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Asian Development Outlook Forecast Skill

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ADB Economics Working Paper Series



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Benno Ferrarini

No. 386 | February 2014

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ABSTRACT

The *Asian Development Outlook* (ADO) provides growth and inflation forecasts for more than 40 economies in the region. This paper assesses the accuracy of those forecasts against actual outcomes for the years from 2008 to 2011. The *World Economic Outlook* (WEO) forecasts by the International Monetary Fund are used as a benchmark against which to derive a comparative measure of the accuracy of ADO forecasts, or skill. ADO is found to be 'more skillful' than WEO in estimating both current-year gross domestic product (GDP) growth and consumer price index (CPI) inflation of Asian economies. WEO may have an edge over ADO when it comes to year-ahead GDP forecasts, while ADO's inflation forecasts tend to be more accurate. By and large, and notwithstanding much heterogeneity across economies and years, both sets of forecasts display a high degree of inaccuracy during the crisis years.

Keywords: economic forecasts, forecast skill, Asian Development Outlook, Asian Development Bank, World Economic Outlook, International Monetary Fund

JEL Classification: E17, E37

I. INTRODUCTION

Every year in spring, the Asian Development Bank (ADB) releases the *Asian Development Outlook* (ADO) report with the latest growth and inflation forecasts for its developing member countries (DMCs), counting more than 40 economies in the region. A week or two later, the International Monetary Fund (IMF) publishes the *World Economic Outlook* (WEO) report with its latest macroeconomic forecasts, with a nearly global coverage, including most of the DMCs. In fall, the two bodies release an update of their reports, including an updated set of economic forecasts. Comes spring again, the cycle starts over.

Rarely do the two reports refer to forecasts other than their own, and then not retrospectively, such as checking on their performance and usefulness as a forecasting body out of many. Systematic evaluations of forecasts' accuracy by these organizations are thus rare, and a comparative performance assessment across international organizations is largely unheard of. This paper attempts to fill this gap, if only partially and within the limits of the adoption of an extremely parsimonious amount of data and an equally limited expense of time devoted to analysis. No attempt is made to investigate the causes underlying the attested difference in forecast accuracy or skillfulness of the reports.

This analysis' focus on the period 2008–2011 is determined by the ready availability in electronic spreadsheet format of ADB and IMF data for these years at the present time of writing. While an assessment of forecasts made during more tranquil times would add insights, the data set at hand will suffice to shed light on the forecasting performance just prior and during the years the global financial and economic crisis, as it invested Asia and subsequently saw the countries in the region come out ahead of almost everyone else. It was during those times of utter crisis and uncertainty about the entity of the Atlantic crisis' impact on Asia first, and the timing and speed of its recovery later, that policymakers and economic agents were looking with an exceptional interest at the sentiments and expectations conveyed in the forecasts by the regional development bank on the one hand, and the premier international economic body *par excellence* on the other. As it turns out, both forecasters were somewhat at a loss during the height of the crisis.

Section II lays out the method of analysis, Section III interprets the findings, Section IV offers, rather reluctantly, a conclusion of sorts.

II. MEASURING FORECAST ERRORS, ACCURACY AND SKILL

Let \mathbf{x}_n be a vector of observations across countries c and years t —together summing over n , such that $\Sigma_n = \Sigma_c \Sigma_t$ —and \mathbf{f}_n a vector of forecasts. Then the forecast error \mathbf{e}_n is defined as the difference vector:

$$\mathbf{e}_n = \mathbf{x}_n - \mathbf{f}_n \quad (1)$$

Positive errors result from forecasts falling short of actual outcomes and the opposite holds true for any negative values in \mathbf{e}_n . Errors are taken at absolute value, $|\mathbf{e}_n|$, to compute averages across forecasts n . The mean absolute (forecast) error is thus defined as:

$$mae_t = \frac{1}{N} \sum_n |\mathbf{e}_n|. \quad (2)$$

and the squared mean squared error (rmse) as:¹

$$rmse_n = \sqrt{mse_n} = \sqrt{\frac{1}{N} \sum_n \mathbf{e}_n^2}. \quad (3)$$

To evaluate comparative forecast accuracy, we borrow from the field of meteorology, adapting a measure known as the Brier Score.² Across all items n in a set N predictions, the Brier Score compares the mean squared difference between the forecast and the actual outcome. In its simplest form and with reference to the forecasts made in the ADO and IMF reports, forecast skill can thus be defined as:

$$fs_n = 1 - \frac{mse_n^{ADO}}{mse_n^{WEO}} \quad (4)$$

where:

$$fs_n = 1 \Rightarrow \text{perfect forecast } (mse_n^{ADO} = 0)$$

$$fs_n > 0 \Rightarrow \text{skillful ADO, better than the WEO reference } (mse_n^{ADO} < mse_n^{WEO})$$

$$fs_n < 0 \Rightarrow \text{ADO is less skillful than the WEO } (mse_n^{ADO} > mse_n^{WEO})$$

Alternatively to compare average magnitudes of errors, as does forecast skill, a simple count score can be devised to gauge the relative number of instances in which ADO estimates or forecasts turned out more accurate than their WEO counterparts. Specifically, we define the count score as:

$$cs_n = \frac{1}{N} \sum_n s_n \quad (5)$$

where

$$s_n = 1 \text{ if } mae_n^{ADO} < mae_n^{WEO}$$

$$s_n = -1 \text{ if } mae_n^{ADO} > mae_n^{WEO}$$

$$s_n = 0 \text{ if } mae_n^{ADO} = mae_n^{WEO}$$

The count score ranges from $-100 \leq cs_n \leq 100$. It takes value -100 if $mae_n^{ADO} > mae_n^{WEO} \forall n \in 1 \dots N$. By contrast, the count score will be 100 if ADO forecast accuracy is superior to WEO in relation to each country and year combination being assessed. More generally, ADO is taken to outperform WEO if $cs_n > 0$, and the opposite is true when $cs_n < 0$.

¹ The (root) mean squared error is more sensitive than the mean absolute error to outliers.

² Brier, Glenn W. 1950. Verification of Forecasts Expressed in Terms of Probability. *Monthly Weather Review* 78: 1–3.

III. *ASIAN DEVELOPMENT OUTLOOK VS. WORLD ECONOMIC OUTLOOK* FORECAST SKILL

ADO and WEO current-year estimates and year-ahead forecasts are assessed for the period 2008–2011. For short, we refer to the main reports as ADO and WEO, and their updates as ADOU and WEOU.

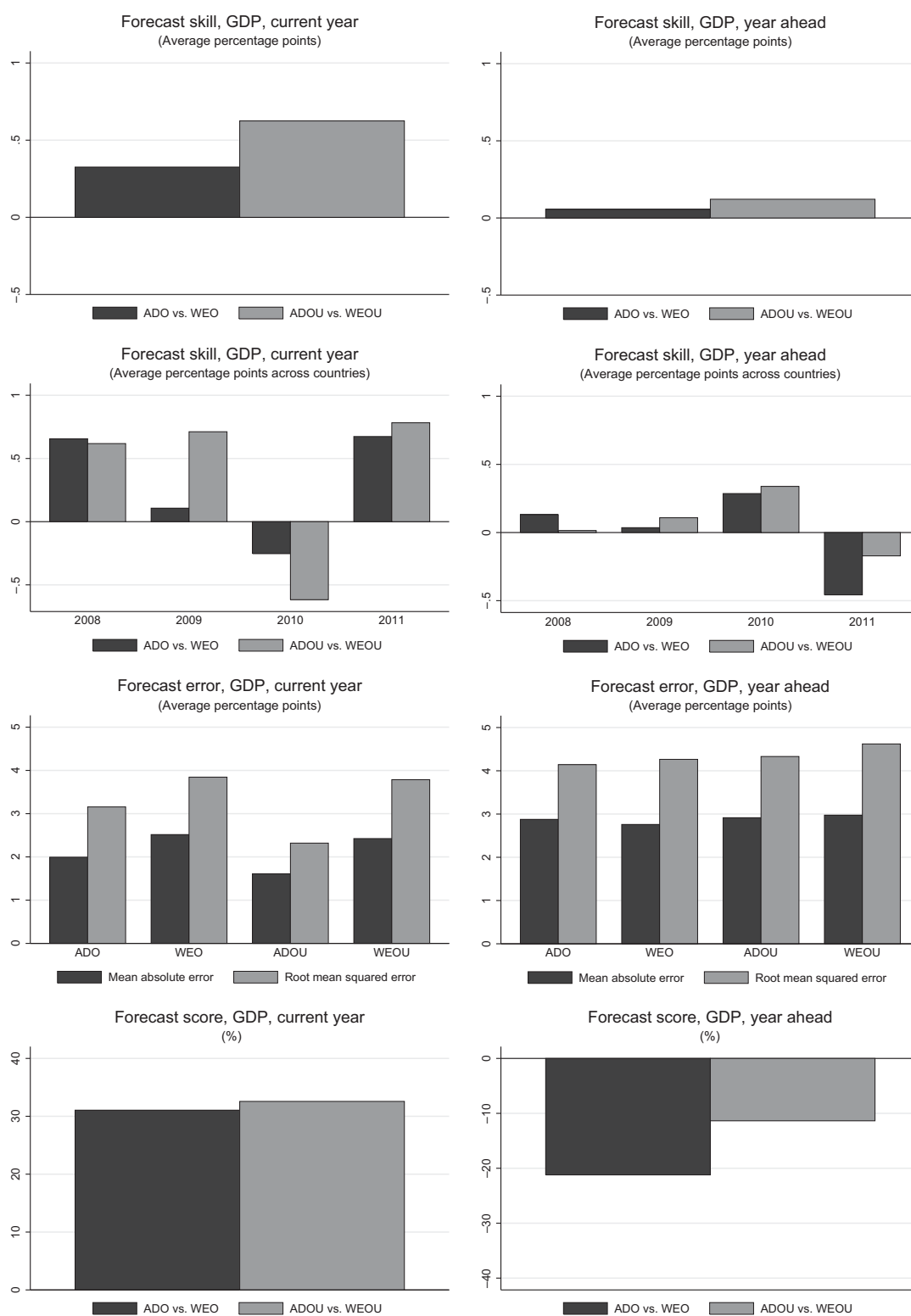
For a consistent comparison across various issues and years, with no observations missing, we compile data for a set of 33 Asian countries that present during 2008–2011 full coverage of gross domestic product (GDP) growth and consumer price index (CPI) inflation estimates and forecasts. That is, for each of the 33 countries and 4 years covered in our data, amounting to 132 country-years, we have a full set of GDP and CPI inflation estimates in relation to current years, as well as the forecasts for the year ahead.³ For example, in relation to 2009, the data set includes the ADO 2009 and WEO 2009 spring estimates of countries' GDP annual growth and CPI inflation during 2009 as a whole, as well as the ADOU 2009 and WEOU 2009 fall updates of those estimates. Moreover, the data set includes the 2009 GDP and CPI forecasts published in the 2008 ADO and WEO reports and their updates. Finally, the data includes the latest revision of actual or observed GDP and CPI figures for 2008–2011, sourced from ADO and WEO 2013.⁴

The key findings in relation to GDP growth are summarized in Figure 1. The panels report forecast skill, both overall (row 1) and by years (row 2), as well as forecast errors (row 3) and count scores (row 4). Panels on the left-hand side refer to growth estimates made in relation to current-year GDP. Panels to the right relate to growth forecasts made one year ahead.

A positive score in the left-hand side, upper panel indicates that, on average, ADO estimates outperformed their WEO counterparts in terms of accuracy. From 0.33 in relation to the spring reports (the dark bar), the score is as high as 0.63 for the fall reports (the lighter bar) when ADOU seems to benefit more than does WEOU from the availability of better and more evidence about economic performance in the current year.

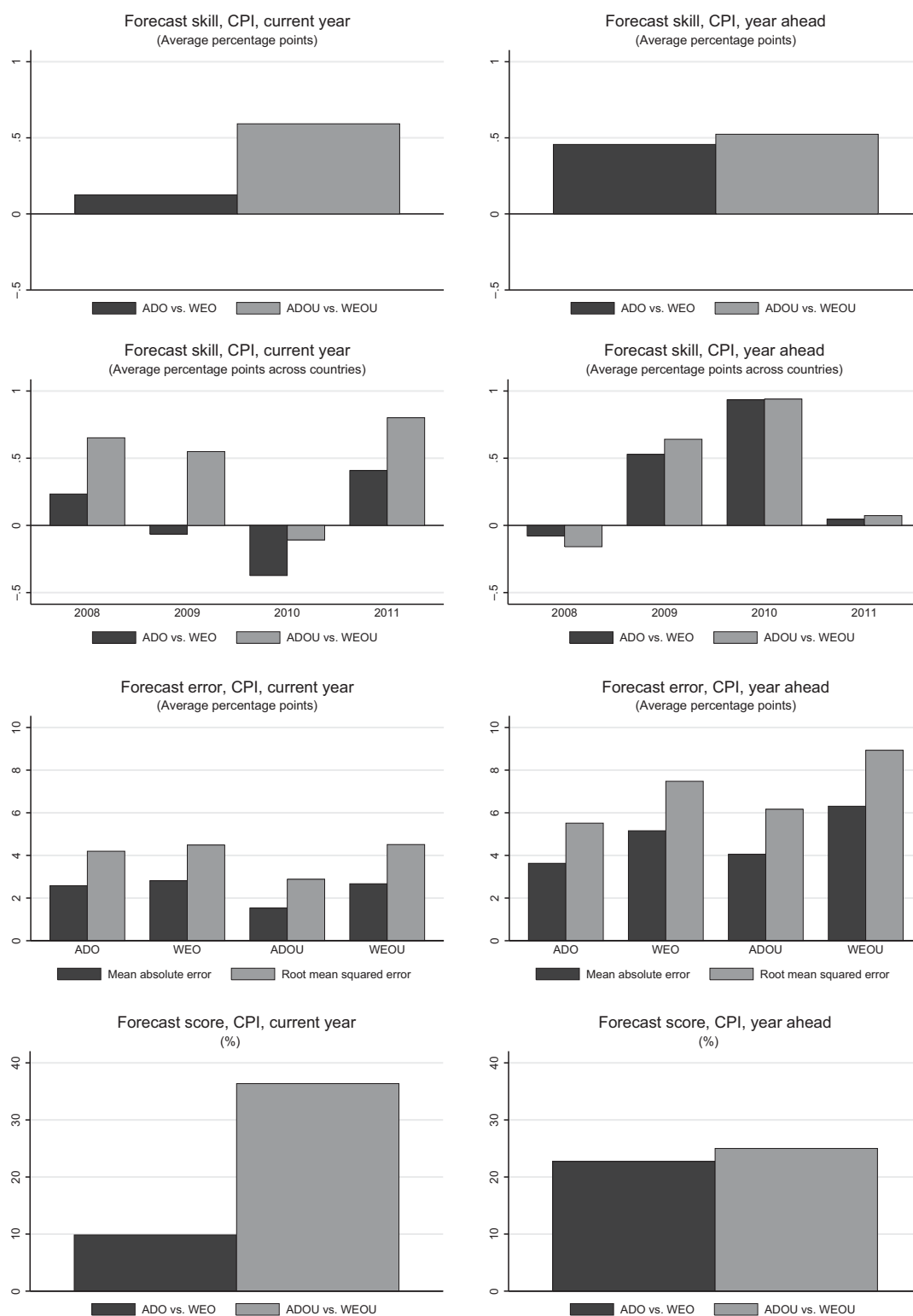
³ Forecasts refer to the calendar year that is following the release year of the report.

⁴ In the few instances where there is a discrepancy between ADO and WEO country growth or inflation figures, we computed averages as the reference value against which to compute forecast errors.

Figure 1: GDP Growth Forecast Skill, Error, Score

ADO = Asian Development Outlook, ADou = Asian Development Outlook Update, GDP = gross domestic product, WEO = World Economic Outlook, WEOU = World Economic Outlook Update.

Source: Author's calculations

Figure 2: Consumer Price Index Inflation Forecast Skill, Error, Score

ADO = Asian Development Outlook, ADOU = Asian Development Outlook Update, CPI = consumer price index, WEO = World Economic Outlook, WEOU = World Economic Outlook Update.

Source: Author's calculations

Turning to year-ahead growth forecasts, the first-row, right-hand panel shows forecast skill close to the zero intercept. This indicates a lesser supremacy of the ADO over WEO, compared to current-year estimates, albeit the outcome is still in favor of both the spring and fall issues of the ADO report.

ADO's higher forecast accuracy is confirmed by evidence shown in the second row of Figure 1, where forecast skill is broken down by years. The exception is 2010, which emerges as a particularly unfortunate year for ADB forecasters, both in relation to current-year estimates (left side) and year-ahead predictions (right side; note that growth predictions for 2011 were made in 2010).

Summarizing mean absolute errors (MAE) and root mean squared errors (RMSE) for the spring and fall reports, row three attests to the greater accuracy of the ADO and its update as far as current-year estimates are concerned, shown on the left-hand side. The same is true for year-ahead GDP forecasts, shown to the right, with the only exception of the MAE measure, which seems to assign WEO a slight lead over ADO.

As would be expected, a comparison of the two charts in row three confirm that year-ahead forecasts entail larger errors than do current-year estimates, across all the reports. Interestingly, ADOU stands out among all the reports as carrying the smallest average error of current-year estimates. By contrast, WEOU errors seem to improve little over WEO on average. For some reason, IMF's update report appears not to fully catch up with the latest pieces of information available to fall's growth estimates. Moreover, its year-ahead forecasts errors are larger than those of WEO and of both the ADO issues. This finds further confirmation in correlation analysis, which points to a significantly lower degree of correlation between the ADOU and WEOU errors compared to ADO and WEO, almost as if WEOU was falling behind ADOU along the way.

Table 1: Correlation Analysis

	MAE			RMSE		
	ADO	WEO	ADOU	ADO	WEO	ADOU
WEO	0.94			0.94		
ADOU	0.92	0.87		0.91	0.89	
WEOU	0.90	0.96	0.90	0.90	0.97	0.89

ADO = Asian Development Outlook, ADOU = Asian Development Outlook Update, MAE = mean absolute error, RMSE = root mean squared error, WEO = World Economic Outlook.

Note: All correlations are significant at 0.01 level.

Source: Author's calculations

The bottom row of Figure 1 reports the count score measure averaged across countries and years. This alternative measure confirms the earlier findings in relation to current-year estimates. In fact, an average count of more than 30 out of 100 possible indicates a substantial margin in favor of both the ADO spring and fall reports over the WEO counterparts. However, the count measure reverses the previous finding of ADO's skill in relation to year-ahead forecasts, which is shown succumbing to WEO in terms of the relative number of instances where the IMF made the smaller forecast error, or got it wrong less often than did ADB. In either case, whether through the forecast skill or the simple count measure, ADB and IMF performances are a fairly close race, and the low score according to either measure attests to the high degree of inaccuracy of either set of forecasts as they cancel each other out.

Figure 2 reports the same set of statistics in relation to CPI inflation. Even more evidently than for GDP growth forecasts, both the forecast skill and count measures show ADO reports outperforming WEO by a margin. The only exceptions are current-year inflation estimates in 2010 and year-ahead forecasts for 2008 (made in 2007). A negative skill margin in current-year 2010 and a barely positive margin in year-ahead 2011 confirm 2010 having been an off year for ADO forecasters.

Of course, average scores across countries and years hide a great deal of heterogeneity. Suffice it compare average forecast errors by years in the third rows of Figures 1 and 2 with the box plots of forecast errors in Appendix 2; the distribution of errors across countries is spread broadly and there are many outliers.

These outliers are easily identified in the charts of Appendix 3, where ADO(U) and WEO(U) MAE and RMSE are compared by countries across years. For example, Appendix 3, Figure A2.1 lists among the outliers with regard to average GDP estimate and forecast errors in 2008–2012 countries such as Afghanistan, Armenia, Azerbaijan, Mongolia, Timor-Leste, and Singapore. It further shows that the GDP forecast errors involving these countries are very large, up to about 6 percentage points on average during 2008–2012. That is, growth forecasts were off by an unflattering 6% on average.

Further detail, by country and year, can be evinced from the charts in Appendixes 6 and 7, in relation to GDP and CPI forecasts, respectively. For example, the first graph (to the upper left) in Appendix 6 shows that Afghanistan stands out with an exceptionally high average mean absolute error mainly because both the ADO and WEO estimates and forecasts for 2009 fell short by more than 12 percentage points of what later came in at 21% of GDP annual growth. While the 2008 error was also sizeable, underestimating growth by more than 5 percentage points, both ADO and WEO were well on target in their 2010 and 2011 forecasts and estimates.

Forecast errors correlate quite strongly with the degree of variation of country growth and inflation. The table below lists highly positive correlation coefficients between the coefficient of variation (CoV), defined as the standard error over the mean GDP or CPI, and the mean errors. The correlation pattern is strongest between the variation and forecast errors of CPI inflation.

