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Abstract: We examine interest rate forecasts for the money markets in Argentina, Brazil, Chile, Mexico and Venezuela which were published in the period between 2001 and 2019 in the journal *Latin American Consensus Forecasts*. Overall this amounted to a total of 209 forecast time series with 28,451 individual interest rate forecasts. This study is thus far more comprehensive than all previous studies. We use the Diebold-Mariano test, the sign accuracy test, the TOTA coefficient and the unbiasedness test. This reveals that the forecasting work carried out in Brazil, Chile and Mexico is remarkably successful. The quality of forecasts from Argentina and Venezuela, on the other hand, is significantly poorer.

Keywords: Interest rate forecasts, Survey forecasts, Forecast accuracy, Maturity transformation, Topically-orientated trend adjustment behavior.

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

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1. Introduction

Future interest rate trends are of key significance for many business-related decisions. This is why banks, investment companies and economic research institutes regularly draw up interest rate forecasts. Whereas the interest rates of bonds with several years residual maturity are predominantly monitored by portfolio managers, very short-term interest rate trends play a significant role for banks which carry out maturity transformations in the lending business. A bank can provide a loan with a payback period of a year. The necessary procurement of funds can be achieved by the bank receiving twelve consecutive deposits with a maturity of one month. In the process, the bank earns the usual profit margin which results from charging its borrowers higher interest rates than it is prepared to pay for customer deposits. Given a normal yield curve, banks also earn from the fact that short-term deposits are rewarded with lower interest rates than long-term ones. This form of maturity transformation plays a major role in making a profit in the lending business. However, this approach bears risks. If interest rates for short-term deposits rise considerably, maturity transformation can lead to serious losses under certain circumstances. Banks which carry out maturity transformations are thus dependent on generating interest rate forecasts for the short end of the yield curve which are generally reliable.

The success of interest rate forecasts has been examined by at least 50 studies in the past four decades (see the synoptic literature survey in Filiz et al., 2019). Many of these studies focused on forecasts of US interest rate trends, but the reliability of European and Asian interest rate forecasts is also comprehensively reviewed in these studies. Interest rate forecasts for Latin American money markets, however, have hardly been considered until now. Three studies examine Brazilian interest rate forecasts: Tabak and Feitosa (2008) analyze Brazilian interest rate forecasts for the period 1982-2002 and place particular emphasis on the Diebold-Mariano test. Baghestani and Marchon (2012), on the other hand, assess Brazilian forecasts from the period 2003-2008 and focus on the unbiasedness test. Knüppel und Schultefrankenfeld (2013) examine Brazilian interest rate forecasts in the period 1999-2011 and use Theil's U among other tools. All three studies make a largely positive assessment of the forecasts they examine. Until now there has only been one study dealing with interest rate forecasts in several Latin American countries: Miah, Khalifa and Hammoudeh (2016) take a look at interest rate forecasts involving Argentina, Brazil, Colombia, Mexico and Venezuela. They analyze forecasts based on surveys which were published on the website Fx4casts.com for the period 2001-2012 and deploy the efficiency test and the unbiasedness test. They come to the conclusion that the interest rate forecasts in question can generally be viewed as efficient but biased.

In our view, however, these results are not sufficient to enable a comprehensive verdict on interest rate forecasts in Latin America. This is because there is a high level of probability that the phenomenon of topically-orientated trend adjustments (Andres and Spiwoks, 1999), which can be observed almost without exception in capital market forecasts of all kinds worldwide (cf. Spiwoks, Gubaydullina and Hein, 2010) leads to the verdict that forecasts are biased (cf. Spiwoks, Bedke and Hein, 2010). By contrast, the efficiency test is not a very difficult hurdle for interest rate forecasts, because it only examines whether the information contained in the most recent interest rate data before the forecast is made has been given sufficient consideration in the forecasts. If this information content is zero, which is very frequently the case, it is of course not possible to take this into account insufficiently. Forecast time series which pass the efficiency test can thus in no way be considered reliable.

In our study we focus on a data basis which has not yet been analyzed. We examine interest rate forecasts for the money markets in Argentina, Brazil, Chile, Mexico and Venezuela which were published in the period 2001-2019 in the monthly journal *Latin American Consensus Forecasts*. In doing so we differentiate between the forecasting results of the individual institutions which participated in the surveys, which were carried out on a monthly basis. In this way we are thus not limiting ourselves to the analysis of consensus forecasts. We make a comparison between experts' forecasts and naïve forecasts, in the course of which we apply the Diebold-Mariano test. In addition, we use the sign accuracy test, the TOTA coefficient and the unbiasedness test.

In the following two chapters we explain the data basis and the methodology used. In the penultimate chapter the results are presented, and the final chapter consists of a brief summary.

2. Data basis

The interest rate forecasts for the countries Argentina, Brazil, Chile, Mexico and Venezuela which are considered here originate from the journal *Latin American Consensus Forecasts.* Since 1994, this journal has – initially every two months – published forecasts on various economically relevant benchmarks such as gross domestic product, private consumption, capital investment, industrial production or inflation. Since April 2001 the journal has been published on a monthly basis and also deals with the field of interest rate forecasts.

Latin American Consensus Forecasts differentiates between two forecast horizons. In the journal, the forecasts are sometimes described as three-month and twelve-month forecasts. In reality, however, the forecast horizons are four and thirteen months. This can be seen in the following example: in the edition of January 2018, which was available around mid-January, the forecasts for the end of April 2018 and the end of January 2019 are 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 2018 to the end of April 2018, however, is four months, while the period of time from the beginning of January 2018 to the end of January 2019 is 13 months.

We examine the forecasts which were published there in the period from April 2001 to December 2019. We evaluate a total of 209 time series with 28,451 interest rate forecasts. There is a detailed overview in Table 1. We analyze all of the forecast time series which contain at least 59 items of data. We do not take time series with less than 59 observations into consideration. Under certain circumstances, time series which are too short or contain large gaps can lead to inconclusive results in the procedures used here to measure the quality of forecasts. However, there are three exceptions: three times series with a forecast horizon of 13 months exhibit less than 59 observations, but we included these three time series nevertheless, because the respective forecasters are represented in the forecast horizons of four months with time series which contain more than 59 observations. In order to round off the results, it seemed meaningful to make these three exceptions.

Table 1: Data basis from the journal *Latin American Consensus Forecasts* as used in the study

Country, subject of the forecast	Forecast horizon	Number of time series analyzed	Number of forecasts analyzed	Results in the table
Argentina, 30 days deposit rate	4 M	21	2,870	3
	13 M	21	2,485	4
Brazil, financing overnight rate (SELIC)	4 M	23	3,363	5
	13 M	23	3,310	6
Chile, monetary policy rate	4 M	22	3,093	7
	13 M	22	3,061	8
Mexico, 28 days closing rate (CETES)	4 M	24	3,445	9
	13 M	24	3,403	10
Venezuela, 30 days deposit rate	4 M	15	1,816	11
	13 M	14	1,605	12
∑		209	28,451	

4 M = 4 months, 13 M = 13 months

3. Methods

In order to evaluate the interest rate forecasts we use the Diebold-Mariano test, the sign accuracy test, the TOTA coefficient and the unbiasedness test (cf. Filiz et al., 2019).

A comparison with the naïve forecast (i.e. everything remains as it is) is still the most significant benchmark for the analysis of capital market forecasts. Given that naïve forecasts are always available as a cost-free alternative, one should expect experts' forecasts to be clearly better.

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 and 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.

The Diebold-Mariano test is usually carried out with standard kernel density estimates. However, in exceptional cases this can lead to individual intrinsic values being smaller than or equal to zero. As a result, the entire matrix is no longer positive definite, which, however, is a necessary precondition for carrying out the Diebold-Mariano test. In these cases, the Bartlett kernel proposed by Newey and West (1987) is used.

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.

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 and 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 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 α = 0 und β = 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.

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

In the forecast of the 30 days deposit rate in Argentina, there are at least some successes at a forecast horizon of four months (Table 3).

