases (Figure 59).

Table 12: Romania release of indicators

publication delay from reference period end - number of days

German IFO business climate index	-5
German IFO business expectations index *	-5
Major purchases in next 12 months indicator	-1
Economic sentiment indicator *	-1
Service confidence indicator	-1
Construction confidence	-1
Retail sales	36
IP *	43
Exports *	42

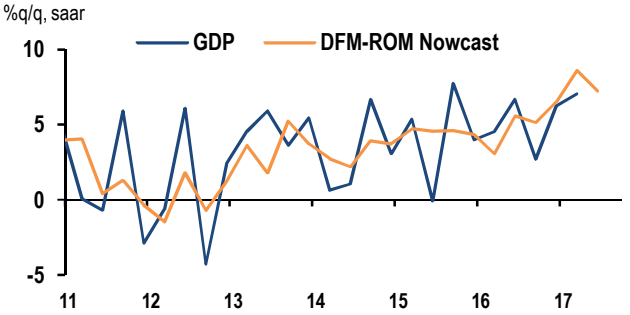
Source: National source, Bloomberg. Note: * denotes additional weight in nowcaster

The PMI survey is not available in Romania, so we rely on other country-specific sentiment indicators, such as the broad economic sentiment index, a measure of confidence for services, and the major purchases index to gauge activity in the business and consumer sector. We additionally consider the impact of Romania's main trading partners proxied through the IFO index, a measure of the business climate in Germany.

Throughout the first quarter of the year, our Romania nowcaster remained fairly stable, hinting to growth slightly below 6.0% q/q saar compared to the strong realized print of 7.1%q/q, saar.

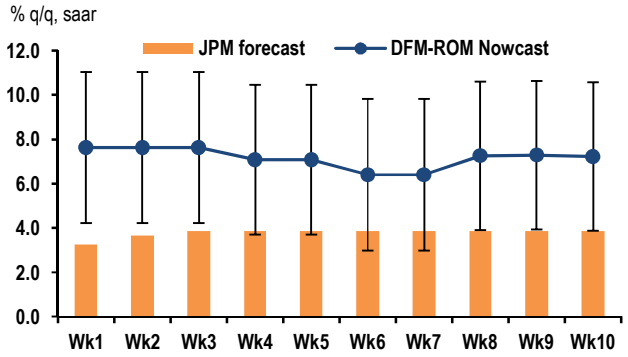
The nowcaster points to growth remaining strong at 7.2%q/q, saar in 2Q17 (Figure 60). This is higher than our 3.5% current forecast, which lies at the bottom of the nowcaster's 68% confidence interval. April activity data have come in on the weak side, but May was very strong for both IP and retail sales. The upside risk to our forecast is now clear, but given the strong print in 1Q17, we intend to maintain the current 2Q forecast until activity data for June is released. Also, GDP growth in 1Q was driven to a significant extent by a large positive statistical discrepancy, and we expect a reversal for that measure in 2Q.

Figure 59: Romania GDP and Nowcaster



Source: National statistic office, J.P. Morgan

Figure 60: Romania nowcasting 2Q17 GDP



Source: J.P. Morgan

Russia

The Russia nowcaster is a good tracker of real-time GDP growth due to the availability of monthly basic sector output indicators published by the statistical office (Figure 61). The dynamic factor model explains 88% of the variation in % q/q saar growth from 1Q04 to 4Q16, better than the other three frameworks included in our analysis. The country-specific inputs for the nowcaster, in addition to the five-sector index, include PMI survey data, business confidence indicators and industrial output. We put extra weight on the services PMI survey to make up for the fact that the five-sector index is skewed toward primary and secondary sectors (Table 13).

Assessing the nowcaster's real-time forecasting ability for 1Q17 GDP highlights the importance of not relying on the point estimate per se, but of also using it as a signal of risk to our economists' forecasts. The initial estimates of around 5-6%q/q, saar growth reflected the strong January momentum of the five sector index (reversing a three-month negative trend) and upbeat PMI survey results. However, this was

slowly revised lower as IP data painted a less constructive picture. We revised our official forecast slightly to the upside throughout the quarter and the nowcaster ended converging to our forecast with both slightly below the 2.6 %q/q, saar 1Q17 GDP growth print.