Table 2: Errors' Correlation with Coefficient of Variation

	Estimates		Forecasts	
	MAE	RMSE	ADO	WEO
GDP	0.24	0.18*	0.37	0.38
CPI	0.41	0.42	0.47	0.51

ADO = Asian Development Outlook, MAE = mean absolute error;
RMSE = root mean squared error, WEO = World Economic Outlook.

Notes:

1. All but the starred item are significant at 0.01 level.
2. The correlations analysis excludes Armenia.

Source: Author's calculations

For more country detail, Appendix 4 provides detailed tabulations of errors and CoV, as well as average 2008–2011 GDP growth. With reference to GDP estimates and forecasts in the four yearly issues of ADO and WEO reports, Appendix 4, Tables 1 to 4 rank the 33 economies by increasing root mean squared forecast error. Across the four tables, each in relation to one of the four reports, a roughly similar group of countries populate the top and bottom rows. On top of the list of most accurate GDP forecasts are countries such as Bangladesh, Indonesia, the Lao People's Democratic Republic, and the People's Republic of China (PRC). On the bottom are Armenia, Azerbaijan, Timor-Leste, Singapore, Taipei, China, among others.

The positive relationship between average errors and CoV does not apply to all the economies in the sample. For example, forecasts for Vanuatu were remarkably accurate, despite recording a comparably high CoV, at 0.74 (Appendix 4, Table 1). With a similar reading of the CoV during 2008–2011, Afghanistan did much worse in terms of forecast accuracy. It should be noted, however, that this is also influenced by the high average yearly growth rate during the period of observation, exceeding 10%. Conversely, average growth close to zero affects the interpretation and partly invalidates the usefulness of the CoV measure for the case of Armenia, and Fiji to a lesser extent.

Concerning the accuracy of inflation forecasts, Appendix 4, Tables 5 to 8, ranks highest the Republic of Korea; Taipei, China; Malaysia; the Philippines; and Vanuatu. Least accurate were the inflation forecasts (and estimates) for countries such as Afghanistan, Cambodia, Mongolia, the Kyrgyz Republic, and Viet Nam. Many of these countries recorded two-digit inflation and a relatively high CoV, which partly explains forecasts' lower degree of accuracy.

Finally, Appendix 5, Tables 9 to 11, provides the country-level or yearly detail for the forecast count scores. For example, the third column of Appendix 5, Table 9 indicates that WEO forecasts' supremacy was mainly on account of ADO inaccuracies as regards India and Turkmenistan, which during 2008–2011 were consistently less accurate than WEO's. By contrast, the first row of Appendix 5, Table 9 shows that ADO's estimates and forecasts for Afghanistan GDP growth were consistently more accurate than WEO estimates, notwithstanding the fact that they involved sizeable errors, as captured by the MAE and RMSE measures discussed earlier. Tabulations of comparative count scores by year, in Appendix 5, Table 11, confirm WEO and, to a lesser extent, WEOU's superior hit score over ADO and ADOU year-ahead scores concerning GDP forecasts. In 2010 only, the same is true for current-year estimates. By contrast, ADO and ADOU score higher in terms of the count on CPI, except in a few instances, when WEO did better.

IV. CONCLUSIONS

The ADO provides growth and inflation forecasts for the economies in the region. For 33 economies, this paper assessed the accuracy of forecasts against observed outcomes for the period 2008–2011. The WEO forecasts by the IMF were used as a benchmark against which to derive a comparative measure of the accuracy of ADO forecasts, or skill.

By and large, ADO was found to be more skillful in estimating both GDP growth and CPI inflation of Asian economies. The evidence is less clear-cut for year-ahead growth forecasts, where the WEO and its update do better in terms of the count score measure, which disregards the entity of forecast errors and rests on a count of favorable instances instead.

Interestingly, WEOU forecasts were found to miss out on much of the action between spring and fall, when evidence in relation to current year growth crystalizes and a clearer view on next year's outlook starts to emerge. This does not appear to be the case for ADOU, the forecast accuracy of which tends to sharpen compared to ADO.

The analysis also has identified some years that stand out against the more general findings. In particular, 2010 ADO average estimates and forecasts of both growth and inflation were found to be far less precise than those of WEO, and the same is true for the update reports.

Illustrative tasks for further research include the expansion of the analysis to cover a larger number of years, alternative measures of forecast errors and skill, and an investigation into the determinants of comparative forecast accuracy that sets apart the two reports, with a look also on the exact timing of publication and how they influence one another.

APPENDIX 1: LIST OF ECONOMIES

Country Name	Country Code
Afghanistan	AFG
Armenia	ARM
Azerbaijan	AZE
Bangladesh	BAN
Bhutan	BHU
China, People's Republic of	PRC
Fiji	FIJ
Hong Kong, China	HKG
Indonesia	INO
India	IND
Kazakhstan	KAZ
Kyrgyz Republic	KGZ
Korea, Republic of	KOR
Lao People's Democratic Republic	LAO
Malaysia	MAL
Mongolia	MON
Nepal	NEP
Pakistan	PAK
Philippines	PHI
Singapore	SIN
Solomon Islands	SOL
Sri Lanka	SRI
Taipei, China	TAP
Tajikistan	TAJ
Thailand	THA
Timor-Leste	TIM
Tonga	TON
Turkmenistan	TKM
Uzbekistan	UZB
Vanuatu	VAN
Viet Nam	VIE

APPENDIX 2: BOX PLOTS OF FORECAST ERRORS ACROSS ECONOMIES

Figure A2.1: ADO and WEO GDP Growth Forecasts

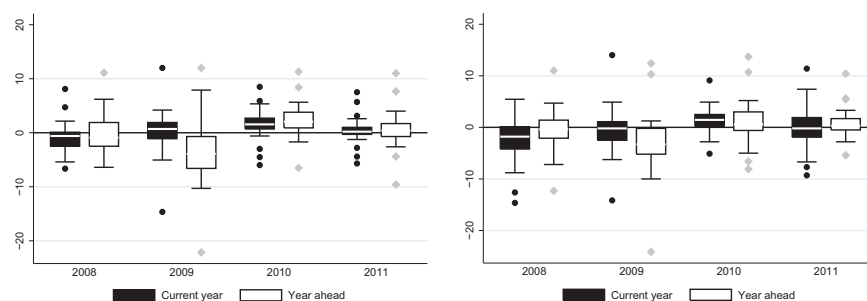


Figure A2.2: ADOU and WEOU GDP Growth Forecasts

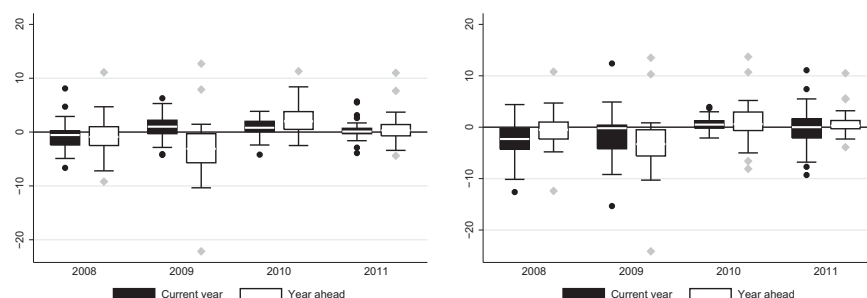


Figure A2.3: ADO and WEO CPI Growth Forecasts

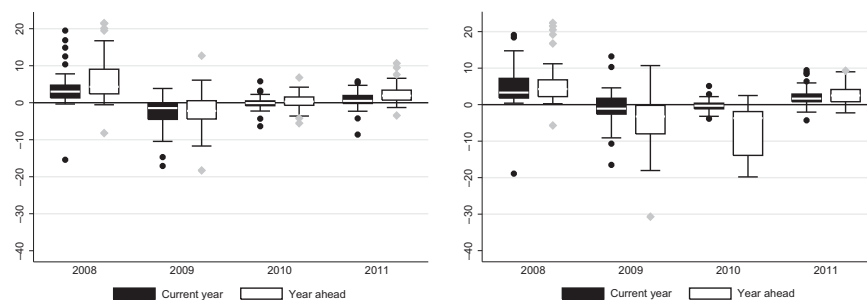
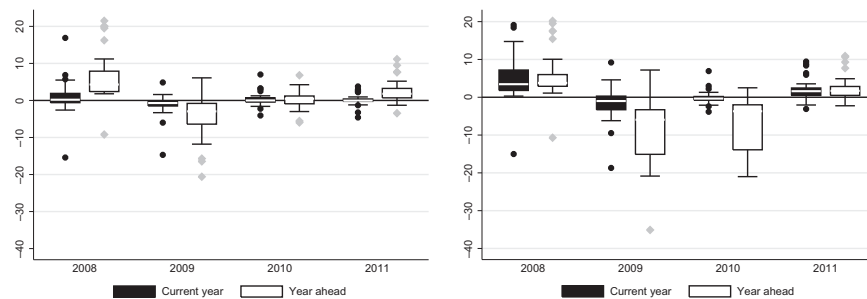


Figure A2.4: ADOU and WEOU GDP Growth Forecasts

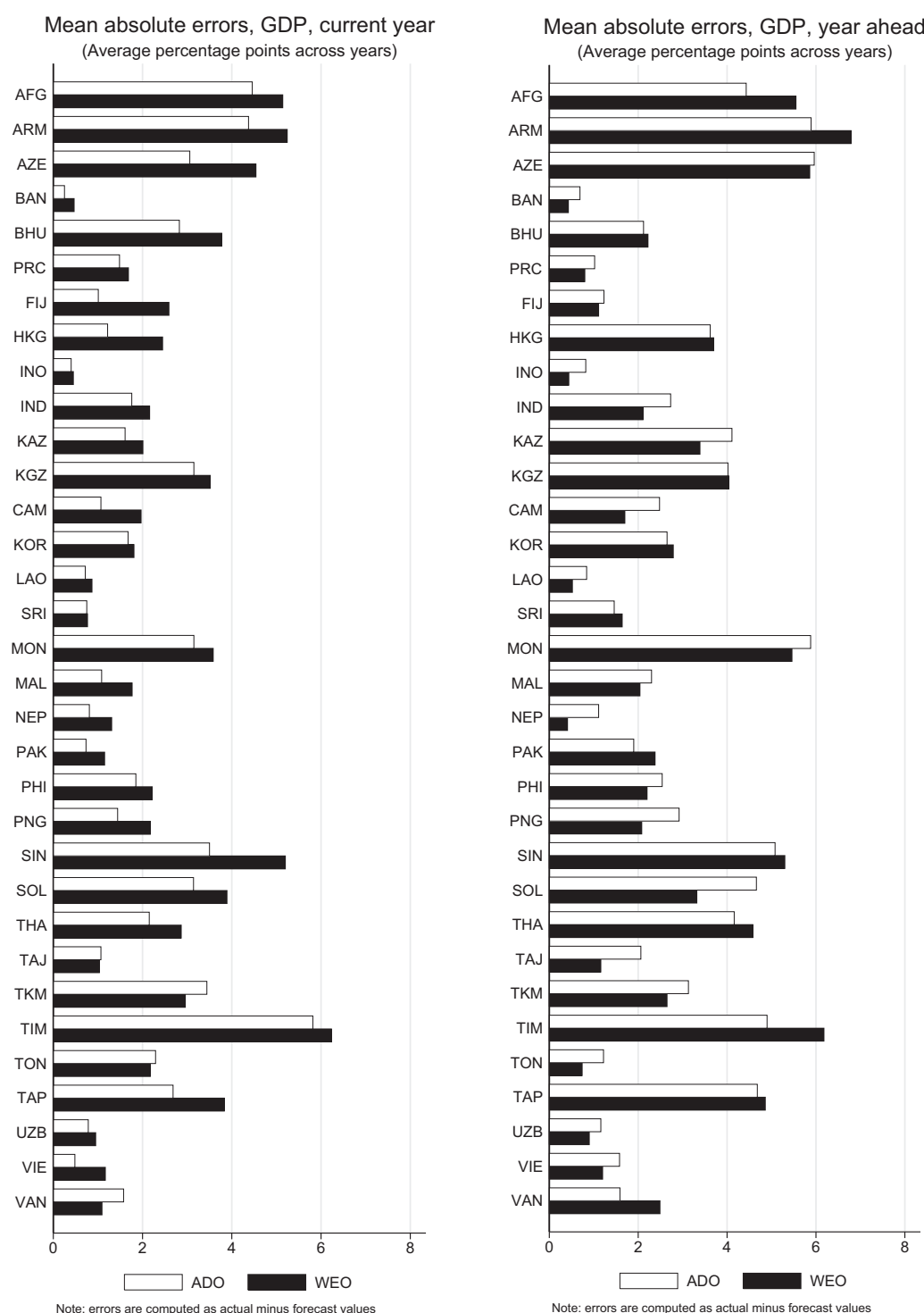


ADO = Asian Development Outlook, ADOU = Asian Development Outlook Update, CPI = consumer price index, GDP = gross domestic product, WEO = World Economic Outlook, WEOU = World Economic Outlook Update.

Source: Author's calculations

APPENDIX 3: CHARTS OF FORECAST ERRORS BY ECONOMIES ACROSS YEARS

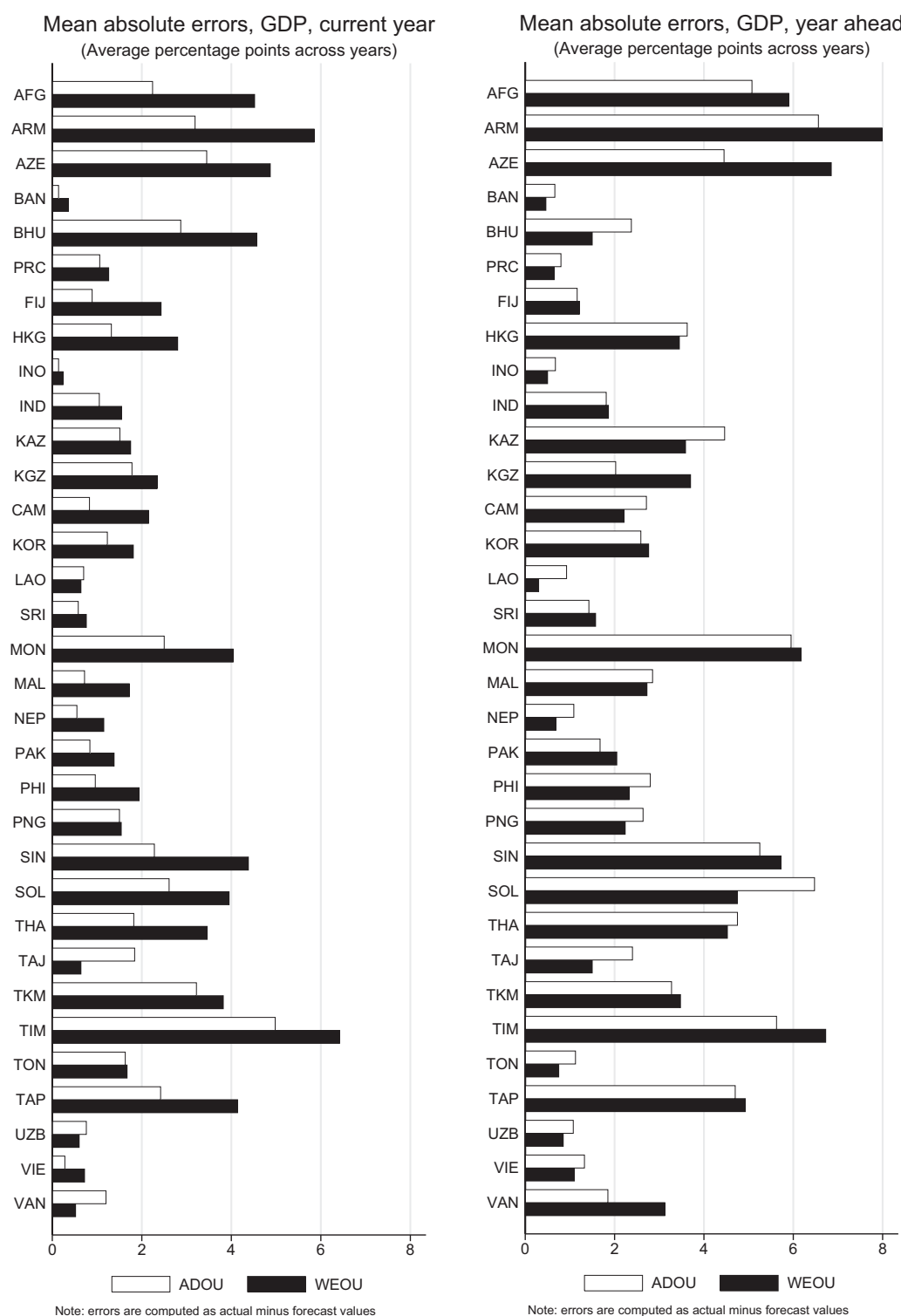
Figure A3.1: ADO and WEO Mean Absolute Errors, GDP



ADO = Asian Development Outlook, GDP = gross domestic product, WEO = World Economic Outlook.

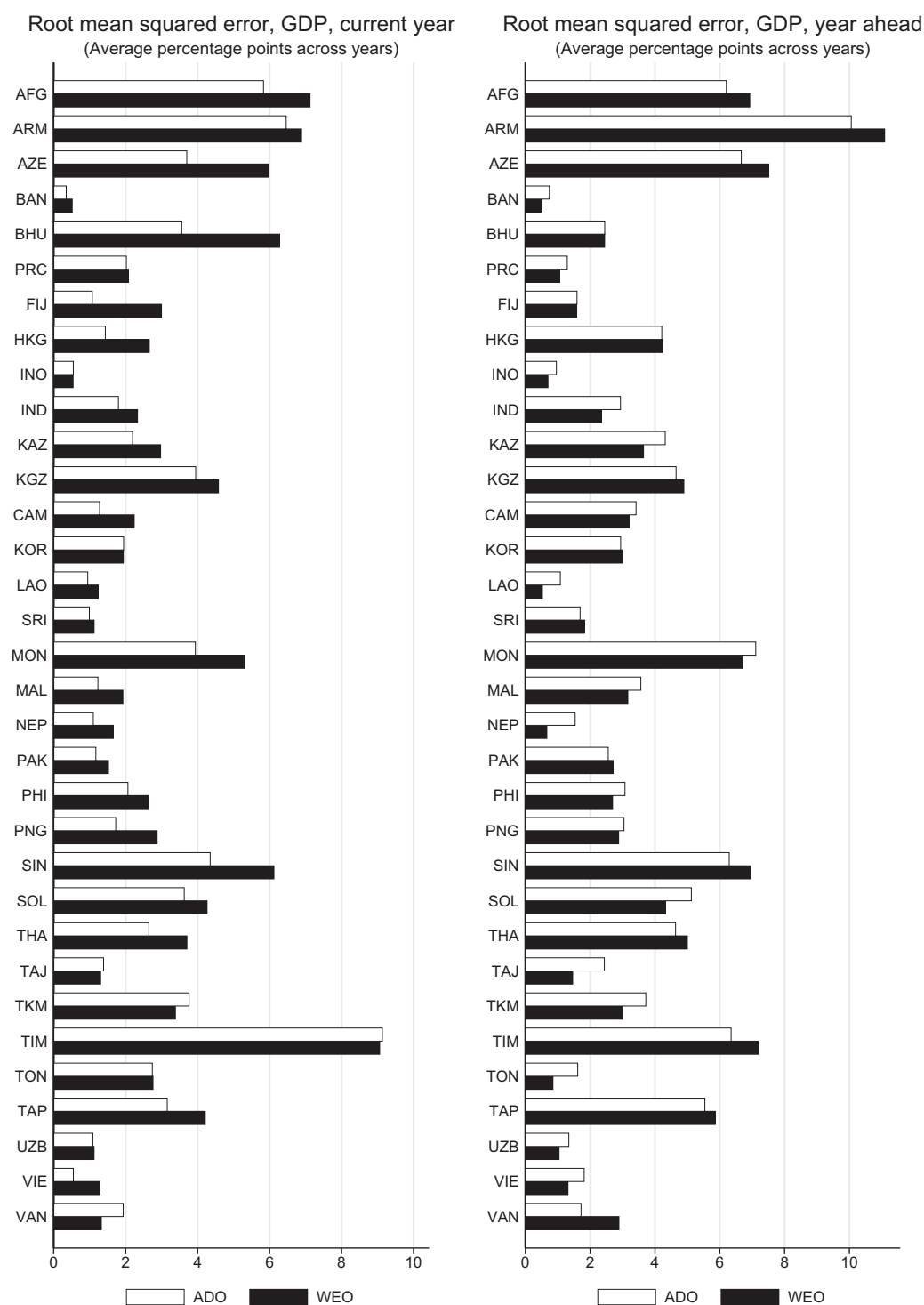
Note: For the list of economies and their corresponding three-letter codes, see Appendix 1.

Source: Author's calculations

Figure A3.2: ADOU and WEOU Mean Absolute Errors, GDP

ADOU = Asian Development Outlook Update, GDP = gross domestic product, WEOU = World Economic Outlook Update.
 Note: For the list of economies and their corresponding three-letter codes, see Appendix 1.

