Ostfalia
Hochschule für angewandte Wissenschaften

Wolfsburg
Fakultät Wirtschaft

WWP

Wolfsburg Working Papers

No. 18-02

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Abstract:

We analyzed interest rate forecasts from Australia, China, Hong Kong, India, Indonesia, Malaysia, New Zealand, Singapore, South Korea, Taiwan and Thailand. We assessed 532 forecast time series with a total of 85,264 individual interest rate forecasts. To do so, we carried out a comparison to naïve forecasts and investigated the forecast time series for topically-orientated trend adjustments. In addition, we deployed the sign accuracy test and the unbiasedness test. The results are very sobering in part: 95.9% of all forecast time series are characterized by the phenomenon of topically-orientated trend adjustments, and 99.4% of all forecast time series proved to be biased. Only a small proportion of the forecast time series (3.6%) reflected the future interest rate trend significantly more precisely than a naïve forecast. However, at the same time some of the results of the study are surprisingly positive. The sign accuracy test revealed that 48.3% of all forecast time series predict the interest rate trend significantly better than a random walk forecast.

Keywords: Interest rate forecasts, survey forecasts, forecast accuracy, portfolio management, topically orientated trend adjustment behavior.

JEL classification: E44, E47, G11, G12, G15, G17, G21, F37.

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1. Introduction

Future interest rate trends are of key significance for almost all investment decisions on the capital markets. If the general level of interest rates in an economy rises, the prices of most bonds will fall. Only securities with a short residual term to maturity and floating-rate bonds remain largely unaffected by such developments. The longer the term to maturity and the lower the coupon, the greater the fall in bond prices. If the general level of interest rates falls, the opposite effect occurs, and the prices of most bonds rise.

Interest rate trends are, however, also of great importance for investments in the stock market. The fair value of a share is the total of all discounted future profits that this share provides. If one wishes to take a critical look at the current market price of a stock, it is wise not to compare its current price with the current fair value, but rather to determine the *future* fair value of the stock. If the current value is significantly below the fair value which it will have at the end of the investment horizon, it is an attractive investment. However, in order to establish the future fair value of a stock, one has to forecast the predominant future interest rate level, because this simultaneously represents the future discount rate in the determination of fair value.

In the case of international portfolios, exchange rate movements also have to be taken into account. The interest rate parity theory shows that interest rate trends at home and abroad have great significance for exchange rates.

As a rule, financial market analyses normally begin with a forecast of interest rate trends, because bond and share prices - and ultimately also exchange rates - are significantly influenced by interest rates. It is therefore not surprising that the accuracy of interest rate forecasts have been of great interests to academics and businesspeople for a long time now. In the past 40 years, around 50 studies have already been published on the accuracy of survey-based interest rate forecasts (see the comprehensive synoptic overview in Table 20 in the appendix). Some trends have emerged in these studies:

Only a few studies considered the interest rate forecasts they analyzed to be largely reliable.[1] These were largely forecasts on the base rates of central banks or forecasts of short-term market rates such as the three-month money market rate. However, for portfolio management, interest rate forecasts for bonds with maturities of at least a year are primarily of interest, because active portfolio management strategies can be realized much more easily in this segment. There are also some studies with mixed findings.[2] Here again, it is mostly forecasts for short-term interest rates which come off well, while more than half of the studies take a very critical view of the quality of the interest rate forecasts which they examined.[3]

[1] See, for example Throop (1981), Tabak and Feitosa (2008), Baghestani and Marchon (2012), Knüppel and Schultefrankenfeld (2013) and Pierdzioch (2015).

[2] See, for example, Dua (1988), Zarnowitz and Braun (1992), Cho (1996), Gosnell and Kolb (1997), Greer (2003), Scheier and Spiwoks (2006), Goodhart and Lim (2008), Spiwoks, Bedke and Hein (2008), Chun (2009), Spiwoks, Bedke and Hein (2010), Jongen, Verschoor and Wolff (2011), Kunze, Kramer and Rudschuk (2013), Kunze and Gruppe (2014), Baghestani and Danila (2014), Beechay and Österholm (2014), Oliver and Pasaogullari (2015), and Miah, Khalifa and Hammoudeh (2016).

[3] See, for example, Friedman (1980), Belongia (1987), Simon (1989), Hafer and Hein (1989), Francis (1991), Hafer, Hein and MacDonald (1992), Domian (1992), Ilmanen (1996), Kolb and Stekler (1996), Baghestani, Jung and Zuchegno (2000), Albrecht (2000), Spiwoks (2003), Brooks and Gray (2004), Benke (2004), Mose (2005), Baghestani (2005), Benke (2006), Spiwoks and Hein (2007), Mitchell and Pearce (2007), Spiwoks, Bedke and Hein (2009), Gubaydullina, Hein and Spiwoks

Until now, US interest rate forecasts have been the main focus of research, although European interest rate forecasts - particularly British and German ones - have also been frequently examined. In the Asia-Pacific area there have been several studies focusing on Japan,[4] but otherwise there has only been little published research dealing with interest rate forecasts for the Asia-Pacific region. Goodhart and Lim (2008) looked at interest rate forecasts in New Zealand, while Baghestani, Arzaghi and Kaya (2015) analyzed their Australian counterparts. Jongen, Verschoor and Wolff (2011) investigated forecasts of interest rate trends in Hong Kong, Indonesia, Malaysia, New Zealand, Singapore and Taiwan for the period 1995-2009. However, this study limited itself to assessment criteria which do not provide a comprehensive impression of the accuracy of the forecasts. What it did was to compare survey forecasts with random walk forecasts or implicit forward rate forecasts. Miah, Khalifa and Hammoudeh (2016) analyzed interest rate forecasts from China, Hong Kong, India, Indonesia, the Philippines, Singapore, South Korea, Taiwan and Thailand, among others. They examined the period 2001-2012 and applied the efficiency test and the unbiasedness test. As a data basis they used the survey forecasts of Fx4casts.com. For us, this is definitely the most interesting study among those which have previously been carried out. However, we refer to a different data basis (*Asia Pacific Consensus Forecasts*), and in addition to interest rate forecasts from China, Hong Kong, India, Indonesia, Singapore, South Korea, Taiwan and Thailand, we also look at forecasts from Malaysia, Australia and New Zealand. We also take a longer period of time into account in our analysis (1990-2016).[5] In addition, we use a far more comprehensive set of tools for the evaluation of the quality of forecasts: (1) comparison to a naïve forecast with the aid of the Diebold-Mariano test, (2) examination of the forecast direction with the help of the sign accuracy test, (3) examination for systematic forecast errors with the aid of the unbiasedness test, and (4) test for the presence of possible topically-oriented trend adjustments with aid of the TOTA coefficient.

Unlike many of the previous studies we not only examine the time series of the consensus forecasts, but also the forecast time series of the banks, investment companies, associations, consulting firms and industrial companies which participated in the survey. It cannot be ruled out that individual institutions might succeed in making forecasts which are more reliable than the consensus forecasts. Limiting the analysis to consensus forecasts might therefore mislead us. We evaluated a total of 267 time series with 85,264 interest rate forecasts. In this respect, the study can be viewed as the most comprehensive analysis by far of interest rate forecasts in the Asia-Pacific region.

Some surprising results were revealed in the process, which certainly opens up opportunities for active portfolio management strategies. For example, 61.5% of the forecast time series on the interest rates of Indian state bonds with ten years remaining to maturity (forecast horizon: 13 months) predict the future interest rate trend (rising or falling) significantly better than a random walk forecast. With forecasting results of this kind, it should be possible to systematically obtain excess returns.

(2011), Schwarzbach, Kunze, Rudschuck and Windels (2012), Chortareas, Jitmaneeroj and Wood (2012), Butter and Jansen (2013), Spiwoks, Gubaydullina and Hein (2015), and Kunze, Wegener, Bizer and Spiwoks (2017).

[4] See, for example Gosnell and Kolb (1997), Spiwoks and Hein (2007), Gubaydullina, Hein and Spiwoks (2011), Jongen, Verschoor and Wolff (2011), Butter and Jansen (2013), Spiwoks, Gubaydullina and Hein (2015), and Baghestani, Arzaghi and Kaya (2015).

[5] The Australian interest rate forecasts start in 1990. The other time series only begin later.

The study is divided into five sections. In chapter 2 the data basis is described in detail. In chapter 3 the methods used are presented. The results of the study are shown in chapter 4. In the final chapter a summary of the study is provided.

2. Data basis

Bates and Granger (1969) were the first to raise the question of whether better results could be achieved via a suitable combination of several forecasts than by means of choosing the (presumably) best forecast. The idea behind this is that many forecasts contain useful elements of information which are not found in other forecasts and which can be brought together in a consensus forecast (see, for example, Thiele 1993). This idea triggered a lively debate on the possibilities and limitations of suitable combinations of forecasts, which culminated in 1989 in a special edition of the *Journal of Forecasting* and the *International Journal of Forecasting.* As a result of this debate, the company *Consensus Economics* created the specialist journal *Consensus Forecasts*. Since October 1989 it has been published on a monthly basis. Every month, *Consensus Economics* interviews more than 700 leading academics from the fields of economics and business for their forecasts in relation to various economic indicators for over 85 countries. Alongside the forecasts of these experts, *Consensus Economics* also publishes a consensus mean, which is the arithmetical average of the experts' forecasts.

The interest rate forecasts for Australia, China, Hong Kong, India, Indonesia, Malaysia, New Zealand, Singapore, South Korea, Taiwan and Thailand which are analyzed here come from the regularly published journal *Asia Pacific Consensus Forecasts*. We examined the forecasts which were published there in the period from January 1990 to December 2015. The forecasts relate to the period from April 1990 to the end of December 2016. The data for Australia in the initial years is from the journal *Consensus Forecasts*. For the period after the establishment of the journal *Asia Pacific Consensus Forecasts* in 1995, the Australian interest rate forecasts are taken from that periodical. We evaluated a total of 532 time series with 85,264 interest rate forecasts. There is a detailed overview in Table 1.

Asia Pacific Consensus Forecasts differentiates between two forecast horizons: in the journal, the forecasts are occasionally described as three-month forecasts and twelve-month forecasts. In reality, however the forecast horizons are of four and thirteen months. This can be seen in the following example: in the edition of January 2015, which was available in around mid-January, the forecasts for the end of April 2015 and the end of January 2016 were published. The forecasts themselves are handed in by the participating institutions at the beginning of January. The actual period of time from the beginning of January 2015 to the end of April 2015 is four months, while the period of time from the beginning of January 2015 to the end of January 2016 is thirteen months.

Table 1: Data used from the journal *Asia Pacific Consensus Forecasts*

Country	Subject of forecast	Number of time series analysed	Number of forecasts analysed	Results in the table
Australia	10 Year Government Bond Yield	42	7,871	3
	Three Month Interest Rates	42	8,115	4
China	One-Year Base Lending Rate	30	3,507	5
Hong Kong	Prime Lending Rate	30	5,159	6
	Three Month Interest Rates	38	6,077	7
India	10 Year Government Bond Yield	26	3,809	8
	Three Month Interest Rates	24	4,196	9
Indonesia	10 Year Government Bond Yield	24	3,595	10
Malaysia	Base Lending Rate	30	4,374	11
	Three Month Interest Rates	36	5,842	12
New Zealand	10 Year Government Bond Yield	36	6,566	13
	Three Month Interest Rates	36	6,552	14
Singapore	Prime Lending Rate	30	3,876	15
	Three Month Interest Rates	38	5,906	16
South Korea	Three Year Interest Rates	28	3,194	17
Taiwan	10 Year Government Bond Yield	16	2,103	18
Thailand	Three Month Interest Rates	26	4,522	19
∑		532	85,264	

We analyzed all of the forecast time series which have at least 80 items of data. We did not take time series with less than 80 observations into consideration. Under certain circumstances, time series which are too short or contain too large gaps can lead to inconclusive results in the procedures used to measure the quality of forecasts.