Table 3: Argentinian 30 days deposit rate with a forecast horizon of four months

Institution		Diebold-Mariano test		Sign accuracy test		TOTA coeff.	Unbiasedness test	
	#	Res	P value	Res	P value		F test P val.	DWT P val.
Abeceb.com	65	-	0.098	o	0.055	0.897	0.000	0.000
Análisis de Coyuntura (ACM)	176	o	0.213	+	0.004	0.903	0.000	0.004
ALPHA	204	o	0.484	+	0.005	0.888	0.472*	0.000
Banco Credicoop	158	+	0.071	+	0.000	0.871	0.000	0.000
Banco Galicia	131	+	0.075	+	0.000	0.911	0.000*	0.000
BBVA	192	-	0.006	+	0.046	0.498	0.000	0.000
Datarisk	100	o	0.660	+	0.010	0.835	0.000	0.000
Deutsche Bank Research	59	o	0.542	+	0.033	0.631	0.038°	0.092
Eco Go Consultores	127	-	0.000	+	0.005	0.886	0.000	0.021
Ecolatina	159	o	0.510	o	0.387	0.885	0.000	0.000
Econometrica	147	o	0.784	+	0.000	0.805	0.018*	0.000
Econviews	129	o	0.169	+	0.007	0.900	0.000*	0.000
Espert & Asociados	132	-	0.016	o	0.437	0.230	0.000	0.169
FIEL	171	o	0.167	+	0.004	0.696	0.000	0.003
IHS Markit	76	o	0.892	+	0.007	0.824	0.000°	0.539
M A Broda & Asociados	161	o	0.266	+	0.005	0.489	0.001*	0.000
Macroview S.A.	161	o	0.258	+	0.000	0.785	0.122*	0.888
Orlando Ferreres & Asoc	110	o	0.113	o	0.319	0.872	0.000	0.000
Oxford Economics	69	o	0.110	+	0.041	0.803	0.000	0.000
Santander Investment	118	o	0.881	+	0.038	0.714	0.000	0.015
Consensus (mean)	225	+	0.020	+	0.000	0.612	0.000	0.000

= Number of observations; TOTA coeff. = TOTA coefficient; Res = result; o = no significant result; - = significantly worse than a naïve or random walk forecast; + = significantly better than a naïve or random walk forecast; P val. = P value; DWT = Durbin-Watson test; ° = heteroscedasticity could not be proven, so the P value was determined with simple standard errors; * = P values which have changed due to estimation with robust standard errors.

Table 4: Argentinian 30 days deposit rate with a forecast horizon of 13 months

Institution		Diebold-Mariano test		Sign accuracy test		TOTA coeff.	Unbiasedness test	
	#	Res.	P value	Res.	P value		F test P val.	DWT P val.
Abeceb.com	64	o	0.278	+	0.032	0.150	0.019*	0.000
Análisis de Coyuntura (ACM)	174	o	0.413	+	0.001	0.605	0.000*	0.000
ALPHA	180	o	0.459	+	0.047	0.270	0.195*	0.000
Banco Credicoop	158	o	0.585	+	0.007	0.456	0.000	0.000
Banco Galicia	94	o	0.919^	o	0.162	0.717	0.000	0.000
BBVA	174	o	0.974	+	0.005	0.038	0.052*	0.000
Datarisk	99	+	0.054	+	0.000	0.758	0.000	0.000
Deutsche Bank Research	59	o	0.594	o	0.055	0.001	0.004°	0.175
Eco Go Consultores	118	o	0.507	+	0.005	0.749	0.000	0.000
Ecolatina	159	o	0.368	o	0.237	0.413	0.000	0.000
Econometrica	124	o	0.390	+	0.001	0.325	0.036*	0.000
Econviews	129	o	0.227	o	0.169	0.317	0.000	0.000
Espert & Asociados	54	o	0.179	o	0.554	0.261	0.000°	0.000
FIEL	140	o	0.248	o	0.063	0.231	0.000	0.021
IHS Markit	76	+	0.051	+	0.002	0.459	0.000	0.000
M A Broda & Asociados	142	o	0.365	o	0.075	0.157	0.000°	0.000
Macroview S.A.	35	o	0.671	o	0.074	0.078	0.526°	0.152
Orlando Ferreres & Asoc	94	o	0.208	o	0.335	0.680	0.000°	0.000
Oxford Economics	69	o	0.609	o	0.438	0.254	0.000	0.000
Santander Investment	118	o	0.349	+	0.015	0.139	0.000*	0.000
Consensus (mean)	225	o	0.600	+	0.008	0.138	0.000	0.000

= Number of observations; TOTA coeff. = TOTA coefficient; Res. = result; o = no significant result; - = significantly worse than a naïve or random walk forecast; + = significantly better than a naïve or random walk forecast; P val. = P value; DWT = Durbin-Watson test; ° = heteroscedasticity could not be proven, so the P value was determined with simple standard errors; * = P values which have changed due to estimation with robust standard errors; ^ = calculation with the Bartlett kernel.

Only three of the 21 forecasts analyzed (14.3%) are significantly more successful than a naïve forecast, but 17 of the 21 forecast time series (81.0%) predict the future trend (rising or falling) notably better than a random walk forecast. However, the forecasts are somewhat poorer at a forecast horizon of 13 months (Table 4). Only two out of 21 forecast time series (9.5%) reveal themselves to be significantly more reliable than a naïve forecast. Eleven out of 21 forecast time series (52.4%) predict the future trend (rising or falling) significantly better than a random walk forecast.

The results of the TOTA coefficient at a forecast horizon of four months (Table 3) as well as with a forecast horizon of 13 months (Table 4) are rather sobering. All 42 forecast time series (100%) tend to reflect the present rather than the future. The forecast time series thus lag behind actual interest rate movements by a period which is roughly equivalent to the forecast horizon (see Fig. A-1 in Appendix B). It is therefore unsurprising that only two of the 42 forecast time series (4.8%) prove to be unbiased (Spiwoks, Bedke and Hein, 2010).

Table 5: Brazilian financing overnight rate (SELIC) with a forecast horizon of four months

Institution		Diebold-Mariano test		Sign accuracy test		TOTA coeff.	Unbiasedness test	
	#	Res	P value	Res	P value		F test P val.	DWT P val.
Banco Fator	70	o	0.137	+	0.000	0.935	0.000	0.000
Banco Votorantim	194	+	0.006	+	0.000	1.017	0.084*	0.000
BofA - Merrill Lynch	87	o	0.783	+	0.000	0.980	0.000*	0.000
Barclays	129	+	0.025	+	0.000	1.009	0.001*	0.000
BBVA	116	+	0.018	+	0.000	0.956	0.502°	0.000
Capital Economics	72	+	0.030	+	0.000	1.060	0.207°	0.000
Datalynk	206	+	0.000	+	0.000	0.968	0.065*	0.000
Deutsche Bank	124	+	0.011	+	0.000	0.974	0.009*	0.000
Dresdner Kleinwort	83	o	0.169	+	0.000	0.760	0.000°	0.000
Eaton	215	o	0.149	+	0.000	0.917	0.259°	0.000
HSBC (Lloyds TSB Brazil)	141	+	0.055	+	0.000	0.956	0.259*	0.000
IDEAglobal	69	o	0.124	+	0.000	0.899	0.000*	0.000
IHS Markit	133	+	0.000	+	0.000	1.021	0.101°	0.000
Itau Unibanco	128	+	0.009	+	0.000	0.970	0.000	0.000
LCA Consultores	172	+	0.000	+	0.000	1.050	0.046*	0.000
M B Associados	149	+	0.069	+	0.000	1.017	0.021*	0.000
MCM Consultores	208	+	0.015	+	0.000	1.013	0.185*	0.000
Morgan Stanley	175	+	0.000	+	0.000	0.951	0.016°	0.000
Rosenberg Consultoria	199	+	0.071	+	0.000	1.001	0.067*	0.000
Santander Brazil	75	+	0.077	+	0.000	0.936	0.000	0.000
SILCON/C.R. Contador & Ass.	217	+	0.000	+	0.000	0.959	0.000	0.000
Tendências Consultoria Inte.	176	+	0.007	+	0.000	1.016	0.003*	0.000
Consensus (mean)	225	+	0.001	+	0.000	0.979	0.009	0.000

= number of observations; TOTA coeff. = TOTA coefficient; Res. = result; o = no significant result; - = significantly worse than a naïve or random walk forecast; + = significantly better than a naïve or random walk forecast; P val. = P value; DWT = Durbin-Watson test; ° = heteroscedasticity could not be proven, so the P value was determined with simple standard errors; * = P values which have changed due to estimation with robust standard errors.

The experts were highly successful with their forecasts of the financing overnight rate in Brazil (SELIC). At a forecast horizon of four months (Table 5), 18 of the 23 forecast time series analyzed (78.3%) are significantly better than the corresponding time series of naïve forecasts. The sign accuracy test shows an even better result. All 23 forecast time series (100%) predict the future interest rate trend (rising or falling) significantly better than a random walk forecast.

The various preceding studies on interest rate forecasts from around the world show that the longer the forecast horizon is, the greater the challenge for forecasters (Filiz et al., 2019). It is thus not surprising that the results are somewhat less impressive at a forecast horizon of 13 months (Table 6). Nevertheless, seven of the 23 forecast time series (30.4%) are significantly more successful than the corresponding time series of naïve forecasts. Furthermore, 19 of the 23 forecast time series (82.6%) predict the future interest rate trend (rising or falling) significantly better than a random walk forecast.