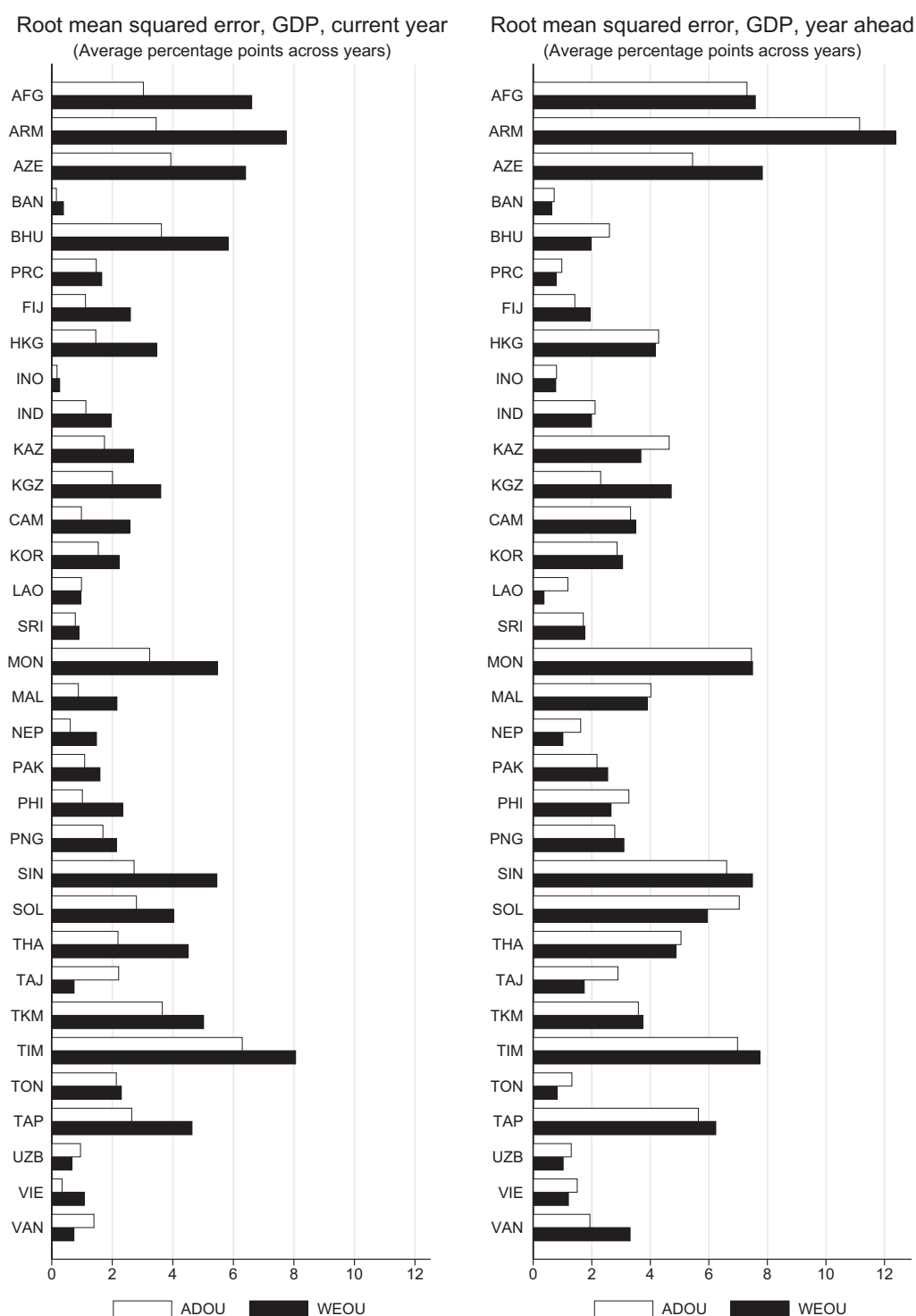
Source: Author's calculations

Figure A3.3: ADO and WEO Root Mean Square Errors, GDP

ADO = Asian Development Outlook, GDP = gross domestic product, WEO = World Economic Outlook.

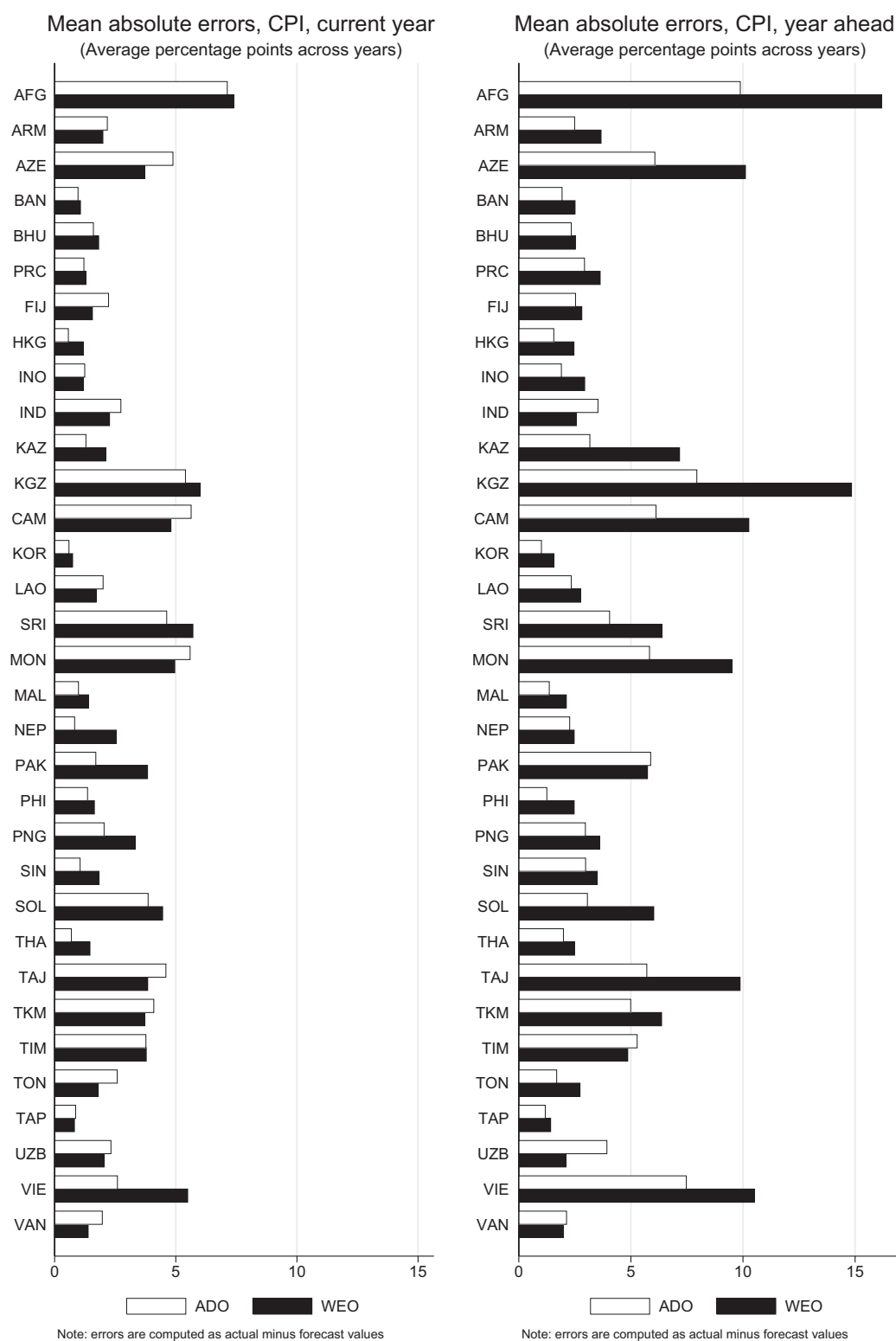
Note: For the list of economies and their corresponding three-letter codes, see Appendix 1.

Source: Author's calculations

Figure A3.4: ADOU and WEOU Root Mean Square Errors, GDP

ADOU = Asian Development Outlook Update, GDP = gross domestic product, WEOU = World Economic Outlook Update.
 Note: For the list of economies and their corresponding three-letter codes, see Appendix 1.

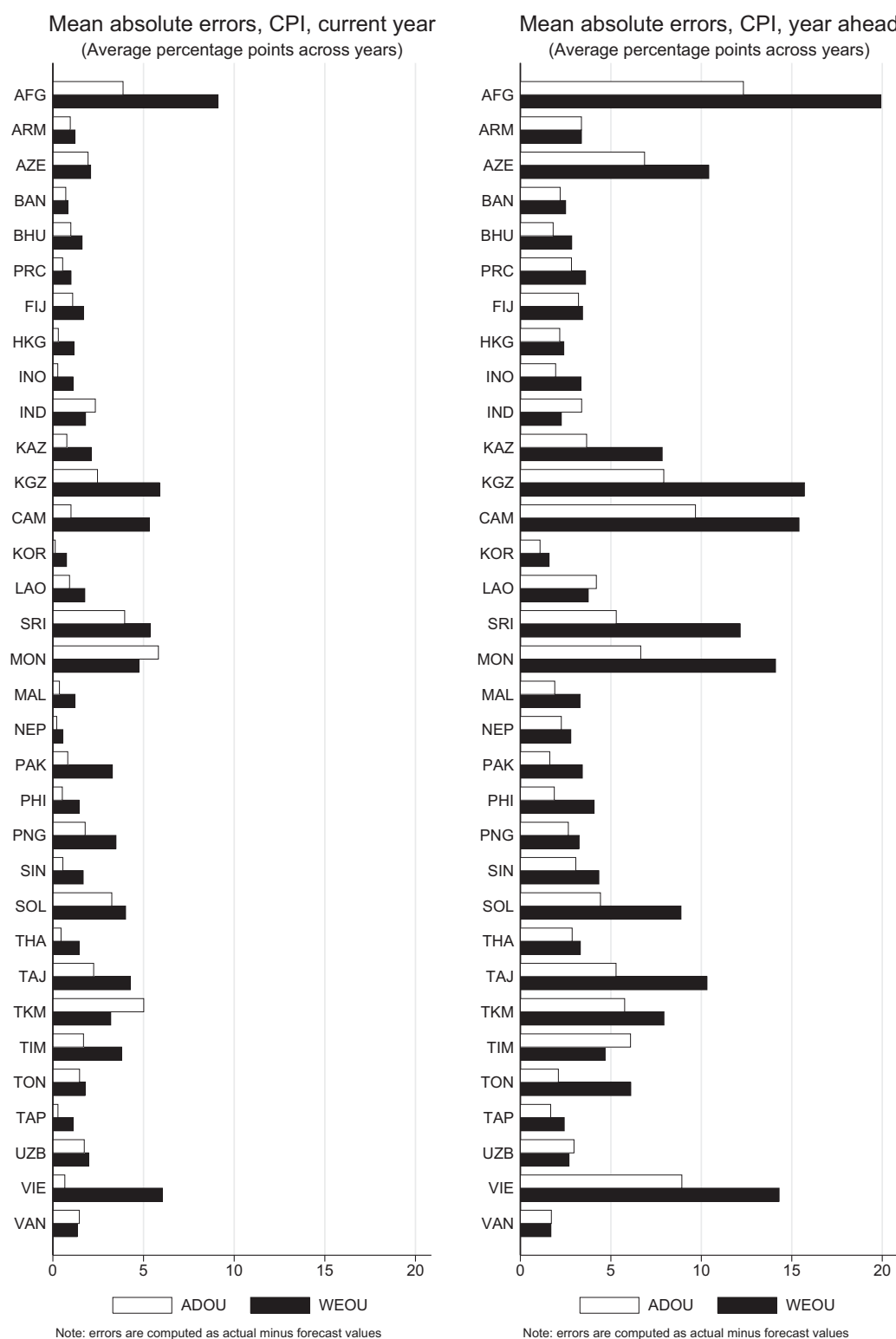
Source: Author's calculations

Figure A3.5: ADO and WEO Mean Absolute Errors, CPI

ADO = Asian Development Outlook, CPI = consumer price index, WEO = World Economic Outlook.

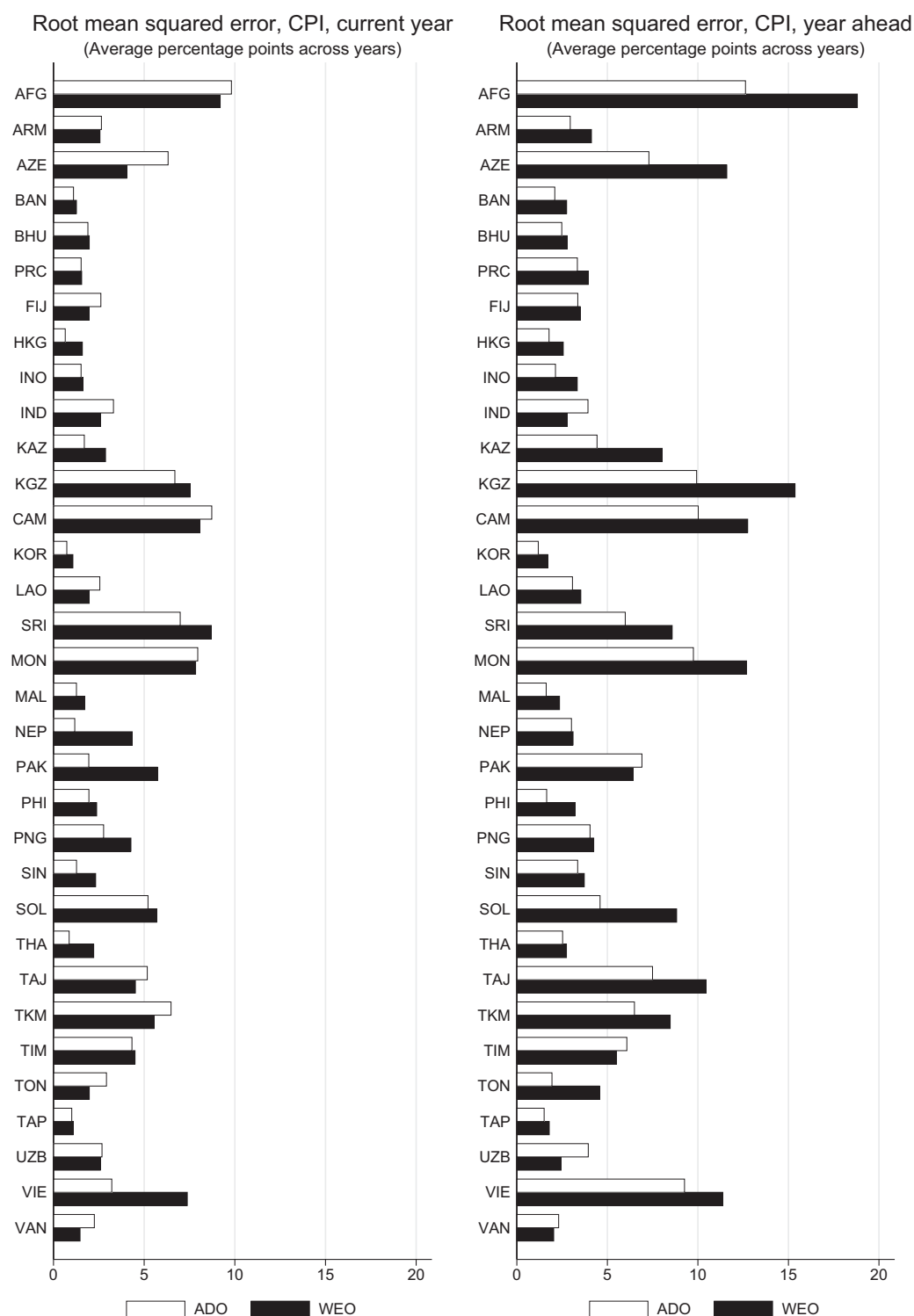
Note: For the list of economies and their corresponding three-letter codes, see Appendix 1.

Source: Author's calculations

Figure A3.6: ADOU and WEOU Mean Absolute Errors, CPI

ADOU = Asian Development Outlook Update, CPI = consumer price index, WEOU = World Economic Outlook Update.
 Note: For the list of economies and their corresponding three-letter codes, see Appendix 1.

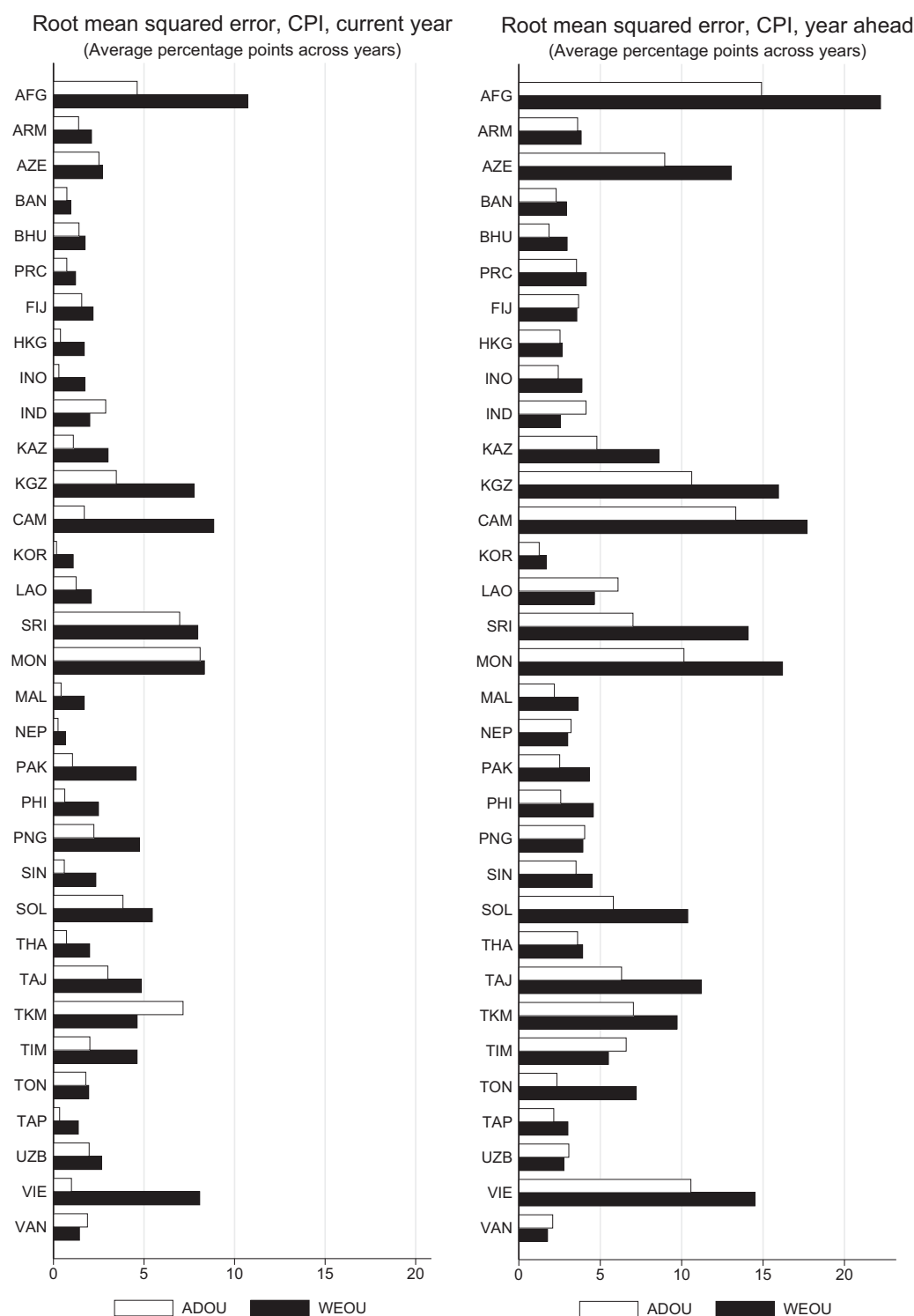
Source: Author's calculations

Figure A3.7: ADO and WEO Root Mean Square Errors, CPI

ADO = Asian Development Outlook, CPI = consumer price index, WEO = World Economic Outlook.

Note: For the list of economies and their corresponding three-letter codes, see Appendix 1.

Source: Author's calculations

Figure A3.8: ADOU and WEOU Root Mean Square Errors, CPI

ADOU = Asian Development Outlook Update, CPI = consumer price index, WEOU = World Economic Outlook Update.
 Note: For the list of economies and their corresponding three-letter codes, see Appendix 1.

