Nowcasting the Japanese economy

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Abstract: In this paper we construct a now-casting model for Japan, which produces forecasts of Japanese GDP in the range period that starts one quarter before the reference period to the time when the official number on GDP is released by the statistical office. The now-casting model has the aim of mimicking market participants activity, i.e. monitoring some more timely variables related to GDP and forming a prediction. The pseudo real time forecasting exercise produced by the sophisticated, yet transparent now-casting model, which updates the prediction at each new release, is able to provide forecasts that are comparable both with the markets and with the Japanese professional forecasts. Another important feature of the now-casting model is its ability to shed light on the main characteristics of economic activity in Japan.

JEL Classification: C33, C53, E37.

Keywords: Forecasting, Dynamic Factor model, Now-casting.

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1 Introduction

Economists, differently from meteorologists, not only have to predict the future, but often also the present and the recent past. This is particularly true if we think about Gross Domestic Product, a variable that, by the time it is released, is already out of date. One has to wait almost 4 weeks (25 days) after the end of the reference quarter to know the preliminary number for the US and the UK, in the case of Europe and Japan the waiting time is even longer, around 6 weeks (45 days). Fortunately market participants and economists can analyze other information regarding the current economic condition by focusing on more timely data at higher frequency. Every day market participants monitor the most relevant data series and update their view on the economy. Bloomberg and Forex Factory, for example, publish a calendar of data releases assigning to each variable a measure of importance according to the attention the market places on those variables.

Academia has moved toward incorporating this more timely information into formal econometric forecasting models (Evans, 2005 and Giannone *et al.*, 2006). According to this literature, it is worth while to update economic predictions often, as the incorporation of the continuous data flow makes the forecasts more and more accurate.

The concept of now-casting, has the aim of summarizing this process of understanding the present economic condition through the use of a formalized statistical model, which has as inputs the relevant information monitored every day by the markets and as output the prediction of real GDP growth in the current quarter.

The idea of now-casting is to update the prediction of current quarter real GDP growth each time a new variable is released. The revision of the old prediction is a function of the fact that the new release generates some 'news'. Only if the new release is surprisingly different from what was expected that the now-cast will be revised.

The result of this sophisticated, but at the same time transparent 'machine', is compared with what professional forecasters do using their own judgment. The IMF and the OECD report the annual forecasts twice a year, private organizations, such as the JCER for Japan, publish quarterly short term forecasts four times a year, Bloomberg conducts a survey which starts two

weeks before GDP is released and ends 24 days before.

Recently, there has been a lot of interest in applying this statistical environment to various countries, both developed economies[2] and more recently also developing countries including China (Yiu and Chow, 2010; Giannone *et al.*, 2013), Indonesia (Luciani *et al.*, 2015) and Brazil (Bragoli *et al.*, 2015)).

Surprisingly very little attention has been devoted to the Japanese economy. Fukuda and Onodera (2001) and Shintani (2005) limit their analysis to forecasting monthly series such as industrial production omitting GDP developments. Godbout and Lombardi (2012), on the other hand, use a mixed frequency factor model to forecast Japanese GDP.

This article proposes a model for nowcasting Japanese real GDP, which mechanically updates the predictions as new information becomes available, differently from previous studies on Japan, the results of the model are compared with the survey of professional forecasts. In addition, this article gives some insight on the input series used in the model, shows their forecast performance and their impact in improving the accuracy of the model's predictions.

In the rest of the paper we will focus on understanding how the now-casting model works for the Japanese economy. We will focus on the calendar of the most important releases in order to emphasize the more timely and lagging piece of information. The model will then be described together with the now-cast updating mechanism. Finally we will present some results on the evaluation exercise and the comparison with the professional forecasters.

2 The selected series

The selected series, reported in Table 1, correspond to the variables monitored by the markets and to the headline numbers identified by national statistical offices, central banks but also local newspapers and other media[3]. We do not include nominal variables or sector-specific series,

[2]For example the United States (Lahiri and Monokroussos, 2013), the Euro Area (Angelini *et al.*, 2010; Angelini *et al.*, 2011; Camacho and Perez-Quiros, 2010), France (Barhoumi *et al.*, 2010), Germany (Marcellino and Schumacher, 2010), Ireland (D'Agostino *et al.*, 2008; Liebermann, 2012), the Netherlands (De Winter, 2011), the Czech Republic (Arnostova *et al.*, 2011; Rusnák, 2013), New Zealand (Matheson, 2010), Norway (Aastveit *et al.*, 2012; Luciani and Ricci, 2014), Switzerland (Siliverstovs, 2012).