3. Methods

The following statistical tools were used to measure the quality of forecasts: comparison to a naïve forecast with the aid of the Diebold-Mariano test (3.1.), examination of the forecast direction with the help of the sign accuracy test (3.2), the test for the unbiasedness of the forecasts (3.3.) and the test for the presence of topically-orientated trend adjustments with the help of the TOTA coefficient (3.4.).

3.1 Comparison to a naïve forecast with the aid of the Diebold-Mariano test

The French mathematician Pierre Simon Laplace (1814) introduced the principle of indifference (also known as the principle of insufficient reason) into the literature: a black box emits a figure x, and then the subject is requested to forecast which figure the black box will emit next. In view of the subject's complete lack of knowledge regarding the processes going on in the black box, it is not possible to give a single reason why the next figure should be larger than x. They can also not give a single reason why the next figure should be smaller than x. The only thing which an unknowing but

sensible person can do is to forecast the figure x again for the future. In this way, a naïve forecast (everything remains the same) is understandable as long as one has no insight into the processes which lead to the figures which need to be forecast. Ever since it was identified, the naïve forecast has been considered to be the rock bottom in terms of forecast accuracy. Even a very rudimentary understanding of the processes at play should lead to better accuracy than that offered by a naïve forecast.

Simple measurements of forecast quality (such as mean absolute error or mean squared error) enable us to make a comparison with a naïve forecast. However, these simple approaches do not permit an assessment of statistical significance. This deficit is avoided by using the Diebold-Mariano test (Diebold und Mariano, 1995). To do so, we calculate the mean squared error (MSE) for the time series of the expert prognoses and for the time series of the naïve forecasts. The test statistics of the Diebold-Mariano test are defined as follows:

$$DM = \frac{\frac{1}{T}\sum(V(P_{t1}) - V(P_{t2}))}{\sqrt{\hat{\gamma}\, d/T}}$$

T = number of observations
V = loss function
P_1 = naïve forecast
P_2 = expert forecast
$\sqrt{\hat{\gamma}\, d/T}$ = joint spread of the two loss functions

The null hypothesis tested in this way is that the naïve forecast (P_1) and the expert forecast (P_2) have the same accuracy. Neither one of the two alternatives thus provides a clearly better result. The numerator is the mean deviation between the loss functions V of the two forecast approaches to be compared. Normally a squared loss function is assumed; in other words, the squared errors of the two forecast approaches are compared (P_1 and P_2). The denominator is the joint spread of the two loss functions. This is estimated on the basis of the long-term autocovariances of the loss functions. In the case of large samples, this test value is asymptotically normally distributed.

3.2. Sign accuracy test

The sign accuracy test (Merton, 1981; Henriksson and Merton, 1981) is another widespread tool for evaluating forecasts. In this procedure, the extent of a forecasted change is not the issue. It only examines whether the general direction of the forecasts (rising or falling) is correct. The forecasts are then entered into a 2x2 matrix (Table 2)

Table 2: 2x2 contingency table

	Actual event: Interest rates rise	Actual event: Interest rates fall	∑
Forecast: Interest rates rise	N_{11}	N_{12}	$N_{1.}$
Forecast: Interest rates fall	N_{21}	N_{22}	$N_{2.}$
∑	$N_{.1}$	$N_{.2}$	N

On the one hand, a differentiation is made between whether an interest rate increase or an interest rate fall was forecast; on the other hand, a differentiation is also made between whether an interest rate rise or an interest rate fall has actually occurred. The principal diagonal in the 2x2 matrix (N_{11} and N_{22}) indicates the forecasts which are correct regarding the trend direction. The secondary diagonal (N_{12} und N_{21}) indicates the forecasts which are incorrect regarding the trend direction. A chi squared test is now applied to examine whether the distribution frequency of the four fields is significantly different from a random walk forecast (cf. Diebold and Lopez, 1996; Joutz and Stekler, 2000). If this is the case, a comparison between the number of observations in the principal diagonals and the secondary diagonals must be carried out to establish whether the forecasts are significantly better or significantly worse than a random walk forecast.

3.3. Unbiasedness test

The unbiasedness test using the Mincer-Zarnowitz regression (Mincer and Zarnowitz, 1969) can check whether the forecast errors are systematic. According to the theory of rational expectations, this should not be the case. The Mincer-Zarnowitz regression takes the following form:

$$A_t = \alpha + \beta P_t + u_t$$

A_t = event which has actually occurred (dependent variable)

α = constant

P_t = forecast of the actual event at the moment in time *t*

β = coefficient of the respective forecasts

u_t = error term at the moment in time *t*

Based on this equation, forecasts are considered unbiased if α is not significantly different to 0, and β is not significantly different to 1. In addition, the error term u_t may not be autocorrelated.

Forecasts are considered unbiased when, with a low probability of error, the joint hypothesis of $\alpha = 0$ und $\beta = 1$ does not have to be rejected. This is checked by using the Wald test. A further condition is the absence of autocorrelations in the value of the error term u_t, which is examined with the Durbin-Watson test. If, according to these criteria, a forecast time series is based on rational expectations, Granger and Newbold (1973) argue that this by no means signifies that the forecasts are perfect. They merely do not exhibit *systematic* errors.

3.4 Topically-orientated trend adjustment

In order to answer the question of whether forecasters have oriented themselves towards current levels when drawing up interest rate forecasts, the TOTA coefficient is used as a statistical benchmark (Andres und Spiwoks, 1999). Topically-orientated trend adjustment (TOTA) is present when forecasts reflect the present more strongly than the future. In the most unfavorable case, the future-oriented character of such forecasts may be lost entirely.

The TOTA coefficient is the quotient of two coefficients of determination (R^2_A and R^2_B). The R^2_A measures the correlation between the forecasts at the time of their validity and the actual events. The R^2_B measures the correlation between the forecasts at the time of their appearance and the actual events. The TOTA coefficient takes the following form:

$$TOTA\,coefficient = \frac{R^2_{\text{forecasts (validity date); actual events}}}{R^2_{\text{forecasts (issue date); actual events}}} = \frac{R^2_A}{R^2_B}$$

If the TOTA coefficient has a value of < 1, topically-orientated trend adjustment is given, and forecasts reflect the present more strongly than the future.

The TOTA coefficient and the unbiasedness test are closely related. If a forecast time series is characterized by the phenomenon of topically-orientated trend adjustment, the forecast error u_t is normally not randomly distributed (cf. Spiwoks, Bedke and Hein, 2010). Forecast time series which have a TOTA coefficient of < 1 are therefore normally biased.

4. Results

510 of the 532 forecasts analyzed have a TOTA coefficient of < 1 (see Tables 3-19). 95.9% of all forecast time series analyzed are therefore characterized by the phenomenon of topically-orientated trend adjustments. If interest rates rise, expectations regarding future interest rates will therefore normally be revised upwards. If interest rates fall, expectations regarding future interest rates will therefore usually be revised downwards. In this way, the forecast time series ultimately reflect current interest rates more strongly than future ones. Expressed more pointedly, it could be said that the experts are forecasting the present rather than the future. This is consistent with the results of earlier studies. In an analysis of 1,182 forecast time series of the G7 countries and five other

European countries, a total of 98.5% of all forecast time series studied exhibited a topically-orientated trend adjustment (see Spiwoks, Gubaydullina and Hein 2015).

These sobering findings are also reflected in the unbiasedness test. 529 of the 532 forecasts analyzed exhibit bias (see Tables 3-19). In 99.4% of all forecast time series studied, either α differs significantly from 0, or β differs significantly from 1, or the error term u_t proves to be autocorrelated.

Even unbiased forecasts can exhibit dramatic forecasting errors. The term unbiased merely states that forecasting errors are not of a systematic nature. A systematic forecasting error is, for example, a continuous over- or underestimation of the subject of the forecast ($\alpha \neq 0$). A different kind of systematic forecasting error is present when small actual events are constantly overestimated (or underestimated), and major actual events are constantly underestimated (or overestimated) ($\beta \neq 1$). Systematic forecasting errors are also present when the error term u_t reveals a pattern. This is usually the case when topically-orientated trend adjustment is present (cf. Spiwoks, Bedke and Hein 2010). However, other systematic forecasting errors can also lead to the error term u_t proving to be autocorrelated. Biased forecast time series are thus a reflection of systematic errors in drawing up the forecasts. This is true for 99.4% of all the forecasts we considered.

An expert's forecast can be viewed as largely worthless if it cannot bear comparison with the respective naïve forecast. A naïve forecast requires no specialist knowledge and is available free of charge to everyone at any time. One should, however, expect that forecasts made by highly-paid financial market experts are more exact than naïve forecasts. In many of the forecast subjects and forecast findings of many previous studies. For example, Spiwoks, Bedke and Hein (2008) established a success rate of only 19.9% among US interest rate forecasts.horizons examined here, the experts' forecasts - compared to the mean squared forecast error - are indeed more precise than naïve forecasts.[6] A total of 175 out of 532 forecast time series (32.9%) exhibit lower mean squared forecast errors than the respective naïve forecasts. However, the Diebold-Mariano test shows that only 19 out of 532 forecast time series (3.6%) contain significantly better forecasting results than naïve forecasts. The experts who forecast the prime lending rate in Hong Kong are particularly successful. 14 out of 30 forecast time series (46.7%) predict the interest rate trend significantly better than a naïve forecast (Table 6). Apart from this there are only five individual cases in which the time series of expert forecasts are significantly more precise than the time series of the respective naïve forecasts.

The sign accuracy test merely reveals whether forecasts were in the right direction (rising or falling). For the sign accuracy test, however, it is completely irrelevant whether forecasts predict the extent of future trends. The findings here are surprisingly favorable. In 248 out of 513 forecast time series

[6] In the forecasts of the prime lending rate in Hong Kong, it can be seen that 26 out of 30 forecast time series (86.7%) were superior to the naïve forecast. In the case of the forecasts of the 3-month rate in Hong Kong, 24 out of 38 forecast time series (63.2%) were superior to a naïve forecast, while in the forecasts of the 3-month rate in India, at least the forecasts with a 13 month forecast horizon were highly successful: 9 out of 12 forecast time series (75%) were more precise than the corresponding naïve forecast. Among the forecasts of 10-year interest rates in Indonesia, the forecasts with a horizon of 13 months were once again very successful. 9 out of 12 forecast time series (75%) are more exact than a naïve forecast. Forecasts of the base lending rate in Malaysia were more successful than a naïve forecast in 18 out of 30 cases (60%), which is also the case for forecasts of 3-month interest rates in Malaysia in 19 out of 36 cases (52.8%). The forecasts of the 3-month rate in New Zealand were more precise than a naïve forecast in 25 out of 36 cases (69.4%). Among the forecasts of the 3-month rate in Thailand with a forecast horizon of 13 months, 9 out of 13 forecast time series (69.2%) were superior to the naïve forecast.