Table 6: Brazilian financing overnight rate (SELIC) with a forecast horizon of 13 months

Institution		Diebold-Mariano test		Sign accuracy test		TOTA coeff.	Unbiasedness test	
	#	Res	P value	Res	P value		F test P val.	DWT P val.
Banco Fator	70	o	0.746	o	0.383	0.832	0.000	0.000
Banco Votorantim	194	o	0.298	+	0.000	0.718	0.000	0.000
BofA - Merrill Lynch	84	o	0.902	o	0.157	0.855	0.000	0.000
Barclays	128	+	0.032	+	0.000	0.704	0.000	0.000
BBVA	116	o	0.182	+	0.000	0.565	0.000°	0.000
Capital Economics	72	o	0.228	+	0.001	0.830	0.412°	0.000
Datalynk	206	+	0.079	+	0.000	0.613	0.000	0.000
Deutsche Bank	122	o	0.484	+	0.026	0.512	0.000	0.000
Dresdner Kleinwort	67	o	0.914	o	0.301	0.490	0.000°	0.000
Eaton	215	+	0.028	+	0.000	0.624	0.084°	0.000
HSBC (Lloyds TSB Brazil)	139	o	0.291	+	0.000	0.551	0.000°	0.000
IDEAglobal	69	o	0.528	+	0.050	0.369	0.000	0.000
IHS Markit	133	+	0.099	+	0.020	0.548	0.000°	0.000
Itau Unibanco	123	o	0.512	o	0.754	0.643	0.000	0.000
LCA Consultores	172	+	0.022	+	0.000	0.682	0.000	0.000
M B Associados	148	o	0.166	+	0.002	0.734	0.000	0.000
MCM Consultores	206	o	0.212	+	0.000	0.710	0.000	0.000
Morgan Stanley	175	o	0.460	+	0.035	0.647	0.000	0.000
Rosenberg Consultoria	199	o	0.386	+	0.000	0.795	0.000	0.000
Santander Brazil	74	o	0.422	+	0.042	0.431	0.000	0.000
SILCON/C.R. Contador & Ass.	217	o	0.158	+	0.000	0.601	0.000	0.000
Tendências Consultoria Inte.	156	+	0.061	+	0.000	0.636	0.000	0.000
Consensus (mean)	225	+	0.041	+	0.000	0.665	0.000	0.000

= Number of observations; TOTA coeff. = TOTA coefficient; Res = result; o = no significant result; - = significantly worse than a naïve or random walk forecast; + = significantly better than a naïve or random walk forecast; P val. = P value; DWT = Durbin-Watson test; ° = heteroscedasticity could not be proven, so the P value was determined with simple standard errors; * = P values which have changed due to estimation with robust standard errors.

A very unusual result can also be seen in the TOTA coefficients. Among the forecasts with a horizon of four months (Table 5), nine of the 23 forecast time series (39.1%) do not exhibit topically-orientated trend adjustment. This means that these time series do not reflect the present more strongly than the future in their forecasts. This is surprising, because capital market forecast time series which do not exhibit topically-orientated trend adjustment are rare (Spiwoks, Gubaydullina and Hein, 2015). However, at a forecast horizon of 13 months (Table 6), the customary picture is restored. All 23 forecast time series (100%) exhibit topically-orientated trend adjustment. At a forecast horizon of four months and also at a horizon of 13 months, the unbiasedness test reveals itself to be the customary high hurdle for forecasters. Not one of the 46 forecast time series (0.0%) can be considered unbiased. This signifies that the forecasts contain systematic errors, not just random ones.

Table 7: Chilean monetary policy rate with a forecast horizon of four months

Institution		Diebold-Mariano test		Sign accuracy test		TOTA coeff.	Unbiasedness test	
	#	Res	P value	Res	P value		F test P val.	DWT P val.
Banchile Inversiones	99	o	0.125	+	0.000	0.964	0.495°	0.000
Banco BICE	204	o	0.104	+	0.000	0.842	0.020°	0.000
Banco de Chile	145	o	0.103	+	0.000	0.882	0.347°	0.000
Banco Security	175	o	0.158	+	0.000	1.133	0.002°	0.000
BTG Pactual (Celfin Capital)	146	+	0.053	+	0.000	0.855	0.018°	0.000
Cámara de Comercio de San.	163	+	0.057	+	0.000	0.836	0.151°	0.000
Corp Research	149	o	0.146	+	0.000	1.059	0.019°	0.000
Dresdner Kleinwort	63	o	0.349	+	0.024	0.672	0.001*	0.000
Econsult	72	+	0.052	+	0.000	0.883	0.049°	0.000
Fontaine y Paúl Consultores	94	o	0.213	+	0.000	0.817	0.032°	0.000
Gemines	215	+	0.059	+	0.000	0.958	0.000°	0.000
HSBC	73	+	0.025	+	0.000	1.038	0.338°	0.000
IHS Markit	104	+	0.094	+	0.000	0.979	0.942°	0.000
Larrain Vial	189	o	0.146	+	0.000	1.092	0.001°	0.000
Libertad y Desarrollo	198	+	0.091	+	0.000	0.871	0.048°	0.000
Pontifica Universidad Catolica	151	o	0.228	+	0.000	0.825	0.000°	0.000
Santander Chile	168	o	0.157	+	0.000	0.892	0.081°	0.000
Scotiabank (BBVA)	163	o	0.104	+	0.000	0.940	0.000°	0.000
UBS	65	+	0.018	+	0.001	0.818	0.000°	0.000
Universidad Andrés Bello	63	+	0.003	+	0.000	0.857	0.199°	0.000
Universidad de Chile	169	o	0.111	+	0.000	0.805	0.000°	0.000
Consensus (mean)	225	+	0.097	+	0.000	0.902	0.016°	0.000

= Number of observations; TOTA coeff. = TOTA coefficient; Res = result; o = no significant result; - = significantly worse than a naïve or random walk forecast; + = significantly better than a naïve or random walk forecast; P val. = P value; DWT = Durbin-Watson test; ° = heteroscedasticity could not be proven, so the P value was determined with simple standard errors; * = P values which have changed due to estimation with robust standard errors.

The experts were also highly successful when forecasting the monetary policy rate in Chile. At a forecast horizon of four months (Table 7), just under half of the forecast time series (45.5%) are significantly better than the corresponding time series of naïve forecasts. The sign accuracy test even shows that all 22 forecast time series (100%) predict the interest rate trend (rising or falling) significantly better than a random walk forecast would.

At a forecast horizon of 13 months (Table 8) the forecasters were still notably successful. Five out of 22 forecast time series (22.7%) reveal themselves to be significantly more reliable than the corresponding time series of naïve forecasts, while 20 out of 22 forecast time series (90.9%) predict the future interest rate trend (rising or falling) significantly better than a random walk forecast.

However, 40 out of the 44 forecast time series on the monetary policy rate in Chile (90.9%) are characterized by topically-orientated trend adjustment. All 44 forecast time series (100%) prove to be biased (Table 7 and Table 8).

Table 8: Chilean monetary policy rate with a forecast horizon of 13 months

Institution		Diebold-Mariano test		Sign accuracy test		TOTA coeff.	Unbiasedness test	
	#	Res	P value	Res	P value		F test P val.	DWT P val.
Banchile Inversiones	97	+	0.067	+	0.000	0.074	0.116°	0.000
Banco BICE	202	o	0.126	+	0.000	0.163	0.000°	0.000
Banco de Chile	140	o	0.221	+	0.000	0.260	0.000°	0.000
Banco Security	175	o	0.101	+	0.000	0.534	0.000°	0.000
BTG Pactual (Celfin Capital)	146	+	0.061	+	0.000	0.227	0.000	0.000
Cámara de Comercio de San.	163	+	0.086	+	0.000	0.123	0.000	0.000
Corp Research	149	+	0.088	+	0.000	0.417	0.004°	0.000
Dresdner Kleinwort	47	o	0.728	o	0.086	0.142	0.001°	0.000
Econsult	72	+	0.033	+	0.001	0.071	0.000°	0.000
Fontaine y Paúl Consultores	94	o	0.527	+	0.003	0.036	0.000°	0.000
Gemines	216	o	0.510	+	0.000	0.235	0.000°	0.000
HSBC	67	o	0.213	+	0.000	0.726	0.002°	0.000
IHS Markit	104	o	0.356	+	0.000	0.595	0.000	0.000
Larrain Vial	189	o	0.152	+	0.000	0.358	0.000°	0.000
Libertad y Desarrollo	198	o	0.114	+	0.000	0.189	0.000°	0.000
Pontifica Universidad Catolica	151	o	0.435	+	0.000	0.136	0.000°	0.000
Santander Chile	168	o	0.173	+	0.000	0.308	0.002°	0.000
Scotiabank (BBVA)	164	o	0.385	+	0.001	0.553	0.000	0.000
UBS	62	o	0.593	o	0.124	0.414	0.000°	0.000
Universidad Andrés Bello	63	o	0.801	+	0.000	0.367	0.000°	0.000
Universidad de Chile	169	o	0.448	+	0.000	0.119	0.000°	0.000
Consensus (mean)	225	o	0.167	+	0.000	0.238	0.000°	0.000

= number of observations; TOTA coeff. = TOTA coefficient; Res = result; o = no significant result; - = significantly worse than a naïve or random walk forecast; + = significantly better than a naïve or random walk forecast; P val. = P value; DWT = Durbin-Watson test; ° = heteroscedasticity could not be proven, so the P value was determined with simple standard errors; * = P values which have changed due to estimation with robust standard errors.