[3]The only exception is the Tankan Survey which we do not include because its sample length is too short.

we also exclude prices and financial variables and focus only on real economic activity inputs. Table 1 also reports a measure of importance that the markets assign to the single variables. The Bloomberg measure, which is shown as a percentage, reflects usage by Bloomberg subscribers; the Forex Factory measure, which is shown as Low/Medium/High, reflects their own judgment. There is a relatively large number of significant surveys in Japan; we consider the following:

Table 1: *Series used in the model*

Name	Timing	Frequency	Source	Starting Date	Units/Transformation	Relevance Forex Factory	Relevance Bloomberg
Average Monthly Earnings	121	M	MHLW	Jan-59	Yen/MoM	M	39.7
Capacity Utilization: Manufacturing	134	M	METI	Jan-78	Index/Differences	n.a.	69.1
Construction Orders: Housing Units	120	M	MoC	jan-65	Bil. Yen/MoM	n.a	43.6
Economy Watchers' Survey	98	M	CAO	Jan-00	Diffusion Index/Levels	L	61.5
Exports and Imports	113	M	MoF	Jan-69	Bil. Yen/MoM	M	60.3
GDP (preliminary)	135	Q	CAO	Q1-80	Bil. Yen/QoQ	H	93.6
GDP (final)	160	Q	CAO	Q1-80	Bil. Yen/QoQ	M	93.6
Consumer Confidence	102	M	CAO	Jun-82	Diffusion Index/Differences	L	0.0
Housing Starts	120	M	MoC	Jan-65	Thous. Units/MoM	L	62.8
Industrial Production: Mining and Manufacturing	119	M	METI	Jan-53	Index/MoM	M	98.7
Large Firms Survey	77	Q	MoF	Q2-04	Yen/Levels	M	10.3
Machinery Orders	128	M	CAO	Jun-82	Mil.Yen/MoM	M	94.9
PMI: Manufacturing	90	M	Markit	Oct-01	Diffusion Index/Levels	L	48.7
Retail Sales	118	M	METI	Jul-78	Bil. Yen/MoM	M	44.9
Small & Medium Enterprises Survey	88	M	SCB	May-76	Index/Levels	n.a.	47.4
Tertiary Industry Activity Index	136	M	METI	Jan-88	Index/MoM	M	91.0
Unemployed	118	M	MHLW	Jan-53	Thous. Units/Differences	L	96.1
Passenger Car production	120	M	JD/JM	Jan-65	Thous. Units/differences	n.a.	37.2
Vehicle Sales	91	M	METI	Jul-78	Thous. Units/MoM	n.a	59.0

Table Notes
Timing: is approximately the number of days from the beginning of the reference period;
Frequency: indicates whether the series is monthly (M) or quarterly (Q);
Sources: BoJ (Bank of Japan), MoF (Ministry of Finance), SCB (Shoko-Chukin Bank), CAO (Cabinet Office), METI (Ministry of Economy, Trade and Industry, JD/JM (Japan Auto Dealers/Manufacturers Association), MHLW (Ministry of Health, Labour and Welfare), MoC (Ministry of Construction);
Forex Factory: reports the market relevance of each variable where L=low, M=medium and H=high according to Forex Factory;
Bloomberg: reports the market relevance of each variable according to Bloomberg's relevance index, that ranges from 0 to 100.