Source: Author's calculations

APPENDIX 4: TABULATIONS OF FORECAST ERRORS BY ECONOMIES AND YEARS

**Table 1: ADO GDP Forecast Errors:
Ranked by Descending Degree of Forecast Accuracy**

Rank	Economy	Estimates		Forecasts		Average	
		MAE	RMSE	MAE	RMSE	GDP	CoV
1	Bangladesh	0.25	0.35	0.69		6.19	0.05
2	Indonesia	0.40	0.54	0.82	0.96	5.82	0.14
3	Lao PDR	0.72	0.95	0.84	1.08	7.65	0.03
4	PRC	1.48	2.02	1.02	1.29	9.63	0.06
5	Uzbekistan	0.78	1.09	1.16	1.34	8.48	0.05
6	Nepal	0.81	1.10	1.11	1.54	4.64	0.20
7	Fiji	1.01	1.07	1.23	1.59	0.44	3.14
8	Tonga	2.29	2.74	1.22	1.62	1.98	0.27
9	Sri Lanka	0.75	0.99	1.46	1.69	6.43	0.34
10	Vanuatu	1.58	1.93	1.59	1.72	3.20	0.74
11	Viet Nam	0.48	0.55	1.58	1.81	6.08	0.10
12	Tajikistan	1.07	1.39	2.06	2.44	6.43	0.28
13	Bhutan	2.83	3.56	2.12	2.45	8.43	0.22
14	Pakistan	0.73	1.17	1.90	2.56	2.88	0.29
15	India	1.76	1.80	2.73	2.93	7.61	0.23
16	Korea, Republic of	1.68	1.94	2.65	2.94	3.14	0.80
17	PNG	1.44	1.72	2.92	3.04	7.81	0.29
18	Philippines	1.85	2.06	2.54	3.07	4.20	0.63
19	Cambodia	1.07	1.28	2.48	3.42	4.99	0.66
20	Malaysia	1.08	1.23	2.30	3.56	3.90	0.96
21	Turkmenistan	3.44	3.76	3.13	3.72	11.18	0.38
22	Hong Kong, China	1.22	1.43	3.62	4.21	2.83	1.43
23	Kazakhstan	1.61	2.19	4.11	4.32	4.81	0.64
24	Thailand	2.15	2.64	4.16	4.64	2.03	2.13
25	Kyrgyz Republic	3.15	3.95	4.02	4.65	4.10	0.91
26	Solomon Islands	3.14	3.63	4.66	5.12	5.57	1.05
27	Taipei, China	2.68	3.15	4.68	5.54	3.45	1.58
28	Afghanistan	4.46	5.83	4.43	6.20	10.02	0.76
29	Singapore	3.50	4.35	5.08	6.29	5.22	1.31
30	Timor-Leste	5.82	9.13	4.90	6.35	11.90	0.19
31	Azerbaijan	3.06	3.70	5.96	6.67	6.30	0.76
32	Mongolia	3.15	3.94	5.88	7.11	7.88	0.98
33	Armenia	4.38	6.46	5.89	10.06	-0.09	-109.37
Average		1.99	3.16	2.88	4.14	5.61	0.79

ADO = Asian Development Outlook, CoV = coefficient of variance, GDP = gross domestic product, Lao PDR = Lao People's Democratic Republic, MAE = mean average error; PNG = Papua New Guinea; PRC = People's Republic of China; RMSE = root mean square error.

Source: Author's calculations

**Table 2: WEO GDP Forecast Errors:
Ranked by Descending Degree of Forecast Accuracy**

Rank	Economy	Estimates		Forecasts		Average	
		MAE	RMSE	MAE	RMSE	GDP	CoV
1	Bangladesh	0.47	0.52	0.43	0.48	6.19	0.05
2	Lao PDR	0.87	1.24	0.52	0.53	7.65	0.03
3	Nepal	1.31	1.66	0.41	0.66	4.64	0.20
4	Indonesia	0.45	0.54	0.44	0.70	5.82	0.14
5	Tonga	2.17	2.76	0.74	0.85	1.98	0.27
6	Uzbekistan	0.95	1.12	0.90	1.04	8.48	0.05
7	PRC	1.68	2.08	0.80	1.06	9.63	0.06
8	Viet Nam	1.17	1.29	1.20	1.32	6.08	0.10
9	Tajikistan	1.03	1.31	1.16	1.46	6.43	0.28
10	Fiji	2.59	2.99	1.11	1.59	0.44	3.14
11	Sri Lanka	0.77	1.12	1.64	1.83	6.43	0.34
12	India	2.16	2.33	2.11	2.35	7.61	0.23
13	Bhutan	3.77	6.28	2.22	2.45	8.43	0.22
14	Philippines	2.22	2.63	2.20	2.69	4.20	0.63
15	Pakistan	1.15	1.52	2.38	2.70	2.88	0.29
16	PNG	2.17	2.87	2.08	2.88	7.81	0.29
17	Vanuatu	1.09	1.32	2.49	2.89	3.20	0.74
18	Turkmenistan	2.96	3.38	2.65	2.98	11.18	0.38
19	Korea, Republic of	1.81	1.93	2.79	2.98	3.14	0.80
20	Malaysia	1.77	1.92	2.04	3.16	3.90	0.96
21	Cambodia	1.97	2.24	1.70	3.20	4.99	0.66
22	Kazakhstan	2.01	2.97	3.39	3.65	4.81	0.64
23	Hong Kong, China	2.45	2.66	3.70	4.23	2.83	1.43
24	Solomon Islands	3.89	4.26	3.32	4.33	5.57	1.05
25	Kyrgyz Republic	3.52	4.58	4.04	4.89	4.10	0.91
26	Thailand	2.87	3.70	4.58	5.00	2.03	2.13
27	Taipei, China	3.83	4.21	4.86	5.86	3.45	1.58
28	Mongolia	3.58	5.29	5.46	6.70	7.88	0.98
29	Afghanistan	5.14	7.12	5.55	6.93	10.02	0.76
30	Singapore	5.20	6.12	5.30	6.96	5.22	1.31
31	Timor-Leste	6.23	9.06	6.18	7.18	11.90	0.19
32	Azerbaijan	4.54	5.98	5.86	7.51	6.30	0.76
33	Armenia	5.24	6.89	6.79	11.09	-0.09	-109.37
Average		2.52	3.84	2.76	4.26	5.61	0.79

CoV = coefficient of variance, GDP = gross domestic product, Lao PDR = Lao People's Democratic Republic, MAE = mean average error, PNG = Papua New Guinea, PRC = People's Republic of China, RMSE = root mean square error, WEO = World Economic Outlook.

Source: Author's calculations

**Table 3: ADOU GDP Forecast Errors:
Ranked by Descending Degree of Forecast Accuracy**

Rank	Economy	Estimates		Forecasts		Average	
		MAE	RMSE	MAE	RMSE	GDP	CoV
1	Bangladesh	0.14	0.15	0.66	0.71	6.19	0.05
2	Indonesia	0.14	0.17	0.67	0.80	5.82	0.14
3	PRC	1.06	1.47	0.80	0.98	9.63	0.06
4	Lao PDR	0.70	0.98	0.93	1.18	7.65	0.03
5	Uzbekistan	0.76	0.95	1.08	1.30	8.48	0.05
6	Tonga	1.63	2.13	1.13	1.32	1.98	0.27
7	Fiji	0.89	1.11	1.16	1.42	0.44	3.14
8	Viet Nam	0.28	0.34	1.32	1.50	6.08	0.10
9	Nepal	0.55	0.61	1.09	1.62	4.64	0.20
10	Sri Lanka	0.58	0.78	1.42	1.71	6.43	0.34
11	Vanuatu	1.20	1.39	1.85	1.94	3.20	0.74
12	India	1.05	1.13	1.81	2.11	7.61	0.23
13	Pakistan	0.84	1.09	1.67	2.18	2.88	0.29
14	Kyrgyz Republic	1.78	2.01	2.03	2.30	4.10	0.91
15	Bhutan	2.87	3.62	2.38	2.60	8.43	0.22
16	PNG	1.50	1.69	2.64	2.79	7.81	0.29
17	Korea, Republic of	1.23	1.54	2.59	2.87	3.14	0.80
18	Tajikistan	1.84	2.21	2.40	2.89	6.43	0.28
19	Philippines	0.96	1.01	2.80	3.27	4.20	0.63
20	Cambodia	0.83	0.98	2.71	3.32	4.99	0.66
21	Turkmenistan	3.22	3.65	3.28	3.59	11.18	0.38
22	Malaysia	0.72	0.88	2.85	4.02	3.90	0.96
23	Hong Kong, China	1.32	1.45	3.63	4.28	2.83	1.43
24	Kazakhstan	1.51	1.74	4.46	4.64	4.81	0.64
25	Thailand	1.82	2.19	4.75	5.05	2.03	2.13
26	Azerbaijan	3.45	3.93	4.45	5.44	6.30	0.76
27	Taipei, China	2.42	2.64	4.70	5.64	3.45	1.58
28	Singapore	2.28	2.72	5.25	6.61	5.22	1.31
29	Timor-Leste	4.98	6.29	5.63	6.98	11.90	0.19
30	Solomon Islands	2.61	2.80	6.47	7.04	5.57	1.05
31	Afghanistan	2.24	3.03	5.07	7.30	10.02	0.76
32	Mongolia	2.50	3.23	5.95	7.45	7.88	0.98
33	Armenia	3.19	3.45	6.56	11.15	-0.09	-109.37
Average		1.61	2.32	2.91	4.33	5.61	0.79

ADO = Asian Development Outlook, CoV = coefficient of variance, GDP = gross domestic product, Lao PDR = People's Democratic Republic, MAE = mean average error, PNG = Papua New Guinea, PRC = People's Republic of China, RMSE = root mean square error.

Source: Author's calculations

**Table 4: WEOU GDP Forecast Errors:
Ranked by Descending Degree of Forecast Accuracy**

Rank	Economy	Estimates		Forecasts		Average	
		MAE	RMSE	MAE	RMSE	GDP	CoV
1	Lao PDR	0.64	0.97	0.30	0.37	7.65	0.03
2	Bangladesh	0.36	0.39	0.46	0.63	6.19	0.05
3	Indonesia	0.24	0.26	0.50	0.77	5.82	0.14
4	PRC	1.26	1.65	0.65	0.78	9.63	0.06
5	Tonga	1.67	2.30	0.75	0.82	1.98	0.27
6	Nepal	1.15	1.48	0.69	1.01	4.64	0.20
7	Uzbekistan	0.60	0.67	0.85	1.02	8.48	0.05
8	Viet Nam	0.72	1.08	1.10	1.20	6.08	0.10
9	Tajikistan	0.64	0.74	1.50	1.74	6.43	0.28
10	Sri Lanka	0.76	0.90	1.57	1.76	6.43	0.34
11	Fiji	2.43	2.60	1.21	1.95	0.44	3.14
12	Bhutan	4.57	5.82	1.50	1.97	8.43	0.22
13	India	1.55	1.96	1.86	1.99	7.61	0.23
14	Pakistan	1.38	1.59	2.05	2.54	2.88	0.29
15	Philippines	1.94	2.35	2.33	2.66	4.20	0.63
16	Korea, Republic of	1.81	2.23	2.76	3.05	3.14	0.80
17	PNG	1.54	2.14	2.24	3.10	7.81	0.29
18	Vanuatu	0.52	0.73	3.13	3.31	3.20	0.74
19	Cambodia	2.15	2.57	2.21	3.50	4.99	0.66
20	Kazakhstan	1.75	2.69	3.59	3.68	4.81	0.64
21	Turkmenistan	3.82	5.01	3.47	3.75	11.18	0.38
22	Malaysia	1.72	2.15	2.72	3.90	3.90	0.96
23	Hong Kong, China	2.80	3.47	3.45	4.17	2.83	1.43
24	Kyrgyz Republic	2.34	3.60	3.70	4.72	4.10	0.91
25	Thailand	3.46	4.51	4.53	4.88	2.03	2.13
26	Solomon Islands	3.95	4.02	4.75	5.95	5.57	1.05
27	Taipei, China	4.14	4.63	4.93	6.24	3.45	1.58
28	Singapore	4.38	5.46	5.72	7.49	5.22	1.31
29	Mongolia	4.04	5.48	6.17	7.49	7.88	0.98
30	Afghanistan	4.52	6.60	5.90	7.59	10.02	0.76
31	Timor-Leste	6.42	8.05	6.73	7.74	11.9	0.19
32	Azerbaijan	4.87	6.40	6.85	7.83	6.30	0.76
33	Armenia	5.85	7.75	7.99	12.39	-0.09	-109.37
Average		2.42	3.79	2.97	4.62	5.61	0.79

CoV = coefficient of variance, GDP = gross domestic product, Lao PDR = Lao People's Democratic Republic, MAE = mean average error, PNG = Papua New Guinea, PRC = People's Republic of China, RMSE = root mean square error, WEOU = World Economic Outlook Update.

Source: Author's calculations

**Table 5: ADO CPI Forecast Errors:
Ranked by Descending Degree of Forecast Accuracy**

Rank	Economy	Estimates		Forecasts		Average	
		MAE	RMSE	MAE	RMSE	CPI	CoV
1	Korea, Republic of	0.59	0.73	1.01	1.18	3.61	0.25
2	Taipei, China	0.87	1.01	1.18	1.51	1.25	1.44
3	Malaysia	0.98	1.27	1.36	1.62	2.73	0.76
4	Philippines	1.36	1.95	1.25	1.65	5.22	0.39
5	Hong Kong, China	0.57	0.65	1.56	1.78	3.13	0.67
6	Tonga	2.58	2.92	1.69	1.94	5.85	0.31
7	Bangladesh	0.97	1.10	1.93	2.09	8.23	0.21
8	Indonesia	1.24	1.52	1.90	2.13	6.28	0.38
9	Vanuatu	1.97	2.25	2.13	2.31	3.19	0.58
10	Bhutan	1.60	1.90	2.34	2.48	6.94	0.20
11	Thailand	0.69	0.87	1.99	2.53	2.91	0.93
12	Armenia	2.17	2.64	2.49	2.95	6.97	0.35
13	Nepal	0.82	1.17	2.27	3.02	9.74	0.23
14	Lao PDR	2.00	2.55	2.34	3.07	5.30	0.68
15	PRC	1.21	1.52	2.93	3.34	3.48	0.86
16	Singapore	1.05	1.27	2.98	3.36	3.81	0.70
17	Fiji	2.22	2.61	2.53	3.36	6.41	0.35
18	India	2.73	3.31	3.53	3.93	8.81	0.17
19	Uzbekistan	2.33	2.67	3.93	3.94	12.29	0.16
20	PNG	2.04	2.76	2.97	4.04	8.02	0.26
21	Kazakhstan	1.29	1.70	3.17	4.43	9.94	0.48
22	Solomon Islands	3.86	5.21	3.06	4.59	8.20	0.83
23	Sri Lanka	4.63	6.99	4.05	5.99	4.30	0.63
24	Timor-Leste	3.77	4.33	5.28	6.07	7.04	0.76
25	Turkmenistan	4.09	6.48	4.99	6.49	5.39	1.31
26	Pakistan	1.70	1.95	5.88	6.91	13.60	0.30
27	Azerbaijan	4.88	6.32	6.07	7.29	8.99	0.92
28	Tajikistan	4.59	5.17	5.71	7.49	11.46	0.57
29	Viet Nam	2.59	3.22	7.47	9.26	14.43	0.53
30	Mongolia	5.59	7.95	5.83	9.75	13.22	0.72
31	Kyrgyz Republic	5.40	6.69	7.94	9.93	13.93	0.60
32	Cambodia	5.63	8.73	6.12	10.02	8.45	1.34
33	Afghanistan	7.13	9.81	9.88	12.63	8.13	1.84
Average		2.58	4.20	3.63	5.51	7.31	0.80

ADO = Asian Development Outlook, CoV = coefficient of variance, CPI = consumer price index, Lao PDR = Lao People's Democratic Republic, MAE = mean average error, PNG = Papua New Guinea, PRC = People's Republic of China, RMSE = root mean square error.

Source: Author's calculations

**Table 6: WEO CPI Forecast Errors:
Ranked by Descending Degree of Forecast Accuracy**

Rank	Economy	Estimates		Forecasts		Average	
		MAE	RMSE	MAE	RMSE	CPI	CoV
1	Korea, Republic of	0.74	1.07	1.57	1.71	3.61	0.25
2	Taipei, China	0.82	1.08	1.42	1.79	1.25	1.44
3	Vanuatu	1.38	1.47	1.99	2.03	3.19	0.58
4	Malaysia	1.40	1.72	2.12	2.36	2.73	0.76
5	Uzbekistan	2.04	2.59	2.11	2.44	12.29	0.16
6	Hong Kong, China	1.18	1.59	2.46	2.56	3.13	0.67
7	Thailand	1.46	2.22	2.49	2.74	2.91	0.93
8	Bangladesh	1.07	1.27	2.51	2.75	8.23	0.21
9	India	2.27	2.59	2.57	2.77	8.81	0.17
10	Bhutan	1.82	1.97	2.52	2.78	6.94	0.20
11	Nepal	2.54	4.34	2.47	3.10	9.74	0.23
12	Philippines	1.64	2.38	2.47	3.20	5.22	0.39
13	Indonesia	1.19	1.63	2.94	3.34	6.28	0.38
14	Fiji	1.56	1.97	2.81	3.50	6.41	0.35
15	Lao PDR	1.72	1.97	2.76	3.53	5.30	0.68
16	Singapore	1.83	2.32	3.50	3.72	3.81	0.70
17	PRC	1.29	1.55	3.63	3.94	3.48	0.86
18	Armenia	1.99	2.56	3.67	4.12	6.97	0.35
19	PNG	3.33	4.27	3.61	4.25	8.02	0.26
20	Tonga	1.80	1.97	2.73	4.57	5.85	0.31
21	Timor-Leste	3.78	4.50	4.86	5.51	7.04	0.76
22	Pakistan	3.83	5.73	5.74	6.42	13.60	0.30
23	Kazakhstan	2.11	2.87	7.17	8.02	9.94	0.48
24	Turkmenistan	3.72	5.55	6.37	8.47	5.39	1.31
25	Sri Lanka	5.71	8.70	6.39	8.58	4.30	0.63
26	Solomon Islands	4.46	5.69	6.02	8.83	8.20	0.83
27	Tajikistan	3.84	4.52	9.87	10.44	11.46	0.57
28	Viet Nam	5.49	7.38	10.51	11.38	14.43	0.53
29	Azerbaijan	3.72	4.04	10.11	11.60	8.99	0.92
30	Mongolia	4.96	7.84	9.51	12.69	13.22	0.72
31	Cambodia	4.80	8.07	10.26	12.75	8.45	1.34
32	Kyrgyz Republic	6.00	7.54	14.84	15.36	13.93	0.60
33	Afghanistan	7.39	9.19	16.18	18.81	8.13	1.84
Average		2.81	4.49	5.16	7.48	7.31	0.80

CoV = coefficient of variance, CPI = consumer price index, Lao PDR = Lao People's Democratic Republic, MAE = mean average error, PNG = Papua New Guinea, PRC = People's Republic of China, RMSE = root mean square error, WEO = World Economic Outlook.

Source: Author's calculations

**Table 7: ADOU CPI Forecast Errors:
Ranked by Descending Degree of Forecast Accuracy**

Rank	Economy	Estimates		Forecasts		Average	
		MAE	RMSE	MAE	RMSE	CPI	CoV
1	Korea, Republic of	0.13	0.17	1.09	1.25	3.61	0.25
2	Bhutan	0.99	1.41	1.81	1.85	6.94	0.20
3	Vanuatu	1.46	1.88	1.71	2.08	3.19	0.58
4	Taipei, China	0.28	0.34	1.67	2.14	1.25	1.44
5	Malaysia	0.36	0.42	1.90	2.18	2.73	0.76
6	Bangladesh	0.71	0.74	2.20	2.29	8.23	0.21
7	Tonga	1.47	1.78	2.10	2.34	5.85	0.31
8	Indonesia	0.27	0.30	1.95	2.42	6.28	0.38
9	Pakistan	0.82	1.05	1.62	2.51	13.60	0.30
10	Hong Kong, China	0.30	0.39	2.18	2.53	3.13	0.67
11	Philippines	0.52	0.62	1.88	2.57	5.22	0.39
12	Uzbekistan	1.73	1.97	2.96	3.07	12.29	0.16
13	Nepal	0.21	0.25	2.26	3.21	9.74	0.23
14	Singapore	0.55	0.60	3.06	3.51	3.81	0.70
15	PRC	0.54	0.74	2.83	3.54	3.48	0.86
16	Thailand	0.45	0.72	2.86	3.61	2.91	0.93
17	Armenia	0.96	1.39	3.38	3.61	6.97	0.35
18	Fiji	1.09	1.56	3.21	3.67	6.41	0.35
19	PNG	1.78	2.23	2.65	4.04	8.02	0.26
20	India	2.34	2.89	3.39	4.13	8.81	0.17
21	Kazakhstan	0.77	1.10	3.66	4.79	9.94	0.48
22	Solomon Islands	3.25	3.84	4.42	5.80	8.20	0.83
23	Lao PDR	0.92	1.25	4.20	6.09	5.30	0.68
24	Tajikistan	2.25	3.00	5.29	6.31	11.46	0.57
25	Timor-Leste	1.69	2.01	6.09	6.59	7.04	0.76
26	Sri Lanka	3.96	6.97	5.30	7.01	4.30	0.63
27	Turkmenistan	5.01	7.16	5.76	7.04	5.39	1.31
28	Azerbaijan	1.94	2.51	6.86	8.96	8.99	0.92
29	Mongolia	5.82	8.10	6.65	10.14	13.22	0.72
30	Viet Nam	0.66	0.99	8.93	10.57	14.43	0.53
31	Kyrgyz Republic	2.46	3.47	7.93	10.62	13.93	0.60
32	Cambodia	1.00	1.70	9.68	13.32	8.45	1.34
33	Afghanistan	3.87	4.62	12.32	14.90	8.13	1.84
Average		1.53	2.88	4.05	6.17	7.31	0.80

ADOU = Asian Development Outlook Update, CoV = coefficient of variance, CPI = consumer price index, MAE = mean average error, Lao PDR = People's Democratic Republic, PNG = Papua New Guinea, PRC = People's Republic of China, RMSE = root mean square error.