The successes achieved in the forecasts of the 28 days closing rate (CETES) in Mexico are at a comparable level. At a forecast horizon of four months (Table 9), nine of the 24 forecast time series analyzed (37.5%) predict the future interest rate trend significantly better than the corresponding naïve forecasts. A total of 23 out of 24 forecast time series (95.8%) predict the future interest rate trend (rising or falling) significantly more precisely than a random walk forecast.

When considering the forecast horizon of 13 months (Table 10), it is revealed that ten out of 24 forecast time series (41.7%) estimate future interest rate trends significantly more precisely than naïve forecasts. 15 out of 24 forecast time series (62.5%) predict the future interest rate trend (rising or falling) significantly more precisely than a random walk forecast.

Table 9: Mexican 28 days closing rate (CETES) with a forecast horizon of four months

Institution		Diebold-Mariano test		Sign accuracy test		TOTA coeff.	Unbiasedness test	
	#	Res	P value	Res	P value		F test P val.	DWT P val.
American Chamber Mex	208	+	0.007	+	0.000	0.836	0.000	0.000
Banamex	141	o	0.145	+	0.000	0.783	0.002	0.000
BBVA	129	o	0.526	+	0.010	0.798	0.071*	0.022
Bulltick	77	o	0.338	+	0.034	0.966	0.659*	0.000
CAIE-ITAM	225	+	0.004	+	0.000	0.840	0.000*	0.055
CEESP	194	o	0.701	+	0.000	0.778	0.000	0.000
Consultores Econ	220	o	0.432	+	0.000	0.844	0.000	0.000
Deutsche Bank Rsrch	97	+	0.000	+	0.004	0.672	0.400*	0.212
ESANE Consultores	77	o	0.818	o	0.128	0.293	0.020°	0.007
Grupo Bursametrica	217	o	0.707	+	0.000	0.851	0.000	0.000
HSBC	157	+	0.016	+	0.000	0.982	0.200°	0.000
IHS Markit	144	+	0.032	+	0.000	0.862	0.809°	0.057
ING	122	o	0.289	+	0.000	0.792	0.797°	0.000
Invex Grupo Financiero	94	+	0.091	+	0.000	0.943	0.030°	0.000
Jonathan Heath & Assoc	81	+	0.004	+	0.000	0.684	0.000	0.007
JP Morgan Chase Mex	107	o	0.363	+	0.000	0.926	0.253*	0.000
Morgan Stanley	187	o	0.930	+	0.000	0.847	0.030*	0.000
Oxford Economics	71	o	0.312	+	0.035	0.979	0.000°	0.000
Santander Mexico	156	o	0.111	+	0.000	0.879	0.000	0.000
Scotiabank	169	o	0.332	+	0.000	0.873	0.000	0.000
UBS	76	o	0.692	+	0.044	0.349	0.046*	0.043
Ve Por Mas (Kleinwort)	90	o	0.224	+	0.037	0.688	0.000°	0.000
Vector Casa de Bolsa	181	+	0.046	+	0.000	0.875	0.013*	0.021
Consensus (mean)	225	+	0.032	+	0.000	0.845	0.000	0.000

= number of observations; TOTA coeff. = TOTA coefficient; Res = result; o = no significant result; - = significantly worse than a naïve or random walk forecast; + = significantly better than a naïve or random walk forecast; P val. = P value; DWT = Durbin-Watson test; ° = heteroscedasticity could not be proven, so the P value was determined with simple standard errors; * = P values which have changed due to estimation with robust standard errors.

However, it can be noted that all 48 forecast time series (100%) for the 28 days closing rate (CETES) in Mexico are characterized by topically-orientated trend adjustment. They thus reflect the present rather than the future. This is also mirrored by the unbiasedness test. Only one of the 48 forecast time series (2.1%) proved to be unbiased.

The forecasters were less successful in their predictions of interest rate trends in Venezuela. At a forecast horizon of four months (Table 11), only two of the 15 forecast time series analyzed (13.3%) are significantly better than a naïve forecast. Nevertheless, nine out of 15 forecast time series (60%) predict the future interest rate trend (rising or falling) significantly more precisely than a random walk forecast.

By contrast, the results are considerably less impressive at a forecast horizon of 13 months (Table 12). Not one of the 14 forecast time series (0.0%) proved to be significantly superior to a naïve forecast, and only three out of 14 forecast time series (21.4%) predict the future interest rate trend (rising or falling) significantly more precisely than a random walk forecast.

Table 10: Mexican 28 days closing rate (CETES) with a forecast horizon of thirteen months

Institution		Diebold-Mariano test		Sign accuracy test		TOTA coeff.	Unbiasedness test	
	#	Res	P value	Res	P value		F test P val.	DWT P val.
American Chamber Mex	208	o	0.367	+	0.006	0.521	0.000	0.000
Banamex	141	o	0.394	o	0.906	0.466	0.033*	0.000
BBVA	129	+	0.045	+	0.000	0.338	0.200*	0.000
Bulltick	78	o	0.661	+	0.010	0.368	0.000*	0.000
CAIE-ITAM	225	+	0.071	+	0.006	0.461	0.000	0.000
CEESP	194	+	0.012	+	0.006	0.404	0.000	0.000
Consultores Econ	220	o	0.869	+	0.000	0.590	0.000	0.000
Deutsche Bank Rsrch	97	+	0.053	o	0.977	0.340	0.056*	0.004
ESANE Consultores	77	o	0.905	o	0.148	0.036	0.031*	0.000
Grupo Bursametrica	214	o	0.400	+	0.027	0.542	0.000	0.000
HSBC	151	o	0.505	o	0.374	0.655	0.000*	0.000
IHS Markit	144	+	0.061	+	0.006	0.454	0.000	0.000
ING	122	o	0.883	o	0.795	0.445	0.154°	0.000
Invex Grupo Financiero	81	o	0.109	o	0.306	0.647	0.024°	0.000
Jonathan Heath & Assoc	81	+	0.073	+	0.007	0.163	0.000	0.000
JP Morgan Chase Mex	107	+	0.010	+	0.000	0.695	0.001*	0.000
Morgan Stanley	187	+	0.023	+	0.000	0.652	0.272*	0.000
Oxford Economics	72	o	0.293	o	0.636	0.730	0.000	0.000
Santander Mexico	155	o	0.179	o	0.986	0.615	0.000	0.000
Scotiabank	169	o	0.603	+	0.000	0.610	0.000	0.000
UBS	74	o	0.620	o	0.441	0.135	0.037*	0.000
Ve Por Mas (Kleinwort)	72	+	0.044	+	0.018	0.333	0.000*	0.001
Vector Casa de Bolsa	180	o	0.106	+	0.015	0.544	0.002*	0.000
Consensus (mean)	225	+	0.026	+	0.025	0.499	0.000	0.000

= number of observations; TOTA coeff. = TOTA coefficient; Res = result; o = no significant result; - = significantly worse than a naïve or random walk forecast; + = significantly better than a naïve or random walk forecast; P val. = P value; DWT = Durbin-Watson test; ° = heteroscedasticity could not be proven, so the P value was determined with simple standard errors; * = P values which have changed due to estimation with robust standard errors.

Only one out of 29 forecast time series for the 30 days deposit rate in Venezuela (3.4%) exhibits no topically-orientated trend adjustment (Tables 11 and 12). It is only this one forecast time series which reflects the future direction of interest rates more strongly than the present trend. All 29 forecast time series (100%) turn out to be biased. This means that the forecasting errors are of a systematic nature and cannot be viewed as purely coincidental.

Table 11: Venezuelan 30 days deposit rate with a forecast horizon of four months

Institution		Diebold-Mariano test		Sign accuracy test		TOTA coeff.	Unbiasedness test	
	#	Res	P value	Res	P value		F test P val.	DWT P val.
Azpurua (AGPV)	192	o	0.135	o	0.189	0.489	0.001*	0.167
Banco Mercantil	150	o	0.839	+	0.008	0.780	0.000°	0.000
Banesco	144	o	0.906^	+	0.000	0.577	0.784*	0.000
BBVA	88	o	0.311	+	0.002	0.554	0.069*	0.000
Coyuntura - Maxim Ross As.	213	+	0.087	+	0.024	0.702	0.000	0.089
Datanalisis	115	-	0.089	o	0.905	0.588	0.000	0.021
Deutsche Bank Research	60	o	0.575	o	0.691	0.619	0.833*	0.001
Ecoanalitica	117	o	0.655	+	0.003	0.867	0.000	0.017
Universidad Católica (UCAB)	90	o	0.758^	+	0.032	0.545	0.215*	0.000
MPG Consultores	60	o	0.327	o	0.512	1.046	0.000*	0.767
Multiplicas	87	o	0.198	o	0.699	0.889	0.000	0.002
Oxford Economics	69	o	0.154	o	0.484	0.694	0.000*	0.000
Santander Venezuela	65	+	0.051	+	0.003	0.577	0.372*	0.007
VenEconomia	141	-	0.000	+	0.002	0.494	0.000	0.000
Consensus (mean)	225	o	0.250	+	0.009	0.540	0.000	0.805

= number of observations; TOTA coeff.= TOTA coefficient; Res = result; o = no significant result; - = significantly worse than a naïve or random walk forecast; + = significantly better than a naïve or random walk forecast; P val. = P value; DWT = Durbin-Watson test; ° = heteroscedasticity could not be proven, so the P value was determined with simple standard errors; * = P values which have changed due to estimation with robust standard errors; ^ = calculated with the Bartlett kernel.