(48.3%), the future trend (rising or falling interest rates) has been grasped significantly better than by a random walk forecast (see Tables 3-19). This is also a remarkable success in comparison to the

In the case of Australian 3-month interest rates with a forecast horizon of four months, 13 out of 21 forecast time series (61.9%) were significantly better in predicting the future trend direction (rising or falling) than a random walk forecast (Table 4). The forecasts for the base lending rate in China are very conspicuous: 29 out of 30 forecast time series (96.7%) predict the future interest rate trend significantly better than a random walk forecast (Table 5). This result is even surpassed by forecasts for the prime lending rate in Hong Kong. All 30 forecast time series (100%) reflect the future interest rate trend significantly more precisely than a random walk forecast (Table 6). The forecasts for three-month interest rates in Hong Kong, with a 13 month forecast horizon, are also very successful. 14 out of 19 forecast time series (73.7%) predict the interest rate trend significantly better than a random walk forecast (Table 7). Forecasts for the three-month rate in India are equally successful. In 17 out of 24 forecast time series (70.8%), the future trend (rising or falling interest rates) is reflected significantly better than by a random walk forecast (Table 9). The base lending rate in Malaysia is also forecasted successfully: 23 out of 28 forecast time series (82.1%) predict the future interest rate trend significantly better than a random walk forecast (Table 11). The forecasts for the three-month rate in New Zealand similarly predict the future interest rate trend significantly better (rising or falling) in 25 out of 36 cases (69.4%) than a random walk forecast (Table 14). Among the forecasts for three-month interest rates in Thailand, it is particularly those with a forecast horizon of four months that are successful. 10 out of 13 forecast time series (76.9%) predict the future trend significantly more precisely than a random walk forecast (Table 19).

In the case of 19 out of 532 forecast time series, the sign accuracy test could not be carried out, because frequencies of < 1 occur in one or several fields of the 2x2 contingency table. In these cases, however, the chi squared distribution is no longer a suitable test statistic (see, for example, Spiwoks, Bedke and Hein, 2009).

Overall, it can be stated that forecasting three-month interest rates is considerably easier than ten-year interest rates. Only 15.3% of the forecast time series on 10-year rates (Australia, India, Indonesia, New Zealand, Taiwan) predict the future trend (rising or falling interest rates) significantly more precisely than a random walk forecast, whereas in the case of three-month interest rates (Australia, Hong Kong, India, Malaysia, New Zealand, Singapore, Thailand) the figure is 57.1%. The coincides with the findings which have been obtained in other parts of the world. For example, in the case of US interest rate forecasts, Spiwoks, Bedke and Hein (2008) showed that only 8.8% of all forecast time series on 10-year interest rates were significantly more successful than a random walk forecast, while in the case of three-month interest rates the figure was 30.9%.

The interest rates for short maturities are influenced considerably more by the actions of central banks than the interest rates for long maturities. In addition, central banks frequently provide an outlook on their future base rate policies. It can be that careful observation of central bank policy benefits forecasts of three-month interest rates, but not those for ten-year interest rates (cf. Spiwoks, Bedke and Hein 2008, p. 376). That would explain the variations in the success of forecasts.

Table 3: Results of the measurement of forecast quality for Australia (10-year government bond yield)

		Forecast horizon 4 months							Forecast horizon 13 months						
							Unbiasedness							Unbiasedness	
			D-M test		Sign acc. test		F test	DW		DM test		Sign acc. test		F test	DW
Institution	#	TOTA	Res	p-value	Res	p-value	p-value	p-value	TOTA	Res	p-value	Res	p-value	p-value	p-value
ANZ	440	0.813	-	0.004	o	0.163	0.000	0.000	0.406	-	0.034	o	0.388	0.000	0.000
BIS Shrapnel	442	0.837	-	0.000	o	0.821	0.000	0.000	0.559	-	0.000	-	0.048	0.000	0.000
BT Financial Group	450	0.808	-	0.025	o	0.803	0.000	0.000	0.431	-	0.024	o	0.108	0.000	0.000
Centre of Policy St.	205	0.461	-	0.011	o	0.994	0.000	0.000	0.022	-	0.049	o	0.743	0.000	0.000
Citigroup	245	0.796	-	0.002	o	0.686	0.000	0.000	0.296	-	0.079	o	0.334	0.000	0.000
Commonwealth B.	444	0.785	-	0.000	-	0.029	0.000	0.000	0.401	-	0.015	o	0.642	0.000	0.000
Deloitte Acc. Econ.	428	0.806	-	0.017	o	0.290	0.000	0.000	0.424	o	0.111	-	0.011	0.000	0.000
Deutsche Bank	124	0.349	o	0.148	o	0.856	0.000	0.000	0.256	-	0.075	o	0.107	0.000	0.000
Goldman Sachs	228	0.743	-	0.009	o	0.542	0.000	0.000	0.415	o	0.183	o	0.564	0.000	0.000
HSBC	286	0.814	-	0.096	o	0.277	0.000	0.000	0.623	-	0.031	o	0.178	0.000	0.000
JPMorgan Chase	403	0.760	-	0.000	-	0.094	0.000	0.000	0.361	-	0.000	o	0.198	0.000	0.000
Macquarie	386	0.752	-	0.035	-	0.064	0.000	0.000	0.363	-	0.001	-	0.025	0.000	0.000
Merrill Lynch	300	0.847	-	0.018	o	0.889	0.000	0.000	0.570	o	0.242	o	0.266	0.000	0.000
Moody's Analytics	206	0.755	-	0.006	o	0.952	0.000	0.000	0.341	o	0.106	o	0.924	0.000	0.000
Nation. Australia B.	411	0.825	-	0.011	o	0.713	0.000	0.000	0.499	-	0.018	o	0.943	0.000	0.000
Nomura	328	0.587	-	0.023	o	0.675	0.000	0.000	0.137	-	0.024	-	0.011	0.000	0.000
Royal B. of Canada	272	0.771	o	0.249	o	0.114	0.000	0.000	0.298	o	0.107	o	0.576	0.000	0.000
Suncorp	212	0.436	-	0.000	o	0.489	0.000	0.000	0.038	o	0.155	+	0.057	0.000	0.000
UBS	449	0.791	-	0.005	o	0.973	0.000	0.000	0.382	-	0.023	-	0.006	0.000	0.000
Westpac	450	0.798	-	0.000	+	0.031	0.000	0.000	0.455	-	0.042	o	0.316	0.000	0.000
Consensus Forec.	504	0.806	-	0.004	o	0.887	0.000	0.000	0.430	-	0.031	o	0.323	0.000	0.000

= number of observations; TOTA = TOTA coefficient; DM test = Diebold-Mariano test; Res = result; o = no significant result; - = significantly worse than a naïve or random walk forecast; + = significantly better than a naïve or random walk forecast; Sign acc. test = sign accuracy test; unbiasedness = test for unbiasedness; DW = Durbin-Watson test.

Table 4: Results of the measurement of forecast quality for Australia (3-month interest rates)

		Forecast horizon 4 months							Forecast horizon 13 months						
			DM test		Sign acc. test		Unbiasedness F test	Unbiasedness DW		DM test		Sign acc. test		Unbiasedness F test	Unbiasedness DW
Institution	#	TOTA	Res	p-value	Res	p-value	p-value	p-value	TOTA	Res	p-value	Res	p-value	p-value	p-value
ANZ	468	0.904	o	0.471	+	0.000	0.000	0.000	0.377	o	0.180	+	0.035	0.000	0.000
BIS Shrapnel	465	0.897	o	0.159	+	0.001	0.000	0.000	0.490	o	0.215	+	0.001	0.000	0.000
BT Financial Group	468	0.886	o	0.432	+	0.000	0.109	0.000	0.427	o	0.847	+	0.002	0.000	0.000
Centre of Policy St.	219	0.780	o	0.393	o	0.107	0.001	0.000	0.015	-	0.096	o	0.663	0.000	0.000
Citigroup	276	0.854	o	0.889	o	0.156	0.002	0.000	0.239	o	0.235	o	0.379	0.000	0.000
Commonwealth B.	470	0.912	o	0.759	o	0.290	0.000	0.000	0.378	o	0.190	o	0.372	0.000	0.000
Deloitte Acc. Econ.	450	0.874	o	0.592	o	0.205	0.000	0.000	0.430	o	0.407	o	0.063	0.000	0.000
Deutsche Bank	124	0.560	o	0.867	o	0.358	0.000	0.000	0.044	o	0.089	o	0.839	0.000	0.000
Goldman Sachs	227	0.913	o	0.162	+	0.000	0.006	0.000	0.457	o	0.351	+	0.000	0.409	0.000
HSBC	272	0.953	o	0.502	o	0.109	0.000	0.000	0.713	o	0.172	+	0.028	0.000	0.000
JPMorgan Chase	410	0.877	o	0.450	+	0.008	0.001	0.000	0.387	o	0.902	o	0.387	0.000	0.000
Macquarie	411	0.900	o	0.537	+	0.005	0.000	0.000	0.368	o	0.388	o	0.482	0.000	0.000
Merrill Lynch	325	0.914	o	0.633	+	0.006	0.008	0.000	0.523	o	0.723	o	0.892	0.000	0.000
Moody's Analytics	188	0.906	o	0.457	+	0.002	0.028	0.000	0.364	o	0.779	o	0.660	0.000	0.000
Nation. Australia B.	432	0.896	o	0.366	+	0.046	0.843	0.000	0.452	o	0.970	o	0.066	0.001	0.000
Nomura	352	0.817	o	0.627	o	0.887	0.000	0.000	0.140	o	0.573	o	0.087	0.000	0.000
Royal B. of Canada	272	0.865	o	0.121	+	0.000	0.000	0.000	0.383	o	0.612	o	0.366	0.036	0.000
Suncorp	212	0.619	-	0.083	o	0.922	0.796	0.000	0.044	o	0.668	o	0.646	0.000	0.000
UBS	472	0.874	o	0.707	+	0.031	0.006	0.000	0.363	o	0.576	o	0.401	0.000	0.000
Westpac	470	0.930	o	0.506	+	0.008	0.000	0.000	0.503	o	0.234	+	0.002	0.000	0.000
Consensus Forec.	504	0.897	o	0.308	+	0.000	0.001	0.000	0.427	o	0.737	o	0.206	0.000	0.000

= number of observations; TOTA = TOTA coefficient; DM test = Diebold-Mariano test; Res = result; o = no significant result; - = significantly worse than a naïve or random walk forecast; + = significantly better than a naïve or random walk forecast; sign acc. test = sign accuracy test; unbiasedness = test for unbiasedness; DW = Durbin-Watson test.