Source: Author's calculations

**Table 8: WEOU CPI Forecast Errors:
Ranked by Descending Degree of Forecast Accuracy**

Rank	Economy	Estimates		Forecasts		Average	
		MAE	RMSE	MAE	RMSE	CPI	CoV
1	Korea, Republic of	0.75	1.09	1.59	1.69	3.61	0.25
2	Vanuatu	1.34	1.44	1.69	1.76	3.19	0.58
3	India	1.80	2.01	2.26	2.54	8.81	0.17
4	Hong Kong, China	1.16	1.70	2.40	2.65	3.13	0.67
5	Uzbekistan	1.97	2.66	2.69	2.77	12.29	0.16
6	Bangladesh	0.83	0.95	2.50	2.92	8.23	0.21
7	Bhutan	1.61	1.75	2.84	2.96	6.94	0.20
8	Nepal	0.55	0.67	2.79	3.00	9.74	0.23
9	Taipei, China	1.12	1.37	2.42	3.01	1.25	1.44
10	Fiji	1.69	2.18	3.44	3.56	6.41	0.35
11	Malaysia	1.22	1.70	3.30	3.64	2.73	0.76
12	Armenia	1.22	2.10	3.38	3.83	6.97	0.35
13	Indonesia	1.11	1.74	3.35	3.87	6.28	0.38
14	Thailand	1.45	2.00	3.31	3.91	2.91	0.93
15	PNG	3.48	4.75	3.25	3.93	8.02	0.26
16	PRC	1.00	1.22	3.60	4.14	3.48	0.86
17	Pakistan	3.28	4.56	3.42	4.33	13.60	0.30
18	Singapore	1.67	2.34	4.34	4.49	3.81	0.70
19	Philippines	1.44	2.49	4.08	4.57	5.22	0.39
20	Lao PDR	1.76	2.09	3.75	4.65	5.30	0.68
21	Timor-Leste	3.79	4.62	4.69	5.50	7.04	0.76
22	Tonga	1.77	1.95	6.10	7.20	5.85	0.31
23	Kazakhstan	2.11	3.02	7.84	8.61	9.94	0.48
24	Turkmenistan	3.19	4.62	7.94	9.72	5.39	1.31
25	Solomon Islands	4.01	5.46	8.88	10.37	8.20	0.83
26	Tajikistan	4.27	4.85	10.31	11.20	11.46	0.57
27	Azerbaijan	2.08	2.70	10.41	13.05	8.99	0.92
28	Sri Lanka	5.36	7.97	12.15	14.08	4.30	0.63
29	Viet Nam	6.04	8.08	14.30	14.50	14.43	0.53
30	Kyrgyz Republic	5.88	7.76	15.70	15.95	13.93	0.60
31	Mongolia	4.74	8.34	14.10	16.19	13.22	0.72
32	Cambodia	5.32	8.85	15.40	17.71	8.45	1.34
33	Afghanistan	9.11	10.72	19.92	22.21	8.13	1.84
Average		2.67	4.51	6.31	8.93	7.31	0.80

CoV = coefficient of variance, CPI = consumer price index, Lao PDR = Lao People's Democratic Republic, MAE = mean average error, PNG = Papua New Guinea, PRC = People's Republic of China, RMSE = root mean square error, WEOU = World Economic Outlook Update.

Source: Author's calculations

APPENDIX 5: TABULATIONS OF FORECAST SCORES BY ECONOMIES AND YEARS

Table 9: ADO(U) vs. WEO(U) GDP Forecasts Scores by Economies

	Estimates		Forecasts	
	ADO	ADOU	ADO	ADOU
Afghanistan	50.0	75.0	50.0	25.0
Armenia	0.0	50.0	25.0	50.0
Azerbaijan	0.0	0.0	50.0	50.0
Bangladesh	100.0	100.0	-50.0	-25.0
Bhutan	0.0	50.0	-50.0	-50.0
Cambodia	50.0	100.0	-50.0	-50.0
PRC	0.0	0.0	-50.0	0.0
Fiji	100.0	100.0	25.0	0.0
Hong Kong, China	100.0	50.0	-50.0	-50.0
India	0.0	0.0	-100.0	-50.0
Indonesia	50.0	50.0	-75.0	0.0
Kazakhstan	0.0	-50.0	-50.0	-50.0
Korea, Republic of	25.0	50.0	0.0	-50.0
Kyrgyz Republic	-50.0	-25.0	0.0	75.0
Lao PDR	-25.0	0.0	0.0	-75.0
Malaysia	100.0	100.0	-50.0	-50.0
Mongolia	100.0	100.0	-25.0	50.0
Nepal	50.0	50.0	-50.0	-25.0
PNG	50.0	0.0	-50.0	0.0
Pakistan	75.0	100.0	0.0	25.0
Philippines	50.0	50.0	-50.0	-75.0
Singapore	50.0	50.0	0.0	50.0
Solomon Islands	50.0	100.0	0.0	-100.0
Sri Lanka	50.0	25.0	75.0	50.0
Taipei, China	0.0	50.0	0.0	0.0
Tajikistan	25.0	-50.0	-75.0	-25.0
Thailand	0.0	0.0	50.0	-50.0
Timor-Leste	0.0	50.0	0.0	0.0
Tonga	0.0	0.0	-50.0	-50.0
Turkmenistan	-50.0	-50.0	-100.0	25.0
Uzbekistan	0.0	0.0	-50.0	0.0
Vanuatu	-25.0	-100.0	50.0	50.0
Viet Nam	100.0	50.0	-50.0	-50.0
Average	31.1	32.6	-21.2	-11.4

ADO = Asian Development Outlook, ADOU = Asian Development Outlook Update, CoV = coefficient of variance, GDP = gross domestic product, Lao PDR = Lao People's Democratic Republic, MAE = mean average error, PNG = Papua New Guinea, PRC = People's Republic of China, RMSE = root mean square error, WEO = World Economic Outlook, WEOU = World Economic Outlook Update.

Note: Comparative scores of ADO and WEO or ADOU vs. WEOU forecast errors.

Source: Author's calculations

Table 10: ADO(U) vs. WEO(U) CPI Forecast Scores by Economies

	Estimates		Forecasts	
	ADO	ADOU	ADO	ADOU
Afghanistan	0.0	50.0	50.0	25.0
Armenia	0.0	0.0	0.0	-25.0
Azerbaijan	0.0	0.0	50.0	0.0
Bangladesh	0.0	0.0	50.0	50.0
Bhutan	0.0	50.0	-50.0	100.0
Cambodia	0.0	75.0	75.0	0.0
PRC	25.0	75.0	50.0	50.0
Fiji	-100.0	25.0	50.0	0.0
Hong Kong, China	50.0	50.0	75.0	0.0
India	-50.0	-50.0	-25.0	0.0
Indonesia	-50.0	50.0	50.0	0.0
Kazakhstan	0.0	100.0	50.0	50.0
Korea, Republic of	25.0	75.0	75.0	0.0
Kyrgyz Republic	0.0	50.0	100.0	50.0
Lao PDR	50.0	100.0	50.0	50.0
Malaysia	50.0	100.0	50.0	100.0
Mongolia	0.0	-50.0	100.0	50.0
Nepal	50.0	75.0	25.0	50.0
PNG	75.0	75.0	-50.0	0.0
Pakistan	0.0	75.0	0.0	0.0
Philippines	75.0	25.0	50.0	50.0
Singapore	100.0	50.0	50.0	0.0
Solomon	50.0	0.0	-50.0	50.0
Sri Lanka	50.0	-25.0	0.0	75.0
Taipei, China	25.0	25.0	-25.0	25.0
Tajikistan	0.0	0.0	50.0	50.0
Thailand	50.0	100.0	50.0	100.0
Timor-Leste	-50.0	50.0	0.0	-50.0
Tonga	-100.0	-50.0	-25.0	0.0
Turkmenistan	0.0	-50.0	0.0	75.0
Uzbekistan	0.0	50.0	-100.0	-50.0
Vanuatu	-50.0	0.0	-50.0	-50.0
Viet Nam	50.0	100.0	25.0	0.0
Total	9.8	36.4	22.7	25.0

ADO = Asian Development Outlook, ADOU = Asian Development Outlook Update, CoV = coefficient of variance, CPI = consumer price index, Lao PDR = Lao People's Democratic Republic, PNG = Papua New Guinea, PRC = People's Republic of China, WEO = World Economic Outlook, WEOU = World Economic Outlook Update.

Note: Comparative scores of ADO vs. WEO and ADOU vs. WEOU forecast errors.

Source: Author's calculations

Table 11: ADO(U) vs. WEO(U) Forecasts Scores by Years

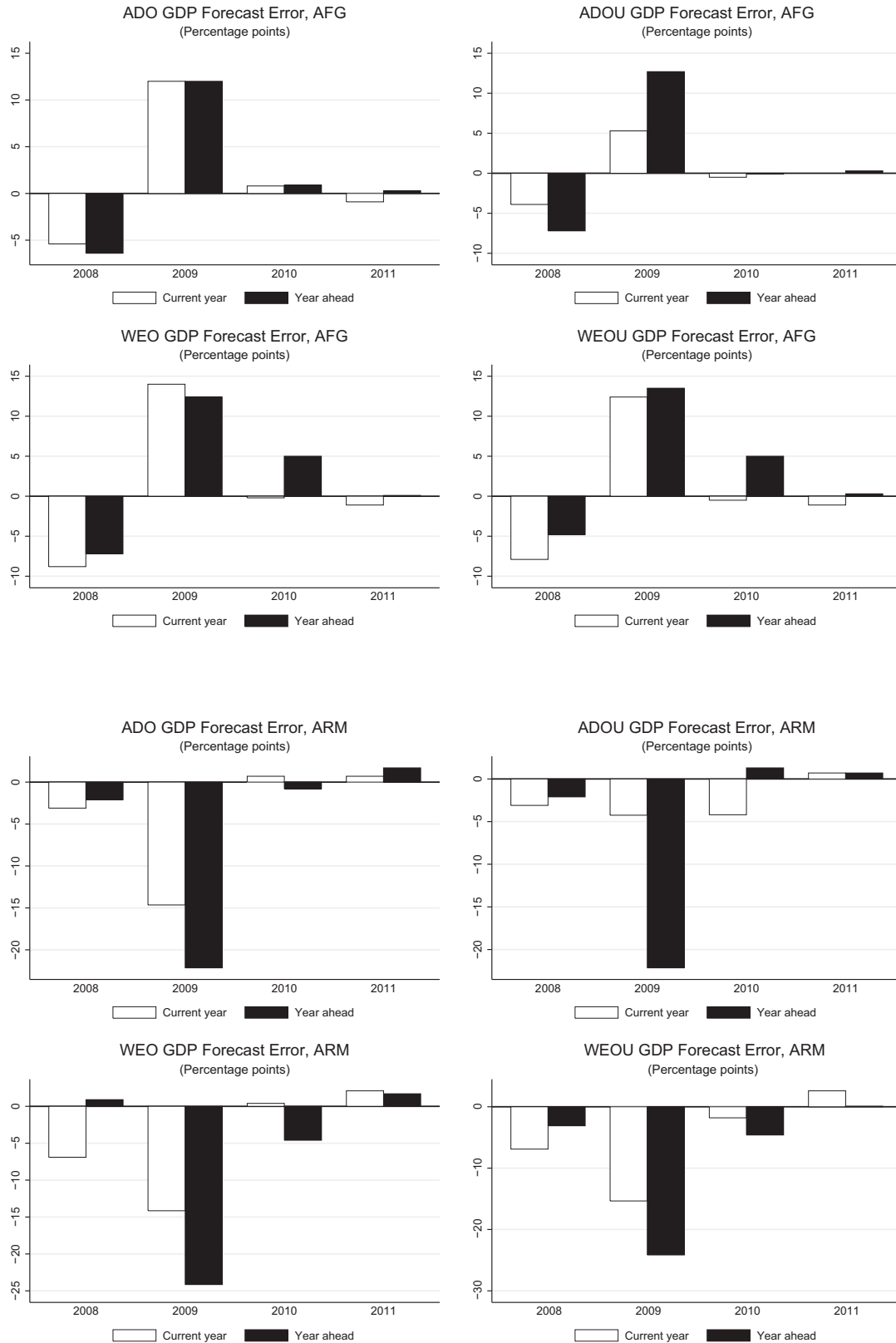
	GDP Growth				CPI Inflation			
	Estimates		Forecasts		Estimates		Forecasts	
	ADO	ADOU	ADO	ADOU	ADO	ADOU	ADO	ADOU
2008	57.6	51.5	-36.4	-33.3	39.4	54.5	-12.1	-21.2
2009	6.1	30.3	-21.2	12.1	-30.3	27.3	21.2	69.7
2010	-9.1	-15.2	-3.0	-6.1	-3.0	9.1	69.7	75.8
2011	69.7	63.6	-24.2	-18.2	33.3	54.5	12.1	-24.2
Average	31.1	32.6	-21.2	-11.4	9.8	36.4	22.7	25.0

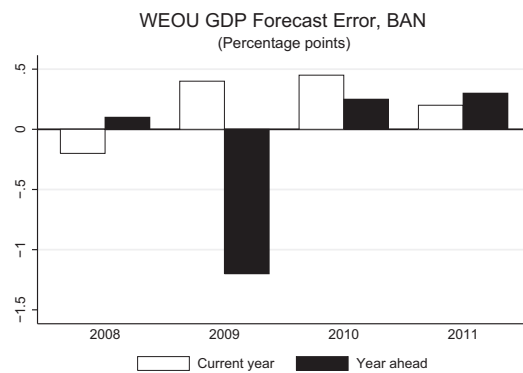
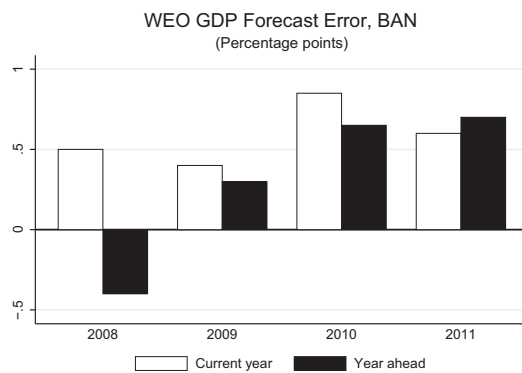
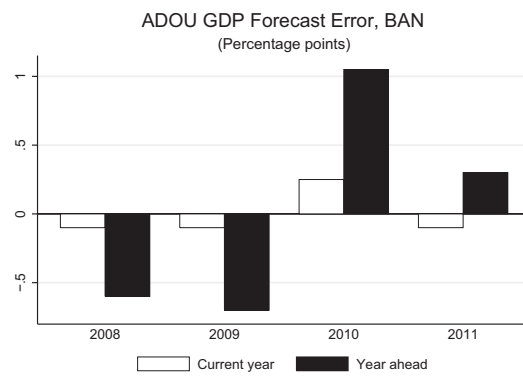
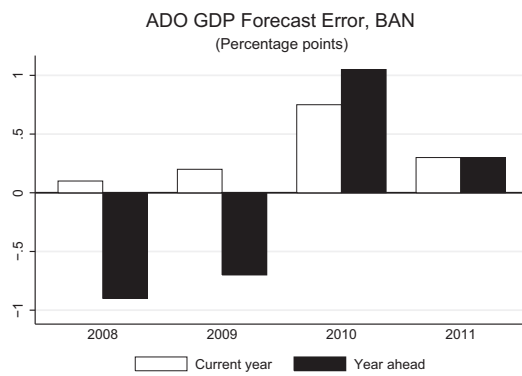
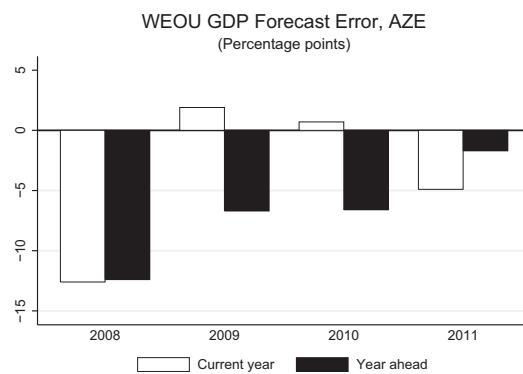
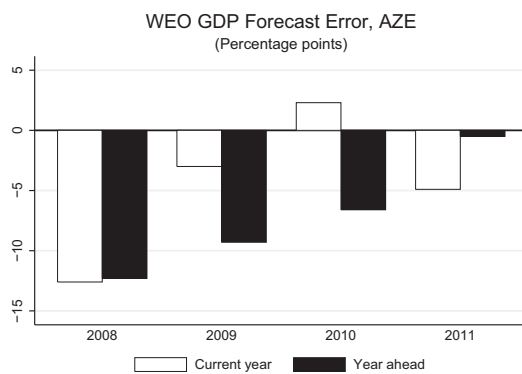
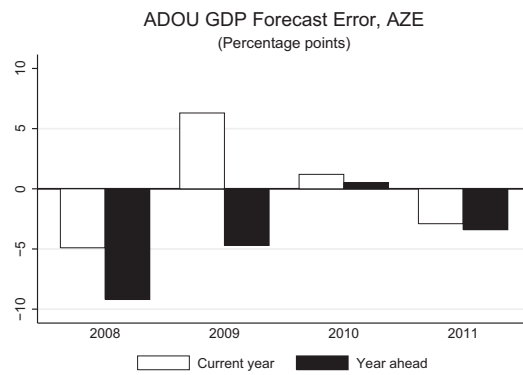
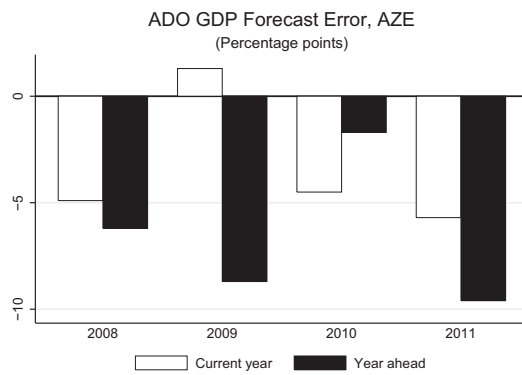
ADO = Asian Development Outlook, ADOU = Asian Development Outlook Update, CPI = consumer price index, GDP = gross domestic product, WEO = World Economic Outlook, WEOU = World Economic Outlook Update.