- Large Firms Survey (LFS) - quarterly
- Economy Watchers' Survey (EWS) - monthly
- Consumer Confidence Survey (CCS) - monthly
- Purchasing Managers Index, Manufacturing (PMI) - monthly
- Small & Medium Enterprises Survey (SMES) - monthly
- Tertiary Industry Activity Index (TAI) - monthly

The EWS and CCS are surveys of consumers, and give information on consumer trends. The EWS is both an indicator of consumer confidence and a leading indicator for the whole economy because, in contrast to the CCS, it gives information on the level of confidence in business cycle-sensitive sectors such as retail, restaurant service, and taxi driving, by asking

about their sentiment in relation to the current and future economic condition of the country. The PMI, LFS and SMES are all surveys of firms and are designed to provide an accurate picture of changes in variables such as output, new orders, stock levels and prices across sectors. By contrast the TAI is a survey of firms which gauges monthly changes in production, and the index from this survey relating to the Tertiary Industry - which we consider - covers only the services sector. The TAI is rated as relatively important, scoring 91.0% and 84.6% respectively on Bloomberg. The EWS, PMI and SMES all have middle rank scores on Bloomberg and L or N/A on Forex Factory. And the LFS and CCS are rated with low importance.

Together with soft data we also include hard data divided into five main categories: production, domestic demand, trade, labour and housing. For production, in addition to Industrial Production (IP) itself, we also track Machinery Orders (MO) and Passenger Car Production (PCP). Both IP and MO are rated highly for importance by Bloomberg[4] (98.7% and 94.9% respectively); PCP is considered less important (37.2%). For domestic demand, we consider: Capacity Utilization (CU), Retail Sales (RS) and Vehicle Sales (VS). All three of these rank as reasonably important on Bloomberg (69.1%, 44.9% and 59.0% respectively). By contrast, Forex Factory does not rate CU or VS at all. For trade, we track Exports and Imports. The trade figures are rated at 60.3% for importance on Bloomberg. For labour, we include the Unemployed and Average Monthly Earnings, which are rated as 96.1% and 39.7% respectively on Bloomberg. For housing, we track two series: Housing Starts (HS) and Construction Orders (CO), rated as 62.8% and 43.6% on Bloomberg. Neither of these is considered important by Forex Factory (rated L and n/a respectively).

3 Timeliness

Table 2 reports the calendar overflow in Japan to give a clear idea of what is released in the gap period that goes from the beginning of the quarter to the day in which the preliminary estimate of GDP in Japan is published (135 days after the beginning of the reference quarter).

[4]The ratings by Forex Factory in relation to hard data are broadly consistent with those by Bloomberg, so we only highlight them where they differ significantly.

From the table we see that a number of monthly and quarterly releases are published. After 27 days from the start of the quarter the first information regarding real economic activity is released: PMI manufacturing released within the reference month. Around 35-40 days after Vehicle Sales, the Economy Watchers Survey and the Consumer Confidence Survey are released. The last variables related to the first month are the Tertiary Activity Index and Capacity Utilization. In general terms surveys are particularly timely. Manufacturing PMI is published at the end of each reference month, the Economy Watchers' Survey and Consumer Confidence Index are published in the first and second week of the following month, respectively. Most of the hard data series (trade, unemployment, construction orders, retail sales and industrial production) are published with a 4-6 week lag after the end of the reference month.