Table 12: Venezuelan 30 days deposit rate with a forecast horizon of 13 months

Institution		Diebold-Mariano test		Sign accuracy test		TOTA coeff.	Unbiasedness test	
	#	Res.	P value	Res.	P value		F test P val.	DWT P val.
Azpurua (AGPV)	189	o	0.301	o	0.713	0.005	0.026*	0.000
Banco Mercantil	103	o	0.321	-	0.047	0.097	0.000	0.000
Banesco	142	o	0.883^	+	0.001	0.002	0.014*	0.000
BBVA	87	o	0.541	o	0.299	0.008	0.004*	0.000
Coyuntura - Maxim Ross As.	154	o	0.131	o	0.572	0.105	0.000	0.000
Datanalisis	107	o	0.158	o	0.086	0.043	0.000	0.000
Deutsche Bank Research	60	o	0.517	o	0.151	0.571	0.000°	0.007
Ecoanalitica	117	o	0.396	+	0.007	0.099	0.000	0.000
Universidad Católica (UCAB)	90	o	0.397	o	0.227	0.015	0.710*	0.000
Multiplicas	59	o	0.657	o	0.851	0.090	0.000°	0.000
Oxford Economics	69	o	0.303	o	0.559	0.137	0.017*	0.000
Santander Venezuela	62	o	0.192	o	0.432	0.072	0.117*	0.000
VenEconomia	141	-	0.092	o	0.068	0.004	0.000	0.000
Consensus (mean)	225	o	0.840	+	0.005	0.012	0.000	0.000

= Number of observations; TOTA coeff. = TOTA coefficient; Res = result; o = no significant result; - = significantly worse than a naïve or random walk forecast; + = significantly better than a naïve or random walk forecast; P val. = P value; DWT = Durbin-Watson test; ° = heteroscedasticity could not be proven, so the P value was determined with simple standard errors; * = P values which have changed due to estimation with robust standard errors; ^ = calculated with the Bartlett kernel.

Overall, it can be stated that relatively frequently the efforts made to correctly forecast interest rates in Latin America in the period 2001-2019 were successful (Table 13). Just under a third of all forecast time series (31.7%) lead to significantly better forecasts than if a naïve forecast had been used, while slightly more than three quarters of forecast time series (77.6%) predict the future direction of interest rates (rising or falling) significantly more precisely than a random walk forecast.

Table 13: Success rates of interest rate forecasts

Country, subject of the forecast	Forecast horizon	Success rate Diebold-Mariano test in %	Success rate sign accuracy test in %	Success rate TOTA coefficient in %	Success rate test for unbiasedness in %
Argentina, 30 days deposit rate	4 M	14.3%	81.0%	0.0%	4.8%
	13 M	9.5%	52.4%	0.0%	4.8%
Brazil, financing overnight rate (SELIC)	4 M	78.3%	100.0%	39.1%	0.0%
	13 M	30.4%	82.6%	0.0%	0.0%
Chile, monetary policy rate	4 M	45.5%	100.0%	18.2%	0.0%
	13 M	22.7%	90.9%	0.0%	0.0%
Mexico, 28 days closing rate (CETES)	4 M	37.5%	95.8%	0.0%	4.2%
	13 M	41.7%	62.5%	0.0%	0.0%
Venezuela, 30 days deposit rate	4 M	15.4%	60.0%	6.7%	0.0%
	13 M	0.0%	23.1%	0.0%	0.0%
Ø weighted		31.7%	77.6%	6.7%	1.9%

4 M = 4 months, 13 M = 13 months

These successes coincide with previous findings on the reliability of interest rate forecasts (see Filiz et al., 2019): earlier studies on various interest rates throughout the world also show that forecasts tend to be more successful when they are made for short and very short maturities. By contrast, forecasts for interest rates at the long end of the yield curve (such as returns on ten-year government bonds) are for the most part far less successful.

Furthermore, in numerous preceding studies it can be noted that interest rate forecasters normally allow themselves to be strongly influenced by the current interest rate trend. If the current level of interest rates falls (rises), forecasts are frequently also revised downwards (upwards). This phenomenon, known as topically-orientated trend adjustment, also characterizes the vast majority (93.3%) of the forecast time series from Latin America which we analyzed (see also Figures A-1 to A-4 in Appendix B). If the forecast horizon (four or 13 months here) is longer than the frequency of the forecasts (monthly in this case), topically-orientated trend adjustments frequently lead to the forecasting errors (residuals) not being distributed randomly. Forecast time series of this kind thus also frequently fail the unbiasedness test (cf. Spiwoks, Bedke and Hein, 2010). This is the situation in Latin America too. The majority of forecast time series (98.1%) prove to be biased.

5. Summary

*S*ince 2001, *Latin American Consensus Forecasts* has published monthly forecasts on interest rate trends at the short end of the yield curve in Argentina, Brazil, Chile, Mexico and Venezuela. We examine the forecast time series from 2001 to 2019 with the aid of the Diebold-Mariano test, the sign accuracy test, the TOTA coefficient and the unbiasedness test. While doing so we not only consider the time series of the consensus forecasts, but all of the time series of forecasting institutions which issued at least 59 forecasts in the period of observation. Overall we assess 209 forecast time series with a total of 28,451 individual forecasts.

The forecasts for interest rate trends in Brazil, Chile and Mexico in particular can be viewed as highly successful. The interest rate forecasts for Argentina and Venezuela, on the other hand, are much less accurate. This can possibly be traced back to the sovereign debt defaults (2001 and 2014) in Argentina and to increasing levels of political destabilization since 2013 in the case of Venezuela.

Just under a third of all forecast time series (31.7%) lead to significantly better forecasts than if a naïve forecast had been used, while somewhat more than three quarters of forecast time series (77.6%) predict the future direction of interest rates (rising or falling) significantly more precisely than a random walk forecast.

However, this study also reveals that the majority of forecast time series (93.3%) exhibit topically-orientated trend adjustment. These forecast time series thus reflect present interest rate trends rather than future ones. In addition, the majority of the forecast time series (98.1%) are biased.

A further aspect is that forecasts with a forecast horizon of four months are usually far more reliable than those with a forecast horizon of 13 months analyzed in this study. This largely corresponds to the findings of numerous previous studies on interest rate forecasts throughout the world.

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Appendix A: Supplements to the unbiasedness test

Table A-1: Argentinian 30 days deposit rate

Institution	4 months forecast horizon			13 months forecast horizon		
	P value Breusch-Pagan test for heteroscedasticity	P value F test Robust estimation	P value F test Normal estimation	P value Breusch-Pagan test for heteroscedasticity	P value F test Robust estimation	P value F test Normal estimation
Abeceb.com	0.000	0.000	0.000	0.052	0.019	0.005
Análisis de Coyuntura (ACM)	0.000	0.000	0.000	0.000	0.000	0.017
ALPHA	0.000	0.472	0.081	0.000	0.195	0.002
Banco Credicoop	0.000	0.000	0.000	0.000	0.000	0.000
Banco Galicia	0.000	0.000	0.002	0.000	0.000	0.000
BBVA	0.000	0.000	0.000	0.000	0.052	0.004
Datarisk	0.000	0.000	0.000	0.002	0.000	0.000
Deutsche Bank Research	0.116	0.276	0.038	0.179	0.001	0.004
Eco Go Consultores	0.000	0.000	0.000	0.000	0.000	0.000
Ecolatina	0.000	0.000	0.000	0.000	0.000	0.000
Econometrica	0.000	0.018	0.000	0.000	0.036	0.000
Econviews	0.000	0.000	0.003	0.000	0.000	0.000
Espert & Asociados	0.000	0.000	0.000	0.321	0.000	0.000
FIEL	0.000	0.000	0.000	0.000	0.000	0.000
IHS Markit	0.150	0.000	0.000	0.000	0.000	0.000
M A Broda & Asociados	0.000	0.001	0.000	0.876	0.000	0.000
Macroview S.A.	0.000	0.122	0.289	0.275	0.295	0.526
Orlando Ferreres & Asoc	0.000	0.000	0.000	0.147	0.000	0.000
Oxford Economics	0.000	0.000	0.000	0.010	0.000	0.000
Santander Investment	0.000	0.000	0.000	0.000	0.000	0.001
Consensus (mean)	0.000	0.000	0.000	0.000	0.000	0.000

Table A-2: Brazilian financing overnight rate (SELIC)