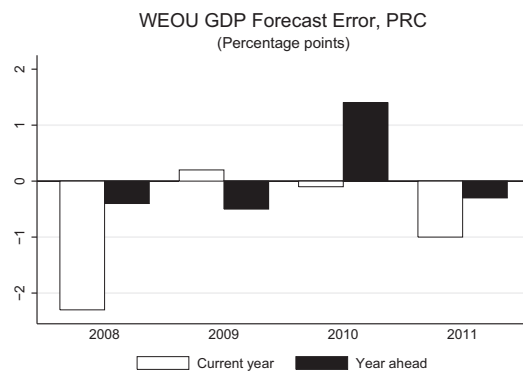
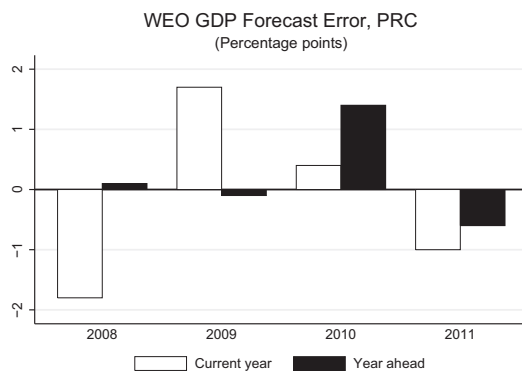
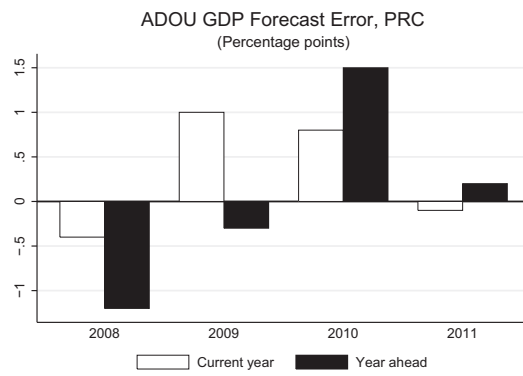
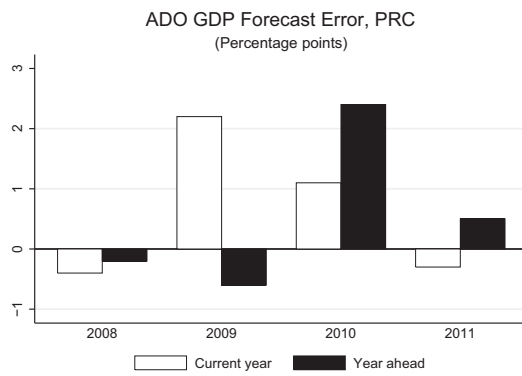
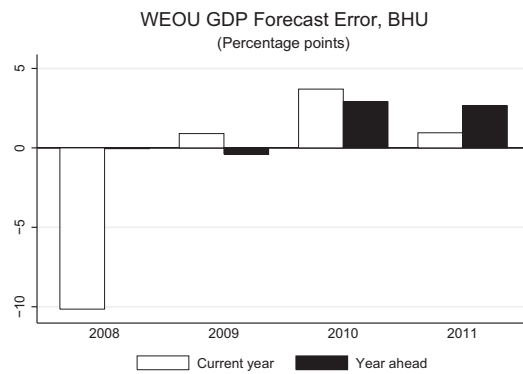
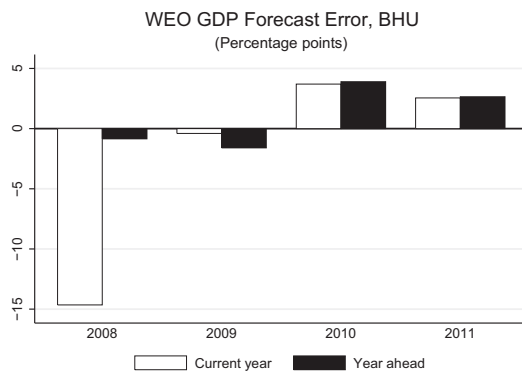
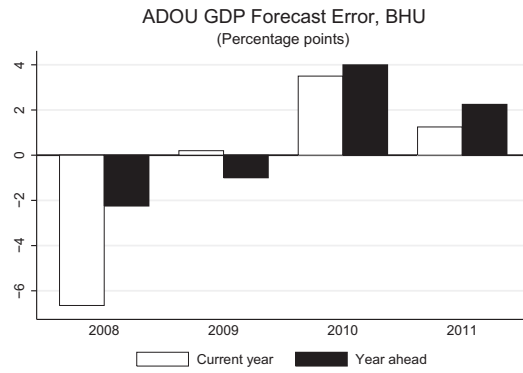
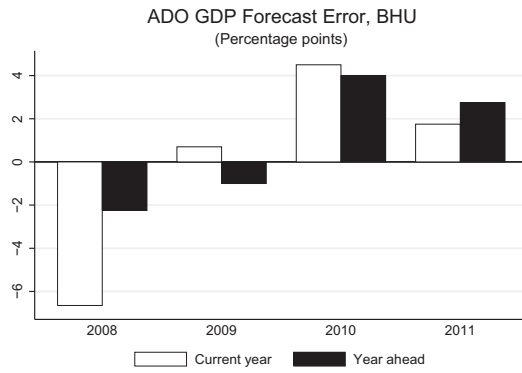
Note: Comparative scores of ADO vs. WEO and ADOU vs. WEOU forecast errors.

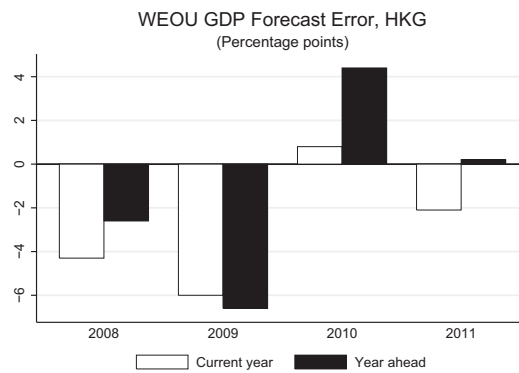
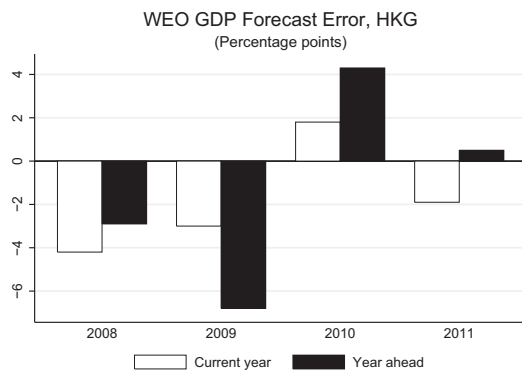
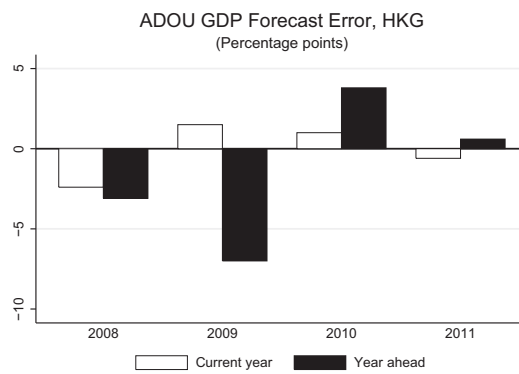
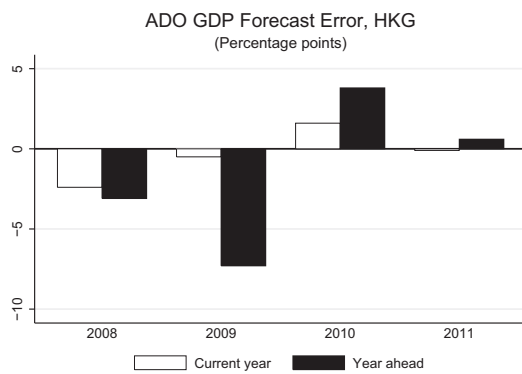
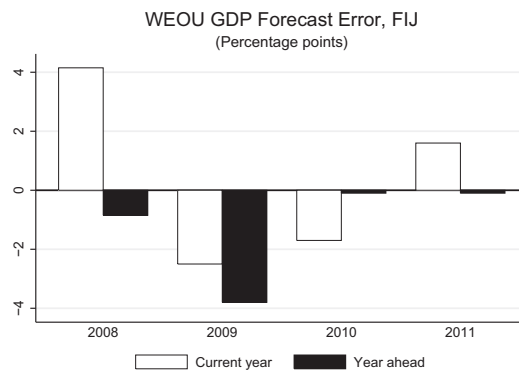
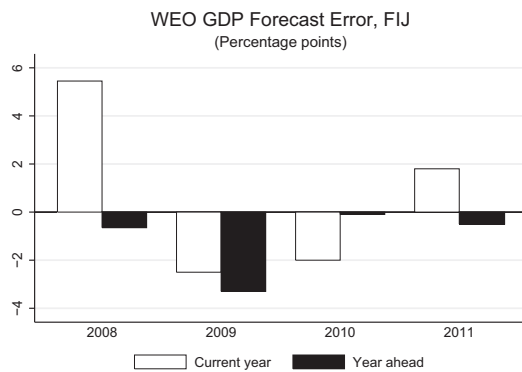
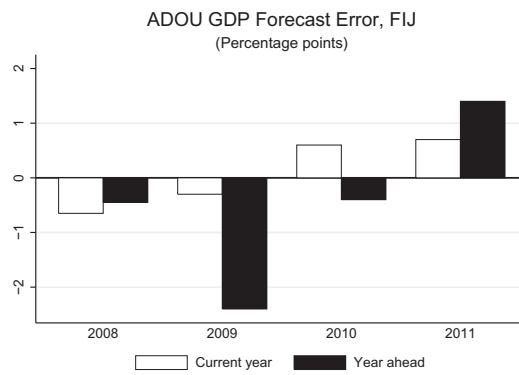
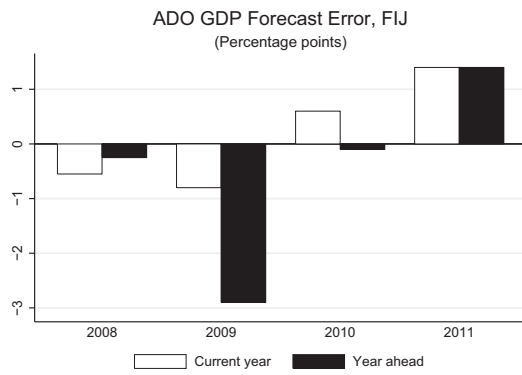
Source: Author's calculations

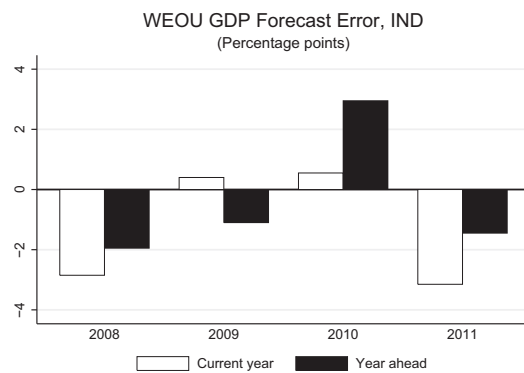
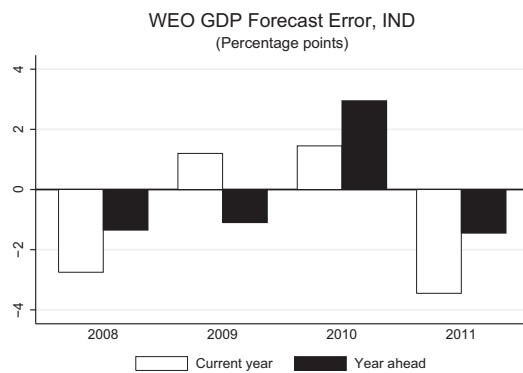
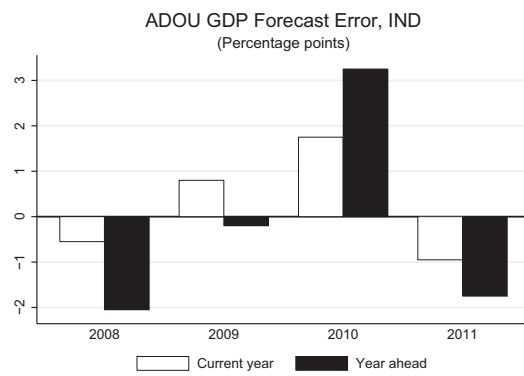
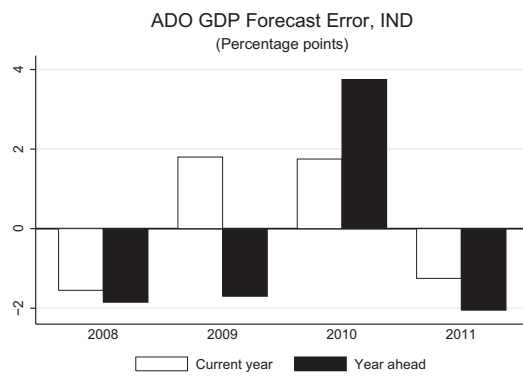
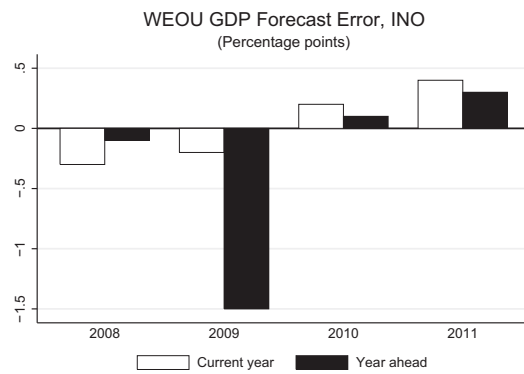
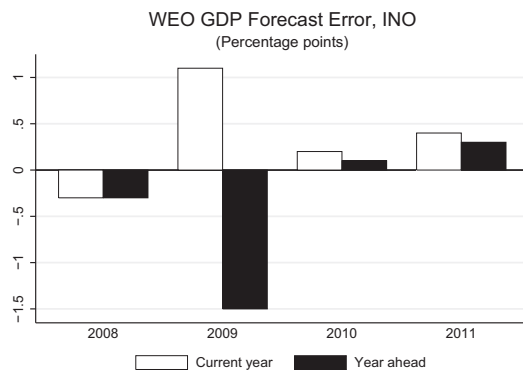
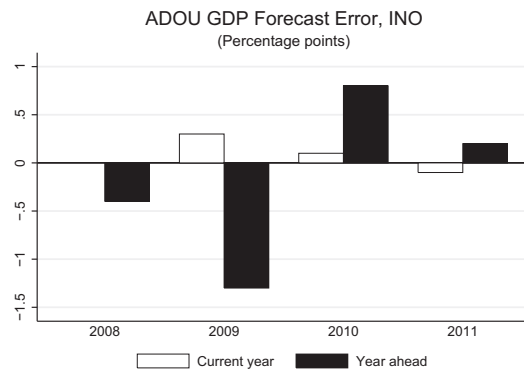
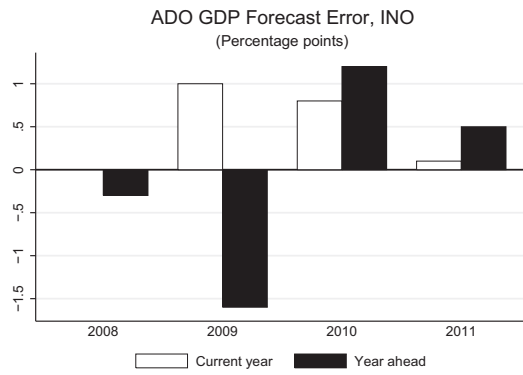
APPENDIX 6: GDP GROWTH FORECAST ERRORS BY REPORT, ECONOMY, YEAR

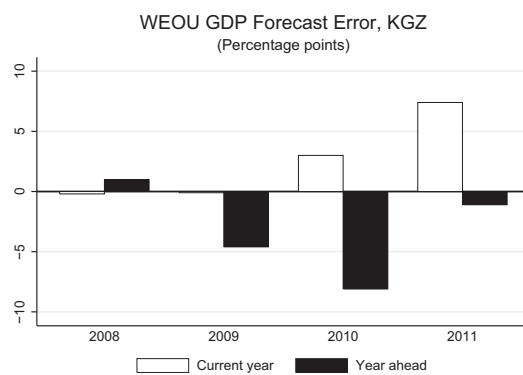
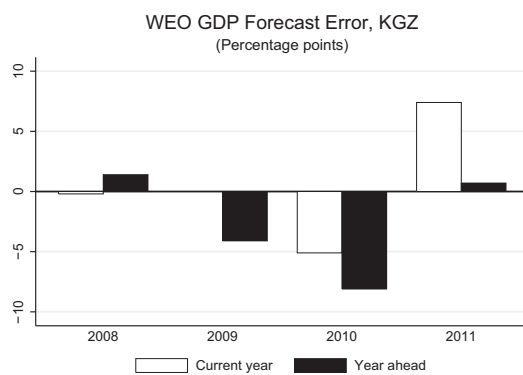
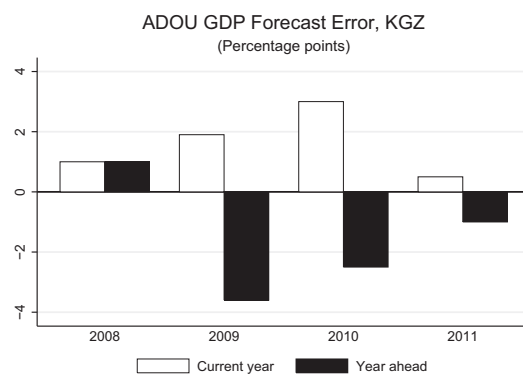
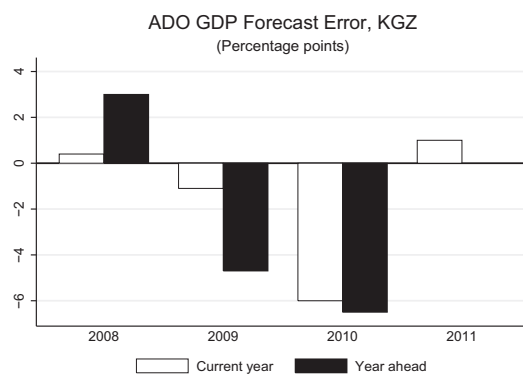
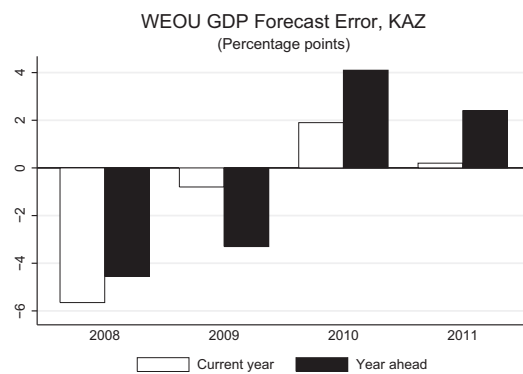
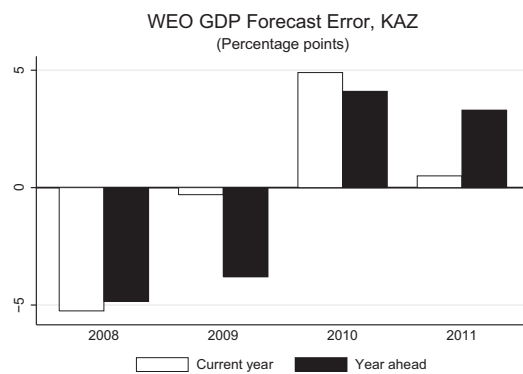
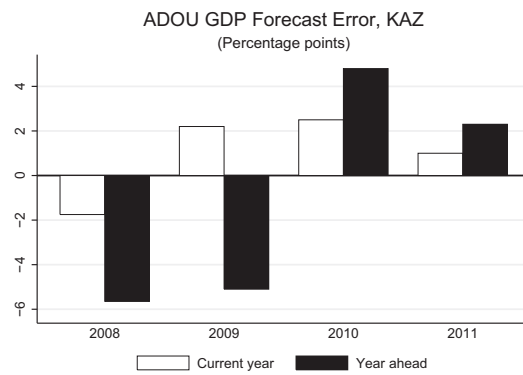
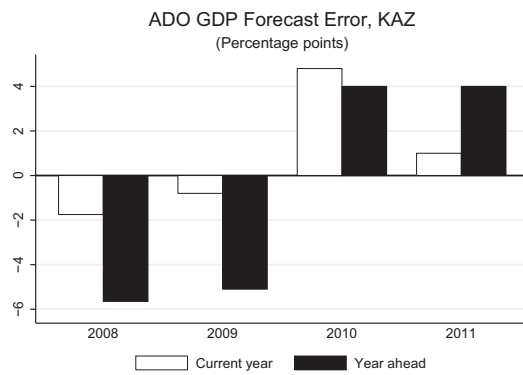