Month	Quarter	Days	Release	Reference Period
		1		
M1		27	PMI:Manufacturing (Markit)	M1
		30		
		31		
		35	Vehicle Sales (METI)	M1
		41	Economy Watchers' Survey (MoF)	M1
		46	Consumer Confidence (Cabinet Office)	M1
		50	Exports & Imports	M1
		57	PMI:Manufacturing (Markit)	M2
			Average Monthly Earnings (MHLW)	M1
M2			Unemployed (MHLW)	M1
			Construction Orders (MoC)	M1
			Housing Starts (MoC)	M1
			Passenger Car Production (JD/JM)	M1
		58	Retail Sales (METI)	M1
		59	Industrial Production (METI)	M1
		60		
		61		
	Q_x	65	Vehicle Sales (METI)	M2
		67	Small & Medium Enterprises Survey (Shoko Chukin Bank)	M1
		68	Machinery Orders (Cabinet Office)	M1
		71	Economy Watchers Survey (MoF)	M2
			Large Firms Survey (MoF)	Q_x
		74	Capacity Utilization (METI)	M1
		76	Tertiary Industry Activity Index (METI)	M1
M3			Consumer Confidence (Cabinet Office)	M2
		80	Exports & Imports	M2
		87	PMI:Manufacturing (Markit)	M3
			Average Monthly Earnings (MHLW)	M2
			Unemployed (MHLW)	M2
			Construction Orders (MoC)	M2
			Housing Starts (MoC)	M2
		88	Retail Sales (METI)	M2
		89	Industrial Production (METI)	M2
		90		
		91		
		95	Vehicle Sales (METI)	M3
		97	Small & Medium Enterprises Survey (Shoko Chukin Bank)	M2
		98	Machinery Orders (Cabinet Office)	M2
		101	Economy Watchers' Survey (MoF)	M3
		104	Capacity Utilization (METI)	M2
		106	Tertiary Industry Activity Index (METI)	M2
		110	Exports & Imports	M3
M4		116	Consumer Confidence (Cabinet Office)	M3
		117	Average Monthly Earnings (MHLW)	M3
			Unemployed (MHLW)	M3
			Construction Orders (MoC)	M3
	Q_{x+1}		Housing Starts (MoC)	M3
			Passenger Car Production (JD/JM)	M3
		118	Retail Sales (METI)	M3
		119	Industrial Production (METI)	M3
		120		
		121		
		127	Small & Medium Enterprises Survey (Shoko Chukin Bank)	M3
		128	Machinery Orders (Cabinet Office)	M3
		134	Capacity Utilization (METI)	M3
M5		135	GDP-preliminary	Q_x
		136	Tertiary Industry Activity Index (METI)	M3
		150		
		151		
M6		160	GDP-final	Q_x

4 The Model

We use a dynamic factor model (DFM) to predict GDP. We find that this model produces a good representation of the data, whilst allowing us to be parsimonious. It exploits the fact that there is a large amount of co-movement among macroeconomic data series, and hence that a relatively few factors can explain the dynamics of many variables (see Sargent and Sims, 1977, Giannone *et al.*, 2005, Stock and Watson, 2005). The estimation procedure is Quasi Maximum Likelihood (Doz *et al.*, 2006) which has been shown to be robust and feasible. Bańbura and Modugno (2014) showed how to adapt the estimation procedure in order to deal with missing

data. The estimation sample starts in 1991. The model can be written as a system with two types of equations: a measurement equation (eq.1) linking observed series (i.e GDP and all the indicators listed in Table 1) to a latent state process and the transition equation (eq.2) which describes the state process dynamics. Equations 1 and 2, written in a state space form, allow the use of the Kalman filter to obtain an optimal projection for both the observed and the state variables. The Kalman filter generates projections for all the variables in the model (GDP but also all the other data releases). The general DFM for the monthly variables is the following:

$$x_{i,t} = \sum_{s=0}^{S} \lambda_{i,s} * f_{t-s} + e_{i,t}, \tag{1}$$

$$f_t = \sum_{p=0}^{P} A_p * f_{t-p} + u_t \qquad u_t iidN(0, Q) \tag{2}$$

$$e_{i,t} = \sum_{q=1}^{G} \rho_{i,g} * e_{i,t-g} + v_{i,t}, \qquad v_{i,t} iidN(0, \sigma_i^2) \tag{3}$$

We set S=0 (no lags in the factors of equation 1), G=1 (the error process is an AR1), P=2 and we consider only 1 factor. We incorporate quarterly variables into the framework by constructing for each of them a partially observed counterpart. If we call $x_{i,t}$ the unobserved monthly growth rate of the generic variable x, then we can write the model as for the monthly variables as follows:

$$x_{i,t} = \sum_{s=0}^{S} \lambda_{i,s}^{Q} * f_{t-s} + e_{i,t}^{Q} \tag{4}$$

$$f_t = \sum_{p=0}^{P} A_p * f_{t-p} + u_t \tag{5}$$

$$e_{i,t}^{Q} = \sum_{q=1}^{G} \rho_{i,g} * e_{i,t-g}^{Q} + v_{i,t}^{Q} \tag{6}$$

In order to link the unobserved monthly growth rate $x_{i,t}$ with the observed quarterly data we use the approximation of Mariano and Murasawa (2003):

$$x_{i,t}^{Q} = x_{i,t} + 2x_{i,t-1} + 3x_{i,t-2} + 2x_{i,t-3} + x_{i,t-4} \tag{7}$$

where t=3,6,9...Finally we construct a partially observed monthly series.