Table 5: Results of the measurement of forecast quality for China (1-year base lending rate)

		Forecast horizon 4 months							Forecast horizon 13 months						
			DM test		Sign acc. test		Unbiasedness F test	Unbiasedness DW		DM test		Sign acc. test		Unbiasedness F test	Unbiasedness DW
Institution	#	TOTA	Res	p-value	Res	p-value	p-value	p-value	TOTA	Res	p-value	Res	p-value	p-value	p-value
Bank of China	258	0.671	o	0.317	+	0.000	0.000	0.000	0.037	o	0.623	+	0.000	0.000	0.000
Barclays Capital	101	0.841	o	0.733	o	0.317	0.000	0.000	0.030	o	0.386	+	0.000	0.000	0.000
BNP Paribas	108	0.888	o	0.830	+	0.009	0.000	0.000	0.441	o	0.343	+	0.000	0.000	0.000
Citigroup	100	0.599	o	0.229	+	0.001	0.000	0.047	0.007	o	0.179	+	0.000	0.000	0.000
Daiwa Capital	115	0.897	o	0.766	+	0.000	0.000	0.952	0.675	o	0.359	+	0.000	0.000	0.000
Deutsche Bank	158	0.702	o	0.240	+	0.036	0.002	0.000	0.000	o	0.445	+	0.000	0.000	0.000
Hang Seng Bank	107	0.918	o	0.532	+	0.001	0.001	0.000	0.547	o	0.885	+	0.590	0.000	0.000
HSBC Economics	212	0.665	o	0.332	+	0.000	0.000	0.000	0.045	o	0.530	+	0.000	0.000	0.000
IHS Economics	278	0.735	o	0.408	+	0.000	0.000	0.000	0.026	o	0.441	+	0.000	0.000	0.000
ING	216	0.574	o	0.298	+	0.002	0.000	0.000	0.036	o	0.889	+	0.000	0.000	0.000
JPMorgan Chase	96	0.580	o	0.271	+	0.000	0.001	0.001	0.000	o	0.324	+	0.002	0.000	0.098
Morgan Stanley	93	0.808	o	0.632	+	0.008	0.000	0.000	0.013	o	0.895	+	0.000	0.000	0.000
Nomura	158	1.017	o	0.860	+	0.000	0.001	0.000	1.432	o	0.751	+	0.000	0.000	0.000
Oxford Economics	232	0.695	-	0.089	+	0.000	0.000	0.000	0.153	o	0.618	+	0.000	0.000	0.000
Consensus Forec.	300	0.718	o	0.564	+	0.000	0.000	0.000	0.040	o	0.738	+	0.000	0.000	0.000

= number of observations; TOTA = TOTA coefficient; DM test = Diebold-Mariano test; Res = result; o = no significant result; - = significantly worse than a naïve or random walk forecast; + = significantly better than a naïve or random walk forecast; sign acc. test = sign accuracy test; unbiasedness = test for unbiasedness; DW = Durbin-Watson test.

Table 6: Results of the measurement of forecast quality for Hong Kong (prime lending rate)

		Forecast horizon 4 months							Forecast horizon 13 months						
			DM test		Sign acc. test		Unbiasedness F test	Unbiasedness DW		DM test		Sign acc. test		Unbiasedness F test	Unbiasedness DW
Institution	#	TOTA	Res	p-value	Res	p-value	p-value	p-value	TOTA	Res	p-value	Res	p-value	p-value	p-value
Bank of China	334	0.967	+	0.025	+	0.000	0.026	0.000	0.574	+	0.058	+	0.000	0.000	0.000
Bank of East Asia	483	0.986	+	0.024	+	0.000	0.003	0.000	0.738	o	0.257	+	0.000	0.000	0.000
C. Pacific-Yamaichi	168	0.985	o	0.264	+	0.000	0.004	0.000	0.287	o	0.131	+	0.012	0.000	0.000
Credit Suisse	168	0.957	o	0.211	+	0.000	0.010	0.000	0.479	o	0.203	+	0.020	0.000	0.000
Daiwa Research I.	273	0.956	+	0.044	+	0.000	0.121	0.000	0.488	+	0.076	+	0.000	0.000	0.000
Deutsche Bank	264	0.967	+	0.031	+	0.000	0.159	0.000	0.633	o	0.418	+	0.000	0.000	0.000
FAZ Institute	132	0.939	o	0.208	+	0.000	0.829	0.000	0.449	o	0.161	+	0.001	0.000	0.000
Goldman Sachs	156	0.972	o	0.703	+	0.001	0.011	0.000	0.785	o	0.697	+	0.000	0.000	0.000
Hang Seng Bank	363	0.994	+	0.021	+	0.000	0.002	0.000	0.778	+	0.047	+	0.000	0.006	0.000
HSBC Economics	341	0.999	o	0.682	+	0.000	0.083	0.000	0.787	o	0.197	+	0.000	0.349	0.000
IHS Economics	288	0.957	+	0.075	+	0.000	0.003	0.000	0.527	o	0.201	+	0.000	0.000	0.000
Sakura Institute	139	0.378	o	0.946	+	0.000	0.169	0.000	0.153	+	0.009	+	0.000	0.000	0.000
S. Chartered Bank	209	0.970	+	0.036	+	0.000	0.023	0.000	0.441	o	0.668	+	0.000	0.000	0.000
UBS	132	0.930	+	0.098	+	0.000	0.863	0.001	0.253	o	0.408	+	0.045	0.455	0.000
Consensus Forec.	504	0.975	+	0.023	+	0.000	0.042	0.000	0.720	+	0.043	+	0.000	0.000	0.000

= number of observations; TOTA = TOTA coefficient; DM test = Diebold-Mariano test; Res = result; o = no significant result; - = significantly worse than a naïve or random walk forecast; + = significantly better than a naïve or random walk forecast; sign acc. test = sign accuracy test; unbiasedness = test for unbiasedness; DW = Durbin-Watson test.

Table 7: Results of the measurement of forecast quality for Hong Kong (3-month interest rates)

		Forecast horizon 4 months							Forecast horizon 13 months						
			DM test		Sign acc. test		Unbiasedness F test	Unbiasedness DW		DM test		Sign acc. test		Unbiasedness F test	Unbiasedness DW
Institution	#	TOTA	Res	p-value	Res	p-value	p-value	p-value	TOTA	Res	p-value	Res	p-value	p-value	p-value
Bank of China	336	0.923	+	0.088	+	0.003	0.080	0.000	0.760	o	0.152	+	0.000	0.000	0.000
Bank of East Asia	484	0.906	o	0.121	+	0.000	0.010	0.000	0.804	o	0.163	+	0.001	0.000	0.000
Citigroup	339	0.967	o	0.125	+	0.000	0.848	0.000	0.768	o	0.390	+	0.001	0.000	0.000
C. Pacific-Yamaichi	168	0.981	o	0.628	+	0.000	0.000	0.000	0.374	o	0.317	+	0.001	0.000	0.000
Credit Suisse	185	0.887	o	0.231	o	0.091	0.292	0.000	0.573	o	0.577	o	0.284	0.000	0.000
Daiwa Research	275	0.818	+	0.096	o	0.191	0.064	0.000	0.481	o	0.418	o	0.301	0.000	0.000
Deutsche Bank	297	0.921	o	0.900	o	0.067	0.012	0.000	0.744	o	0.736	+	0.014	0.000	0.000
FAZ Institute	132	0.921	o	0.456	o	0.392	0.061	0.000	0.374	o	0.931	+	0.030	0.000	0.000
Goldman Sachs	375	0.862	o	0.214	+	0.000	0.081	0.000	0.795	o	0.223	+	0.000	0.001	0.000
Hang Seng Bank	363	0.913	o	0.143	+	0.023	0.595	0.000	0.832	+	0.041	+	0.000	0.011	0.000
HSBC	342	0.962	o	0.318	o	0.244	0.082	0.000	0.827	o	0.182	+	0.000	0.002	0.000
ING	405	0.920	o	0.202	+	0.000	0.339	0.000	0.794	o	0.368	+	0.000	0.000	0.000
Morgan Stanley	100	1.013	o	0.411	o	0.401	0.240	0.761	0.818	o	0.744	+	0.008	0.000	0.000
Nomura	196	0.947	o	0.251	o	0.474	0.000	0.000	0.868	o	0.336	+	0.001	0.000	0.000
Sakura Institute	139	0.126	o	0.291	o	0.098	0.123	0.001	0.002	o	0.301	o	0.077	0.044	0.000
Societe Generale	117	0.834	o	0.464	o	0.184	0.024	0.094	0.676	o	0.327	o	0.149	0.004	0.000
S. Chartered Bank	212	0.782	o	0.415	o	0.521	0.000	0.002	0.392	o	0.897	+	0.013	0.000	0.000
UBS	131	0.808	o	0.638	o	0.674	0.001	0.001	0.026	o	0.767	o	0.510	0.000	0.000
Consensus Forec.	504	0.909	o	0.154	+	0.000	0.001	0.000	0.778	o	0.140	+	0.000	0.000	0.000

= number of observations; TOTA = TOTA coefficient; DM test = Diebold-Mariano test; Res = result; o = no significant result; - = significantly worse than a naïve or random walk forecast; + = significantly better than a naïve or random walk forecast; sign acc. test = sign accuracy test; unbiasedness = test for unbiasedness; DW = Durbin-Watson test.

Table 8: Results of the measurement of forecast quality for India (10-year government bond yield)

	Forecast horizon 4 months								Forecast horizon 13 months							
							Unbiasedness								Unbiasedness	
			DM test		Sign acc. test		F test	DW		DM test		Sign acc. test		F test	DW	
Institution	#	TOTA	Res	p-value	Res	p-value	p-value	p-value	TOTA	Res	p-value	Res	p-value	p-value	p-value	
Citigroup	190	0.182	o	0.110	O	0.273	0.007	0.000	0.025	o	0.725	+	0.001	0.004	0.000	
Confed of Indian I.	144	0.949	-	0.037	o	0.073	0.000	0.032	0.684	o	0.563	o	0.093	0.000	0.000	
Deutsche Bank	101	0.932	-	0.011	+	0.020	0.090	0.000	0.907	o	0.329	+	0.030	0.008	0.000	
Dresdner Bank	84	0.747	o	0.919	+	0.011	0.021	0.790	0.653	o	0.287	+	0.037	0.183	0.829	
FERI	156	0.389	-	0.058	o	0.270	0.000	0.000	0.003	o	0.245	o	0.123	0.000	0.000	
Hindustan Lever	176	0.897	-	0.063	o	0.601	0.000	0.000	0.718	o	0.112	o	0.500	0.000	0.000	
HSBC Securities	272	0.849	o	0.126	o	0.080	0.015	0.000	0.812	o	0.299	+	0.000	0.000	0.000	
HIS Economics	186	0.607	o	0.170	+	0.028	0.076	0.000	0.317	o	0.140	-	0.046	0.000	0.000	
NCAER	214	0.881	-	0.005	o	0.214	0.000	0.000	0.712	-	0.003	o	0.688	0.000	0.000	
Nomura	224	0.951	o	0.171	o	0.106	0.000	0.000	0.951	o	0.537	+	0.000	0.000	0.000	
Tata Services	327	0.922	-	0.073	+	0.001	0.033	0.000	0.813	o	0.163	+	0.000	0.000	0.000	
UBS	138	0.905	o	0.178	o	0.128	0.000	0.000	0.730	o	0.518	+	0.013	0.000	0.000	
Consensus Forec.	504	0.934	o	0.167	+	0.001	0.000	0.000	0.843	o	0.944	+	0.000	0.000	0.000	

= number of observations; TOTA = TOTA coefficient; DM test = Diebold-Mariano test; Res = result; o = no significant result; - = significantly worse than a naïve or random walk forecast; + = significantly better than a naïve or random walk forecast; sign acc. test = sign accuracy test; unbiasedness = test for unbiasedness; DW = Durbin-Watson test.