Table 13: Russia release of indicators

publication delay from reference period end - number of days

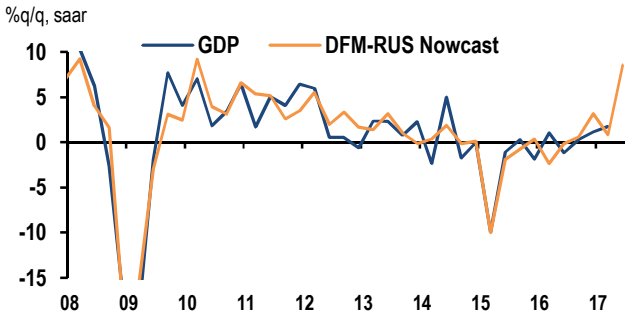
Business confidence indicator	-1
PMI (manufacturing)	1
PMI (services) *	1
IP *	16
Retail sales *	20
Five sector index	32

Source: National source, Bloomberg. Note: * denotes additional weight in nowcaster

We conducted a synthetic exercise to highlight the improvement in the nowcaster's tracking as new data for the first two months of the quarter become available. Similarly to the evolution of the 1Q17 nowcaster estimate, the late data releases for the quarter do not significantly improve the nowcaster's growth tracking as measured by the standard error.

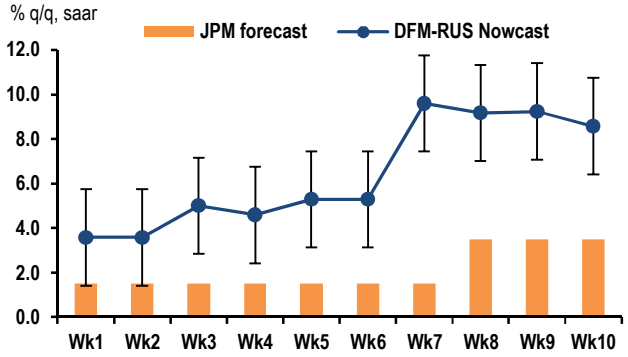
The nowcaster points to 8.6 %q/q saar GDP growth in 2Q17 (Figure 62). The upward adjustment in week 7 was due to data surprising substantially to the upside, with the May IP growth the highest in the series' history (Figure 62). We acknowledged that the strong sequential data points to upside risk and adjusted our forecast to 3.5% q/q saar (from 1.5% previously).

Figure 61: Russia GDP and Nowcast



Source: National statistic office, J.P. Morgan

Figure 62: Russia nowcasting 2Q17 GDP



Source: J.P. Morgan

South Africa

The South Africa nowcaster tracks 86% of the variation in GDP growth from 1Q04 to 4Q16, better than the other three frameworks and with a 30% reduction in the standard error compared to the multivariate model.

In South Africa, the nowcaster extracts the latent variable that is common across several monthly indicators, such as confidence indicators and output data, while giving additional emphasis to mining production as its tends to drive short-term swings in economic activity (Table 14).

Table 14: South Africa release of indicators

publication delay from reference period end - number of days

PMI (manufacturing)	1
Business confidence indicator *	7
All-economy PMI	5
Electricity production	31
Mining production *	38
Manufacturing production *	38
Wholesale production *	38
Business cycle indicator	80
Retail sales	80

Source: National source, Bloomberg. Note: * denotes additional weight in nowcaster

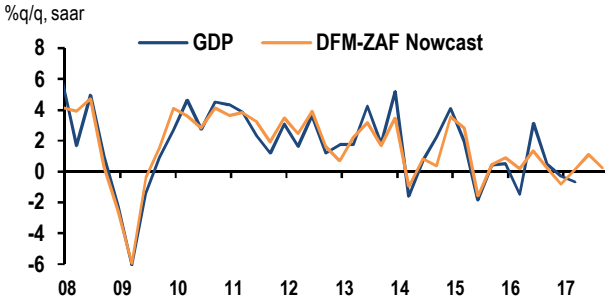
Looking back to 1Q17, the nowcaster signaled downside risk to our official forecast during the first two months of the tracking period but converged to our 1% q/q saar estimate following a pick-up in primary and secondary sector activity data, especially in the mining sector. While the 0.7% q/q, saar GDP contraction did reflect a 0.7 %-pt boost from the primary and secondary sectors, the nowcaster did not signal the striking 2% q/q saar contraction in the tertiary sector.

Our South Africa nowcaster currently points to 1.1% q/q, saar GDP growth in 2Q17 (Figure 64). However, we believe the risks are tilted to the downside in South Africa as both the

manufacturing and services PMI came in on the weak side in June and the 2Q average is below that for 1Q for both indicators. We maintain our 0.8% q/q, saar estimate for 2Q17.