5 Evaluation

In order to evaluate the performance of the model we perform a 'pseudo real time' historical reconstruction. The aim is to mimic, as closely as possible, what the model would have produced as output, had it been used continuously over an historic time period - in this case from 2005 q1 to 2012 q4. In particular, we estimate the model recursively, and we take account of information from each new data release when it would have first appeared. The exercise is said to be 'pseudo' real time because we do not take data revisions into account. That is to say, we use only the latest vintage of data, and therefore we implicitly assume that there were no revisions. In Figure 1 we compare the performance of the model - on average for all of the calendar quarters in the historic reconstruction period - with (i) the short-term forecast of the Japan Centre for Economic Research (JCER), which is typically published 53 days after the start of the quarter, (ii) Bloomberg's survey of independent forecasters, which is published the day before the preliminary GDP release, and (iii) an auto-regressive forecast, which changes only when GDP is released[5]. We also consider what the performance of the model would have been if the period affected by the Great East Japan Earthquake of March 2011 was excluded, because we consider it as an exceptional event. The X-axis is the 235 days of the 'prediction period' for each calendar quarter. The model's quarterly GDP growth prediction is first made 90 days before the start of a given quarter, and is then updated with each successive data release until the release of preliminary GDP, which takes place 145 after the start of the calendar quarter. So for each calendar quarter there is a period of 235 days (the 'prediction period') over

[5]See appendix C for more on benchmarks used for forecast comparisons.

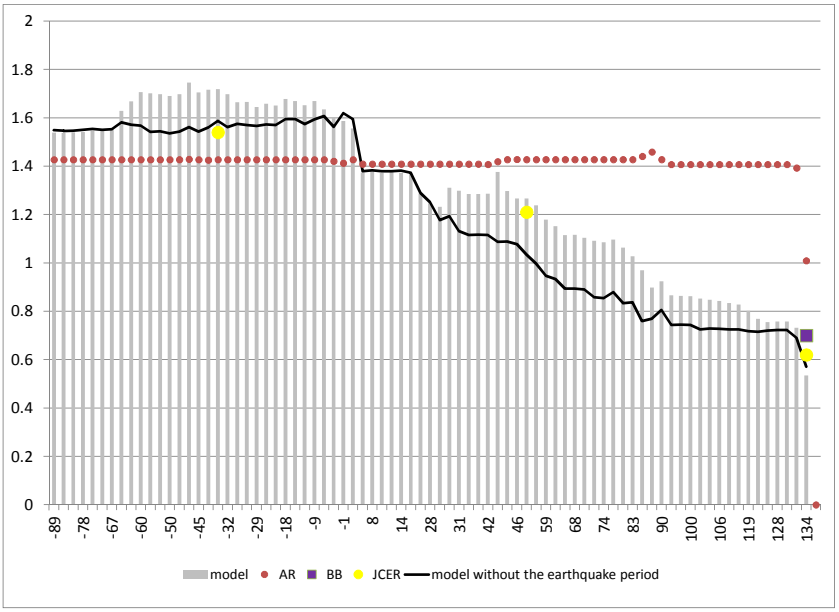

Figure 1: RMSFE

which the prediction is continuously updated. The Y-axis measures the root mean squared forecast error (RMSFE) for each different series of predictions. We can see from Figure 1 that the model's RMSFE declines more or less continuously over the prediction period, which means that new information has a monotonic and negative effect on uncertainty. So it is useful to update the now-cast of GDP with each data release, as the accuracy of the predictions made by the model increases. If we exclude the earthquake period, this result is even stronger. We can also see that the model's accuracy is comparable to that of the JCER when the JCER prediction is published, but that the model's accuracy will continue to improve thereafter. In figure 1 we report the RMSFE reduction as days go by. In appendix A we report the same result by release. Specifically, Exports, Industrial Production, and the Small and Medium Enterprises Survey are the data releases that have the most impact in improving the accuracy of the model's prediction.