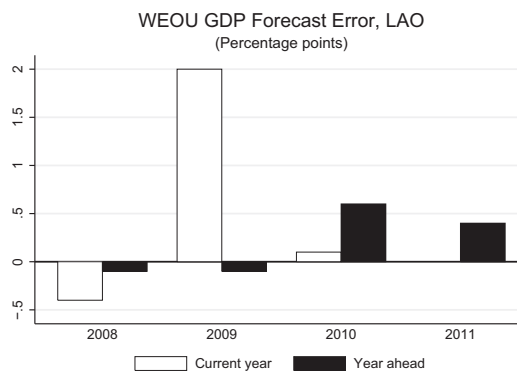
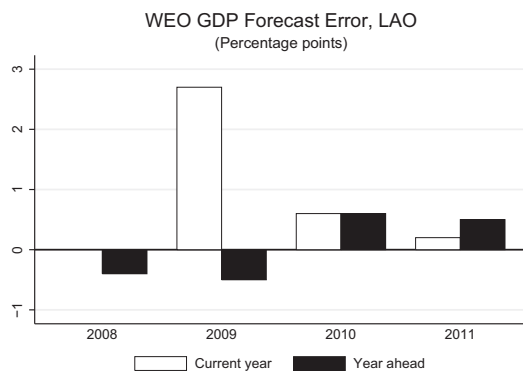
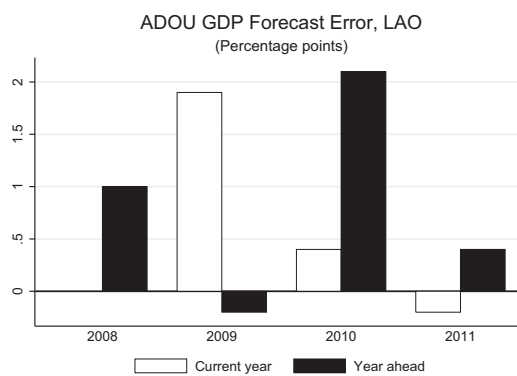
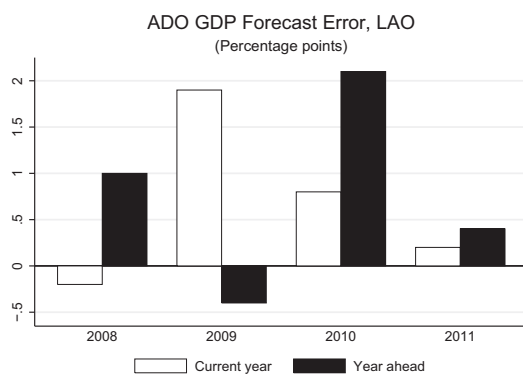
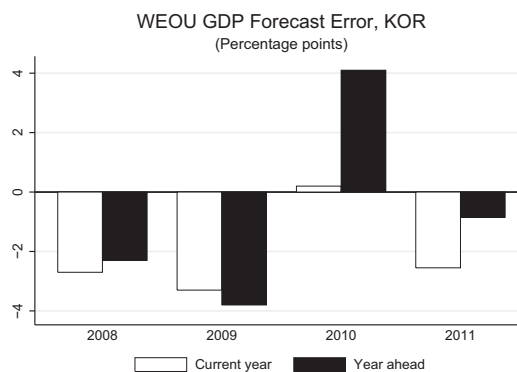
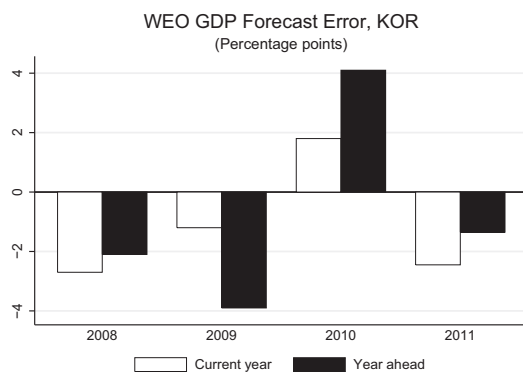
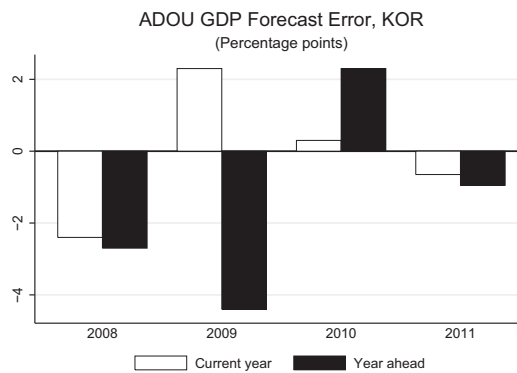
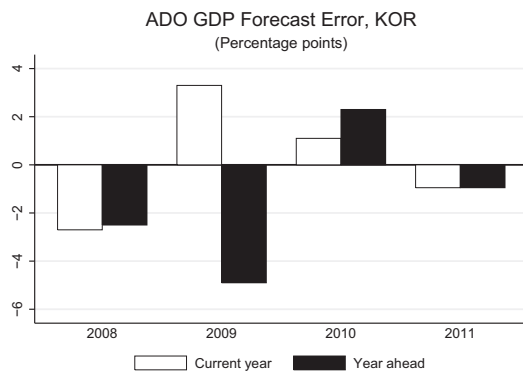


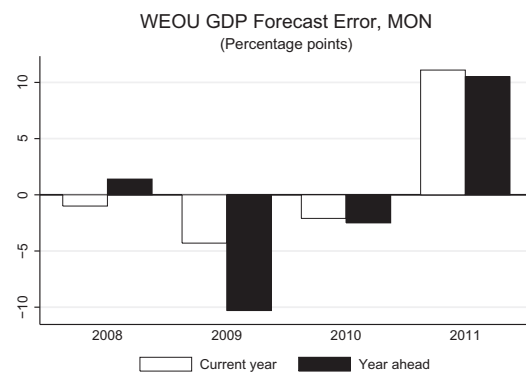
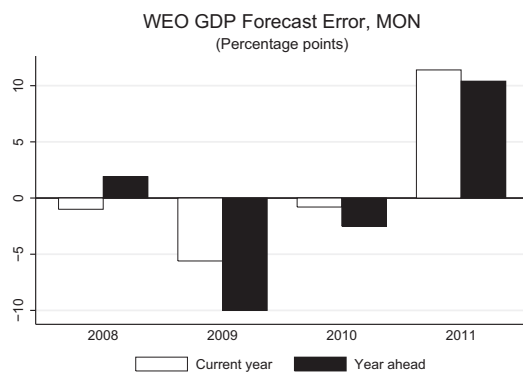
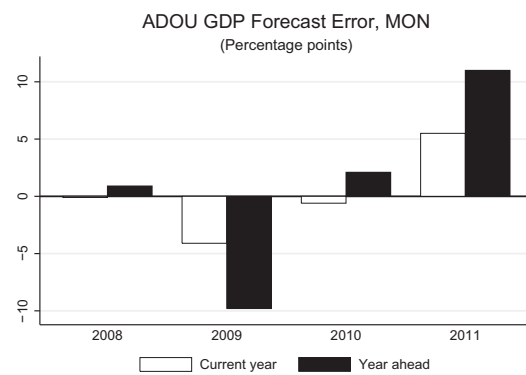
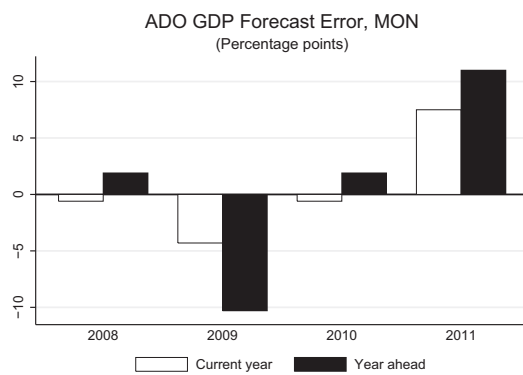
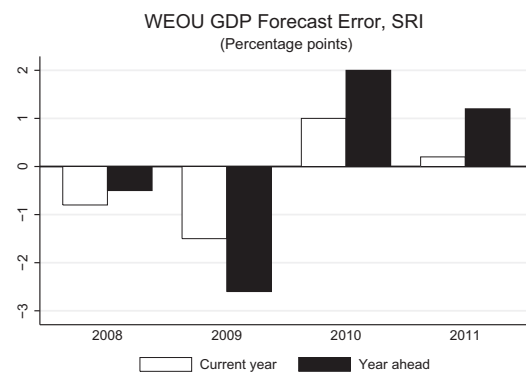
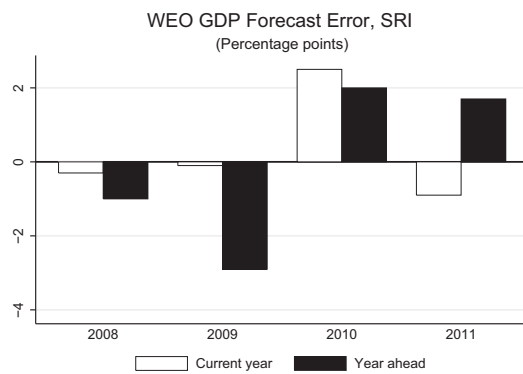
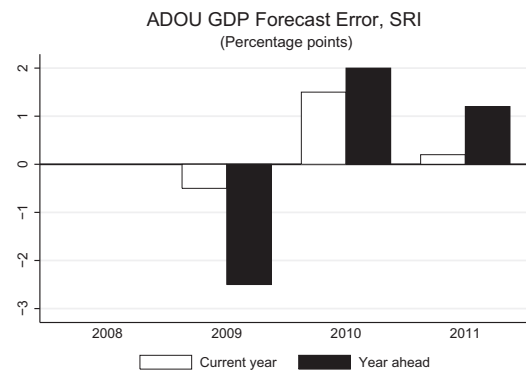
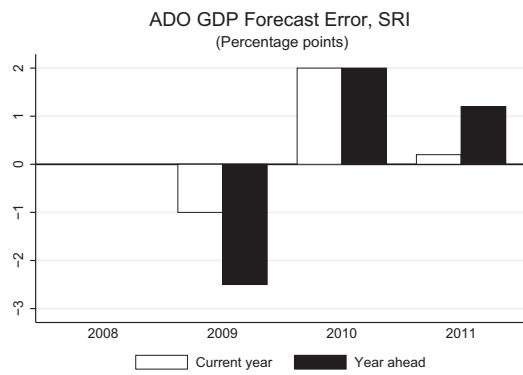


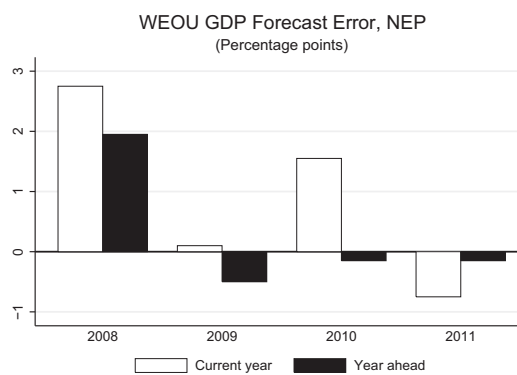
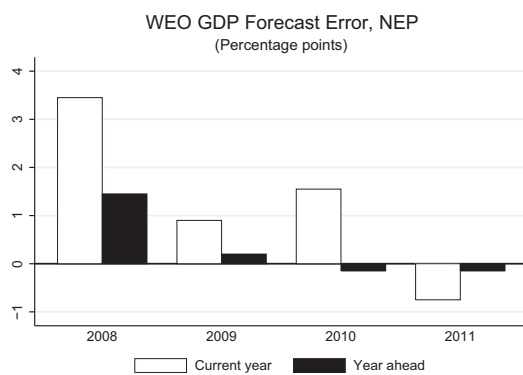
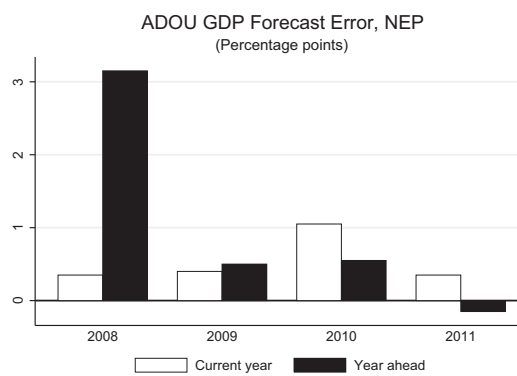
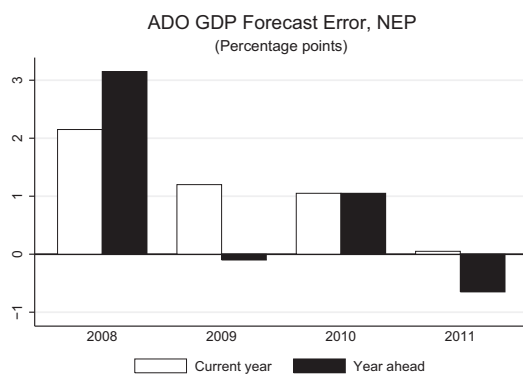
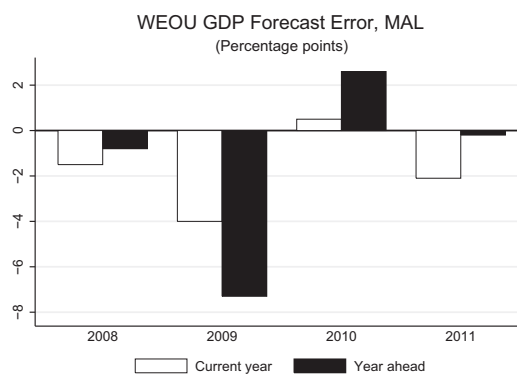
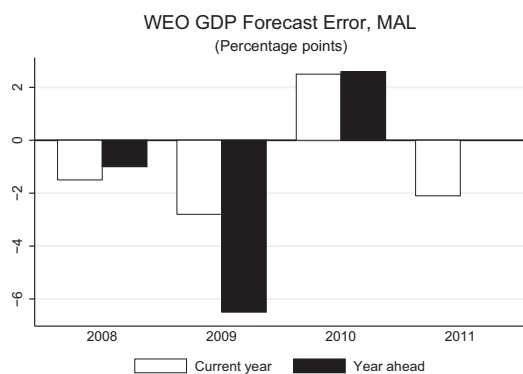
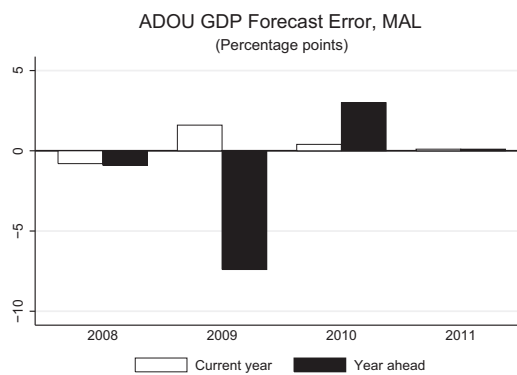
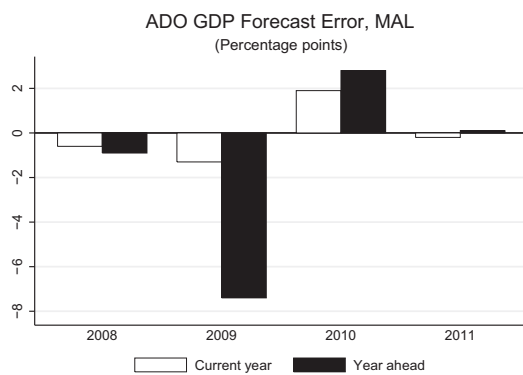


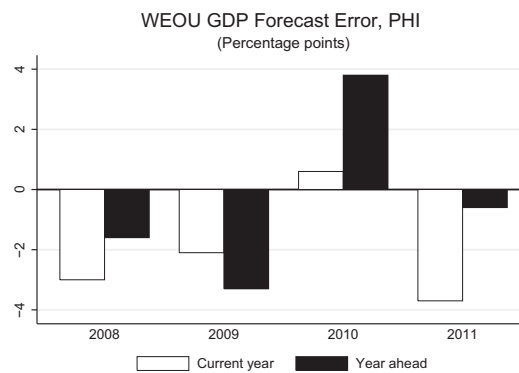
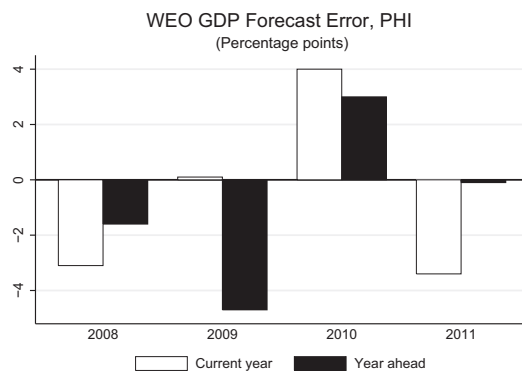
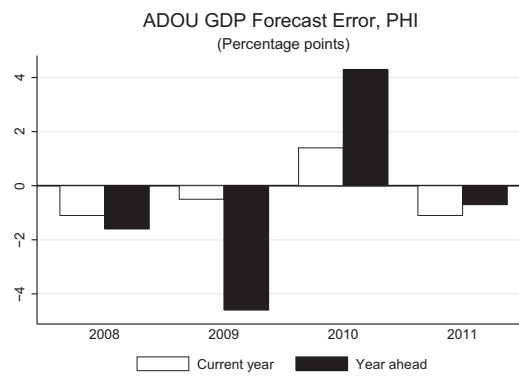
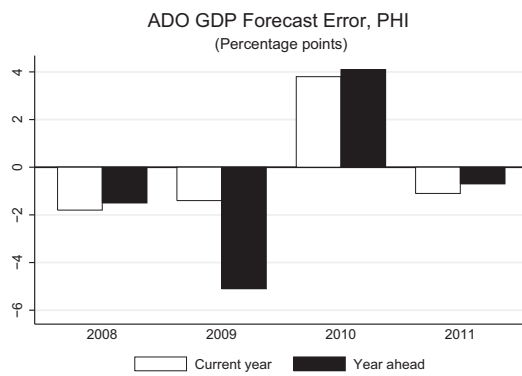
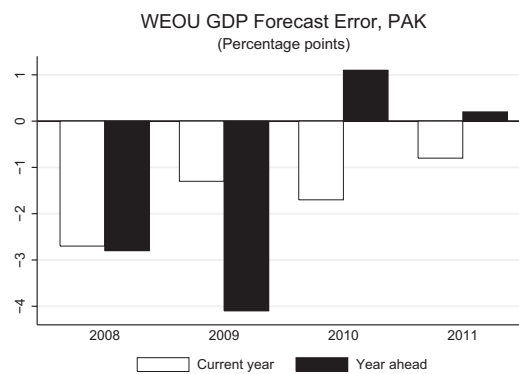
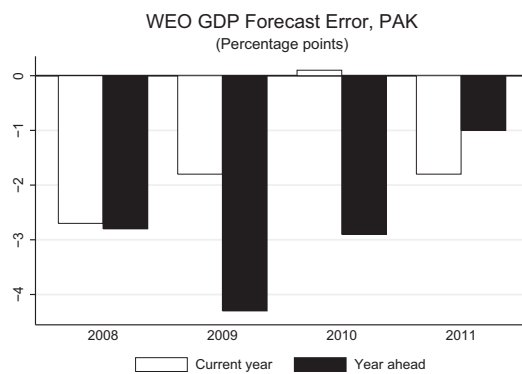
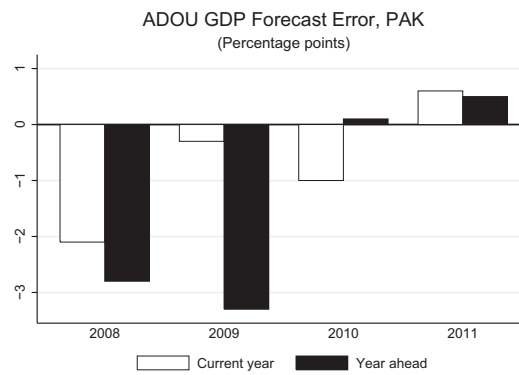
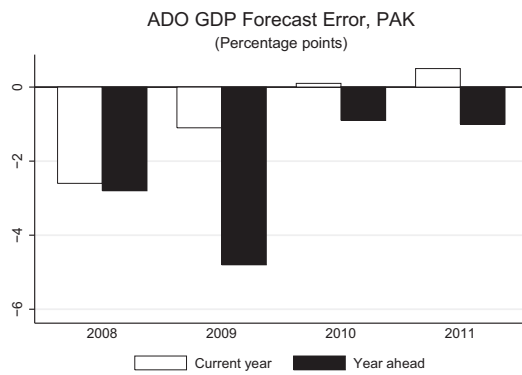