Table 9: Results of the measurement of forecast quality for India (3-month interest rates)

		Forecast horizon 4 months							Forecast horizon 13 months						
			DM test		Sign acc. test		Unbiasedness F test	Unbiasedness DW		DM test		Sign acc. test		Unbiasedness F test	Unbiasedness DW
Institution	#	TOTA	Res	p-value	Res	p-value	p-value	p-value	TOTA	Res	p-value	Res	p-value	p-value	p-value
Citigroup	221	0.862	o	0.316	o	0.558	0.000	0.000	0.104	o	0.669	+	0.001	0.000	0.000
Confed of Indian I.	166	0.908	o	0.621	+	0.001	0.000	0.009	0.656	o	0.624	+	0.028	0.000	0.002
Deutsche Bank	151	0.905	o	0.304	+	0.011	0.109	0.000	0.443	o	0.413	+	0.000	0.000	0.000
Dresdner Bank	232	0.808	NA	NA	+	0.010	0.001	0.000	0.373	o	0.296	+	0.000	0.018	0.000
Goldman Sachs	98	0.113	o	0.389	+	0.026	0.002	0.000	0.000	o	0.553	o	0.835	0.000	0.000
Hindustan Lever	168	0.864	NA	NA	+	0.011	0.000	0.001	0.752	-	0.001	+	0.000	0.000	0.002
HSBC Securities	234	0.502	o	0.172	o	0.585	0.000	0.000	0.167	o	0.513	+	0.000	0.000	0.000
JPMorgan	108	0.484	o	0.315	o	0.793	0.000	0.707	0.452	o	0.249	+	0.001	0.004	0.594
NCAER	212	0.809	o	0.335	+	0.000	0.006	0.000	0.336	o	0.927	o	0.090	0.000	0.000
Tata Services	325	0.854	o	0.487	+	0.000	0.000	0.000	0.180	o	0.870	+	0.000	0.000	0.000
UBS	136	0.666	o	0.158	o	0.200	0.001	0.000	0.049	o	0.186	o	0.133	0.122	0.002
Consensus Forec.	504	0.799	o	0.393	+	0.002	0.001	0.000	0.223	o	0.502	+	0.000	0.000	0.000

= number of observations; TOTA = TOTA coefficient; DM test = Diebold-Mariano test; Res = result; o = no significant result; - = significantly worse than a naïve or random walk forecast; + = significantly better than a naïve or random walk forecast; sign acc. test = sign accuracy test; unbiasedness = test for unbiasedness; DW = Durbin-Watson test; NA = not available.

Table 10: Results of the measurement of forecast quality for India (10-year government bond yield)

		Forecast horizon 4 months							Forecast horizon 13 months						
			DM test		Sign acc. test		Unbiasedness F test	Unbiasedness DW		DM test		Sign acc. test		Unbiasedness F test	Unbiasedness DW
Institution	#	TOTA	Res	p-value	Res	p-value	p-value	p-value	TOTA	Res	p-value	Res	p-value	p-value	p-value
Bahana Securities	194	0.916	o	0.990	o	0.108	0.000	0.000	0.569	o	0.553	-	0.033	0.000	0.000
Bank Danamon	98	0.809	NA	NA	o	0.301	0.000	0.023	0.464	o	0.367	+	0.043	0.000	0.000
Castle Asia	108	0.787	-	0.034	o	0.433	0.360	0.000	0.440	o	0.513	+	0.003	0.000	0.000
Citigroup	228	0.912	o	0.505	o	0.273	0.000	0.615	0.443	o	0.707	o	0.722	0.000	0.000
Danareksa S.	375	1.001	NA	NA	o	0.422	0.000	0.000	0.844	o	0.273	o	0.317	0.156	0.000
GK Goh	110	1.107	o	0.347	o	0.053	0.276	0.000	0.969	o	0.864	o	0.542	0.000	0.000
HSBC Economics	272	0.916	o	0.270	o	0.983	0.000	0.000	0.590	o	0.281	o	0.601	0.000	0.000
ING	199	0.937	o	0.353	o	0.191	0.008	0.000	0.747	o	0.519	o	0.983	0.000	0.000
Nomura	134	0.867	o	0.338	o	0.866	0.000	0.095	0.419	o	0.308	-	0.004	0.000	0.000
Societe Generale	124	0.822	-	0.002	NA	NA	0.450	0.000	0.653	o	0.222	NA	NA	0.031	0.000
S. Chartered Bank	174	0.861	o	0.111	o	0.676	0.144	0.000	0.358	o	0.660	o	0.971	0.018	0.000
Consensus Forec.	504	0.926	o	0.265	o	0.884	0.000	0.000	0.590	o	0.501	o	0.547	0.000	0.000

= number of observations; TOTA = TOTA coefficient; DM test = Diebold-Mariano test; Res = result; o = no significant result; - = significantly worse than a naïve or random walk forecast; + = significantly better than a naïve or random walk forecast; sign acc. test = sign accuracy test; unbiasedness = test for unbiasedness; DW = Durbin-Watson test; NA = not available.

Table 11: Results of the measurement of forecast quality for Malaysia (base lending rate)

		Forecast horizon 4 months							Forecast horizon 13 months						
			DM test		Sign acc. test		Unbiasedness F test	Unbiasedness DW		DM test		Sign acc. test		Unbiasedness F test	Unbiasedness DW
Institution	#	TOTA	Res	p-value	Res	p-value	p-value	p-value	TOTA	Res	p-value	Res	p-value	p-value	p-value
AMSecurities	212	0.890	o	0.226	+	0.000	0.000	0.000	0.493	o	0.318	o	0.309	0.000	0.000
CIBD-CIMB	157	1.002	+	0.096	+	0.003	0.001	0.000	0.612	o	0.272	+	0.017	0.000	0.000
Citigroup	94	0.848	o	0.305	+	0.007	0.000	0.000	0.105	o	0.821	+	0.013	0.000	0.000
Deutsche Bank	92	0.996	o	0.261	NA	NA	0.022	0.000	1.016	o	0.222	+	0.000	0.000	0.010
Goldman Sachs	118	0.792	-	0.049	+	0.000	0.000	0.000	0.388	o	0.301	+	0.000	0.000	0.000
HSBC Securities	149	0.551	-	0.056	o	0.178	0.000	0.000	0.005	o	0.441	+	0.001	0.000	0.000
JM Sassoon	150	0.918	o	0.218	+	0.000	0.055	0.000	0.746	o	0.158	+	0.001	0.270	0.000
Kanega Research	109	0.954	o	0.131	+	0.009	0.014	0.000	0.142	o	0.155	+	0.012	0.000	0.000
Kay Hian Research	261	0.951	o	0.249	+	0.001	0.495	0.000	0.918	o	0.231	+	0.001	0.368	0.000
Maybank	145	0.791	o	0.390	NA	NA	0.082	0.000	0.037	-	0.086	o	0.201	0.000	0.000
MIER	276	0.862	o	0.277	+	0.000	0.095	0.000	0.636	o	0.475	o	0.697	0.204	0.000
RHB Research	400	1.021	o	0.287	+	0.000	0.000	0.000	0.676	o	0.169	+	0.000	0.045	0.000
Societe Generale	104	0.911	o	0.216	+	0.000	0.000	0.000	1.102	o	0.800	+	0.008	0.000	0.000
S. Chartered Bank	165	1.051	o	0.240	+	0.000	0.003	0.000	0.654	o	0.555	o	0.059	0.000	0.000
Consensus Forec.	480	0.939	o	0.130	+	0.000	0.005	0.000	0.606	o	0.160	+	0.000	0.180	0.000

= number of observations; TOTA = TOTA coefficient; DM test = Diebold-Mariano test; Res = result; o = no significant result; - = significantly worse than a naïve or random walk forecast; + = significantly better than a naïve or random walk forecast; sign acc. test = sign accuracy test; unbiasedness = test for unbiasedness; DW = Durbin-Watson test; NA = not available.

Table 12: Results of the measurement of forecast quality for Malaysia (3-month interest rates)

		Forecast horizon 4 months							Forecast horizon 13 months						
			DM test		Sign acc. test		Unbiasedness F test	Unbiasedness DW		DM test		Sign acc. test		Unbiasedness F test	Unbiasedness DW
Institution	#	TOTA	Res	p-value	Res	p-value	p-value	p-value	TOTA	Res	p-value	Res	p-value	p-value	p-value
AMSecurities	211	0.896	o	0.261	o	0.051	0.706	0.000	0.364	o	0.400	o	0.161	0.000	0.000
Baring- ING	427	0.882	o	0.499	+	0.000	0.072	0.000	0.603	o	0.920	+	0.000	0.000	0.000
BofA-Merrill Lynch	111	1.050	o	0.643	o	0.068	0.052	0.000	0.924	o	0.650	o	0.536	0.000	0.000
CIBD-CIMB	156	0.962	o	0.622	o	0.350	0.028	0.000	0.588	o	0.184	o	0.148	0.000	0.000
Citigroup	383	0.923	o	0.100	+	0.004	0.011	0.000	0.534	o	0.474	+	0.002	0.000	0.000
Deutsche Bank	127	0.996	o	0.546	o	0.071	0.006	0.000	0.884	o	0.153	+	0.000	0.000	0.014
Goldman Sachs	464	0.877	-	0.081	o	0.663	0.000	0.000	0.573	NA	NA	+	0.017	0.000	0.000
HSBC Economics	195	0.819	-	0.051	o	0.060	0.000	0.000	0.138	o	0.479	+	0.004	0.000	0.000
JM Sassoon	150	0.917	o	0.180	+	0.000	0.472	0.000	0.689	o	0.248	+	0.002	0.064	0.000
Kanega Research	118	0.819	o	0.113	+	0.005	0.098	0.000	0.077	o	0.179	+	0.000	0.047	0.000
Kay Hian Research	120	0.841	o	0.575	+	0.001	0.009	0.001	0.497	o	0.276	o	0.940	0.000	0.000
Maybank	141	0.876	o	0.110	o	0.699	0.008	0.000	0.200	o	0.144	o	0.248	0.000	0.000
MIER	282	0.915	o	0.243	+	0.002	0.006	0.000	0.604	o	0.424	o	0.482	0.000	0.000
RHB Research	404	0.935	o	0.245	+	0.000	0.527	0.000	0.501	o	0.263	+	0.000	0.000	0.000
Societe Generale	118	1.019	o	0.938	+	0.000	0.436	0.001	1.540	o	0.810	o	0.095	0.000	0.000
S. Chartered Bank	238	0.963	o	0.237	+	0.001	0.028	0.000	0.581	o	0.445	o	0.238	0.025	0.000
UOB Kay Hian	220	0.908	o	0.274	o	0.189	0.654	0.000	0.352	o	0.294	+	0.007	0.000	0.000
Consensus Forec.	504	0.927	o	0.199	+	0.000	0.154	0.000	0.588	o	0.291	+	0.000	0.000	0.000

= number of observations; TOTA = TOTA coefficient; DM test = Diebold-Mariano test; Res = result; o = no significant result; - = significantly worse than a naïve or random walk forecast; + = significantly better than a naïve or random walk forecast; sign acc. test = sign accuracy test; unbiasedness = test for unbiasedness; DW = Durbin-Watson test; NA = not available.