5.1 The news

'A now-casting model formalizes key features of how market participants and policy-makers read data in real time which involves: monitoring many data releases, forming expectations about them and revising the assessment of the state of the economy whenever realisations diverge sizeably from those expectations.' (Bańbura *et al.*, 2012, Bańbura and Modugno, 2014). In the same way the model's now-casts are updated in relation to the news. In the extreme case in which a release is perfectly predicted, the news is zero and consequently there is no update to the now-cast of GDP. Although GDP is the main target variable, the model actually produces forecasts (or now-casts) for all of the series in the dataset. Consequently, we are able to show, for every data release, the difference between its actual value and the value predicted by the model. This difference - the surprise relative to the model's expectation - is what we call the 'news'. In Table 3 we report the mean and the standard deviation of the news for all of the series in the dataset. The fact that the mean values are close to zero and the standard deviations are small tends to confirm that the model is well specified ($|mean| < 2$ standard deviation). In Table 3 we also compare the model's performance in predicting each of the series with that of the Bloomberg survey, which is published on the day before each release (see appendix C) for more on benchmark comparisons. The table shows that, for most series, the model's predictions are comparable to the Bloomberg survey predictions. We have included in Table 3 the mean and standard deviation of the revisions for each of the series in the dataset. This suggests that the model's relative performance would have been similar in real time[6].

Another important feature of the now-casting framework is that it allows interpretation of all the data releases in terms of the signals they give about current economic conditions (Bańbura and Modugno, 2014). The impact that a given release has on the GDP now-cast is the product of two variables: the news (or the unexpected component of the release value), and the relevance of the series in relation to GDP, which is expressed as its weight (i.e., impact = news x weight). Figure 2 shows the average impact of each variable in the first, second and third month of the

[6]Note that the Bloomberg survey is conducted in real time, and the respondents whose forecasts it reflects are attempting to predict the first release of each series, whereas the reconstruction of the model's predictions is based on the last available vintage of data, ignoring revisions.

Table 2: *Average news and standard deviation*

		Entire Sample		Excluding the earthquake					
		Model News		Model News		Bloomberg News		Revisions	
	Units/ Transformation	Mean	StD	Mean	StD	Mean	StD	Mean	StD
Vehicle Sales	Thous. Units/MoM	0.4	5.7	0.2	5.2				
Average Monthly Earnings	Yen/MoM	0.0	1.2	-0.1	1.2				
Economy Watchers' Survey	D.I./Diff.	-0.6	12.2	-0.6	12.0	0	3.3	0	0.0
Machinery Orders	Mil.Yen/MoM	0.0	5.1	-0.1	5.2	-0.5	4.8	0.2	6.2
Consumer Confidence Survey	D.I./Levels	-0.3	1.6	-0.3	1.5	0.3	1.2	0	0.8
Capacity Utilization: Manuf.	Index/Diff.	0.0	2.2	0.0	1.5				
Tertiary Industry Activity Index	Index/MoM	0.0	0.9	0.0	0.8	0.4	0.7	0	0.8
Exports	Bil.Yen/MoM	-0.1	4.4	0.0	4.1				
Imports	Bil.Yen/MoM	0.5	5.7	0.4	4.8				
Retail Sales	Bil.Yen/MoM	0.2	1.8	0.2	1.4	-0.1	0.9	0.1	1.2
Small & Medium Enterprises Survey	Index/Levels	-0.1	2.4	-0.1	2.1	-0.7	2.1	0	0.0
Industrial Production: Mining and Manuf.	Rate/Diff.	0.1	3.0	0.1	2.0	0.2	1.5	-0.2	1.5
Unemployed	Index/MoM	-1.3	8.5	0.3	5.3	0.1	0.2	0	0.1
Construction Orders: Husing Units	Bil.Yen/MoM	-0.2	27.7	-0.9	8.4				
Housing Starts	Thous.Units/MoM	0.0	8.1	0.2	26.6	1.3	7.5	0	0.7
PMI: Manufacturing	D.I./Levels	-0.1	2.0	0.0	8.1	0	1.2	0	0.0
Passenger Car Production	Thous.Units/Diff.	0.4	11.5	-0.1	1.8				
GDP	Bil.Yen/QoQ	-0.1	0.8	0.0	0.7	0	1	0	1.0
Large Firms Survey	Yen/Levels	-5.0	12.4	-5.2	13.2				

D.I.=diffusione index; Diff.= differences; Thous. Units= Thousand Units; Manuf.= Manufacturing; Bil. Yen=Billion Yen.

quarter. See appendix B for the decomposition of average impact.