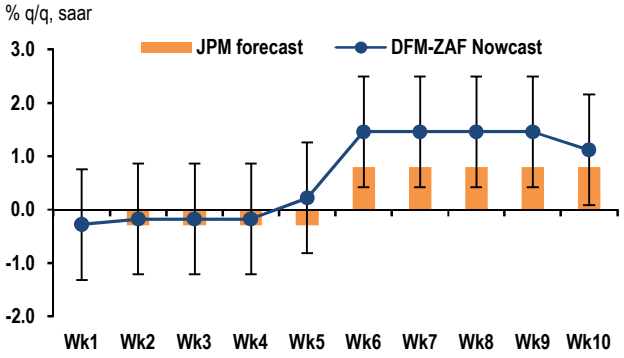
The key difficulty with the nowcaster for South Africa is the impact of political uncertainty following the cabinet reshuffle and ratings downgrade and ahead of highly anticipated year-end ANC elections. The nowcaster also struggled to capture any of the tertiary sector weakness because historically the primary and secondary sectors rather than the tertiary sector accounted for growth variability. However, this is potentially changing as the 1Q17 growth swing stemmed from the services sector—the nowcaster will calibrate over time to capture this as historically it did not matter as much.

Figure 63: South Africa GDP and Nowcaster



Source: National statistic office, J.P. Morgan

Figure 64: South Africa nowcasting 2Q17 GDP



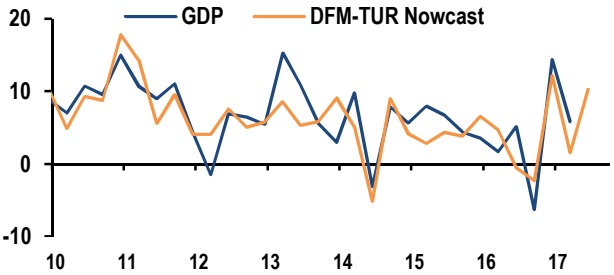
Source: J.P. Morgan

Turkey

We face several severe challenges in tracking growth in Turkey: very volatile quarterly GDP growth, the recent rebasing of GDP from 1998 to 2009, which resulted in a 20% upward revision to 2015 oya growth, and large revisions by the statistical office (e.g. the 4Q16 GDP release raised 2Q16 growth by 0.8%-pt and 3Q16 by 0.5%-pt in oya terms). Notwithstanding these complications, our Turkey nowcaster tracks 52% of the variation in % q/q, saar GDP growth from 1Q04 to 1Q17 (Figure 65), a similar range as our multivariate framework with the added benefit of providing a real-time signal of risks to our forecast.

Figure 65: Turkey GDP and Nowcaster

% q/q saar



Source: National statistic office, J.P. Morgan

Table 15: Turkey release of indicators

publication delay from reference period end - number of days

GDP growth expectation survey	-17
Consumer confidence indicator *	-12
Capacity Utilization: Consumer Goods	-7
Service sector confidence indicator *	-7
Construction sector confidence indicator	-7
Real sector confidence indicator	-7
Retail trade confidence indicator	-7
Economic confidence indicator	-4
PMI (manufacturing)	1
PPI *	5
Car production	8
Retail sales	38
IP	38
Total industry: Domestic turnover *	43

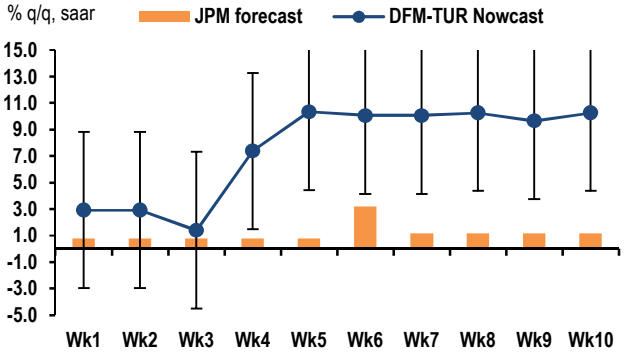
Source: National source, Bloomberg. Note: * denotes additional weight in nowcaster

Our Turkey nowcaster signals a growth rebound towards 10.3 % q/q saar in 2Q17, much higher than our 3.2% current estimate (Figure 66). However considering nowcaster did not signal the surprise 5.8% q/q, saar GDP growth 1Q17, and, second, that we believe further data releases will confirm a growth downtrend from the strong 1Q print, we maintain our forecast with upside risk. The fiscal stimulus packages introduced by the government and the resulting strength in net government spending contributed significantly to GDP growth in 1Q17. Such a fiscal thrust could at least be attributed to the government's efforts to increase popular support for the constitutional amendment package that was voted on in the April referendum.

As some of these measures have already expired and as the government put the brakes on certain expenditures (evidenced by the strong fiscal data in May), the contribution of public consumption to GDP growth should decline in 2Q. On the other hand, the recovery in consumer sentiment suggests that—as the nowcaster shows—there are upside risks to the growth forecast. Also, the manufacturing PMI reached a his-

torical high in June, partly with due to support from governmental decisions and European growth.

Figure 66: Turkey nowcasting 2Q17 GDP



Source: J.P. Morgan

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