Institution	4 months forecast horizon			13 months forecast horizon		
	P value Breusch-Pagan test for heteroscedasticity	P value F test Robust estimation	P value F test Normal estimation	P value Breusch-Pagan test for heteroscedasticity	P value F test Robust estimation	P value F test Normal estimation
Banco Fator	0.014	0.000	0.000	0.003	0.000	0.000
Banco Votorantim	0.000	0.084	0.165	0.002	0.000	0.000
BofA - Merrill Lynch	0.075	0.000	0.010	0.059	0.000	0.000
Barclays	0.002	0.001	0.000	0.000	0.000	0.000
BBVA	0.182	0.465	0.502	0.737	0.000	0.000
Capital Economics	0.967	0.019	0.207	0.882	0.384	0.412
Datalynk	0.091	0.065	0.093	0.004	0.000	0.000
Deutsche Bank	0.069	0.009	0.022	0.001	0.000	0.000
Dresdner Kleinwort	0.204	0.001	0.000	0.744	0.000	0.000
Eaton	0.932	0.198	0.259	0.409	0.090	0.084
HSBC (Lloyds TSB Brazil)	0.004	0.259	0.120	0.931	0.000	0.000
IDEAglobal	0.002	0.000	0.005	0.005	0.000	0.000
IHS Markit	0.108	0.066	0.101	0.164	0.000	0.000
Itau Unibanco	0.001	0.000	0.000	0.000	0.000	0.000
LCA Consultores	0.065	0.046	0.115	0.006	0.000	0.000
M B Associados	0.000	0.021	0.055	0.001	0.000	0.000
MCM Consultores	0.000	0.185	0.238	0.000	0.000	0.000
Morgan Stanley	0.211	0.006	0.016	0.002	0.000	0.000
Rosenberg Consultoria	0.000	0.067	0.142	0.000	0.000	0.000
Santander Brazil	0.017	0.000	0.000	0.023	0.000	0.000
SILCON/C.R. Contador & Ass.	0.039	0.000	0.000	0.006	0.000	0.000
Tendências Consultoria Inte.	0.000	0.003	0.004	0.000	0.000	0.000
Consensus (mean)	0.032	0.009	0.009	0.010	0.000	0.000

Table A-3: Chilean monetary policy rate

Institution	4 months forecast horizon			13 months forecast horizon		
	P value Breusch-Pagan test for heteroscedasticity	P value F test Robust estimation	P value F test Normal estimation	P value Breusch-Pagan test for heteroscedasticity	P value F test Robust estimation	P value F test Normal estimation
Banchile Inversiones	0.858	0.561	0.495	0.390	0.132	0.116
Banco BICE	0.807	0.040	0.020	0.281	0.000	0.000
Banco de Chile	0.571	0.216	0.347	0.512	0.000	0.000
Banco Security	0.371	0.014	0.002	0.639	0.000	0.000
BTG Pactual (Celfin Capital)	0.219	0.082	0.018	0.010	0.000	0.000
Cámara de Comercio de San.	0.670	0.248	0.151	0.092	0.000	0.000
Corp Research	0.364	0.010	0.019	0.732	0.003	0.004
Dresdner Kleinwort	0.020	0.001	0.009	0.356	0.000	0.001
Econsult	0.221	0.043	0.049	0.122	0.000	0.000
Fontaine y Paúl Consultores	0.328	0.068	0.032	0.830	0.000	0.000
Gemines	0.624	0.000	0.000	0.686	0.000	0.000
HSBC	0.412	0.248	0.338	0.944	0.002	0.002
IHS Markit	0.720	0.952	0.942	0.087	0.000	0.000
Larrain Vial	0.892	0.002	0.001	0.797	0.000	0.000
Libertad y Desarrollo	0.582	0.073	0.048	0.463	0.000	0.000
Pontifica Universidad Catolica	0.556	0.001	0.000	0.640	0.000	0.000
Santander Chile	0.759	0.115	0.081	0.186	0.006	0.002
Scotiabank (BBVA)	0.915	0.000	0.000	0.035	0.000	0.000
UBS	0.171	0.000	0.000	0.432	0.000	0.000
Universidad Andrés Bello	0.266	0.081	0.199	0.561	0.000	0.000
Universidad de Chile	0.240	0.000	0.000	0.926	0.000	0.000
Consensus (mean)	0.968	0.022	0.016	0.601	0.000	0.000

Table A-4: Mexican 28 days closing rate (CETES)

Institution	4 months forecast horizon			13 months forecast horizon		
	P value Breusch-Pagan test for heteroscedasticity	P value F test Robust estimation	P value F test normal estimation	P value Breusch-Pagan test for heteroscedasticity	P value F test Robust estimation	P value F test Normal estimation
American Chamber Mex	0.000	0.000	0.000	0.000	0.000	0.000
Banamex	0.005	0.002	0.002	0.026	0.033	0.072
BBVA	0.014	0.071	0.002	0.003	0.200	0.178
Bulltick	0.006	0.659	0.390	0.001	0.000	0.002
CAIE-ITAM	0.000	0.000	0.009	0.000	0.000	0.000
CEESP	0.028	0.000	0.000	0.000	0.000	0.000
Consultores Econ	0.003	0.000	0.000	0.000	0.000	0.000
Deutsche Bank Rsrch	0.001	0.400	0.438	0.046	0.056	0.074
ESANE Consultores	0.493	0.026	0.020	0.000	0.031	0.000
Grupo Bursametrica	0.000	0.000	0.000	0.000	0.000	0.000
HSBC	0.445	0.238	0.200	0.002	0.000	0.001
IHS Markit	0.219	0.785	0.809	0.050	0.000	0.000
ING	0.246	0.785	0.797	0.279	0.283	0.154
Invex Grupo Financiero	0.782	0.014	0.030	0.450	0.002	0.024
Jonathan Heath & Assoc	0.003	0.000	0.000	0.000	0.000	0.000
JP Morgan Chase Mex	0.000	0.253	0.037	0.016	0.001	0.021
Morgan Stanley	0.001	0.030	0.004	0.000	0.272	0.264
Oxford Economics	0.117	0.000	0.000	0.027	0.000	0.000
Santander Mexico	0.000	0.000	0.000	0.000	0.000	0.000
Scotiabank	0.000	0.000	0.000	0.000	0.000	0.000
UBS	0.026	0.046	0.008	0.000	0.037	0.001
Ve Por Mas (Kleinwort)	0.103	0.000	0.000	0.002	0.000	0.002
Vector Casa de Bolsa	0.000	0.013	0.096	0.000	0.002	0.024
Consensus (mean)	0.001	0.000	0.000	0.000	0.000	0.000

Table A-5: Venezuelan 30 days deposit rate

Institution	4 months forecast horizon			13 months forecast horizon		
	P value Breusch-Pagan test for heteroscedasticity	P value F test Robust estimation	P value F test Normal estimation	P value Breusch-Pagan test for heteroscedasticity	P value F test Robust estimation	P value F test Normal estimation
Azpurua (AGPV)	0.000	0.001	0.000	0.000	0.026	0.000
Banco Mercantil	0.304	0.001	0.000	0.000	0.000	0.000
Banesco	0.000	0.784	0.639	0.001	0.014	0.024
BBVA	0.000	0.069	0.000	0.001	0.004	0.000
Coyuntura - Maxim Ross As.	0.000	0.000	0.000	0.000	0.000	0.000
Datanalisis	0.000	0.000	0.000	0.000	0.000	0.000
Deutsche Bank Research	0.002	0.833	0.557	0.959	0.000	0.000
Ecoanalitica	0.000	0.000	0.000	0.000	0.000	0.000
Universidad Católica (UCAB)	0.002	0.215	0.407	0.000	0.710	0.399
MPG Consultores	0.000	0.000	0.002	NA	NA	NA
Multiplicas	0.028	0.000	0.000	0.242	0.000	0.000
Oxford Economics	0.000	0.000	0.373	0.001	0.017	0.000
Santander Venezuela	0.004	0.372	0.109	0.004	0.117	0.045
VenEconomia	0.000	0.000	0.000	0.000	0.000	0.000
Consensus (mean)	0.000	0.000	0.000	0.000	0.000	0.000

NA = not available.