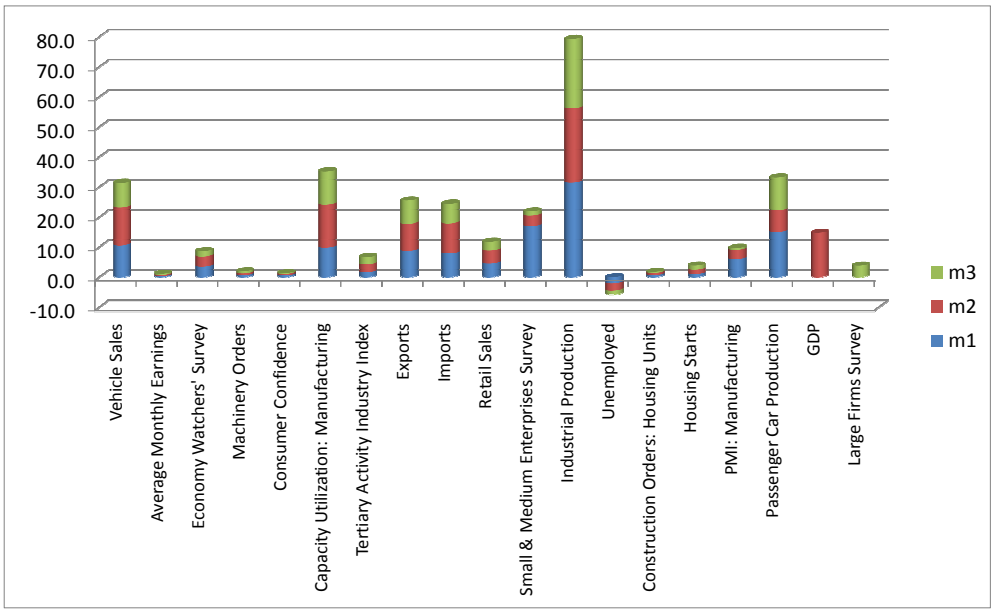

Figure 2: Variables' Relevance

6 Conclusions

The now-casting model for Japan reported in this paper, which mimics the behavior of market participants in updating GDP growth, outperforms the standard AR(1) model and performs as well as the markets (Bloomberg Survey) and the professional forecasters (JCER forecasts).

The construction of the now-casting framework is also important in terms of understanding how the Japanese economy works. There is a relevant number of surveys in Japan that cover different aspects of the economy (production and consumption), with different frequency (monthly and quarterly) and timeliness. In particular Manufacturing PMI is published at the end of each reference month, the Economy Watchers Survey and Consumer Confidence Index are published in the first and second week of the following month, respectively. On the other hand most of the hard data series (trade, unemployment, construction orders, retail sales and

industrial production) are published with a 4-6 week lag after the end of the reference month.

In addition the model gives information on the single input series, shows their forecast performance and their impact in improving the accuracy of the model's prediction. The most relevant Japanese data releases are Exports, Industrial Production and the Small and Medium Enterprises Survey.

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A. Average RMSFE reduction by variable