Table 13: Results of the measurement of forecast quality for New Zealand (10-year government bond yield)

	Forecast horizon 4 months								Forecast horizon 13 months							
				DM test		Sign acc. test	Unbiasedness F test	Unbiasedness DW			DM test		Sign acc. test		Unbiasedness F test	Unbiasedness DW
Institution	#	TOTA	Res	p-value	Res	p-value	p-value	p-value	TOTA	Res	p-value	Res	p-value		p-value	p-value
ANZ Bank	488	0.832	-	0.010	o	0.286	0.000	0.000	0.575	-	0.053	+	0.007		0.000	0.000
ASB Bank	274	0.798	-	0.011	o	0.849	0.000	0.000	0.393	-	0.072	o	0.630		0.000	0.000
Bank of NZ	480	0.779	-	0.038	o	0.806	0.000	0.000	0.426	-	0.047	o	0.423		0.000	0.000
BERL	340	0.483	-	0.024	o	0.951	0.000	0.000	0.231	-	0.086	o	0.355		0.043	0.000
Credit Suisse FB	114	0.297	o	0.263	o	0.602	0.002	0.000	0.239	o	0.983	o	0.638		0.213	0.000
Deutsche Bank NZ	468	0.831	-	0.006	+	0.032	0.000	0.000	0.481	-	0.001	-	0.004		0.000	0.000
First NZ Capital	348	0.830	-	0.000	o	0.988	0.000	0.000	0.565	o	0.145	o	0.198		0.000	0.000
Goldman Sachs NZ	144	0.516	-	0.059	o	0.955	0.043	0.000	0.093	o	0.308	-	0.015		0.000	0.000
HSBC Economics	216	0.867	-	0.003	o	0.550	0.000	0.000	0.490	-	0.053	o	0.129		0.000	0.000
Infometrics	498	0.762	-	0.002	o	0.469	0.000	0.000	0.426	-	0.021	o	0.549		0.000	0.000
JPMorgan Chase	331	0.754	-	0.000	o	0.444	0.019	0.000	0.361	-	0.035	o	0.833		0.000	0.000
Macquarie	172	0.776	-	0.003	o	0.271	0.000	0.000	0.341	-	0.050	o	0.472		0.000	0.000
National Bank NZ	212	0.465	o	0.663	o	0.107	0.529	0.000	0.000	o	0.180	o	0.455		0.000	0.000
NZIER	440	0.764	-	0.000	o	0.257	0.000	0.000	0.572	-	0.060	+	0.002		0.000	0.000
Ord Minnett S.	128	0.234	-	0.005	o	0.567	0.008	0.000	0.367	o	0.783	+	0.000		0.000	0.000
UBS	476	0.779	-	0.001	-	0.038	0.000	0.000	0.393	-	0.084	-	0.040		0.000	0.000
Westpac	482	0.799	-	0.003	o	0.663	0.000	0.000	0.497	-	0.092	o	0.359		0.000	0.000
Consensus Forec.	504	0.793	-	0.005	o	0.377	0.000	0.000	0.504	o	0.118	o	0.075		0.000	0.000

= number of observations; TOTA = TOTA coefficient; DM test = Diebold-Mariano test; Res = result; o = no significant result; - = significantly worse than a naïve or random walk forecast; + = significantly better than a naïve or random walk forecast; sign acc. test = sign accuracy test; unbiasedness = test for unbiasedness; DW = Durbin-Watson test.

Table 14: Results of the measurement of forecast quality for New Zealand (3-month interest rates)

	Forecast horizon 4 months								Forecast horizon 13 months							
				DM test		Sign acc. test	Unbiasedness F test	Unbiasedness DW			DM test		Sign acc. test	Unbiasedness F test	Unbiasedness DW
Institution	#	TOTA	Res	p-value	Res	p-value	p-value	p-value	TOTA	Res	p-value	Res	p-value	p-value	p-value
ANZ Bank	488	0.939	o	0.287	+	0.000	0.063	0.000	0.694	o	0.383	o	0.446	0.000	0.000
ASB Bank	274	0.998	o	0.243	+	0.000	0.018	0.000	0.684	o	0.654	o	0.434	0.000	0.000
Bank of NZ	480	0.937	o	0.152	+	0.000	0.068	0.000	0.758	o	0.341	+	0.003	0.000	0.000
BERL	340	0.770	o	0.275	o	0.173	0.000	0.000	0.403	o	0.213	o	0.128	0.038	0.000
Credit Suisse FB	114	0.742	o	0.215	+	0.012	0.490	0.000	0.042	o	0.236	+	0.000	0.043	0.000
Deutsche Bank NZ	468	0.947	+	0.076	+	0.000	0.064	0.000	0.630	o	0.497	+	0.007	0.000	0.000
First NZ Capital	348	0.960	o	0.161	+	0.000	0.124	0.000	0.637	o	0.394	o	0.299	0.000	0.000
Goldman Sachs NZ	146	0.825	o	0.265	+	0.000	0.000	0.000	0.079	o	0.464	+	0.008	0.000	0.000
HSBC Economics	198	0.972	o	0.294	+	0.001	0.000	0.000	0.805	o	0.419	+	0.038	0.000	0.000
Infometrics	498	0.925	o	0.411	+	0.000	0.000	0.000	0.472	o	0.969	o	0.363	0.000	0.000
JPMorgan Chase	327	0.959	o	0.328	o	0.071	0.115	0.000	0.435	o	0.861	o	0.743	0.000	0.000
Macquarie	176	1.002	o	0.320	+	0.001	0.021	0.000	0.806	o	0.324	o	0.379	0.000	0.000
National Bank NZ	212	0.807	o	0.130	+	0.000	0.124	0.000	0.270	o	0.361	+	0.000	0.000	0.000
NZIER	440	0.891	o	0.997	o	0.067	0.015	0.000	0.493	o	0.860	o	0.258	0.000	0.000
Ord Minnett S.	128	0.772	o	0.537	+	0.009	0.078	0.000	0.685	o	0.193	+	0.001	0.860	0.000
UBS	478	0.927	o	0.412	+	0.001	0.496	0.000	0.558	o	0.571	+	0.028	0.000	0.000
Westpac	482	0.946	o	0.137	+	0.000	0.041	0.000	0.542	o	0.611	+	0.039	0.006	0.000
Consensus Forec.	504	0.929	o	0.150	+	0.000	0.562	0.000	0.603	o	0.291	+	0.009	0.000	0.000

= number of observations; TOTA = TOTA coefficient; DM test = Diebold-Mariano test; Res = result; o = no significant result; - = significantly worse than a naïve or random walk forecast; + = significantly better than a naïve or random walk forecast; sign acc. test = sign accuracy test; unbiasedness = test for unbiasedness; DW = Durbin-Watson test.

Table 15: Results of the measurement of forecast quality for Singapore (prime lending rate)

	Forecast horizon 4 months								Forecast horizon 13 months							
							Unbiasedness							Unbiasedness		
			DM test		Sign acc. test		F test	DW		DM test		Sign acc. test		F test	DW	
Institution	#	TOTA	Res	p-value	Res	p-value	p-value	p-value	TOTA	Res	p-value	Res	p-value	p-value	p-value	
Citigroup	94	0.580	o	0.604	NA	NA	0.004	0.000	0.308	o	0.163	+	0.000	0.000	0.000	
Credit Suisse	95	0.847	-	0.000	NA	NA	0.000	0.000	0.355	-	0.000	NA	NA	0.000	0.002	
Deutsche Bank	164	0.996	-	0.000	NA	NA	0.000	0.000	0.920	-	0.000	NA	NA	0.000	0.000	
Goldman Sachs	151	0.792	-	0.003	o	0.696	0.000	0.000	0.871	o	0.196	+	0.003	0.000	0.000	
HSBC	322	1.090	-	0.000	NA	NA	0.000	0.000	2.542	-	0.000	NA	NA	0.000	0.000	
JM Sassoon	164	1.144	o	0.457	o	0.119	0.000	0.000	2.295	o	0.956	-	0.030	0.000	0.000	
Kay Hian Research	122	0.784	o	0.280	o	0.055	0.000	0.000	1.378	o	0.951	+	0.001	0.000	0.000	
Morgan Stanley	95	0.818	-	0.000	NA	NA	0.000	0.000	0.704	-	0.010	o	0.338	0.000	0.000	
Nomura	183	0.973	-	0.000	o	0.505	0.000	0.000	1.054	-	0.008	+	0.003	0.000	0.000	
OCBC Bank	194	0.970	-	0.000	NA	NA	0.000	0.000	0.868	-	0.000	NA	NA	0.000	0.000	
Sakura Institute	144	0.749	o	0.430	+	0.007	0.000	0.000	0.398	o	0.903	+	0.003	0.000	0.000	
S. Chartered Bank	168	0.978	-	0.061	o	0.107	0.000	0.000	0.863	o	0.395	o	0.064	0.000	0.000	
U. Overseas Bank	190	0.937	-	0.013	o	0.058	0.000	0.000	1.050	o	0.542	+	0.004	0.000	0.000	
UOB Kay Hian	143	9.037	-	0.000	NA	NA	0.000	0.000	2.053	-	0.000	NA	NA	0.000	0.000	
Consensus Forec.	392	0.946	-	0.000	o	0.090	0.000	0.000	0.749	-	0.002	-	0.039	0.000	0.000	

= number of observations; TOTA = TOTA coefficient; DM test = Diebold-Mariano test; Res = result; o = no significant result; - = significantly worse than a naïve or random walk forecast; + = significantly better than a naïve or random walk forecast; sign acc. test = sign accuracy test; unbiasedness = test for unbiasedness; DW = Durbin-Watson test; NA = not available.