Appendix B: Graphic representation of the time series of consensus forecasts

Fig. A-1 Argentinian 30 days deposit rate

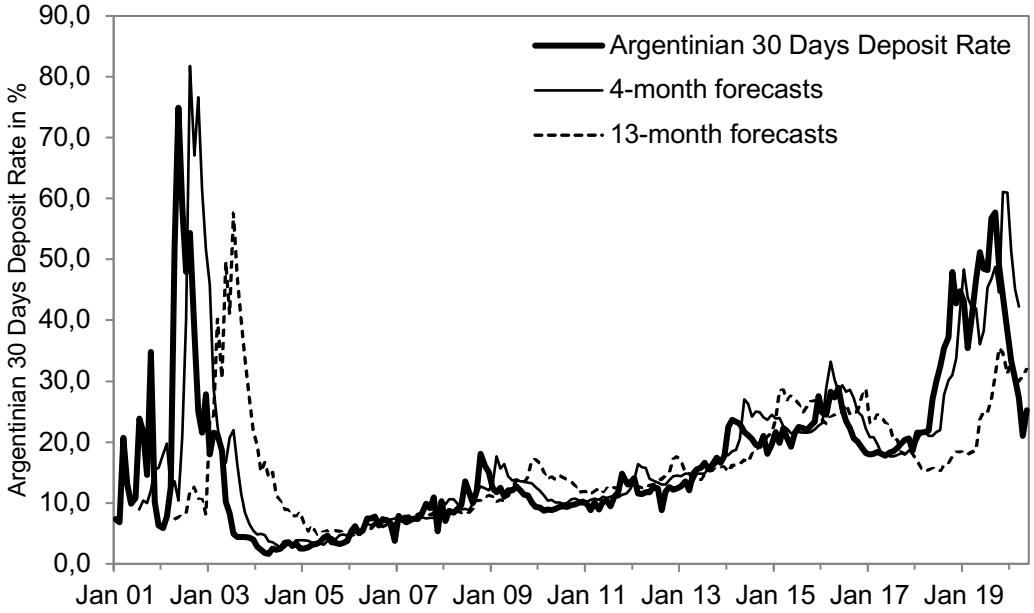


Fig. A-2: Brazilian financing overnight rate (SELIC)

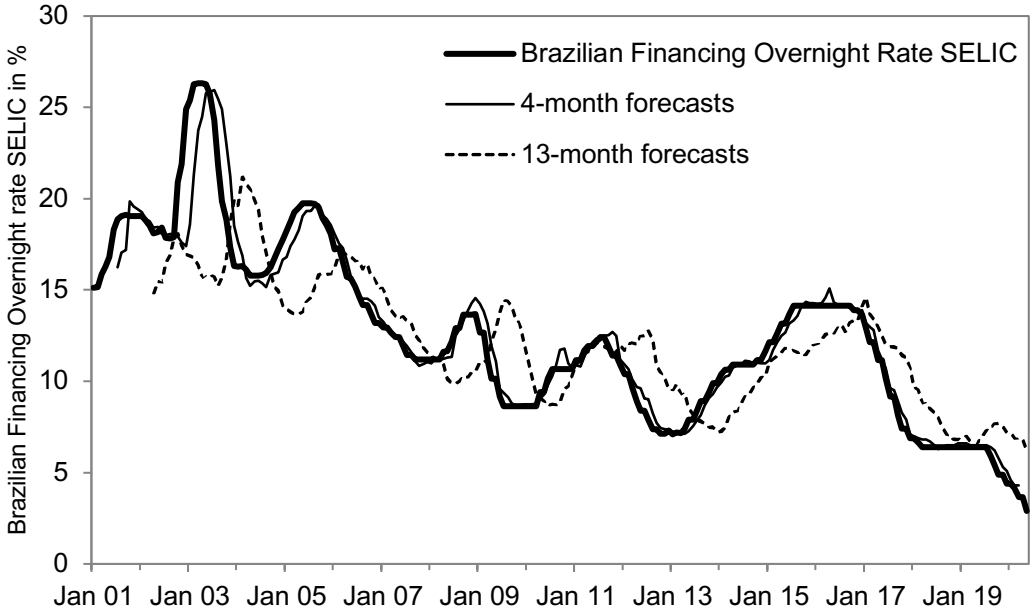


Fig. A-3: Chilean monetary policy rate

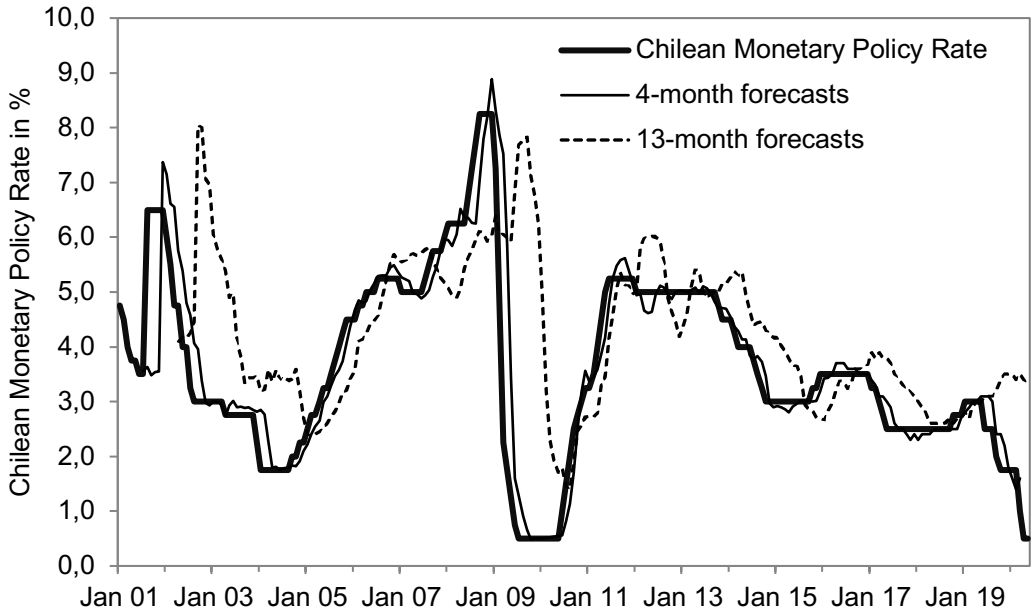
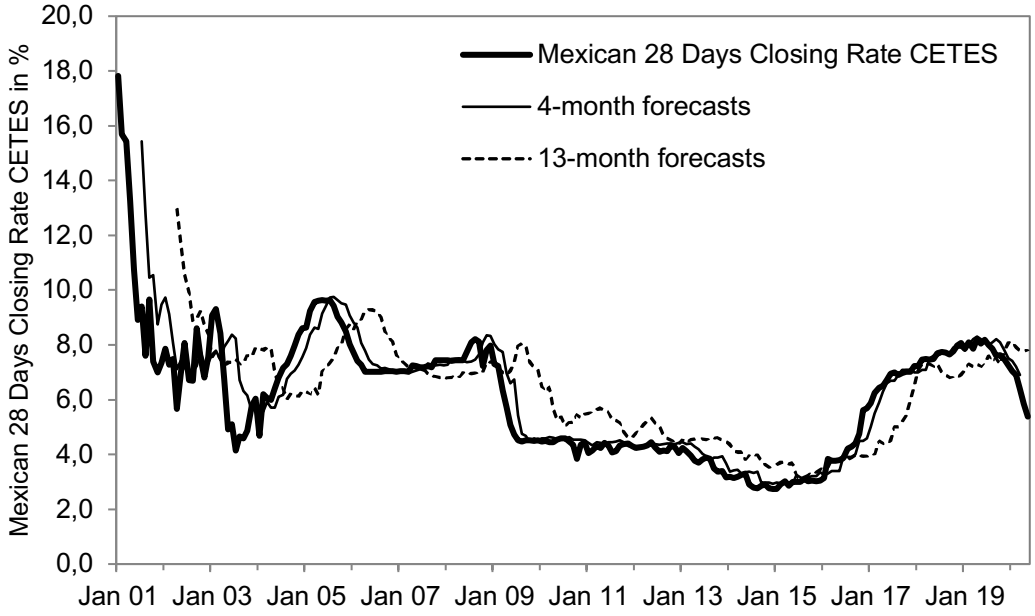


Fig. A-4: Mexican 28 days closing rate (CETES)



Appendix C: Documentation on the merging of forecast time series

Table A-6: Argentina 30 days deposit rate

Institution (designation of the merger)		Forecast horizon	
Time scale	Institution	4 months	13 months
		#	#
Analisis de Coyuntura (ACM)		**176**	**174**
Nov. 2004 – Aug. 2006	MVA Macroeconomia	22	22
Sep. 2006 – June 2009	MVAS Macroeconomia	32	32
July 2009 – Dec. 2019	ACM (name change June 2009)	122	120
BBVA		**192**	**174**
Apr. 2001 – Apr. 2002	BBVA Securities	13	13
May 2002 – Dec. 2019	BBVA Banco Frances	179	161
Eco Go Consultores		**127**	**118**
May 2006 – Dec. 2015	Estudio Bein & Asoc	106	101
Feb. 2018 – Dec. 2019	Eco Go (name change Nov. 2017)	21	17
Espert & Asociados		**132**	**54**
Apr. 2001 – Apr. 2002	Jose Luis Espert & Asoc	13	4
May 2002 – Dec. 2016	Espert & Asociados	113	50
Mar. 2017 – Dec. 2017	Estudio Espert	6	0
IHS Markit		**76**	**76**
Jan. 2005 – Nov. 2008	Global Insight	46	46
Dec. 2008 – Aug. 2011	IHS Global Insight	29	29
Dec. 2016	IHS Markit	1	1
M A Broda & Asociados		**161**	**142**
Apr. 2001 – Dec. 2002	M A Broda y Asociades	18	7
Apr. 2003 – Apr. 2006	M A Broda y Asociados	31	25
May 2006 – Sept. 2017	M A Broda & Asociados	112	110
Macroview S.A.		**161**	**35**
June 2001 – Nov. 2015	M & S Consultores	118	35
Jan. 2016 – Dec. 2019	Macroview (name change Dec. 2015)	43	0
Orlando Ferreres & Asoc		**110**	**94**
March 2006	Orlando Ferreres	1	1
Apr. 2006 – May 2017	Orlando Ferreres & Asoc	109	93