	Entire Sample			Excluding the Earthquake period		
	Average MSFE Reduction			Average MSFE Reduction		
	m1	m2	m3	m1	m2	m3
Vehicle Sales	-0.05	-0.05	-0.03	-0.03	-0.06	0.00
Average Monthly Earnings	0.00	0.00	0.00	0.00	0.00	0.00
Economy Watchers' Survey	0.03	0.00	0.02	0.02	0.00	0.00
Machinery Orders	-0.01	-0.01	0.00	-0.01	-0.01	0.00
Consumer Confidence	0.00	0.00	0.00	0.00	0.00	0.00
Capacity Utilization: Manufacturing	-0.01	0.18	-0.05	0.00	-0.05	-0.07
Tertiary Industry Activity Index	-0.05	0.01	0.01	-0.03	-0.02	0.03
Exports	-0.19	-0.29	-0.14	-0.21	-0.12	-0.05
Imports	-0.19	-0.29	-0.14	-0.21	-0.12	-0.05
Retail Sales	-0.05	-0.07	-0.05	-0.03	-0.07	-0.05
Small & Medium Enterprises Survey	-0.04	-0.04	-0.01	-0.05	-0.04	-0.01
Industrial Production: Mining and Manufacturing	0.01	-0.25	-0.16	-0.20	-0.19	-0.06
Unemployed	0.01	-0.01	0.01	-0.02	-0.02	-0.01
Construction Orders: Housing Units	-0.02	-0.03	-0.01	0.01	0.00	0.00
Housing Starts	-0.02	-0.03	-0.01	-0.02	-0.03	-0.01
Purchasing Managers Index: Manufacturing	-0.04	-0.02	-0.01	-0.02	-0.03	-0.01
Passenger Car Production	0.16	0.02	-0.06	-0.07	0.00	0.00
GDP		0.03			-0.01	
Large Firms Survey			0.00			0.01

B. Impact of the releases on the now-cast

	A= ave weight			B=News STD			Average Impact=A*B		
	m1	m2	m3	m1	m2	m3	m1	m2	m3
Vehicle Sales	1.7	2.2	1.5	6.3	5.6	5.3	10.5	12.6	8.2
Average Monthly Earnings	0.3	0.3	0.4	1.0	1.4	1.2	0.2	0.5	0.4
Economy Watchers' Survey	0.3	0.3	0.1	12.0	12.1	12.9	3.4	3.4	1.8
Machinery Orders	0.1	0.1	0.2	6.1	4.4	4.6	0.6	0.6	0.7
Consumer Confidence	0.3	0.4	0.2	1.8	1.5	1.2	0.6	0.5	0.3
Capacity Utilization: Manufacturing	4.3	5.7	6.7	2.3	2.5	1.6	9.9	14.3	11.0
Tertiary Industry Activity Index	2.0	2.5	2.9	0.8	1.0	0.8	1.6	2.6	2.4
Exports	2.0	2.3	1.6	4.4	3.9	4.9	8.7	9.0	7.7
Imports	1.4	1.7	1.2	5.7	6.0	5.6	7.8	10.0	6.6
Retail Sales	2.3	2.6	1.6	1.9	1.6	1.8	4.6	4.3	2.9
Small & Medium Enterprises Survey	6.1	2.7	0.5	2.8	1.3	2.6	17.0	3.6	1.3
Industrial Production: Mining and Manufacturing	8.9	10.6	7.3	3.5	2.3	3.2	31.5	24.7	23.1
Unemployed	-0.2	-0.3	-0.2	9.0	8.9	7.7	-2.0	-2.3	-1.3
Construction Orders: Housing Units	0.0	0.0	0.0	28.7	31.4	22.9	0.6	0.7	0.4
Housing Starts	0.2	0.2	0.1	6.2	8.6	9.1	1.0	1.5	1.2
PMI: Manufacturing	3.2	1.5	0.3	1.9	1.9	2.1	6.0	3.0	0.7
Passenger Car Production	1.0	1.1	0.9	14.9	6.3	11.8	15.0	7.2	11.0
GDP		19.3			0.8			14.7	
Large Firms Survey			0.3			12.4			3.8

C. Benchmarks comparisons

In order to assess the forecasting accuracy of our results we compare them against the survey conducted by Bloomberg and the professional forecasts from the Japan Centre for Economic Research (JCER). Bloomberg conducts a survey and collects forecasts from analysts and economists in order to produce predictions for GDP and other market relevant variables before their release dates. Bloomberg publishes predictions as soon as they have at least three respondents to their questionnaire, which is generally around two weeks before the release of the relevant data series. Thereafter the prediction is continually revised up to 24 hours before the release. The final number is usually close to the actual release value. The JCER, on the other hand, provides quarterly short-term forecasts of GDP. The JCER is a private, non-profit organization established in 1963 with the objective of contributing to the development of the Japanese economy. The short-term forecast is published quarterly in February, May, August and November. The 'Successive Approximation' method is used, whereby data up to the most recent quarter are analysed to make projections for an 18-24 month period. The short-term forecasts that we use in this paper are the result of JCER analysis.