Table 16: Results of the measurement of forecast quality for Singapore (3-month interest rates)

		Forecast horizon 4 months							Forecast horizon 13 months						
			DM test		Sign acc. test		Unbiasedness F test	Unbiasedness DW		DM test		Sign acc. test		Unbiasedness F test	Unbiasedness DW
Institution	#	TOTA	Res	p-value	Res	p-value	p-value	p-value	TOTA	Res	p-value	Res	p-value	p-value	p-value
Citigroup	382	0.847	o	0.196	+	0.017	0.002	0.000	0.431	o	0.189	o	0.229	0.353	0.000
Credit Suisse	154	0.922	o	0.246	o	0.058	0.270	0.000	0.424	o	0.531	o	0.264	0.000	0.000
DBS Bank	208	0.892	o	0.554	+	0.001	0.000	0.000	0.379	o	0.349	-	0.032	0.000	0.000
Deutsche Bank	240	0.916	o	0.999	+	0.003	0.017	0.047	0.761	o	0.844	+	0.049	0.000	0.000
Goldman Sachs	454	0.818	o	0.111	+	0.007	0.000	0.000	0.522	o	0.557	+	0.007	0.000	0.000
HSBC	335	0.926	o	0.553	o	0.103	0.000	0.000	0.501	o	0.948	-	0.002	0.000	0.000
IHS	212	0.891	o	0.119	o	0.990	0.451	0.000	0.311	-	0.098	o	0.622	0.000	0.000
ING	279	0.697	o	0.319	+	0.028	0.024	0.000	0.097	o	0.442	+	0.011	0.000	0.000
JM Sassoon	166	0.541	o	0.494	+	0.041	0.149	0.163	0.064	o	0.495	o	0.914	0.626	0.000
Kay Hian Research	236	0.572	-	0.057	o	0.375	0.059	0.000	0.188	o	0.426	+	0.023	0.000	0.000
Merrill Lynch	127	0.767	o	0.313	o	0.855	0.470	0.027	0.371	o	0.229	o	0.874	0.000	0.001
Nomura	252	0.663	o	0.571	o	0.385	0.202	0.000	0.426	o	0.319	+	0.031	0.000	0.000
OCBC Bank	323	0.831	o	0.554	o	0.291	0.000	0.000	0.527	o	0.750	+	0.002	0.000	0.000
Sakura Institute	128	0.315	-	0.052	o	0.796	0.001	0.444	0.001	o	0.391	o	0.492	0.000	0.028
S. Chartered Bank	243	0.658	o	0.484	+	0.016	0.049	0.002	0.098	o	0.823	o	0.066	0.000	0.000
UBS	122	0.625	o	0.951	o	0.435	0.146	0.002	0.355	o	0.492	o	0.411	0.000	0.000
U. Overseas Bank	206	0.751	o	0.412	+	0.026	0.176	0.000	0.615	o	0.240	+	0.000	0.031	0.000
UOB Kay Hian	143	0.837	o	0.434	o	0.184	0.051	0.000	0.342	o	0.719	+	0.000	0.000	0.000
Consensus Forec.	504	0.770	o	0.511	+	0.000	0.000	0.000	0.436	o	0.403	+	0.002	0.000	0.000

= number of observations; TOTA = TOTA coefficient; DM test = Diebold-Mariano test; Res = result; o = no significant result; - = significantly worse than a naïve or random walk forecast; + = significantly better than a naïve or random walk forecast; sign acc. test = sign accuracy test; unbiasedness = test for unbiasedness; DW = Durbin-Watson test.

Table 17: Results of the measurement of forecast quality for South Korea (3-year government bond yield)

		Forecast horizon 4 months							Forecast horizon 13 months						
			DM test		Sign acc. test		Unbiasedness F test	Unbiasedness DW		DM test		Sign acc. test		Unbiasedness F test	Unbiasedness DW
Institution	#	TOTA	Res	p-value	Res	p-value	p-value	p-value	TOTA	Res	p-value	Res	p-value	p-value	p-value
Credit Suisse	112	0.295	-	0.032	o	0.790	0.009	0.000	0.403	-	0.021	o	0.340	0.000	0.000
Daewoo Securities	208	0.849	-	0.090	o	0.874	0.000	0.000	0.586	o	0.465	o	0.172	0.000	0.000
Daishin Economics	133	0.634	-	0.098	o	0.466	0.000	0.000	0.164	-	0.000	-	0.001	0.001	0.000
Dresdner Bank	179	0.724	-	0.002	o	0.277	0.000	0.000	0.643	-	0.006	o	0.473	0.000	0.000
HSBC Economics	94	0.838	-	0.009	o	0.848	0.002	0.000	0.634	o	0.463	o	0.108	0.000	0.000
Hyundai Securities	228	0.714	-	0.005	o	0.364	0.000	0.000	0.216	-	0.056	o	0.166	0.000	0.000
ING Baring	94	0.322	o	0.149	-	0.046	0.000	0.000	0.382	-	0.000	-	0.040	0.001	0.000
LG Group	211	0.856	-	0.056	o	0.283	0.000	0.000	0.338	-	0.001	-	0.001	0.000	0.000
Samsung ER	196	0.923	-	0.000	o	0.198	0.000	0.000	0.830	-	0.021	-	0.025	0.000	0.000
Sakura	143	0.581	-	0.013	o	0.252	0.000	0.000	0.020	-	0.031	o	0.107	0.372	0.000
Shinhan Securities	144	0.640	-	0.002	NA	NA	0.000	0.000	0.138	-	0.000	NA	NA	0.000	0.000
Societe Generale	92	0.841	-	0.000	o	0.204	0.000	0.000	0.573	o	0.725	o	0.123	0.000	0.002
UBS	101	0.912	-	0.018	o	0.073	0.001	0.000	0.820	-	0.038	o	0.781	0.000	0.005
Consensus Forec.	278	0.834	-	0.047	o	0.795	0.000	0.000	0.485	-	0.008	-	0.014	0.000	0.000

= number of observations; TOTA = TOTA coefficient; DM test = Diebold-Mariano test; Res = result; o = no significant result; - = significantly worse than a naïve or random walk forecast; + = significantly better than a naïve or random walk forecast; sign acc. test = sign accuracy test; unbiasedness = test for unbiasedness; DW = Durbin-Watson test; NA = not available.

Table 18: Results of the measurement of forecast quality for Taiwan (10-year government bond yield)

		Forecast horizon 4 months							Forecast horizon 13 months						
			DM test		Sign acc. test		Unbiasedness			DM test		Sign acc. test		Unbiasedness	
Institution	#	TOTA	Res	p-value	Res	p-value	F test p-value	DW p-value	TOTA	Res	p-value	Res	p-value	F test p-value	DW p-value
Citigroup	176	0.325	o	0.116	o	0.791	0.000	0.043	0.000	-	0.036	o	0.645	0.000	0.294
HSBC	192	0.629	-	0.004	o	0.681	0.000	0.000	0.127	-	0.094	o	0.163	0.000	0.000
IHS	234	0.645	-	0.023	-	0.034	0.000	0.000	0.222	-	0.018	o	0.222	0.000	0.000
ING	224	0.675	o	0.119	o	0.752	0.000	0.005	0.208	o	0.120	o	0.941	0.000	0.000
Nomura	167	0.635	-	0.004	o	0.444	0.001	0.000	0.001	-	0.032	o	0.391	0.000	0.000
Polaris Research	134	0.721	-	0.000	o	0.601	0.000	0.000	0.339	-	0.003	o	0.314	0.000	0.000
Taiwan Institute R.	126	0.719	o	0.227	+	0.024	0.000	0.000	0.222	o	0.102	NA	NA	0.000	0.000
Consensus Forec.	236	0.672	-	0.045	o	0.453	0.000	0.000	0.201	-	0.065	o	0.234	0.000	0.000

= number of observations; TOTA = TOTA coefficient; DM test = Diebold-Mariano test; Res = result; o = no significant result; - = significantly worse than a naïve or random walk forecast; + = significantly better than a naïve or random walk forecast; sign acc. test = sign accuracy test; unbiasedness = test for unbiasedness; DW = Durbin-Watson test; NA = not available.

Table 19: Results of the measurement of forecast quality for Thailand (3-month interest rates)

		Forecast horizon 4 months							Forecast horizon 13 months						
			DM test		Sign acc. test		Unbiasedness			DM test		Sign acc. test		Unbiasedness	
Institution	#	TOTA	Res	p-value	Res	p-value	F test p-value	DW p-value	TOTA	Res	p-value	Res	p-value	F test p-value	DW p-value
Citigroup	298	0.823	o	0.366	+	0.003	0.000	0.000	0.468	o	0.570	+	0.000	0.000	0.000
Deutsche Bank	82	0.972	o	0.762	+	0.006	0.064	0.000	0.797	o	0.320	o	0.908	0.298	0.000
Goldman Sachs	377	0.762	o	0.231	o	0.297	0.063	0.000	0.522	o	0.368	o	0.366	0.000	0.000
HSBC Economics	346	0.865	o	0.349	+	0.000	0.164	0.000	0.361	o	0.332	o	0.060	0.000	0.000
ING	400	0.820	o	0.328	+	0.006	0.481	0.000	0.344	o	0.297	+	0.000	0.000	0.000
Kasikornbank	390	0.761	o	0.148	+	0.001	0.000	0.000	0.391	o	0.401	+	0.007	0.000	0.000
Merrill Lynch	155	0.865	o	0.270	o	0.659	0.000	0.002	0.538	o	0.524	-	0.025	0.000	0.000
Morgan Stanley	85	0.963	o	0.379	o	0.804	0.194	0.027	0.131	o	0.509	o	0.095	0.030	0.095
Nomura	146	0.791	o	0.487	+	0.000	0.000	0.421	0.579	o	0.912	+	0.006	0.000	0.007
Phatra Thanakit S.	334	0.850	o	0.370	+	0.007	0.000	0.000	0.554	o	0.382	+	0.001	0.000	0.000
Siam C. Bank	175	0.899	o	0.254	+	0.006	0.000	0.008	0.725	o	0.391	o	0.506	0.000	0.000
S. Chartered Bank	206	0.841	o	0.838	+	0.000	0.000	0.000	0.398	o	0.474	+	0.047	0.000	0.000
Consensus Forec.	504	0.841	o	0.437	+	0.000	0.008	0.000	0.477	o	0.379	o	0.186	0.000	0.000

= number of observations; TOTA = TOTA coefficient; DM test = Diebold-Mariano test; Res = result; o = no significant result; - = significantly worse than a naïve or random walk forecast; + = significantly better than a naïve or random walk forecast; sign acc. test = sign accuracy test; unbiasedness = test for unbiasedness; DW = Durbin-Watson test.

A further factor is that it is obviously more difficult to forecast market interest rates than those which are set or controlled by governments. The base lending rate in China, the prime lending rate in Hong Kong, the base lending rate and the three-month interest rate in Malaysia as well as the prime lending rate in Singapore are set directly by the respective administration or - at least partly - managed by it. The success rate for the relevant forecast time series is relatively high: 75% of the forecast time series for these interest rates predict the future interest rate trend (rising or falling) significantly better than a random walk forecast.

5. Summary

We analyzed interest rate forecasts for the Asia-Pacific region in the period 1990-2016. To do so, we examined individual interest rate forecasts from Australia, China, Hong Kong, India, Indonesia, Malaysia, New Zealand, Singapore, South Korea, Taiwan and Thailand. As a basis we used forecasting data which had been published in the journal *Asia Pacific Consensus Forecasts* on a monthly basis. We did not limit ourselves to the analysis of consensus forecasts, however: we also evaluated all of the forecast time series issues by banks, investment companies, consulting firms, associations and industrial companies. Overall we assessed 532 forecast time series with a total of 85,264 individual interest rate forecasts. The variety of procedures which we used to measure the quality of forecasts enabled us to create a comprehensive evaluation of forecasting performance in the Asia-Pacific region. We carried out a comparison to naïve forecasts. We examined the forecast time series for evidence of topically-orientated trend adjustments. In addition, we deployed the sign accuracy test and the unbiasedness test.

The results are very sobering in part. 95.9% of all forecast time series are characterized by the phenomenon of topically-oriented trend adjustments. This means that the overwhelming majority of all forecast time series reflect the present rather than the future. In total, 99.4% of all forecast time series proved to be biased. Given that topically-orientated trend adjustments usually lead to the error term u_t not being distributed randomly, the result of the unbiasedness test is not surprising.

Only a small proportion of the forecast time series (3.6%) reflected the future interest rate trend significantly more precisely than a naïve forecast. The only forecast whose success went beyond rare individual cases was that for the prime lending rate in Hong Kong. 46.7% of these forecast time series predict the future interest rate trend significantly better than a random walk forecast.