= number of observations

Table A-7: Brazilian financing overnight rate (SELIC)

Institution (designation of the merger)		Forecast horizon	
Time scale	Institution	4 months	13 months
		#	#
Barclays		**129**	**128**
June 2003 – May 2015	Barclays Capital	75	74
June 2015 – Dec. 2019	Barclays	54	54
BBVA		**116**	**116**
Apr. 2001 – Mar. 2002	BBVA Securities	23	23
Apr. 2003 – Sept. 2003	BBVA Brasil	4	4
Oct. 2003 – Jan. 2018	BBVA	89	89
BofA – Merrill Lynch		**87**	**84**
July 2001 – Apr. 2005	Merrill Lynch	20	17
Jan. 2014 – Dec. 2019	BofA – Merrill Lynch	67	67
Eaton		**215**	**215**
Apr. 2001 – Nov. 2013	Eaton Corporation	144	144
Dec. 2013 – Dec. 2019	Eaton	71	71
HSBC (Lloyds TSB Brazil)*		**141**	**139**
Apr. 2001 – Nov. 2003	Lloyds TSB Brazil	31	31
June 2004 – May 2016	HSBC (takeover 2003)	110	108
IHS Markit		**133**	**133**
Dec. 2004 – Oct. 2008	Global Insight	44	44
Dec. 2008 – Oct. 2013	HIS Global Insight	36	36
Jan. 2014 – Aug. 2016	HIS Economics	25	25
Nov. 2016 – Dec. 2019	HIS Markit	28	28
Itau Unibanco		**128**	**123**
Apr. 2001 – Mar. 2009	Unibanco	66	61
Dec. 2009	Itau BBA	1	1
Dec. 2013	Itau Unibanco	1	1
July 2014 – Dec. 2019	Itau BBA	60	60
M B Associados		**149**	**148**
July 2001 – Nov. 2001	M B Associados	5	4
Dec. 2001 – May 2004	M B Asociados	24	24
June 2004	MB Associados	1	1
July 2004 – June 2010	M B Asociados	64	64
July 2010 – Aug. 2019	M B Associados	55	55
SILCON/C.R. Contador & Associados		**217**	**217**
Apr. 2001 – Mar. 2003	C Contador & Asocs	22	22
Apr. 2003 – Dec. 2019	SILCON/C.R. Contador	195	195

* Five forecasting figures from July – November 2001 (published under the name of HSBC Brazil) are not taken into consideration; # = number of observations

Table A-8: Chilean monetary policy rate

Institution (designation of the merger)		Forecast horizon	
Time scale	Institution	4 months	13 months
		#	#
BTG Pactual (Celfin Capital)		**146**	**146**
Oct. 2002 – Dec. 2012	Celfin Capital	92	92
Apr. 2013 – Aug. 2018	BTG Pactual (takeover 2012)	54	54
Cámara de Comercio de Santiago		**163**	**163**
July 2001 – Apr.2004	Camara Comercio	23	23
May 2004 – Aug. 2010	C. Comercio Santiago (CCS)	60	60
Oct. 2010 – Apr. 2019	C. Comercio Santiago	80	80
Fontaine y Paúl Consultores		**94**	**94**
Apr. 2001 – Feb. 2003	Fontaine y Paúl Consultores	20	20
Apr. 2003 – May 2004	Fontaine Ihnen y Asoc	14	14
July 2004 – Jan. 2010	Fontaine y Paúl Consultores	60	60
IHS Markit		**104**	**104**
July 2007 – Aug. 2007	Global Insight	2	2
Oct. 2009 – Dec. 2013	IHS Global Insight	41	41
Jan. 2014 – Sept. 2016	IHS Economics	25	25
Oct. 2016	IHS Markit	1	1
Nov. 2016	IHS Economics	1	1
Dec. 2016 – Dec. 2019	IHS Markit	34	34
Santander Chile		**168**	**168**
Apr. 2001 – July 2002	Santander Chile	12	12
Sept. 2002	Banco Santander	1	1
Oct. 2002 – Dec. 2019	Santander Chile	155	155
Scotiabank (BBVA)		**163**	**164**
Apr. 2001 – Mar. 2003	BBVA Securities	22	22
Apr. 2003 – Aug. 2018	BBVA	126	127
Sept. 2018 – Dec. 2019	Scotiabank (takeover 2018)	15	15
UBS		**65**	**62**
June 2001 – June 2003	UBS Warburg	14	13
July 2003 – Apr. 2008	UBS	51	49
Universidad Andrés Bello (UNAB)		**63**	**63**
Apr. 2001 – June 2006	CIEF-Univ Andres Bello	57	57
July 2006 – Dec. 2006	CIEF	6	6
Universidad de Chile		**169**	**169**
Apr. 2001 – June 2001	Universidad de Chile	2	2
July 2001	University of Chile	1	1
Aug. 2001 – Dec. 2019	Universidad de Chile	166	166

= number of observations

Table A-9: Mexican 28 days closing rate (CETES)

Institution (designation of the merger)		Forecast horizon	
Time scale	Institution	4 months	13 months
		#	#
Banamex		**141**	**141**
Apr. 2001 – Nov. 2013	Banamex	139	139
Mar. 2014 & Jan. 2019	Banamex-Citi	2	2
BBVA		**157**	**151**
Apr. 2001 – Dec. 2001	Bancomer	7	7
Jan. 2002 – Oct. 2011	BBVA Bancomer	87	87
Aug. 2014 – Nov. 2015	BBVA	34	34
Dec. 2018	BBVA Banco Frances	1	1
HSBC		**157**	**151**
Aug. 2004 – Aug. 2008	HSBC Mexico	45	40
Sept. 2008 – Dec. 2019	HSBC	112	111
IHS Markit		**144**	**144**
Apr. 2001 – Aug. 2002	CIEMEX-WEFA (new brand 2001)	14	14
Dec. 2004 – Oct. 2008	Global Insight	44	44
Dec. 2008 – Oct. 2013	IHS Global Insight	36	36
Apr. 2014 – Sept. 2016	IHS Economics	23	23
Oct. 2016	IHS Markit	1	1
Nov. 2016	IHS Economics	1	1
Dec. 2016 – Nov. 2019	IHS Markit	25	25
ING		**122**	**122**
June 2001 – Aug. 2002	ING Barings	12	12
Sep. 2002 – Aug. 2012	ING Bank	110	110
Jonathan Heath & Assoc		**81**	**81**
Apr. 2001 – July 2004	Latin Source (Jonathan Heath)	38	38
Dec. 2013 – Oct. 2018	Jonathan Heath & Assoc	43	43
JP Morgan Chase Mex		**107**	**107**
July 2001 – Mar. 2003	JP Morgan Chase Mex	3	3
May 2003	JP Morgan Mexico	1	1
June 2003 – Sep. 2019	JP Morgan Chase Mex	103	103
Santander Mexico		**156**	**155**
Apr. 2001	Santander Investment	1	1
May 2001	Santander Mexico	1	1
July 2001 – Nov. 2013	Santander Serfin Mexico	100	99
Dec. 2013 – Nov. 2019	Santander Mexico	54	54
Scotiabank		**169**	**169**
May 2001	Scotiabank Inverlat	1	1
July 2001 – Mar. 2006	Scotia Inverlat	45	45
May 2006 – Dec. 2019	Scotiabank	123	123

UBS		**76**	**74**
Apr. 2001 – June 2003	UBS Warburg	22	23
July 2003 – Apr. 2008	UBS	54	51
Ve Por Mas (Kleinwort)		**90**	**72**
Apr. 2001 – Sept. 2004	Dresdner Kleinwort	36	22
Nov. 2014 – Nov. 2019	Ve Por Mas (takeover 2003)	54	50

= number of observations

Tab. A-10: Venezuela 30 days deposit rate

Institution (designation of the merger)		Forecast horizon	
Time scale	Institution	4 months	13 months
		#	#
Azpurua, Garcia-Palacios & Velazquez (AGPV)		**192**	**189**
Apr. 2001 – Jan. 2018	Azpurua Garcia Velazquez	169	166
Feb. 2018 – Dec. 2019	AGPV	23	23
Banesco		**144**	**142**
July 2001 – Feb. 2003	Banesco Banco Universal	20	20
Mar. 2003 – Dec. 2014	Banesco	124	122
BBVA		**88**	**87**
Apr. 2001 – Feb. 2003	BBVA Securities	18	18
Apr. 2003 – Sept. 2003	BBVA	5	5
Oct. 2003 – Sept. 2011	BBVA Banco Provincial	65	64
Datanalisis		**115**	**107**
July 2001 – Aug. 2001	Datanalysis	2	2
Sept. 2001 – July 2018	Datanalisis	113	105

= number of observations