However, some of the results of the study are also surprisingly positive. The sign accuracy test reveals that in 248 out of 513 forecast time series (48.3%), the future trend (rising or falling interest rates) has been grasped significantly better than by a random walk forecast. In this context, at least part of the forecasts for Australia, China, Hong Kong, India, Malaysia, New Zealand, Singapore and Thailand proved to be particularly successful.

Overall it can be stated that - at least in some countries and for some forecast horizons - forecasts of future interest rate trends in the Asia-Pacific region are significantly more successful than those made in other parts of the world. This has consequences for portfolio management: active portfolio management strategies have no prospects of success in many financial markets because the necessary forecasting competence is simply not there. However, this is different, for example, in the case of the Indian bond market. 61.5% of the forecast time series on the interest rates of Indian state

bonds with ten years remaining to maturity (forecast horizon: 13 months) predict the future interest rate trend (rising or falling) significantly better than a random walk forecast. This should suffice in order to achieve systematic excess returns with active portfolio management strategies.

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7. Appendix

Table 20: Overview of studies on the accuracy of survey-based interest rate forecasts

Study	Countries analysed	Interest rates analysed	Data source	Period considered	Methods used	Result
Friedman (1980)	USA	Fed Funds Rate, 3- and 12-month Bills, 6-month Eurodollars, Utility Bonds, Municipal Bonds	Goldsmith-Nagan Bond and Money Market Letter	1969 - 1977	Unbiasedness test, efficiency test, consistency test	negative
Throop (1981)	USA	3-month Treasury Bill Rate	Goldsmith-Nagan Bond and Money Market Letter	1970 - 1979	MSE, RMSE	positive
Belongia (1987)	USA	3-month Treasury Bill Rate	The Wall Street Journal	1981 - 1986	Direction of change, MAE, RMSE	negative
Dua (1988)	USA	3- and 12-month Treasury Bill Rate, Fed Funds Rate	Goldsmith-Nagan Bond and Money Market Letter / Federal Reserve Bulletin / The Bond Buyer	1972 - 1985	MAE, RMSE, Theil´s U	mixed
Simon (1989)	USA	Fed Funds Rate	Money Market Services	1984 - 1987	MAE, MSE	negative
Hafer/Hein (1989)	USA	3-month Treasury Bill Rate	Bond and Money Market Letter	1969 - 1989	Bias tests, market efficiency tests	negative
Francis (1991)	USA	Diverse Bankzinssätze in Pennsylvania	Call Reports	1983 - 1986	Mann-Whitney test	negative
Zarnowitz/Braun (1992)	USA	3-month Treasury Bill Rate	ASA-NBER Quarterly Survey	1968 - 1990	ME, MAE, RMSE	mixed
Hafer/Hein/MacDonald (1992)	USA	3-month Treasury Bill Rate	Bond and Money Market Letter / Wall Street Journal	1977 - 1988	Unbiasedness test, ME, MAE, RMSE, Theil´s U	negative
Domian (1992)	USA	3-month Treasury Bill Rate	IBC / Donoghue's Money Fund Report	1982 - 1990	Granger causality	negative

Ilmanen (1996)	USA	3-month Treasury Bill Rate and 30-year Government Bond Yield	The Wall Street Journal	1981 - 1994	Yield change predictions compared to forwards and no-change	negative
Kolb/Stekler (1996)	USA	3-month Treasury Bill Rate and 30-year Government Bond Yield	The Wall Street Journal	1982 - 1990	Compared to no-change, random walk measured by Skillings-Mack, Fisher's exact	negative
Cho (1996)	USA	3-month Treasury Bill Rate and 30-year Government Bond Yield	The Wall Street Journal	1989 - 1994	Rank consistency test	mixed
Gosnell/Kolb (1997)	GER, JPN, CH, GB, USA	3-month Euromarket Rate	Risk	1990 - 1992	Measured against no-change model and forward rate forecast	mixed
Baghestani/Jung /Zuchegno (2000)	USA	3-month Treasury Bill Rate	ASA-NBER Quarterly Survey	1983 - 1995	Unbiasedness test	negative
Albrecht (2000)	GER	3-month Rate, 10-year Government Bond Yield	Finanzen	1991 - 1997	ME	negative
Spiwoks (2003)	GER	10-year Government Bond Yield	Consensus Forecasts	1989 - 1999	Theil's U, TOTA coefficient	negative
Greer (2003)	USA	30-year Government Bond Yield	The Wall Street Journal	1984 - 1998	Binomial test, directional accuracy test, institutional affiliation test	mixed
Brooks/Gray (2004)	USA	30- and 10-year Government Bond Yield	The Wall Street Journal	1982 - 2002	Simplified sign accuracy test, simplified unbiasedness test	negative
Benke (2004)	GER	10-year Government Bond Yield	Handelsblatt	1991 - 2003	Simplified sign accuracy test	negative
Mose (2005)	GER, USA	10-year Government Bond Yield	Consensus Forecasts	1989 - 2005	MAE	negative
Baghestani (2005)	USA	3-month Treasury Bill Rate	Survey of Professional Forecasters (SPF)	2001 - 2003	ME, MAE, RMSE	negative

Scheier/Spiwoks (2006)	GB	10-year Government Bond Yield	Consensus Forecasts	1989 - 2004	Theil's U_2, TOTA coefficient	mixed
Benke (2006)	GER	10-year Government Bond Yield	Handelsblatt	1992 - 2005	Simplified sign accuracy test	negative
Spiwoks/Hein (2007)	FRA, GER, ITA, JPN, GB, USA	10-year Government Bond Yield	ZEW-Finanzmarktreport	1995 - 2004	RMSE, MARE	negative
Mitchell/Pearce (2007)	USA	3-month Treasury Bill Rate and 30-year Gov. Bond Yield	The Wall Street Journal	1982 - 2002	Unbiasedness test	negative
Tabak/Feitosa (2008)	BRA	Short term interest rate	Selic/Bloomberg und Central Bank of Brazil	1982 - 2002	MSE, Diebold-Mariano	positive
Goodhart/Lim (2008)	NZ, GB	3-month Official Cash NZ, Official Bank Rate UK (Libor)	RBNZ and BoE Interest Rate Forecasts	NZ 2000 - 2006 UK 1992 - 2004	Unbiasedness test	mixed
Spiwoks/Bedke/Hein (2008)	USA	10-year Government Bond Yield and 3-month Treasury Bill Rate	Consensus Forecasts	1989 - 2004	Unbiasedness test, sign accuracy test, efficiency test	mixed
Spiwoks/Bedke/Hein (2009)	CH	3-month Interest Rate and 10-year Government Bond Yield	Consensus Forecasts	1998 - 2007	Unbiasedness test, sign accuracy test, TOTA coefficient, efficiency test	negative
Chun (2009)	USA	Fed Funds Rate, Short, Medium and Long Maturity Yield	Blue Chip Financial Forecasts	1993 - 2011	Compared against time-series models, parame-tric yield curve models and futures prices	mixed
Spiwoks/Bedke/Hein (2010)	GER	3-month Interest Rate und 10-year Government Bond Yield	Consensus Forecasts	1989 - 2006	Unbiasedness test, TOTA coefficient, efficiency test, sign accuracy test, modified Diebold-Mariano test, Theil's U_2	mixed

Gubaydullina/Hein/ Spiwoks (2011)	CAN, CH, ESP, FRA, GER, ITA, JPN, NLD, NOR, SWE, GB, USA	10-year Government Bond Yield und 3-month Interest Rate	Consensus Forecasts	1989 - 2009	TOTA coefficient	negative
Jongen/Verschoor/ Wolff (2011)	23 countries inter alia AUS, HK, IDN, MYS, NZ, SGP, TWN	3-month interest rates	Consensus Forecasts	1995 - 2009	Dickey-Fuller unit root test Expectations hypothesis tests	mixed
Schwarzbach/Kunze/ Rudschuck/Windels (2012)	GER	10-year Government Bond Yield	Bloomberg, Reuters	1999 - 2011	Augmented Dickey Fuller test (ADF test), Johansen approach, Granger causality	negative
Chortareas/Jitmaneeroj /Wood (2012)	GB	3-month Interest Rate and 10-year Government Bond Yield	Consensus Forecasts	1989 - 2006	Unbiasedness test, orthogonality test	negative
Baghestani/Marchon (2012)	BRA	Central Bank of Brazil Selic interest rate target	Central Bank of Brazil online survey	2003 - 2011	Unbiasedness test	positive
Butter/Jansen (2013)	GER, GB, JPN, NLD, USA	10-year Government Bond Yield	Consensus Forecasts	2003 - 2008	Successful forecasts as a percentage of total forecasts	negative
Kunze/Kramer/ Rudschuk (2013)	EUR	3-month EURIBOR	Bloomberg/Reuters professional survey forecasts	1998 - 2011	Granger causality	mixed
Knüppel/Schulte-frankenfeld (2013)	BRA, GB	Zinssätze der Zentralbank	COPOM, IBGE	1999 - 2011	RMSE	positive
Kunze/Gruppe (2014)	EUR	3-month EURIBOR	Consensus Forecasts	1998 - 2013	Quandt-Andrews break-point test, Theil´s U	mixed

Baghestani/Danila (2014)	CZE	2-week Repo Rate und 12-month Interbank Interest Rate PRIBOR	Czech National Bank (CNB)	2005 - 2012	Theil´s U, Diebold-Mariano test, Fisher´s exact test	mixed
Beechay/Österholm (2014)	SWE	Government Bond Yield, Forward Rate und Interest-Rate Swaps	Prospera, Swedish financial markets	2002 - 2012	Unbiasedness test, efficiency test, modified Diebold Mariano test, RMSE	mixed
Kunze/Gruppe/ Wendler (2015)	EUR	3-month EURIBOR	Consensus Forecasts	1998 - 2013	Sign accuracy test, turning point analysis, RMSE	mixed
Spiwoks/Gubaydullina/ Hein (2015)	CAN, CH, ESP, GER, FR GB, ITA, JPN, NLD, NOR, SWE, USA	10-year Government Bond Yield	Consensus Forecasts	1989 - 2009	TOTA coefficient	negative
Oliver/Pasaogullari (2015)	USA	Fed Funds Rate, 1-year, 5-year and 10-year Bond Yield	Blue Chip Financial Forecasts	1990 - 2012	RMSE	mixed
Baghestani/Arzaghi/ Kaya (2015)	AUS, CAN, CH, EUR, GB, JPN, USA	3-month Eurocurrency Rate und 10-year Government Bond Yield	Blue Chip Financial Forecasts	1999 - 2008	Unbiasedness test, Theil's U, ME, MAE, sign accuracy test, rationality test	mixed
Pierdzioch (2015)	USA	Prime Interest Rate, Treasury Bill Rate and T-Bond Rate	Livingston Survey	1981 - 2013	ROC (relative operating characteristic) curves analysing techniques	positive
Miah/Khalifa/ Hammoudeh (2016)	30 countries inter alia CHN, HK, IND, KOR, PHL, SGP, THAI, TWN	Long-term and Short-term Interest Rates	Fx4casts.com	2001 - 2012	Unbiasedness test, efficiency test, unit root test	mixed
Kunze/Wegener/ Bizer/Spiwoks (2017)	GER, GB	3-month Interbank Rate and 10-year Governm. Bond Yield	Consensus Forecasts	1993 - 2014	RMSE, Theil´s U, Diebold-Mariano test	negative