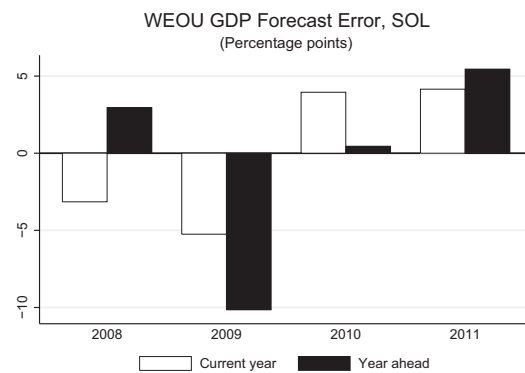
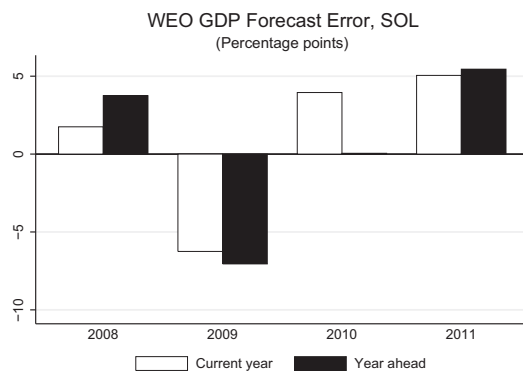
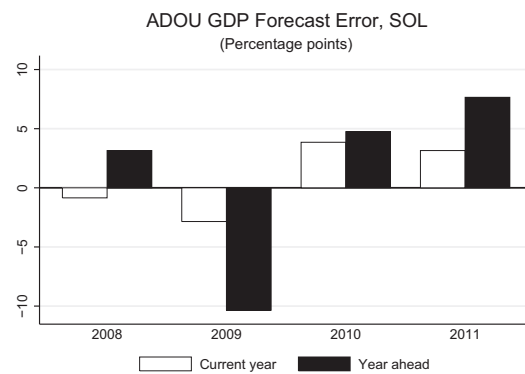
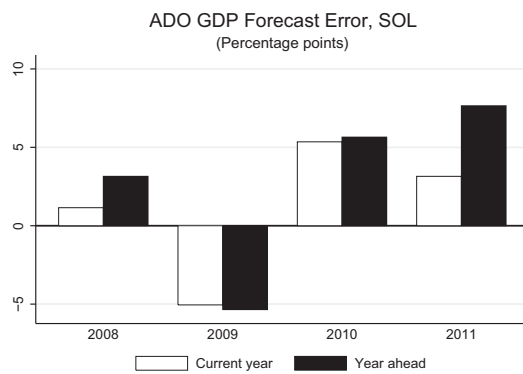
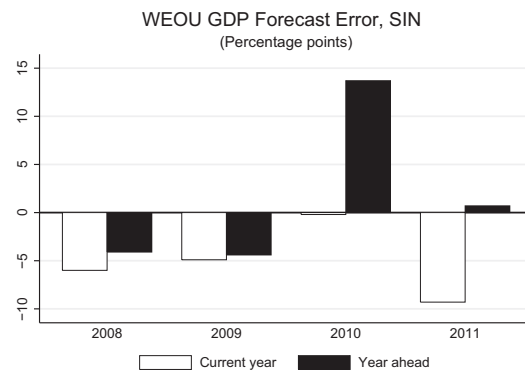
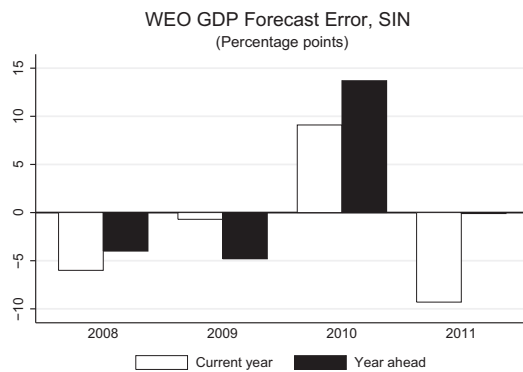
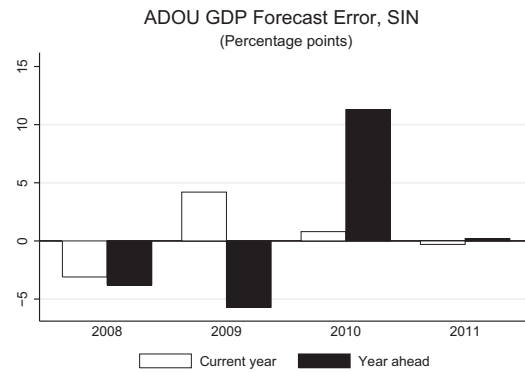
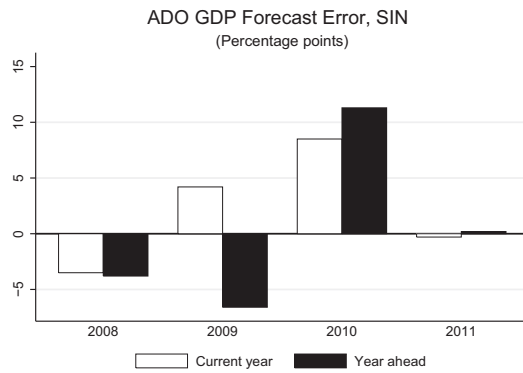


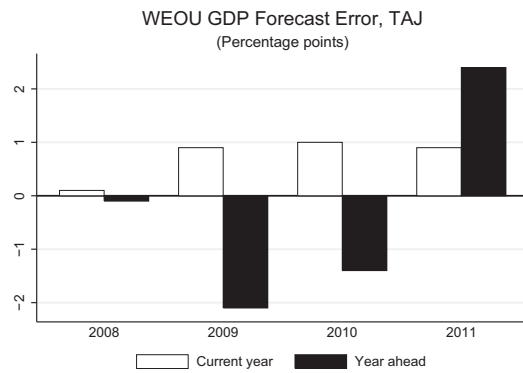
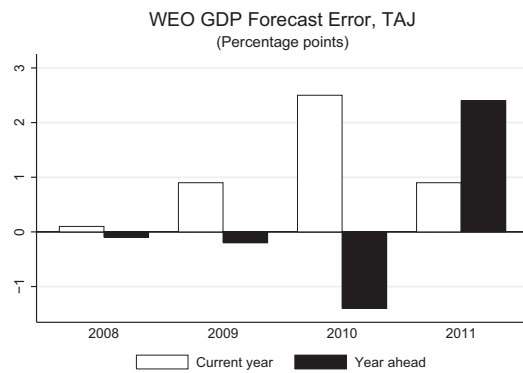
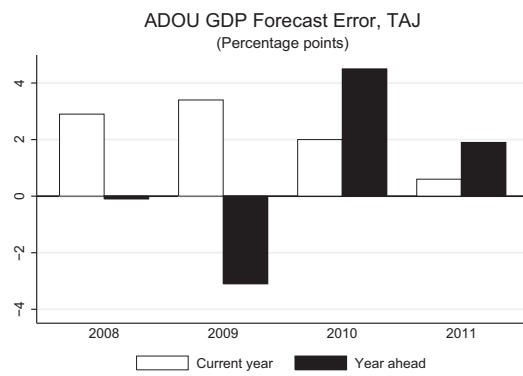
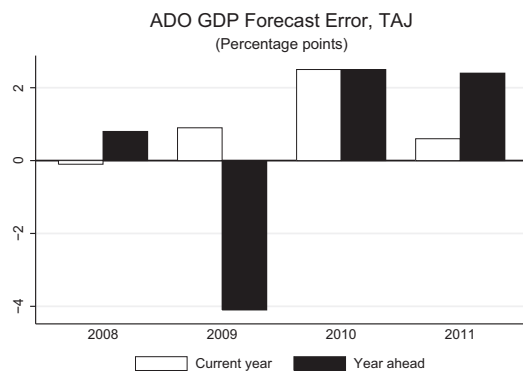
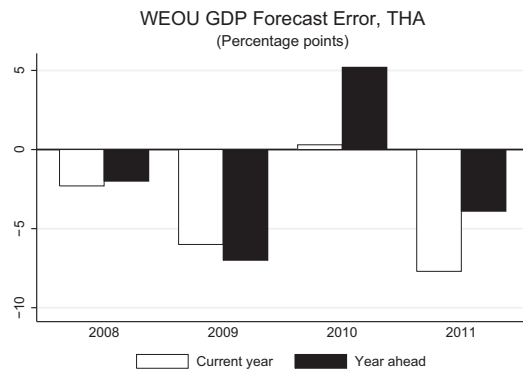
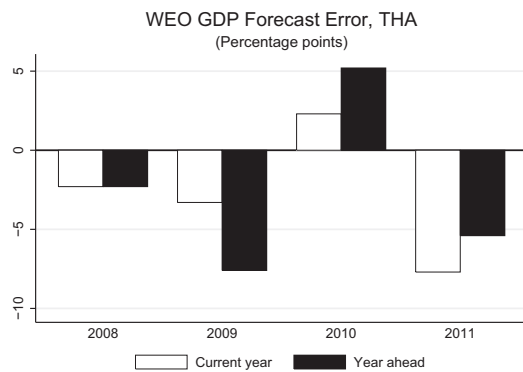
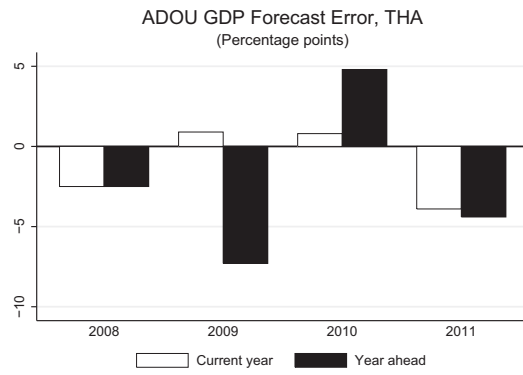
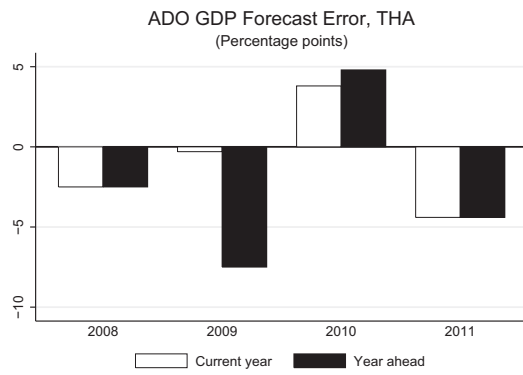


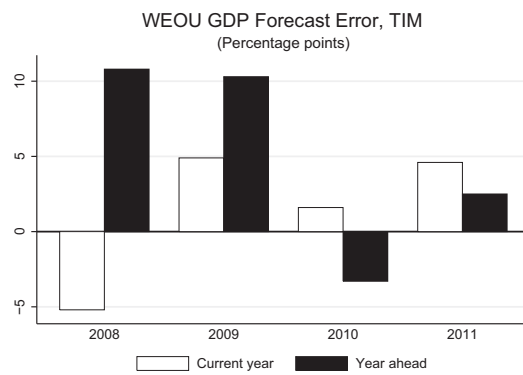
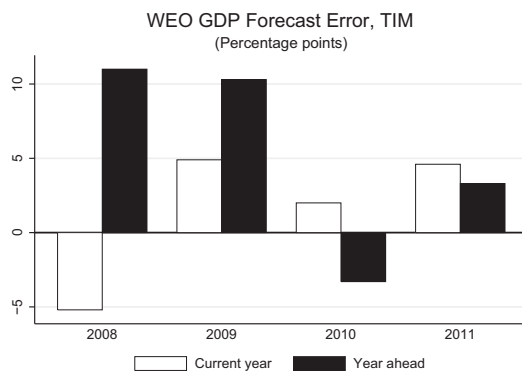
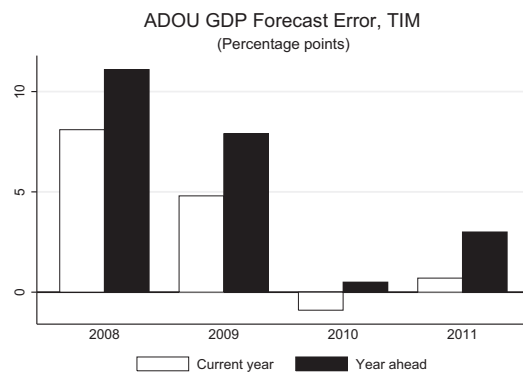
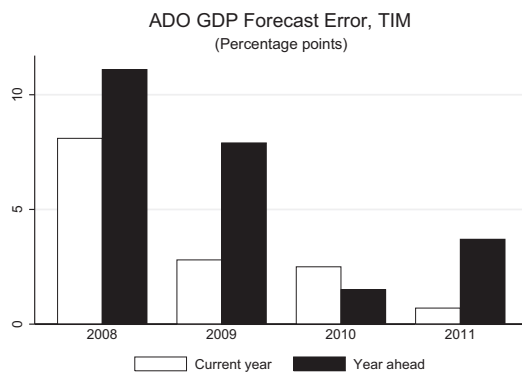
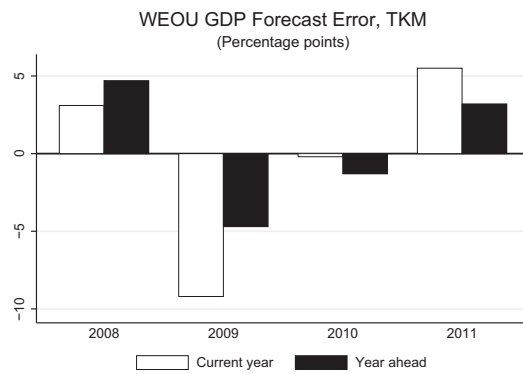
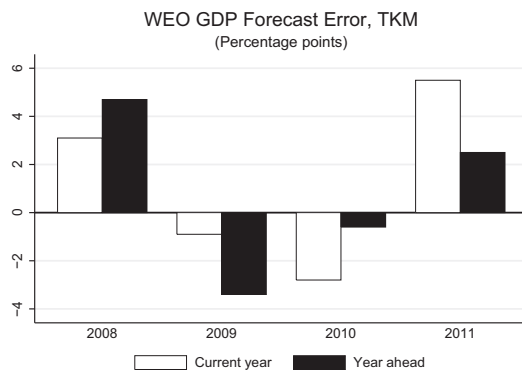
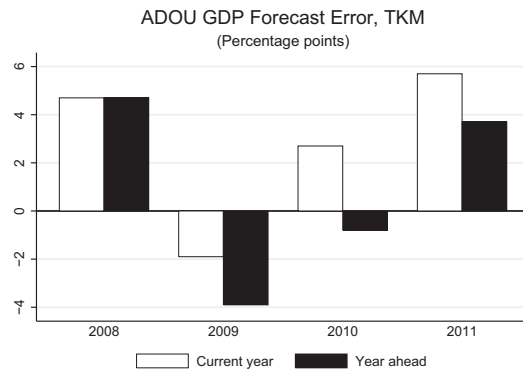
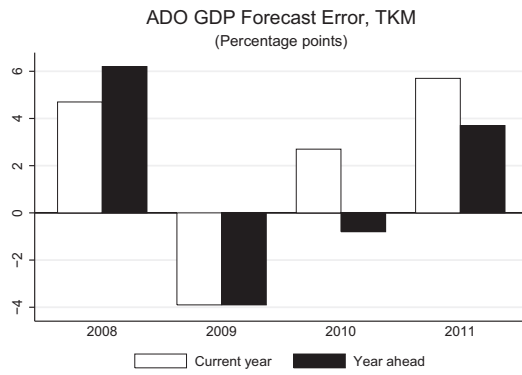


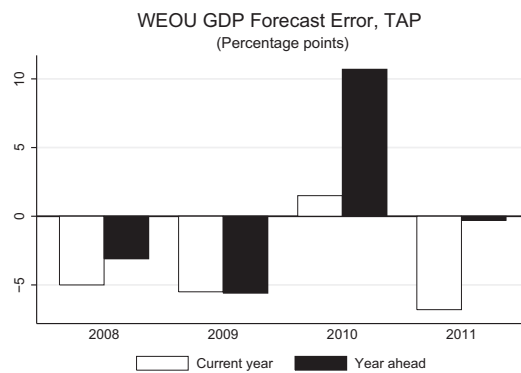
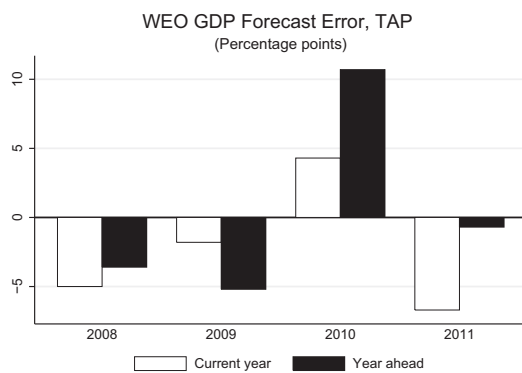
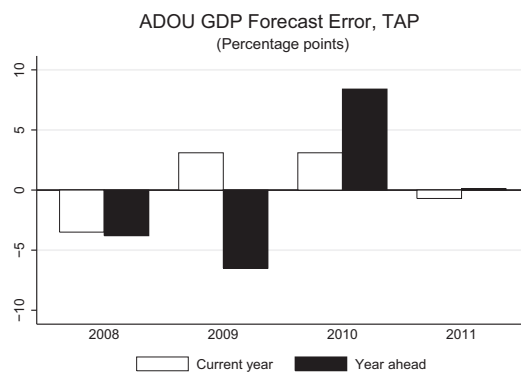
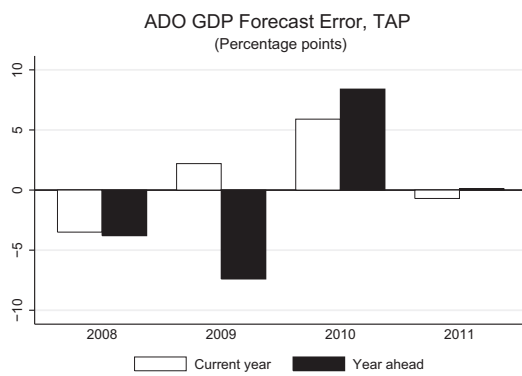
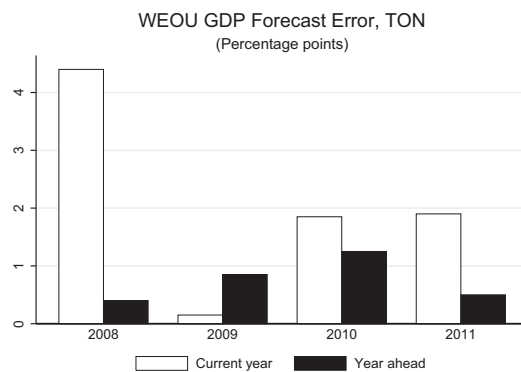
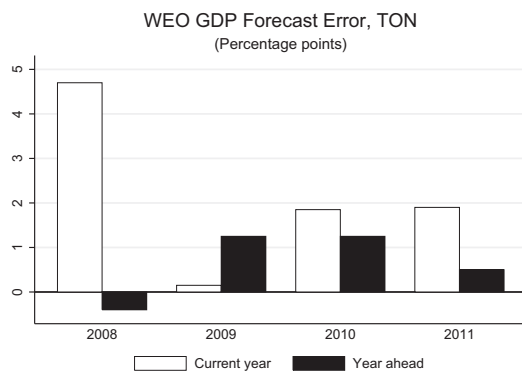
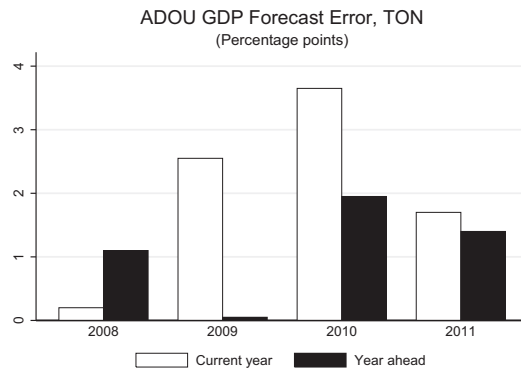
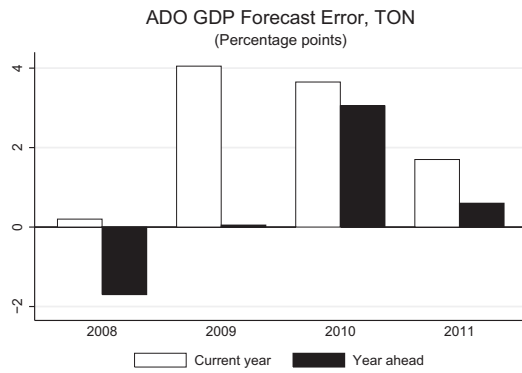


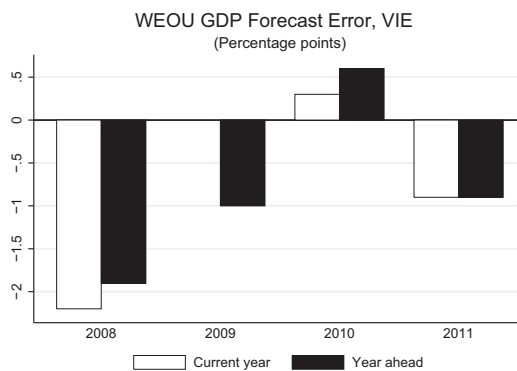
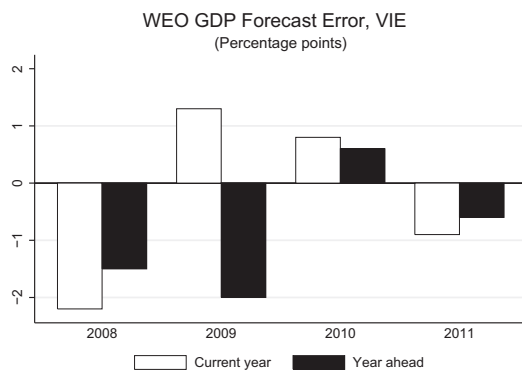
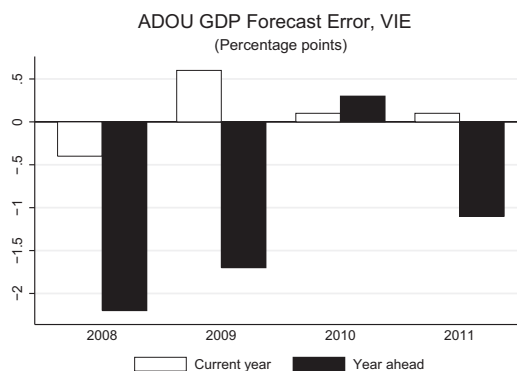
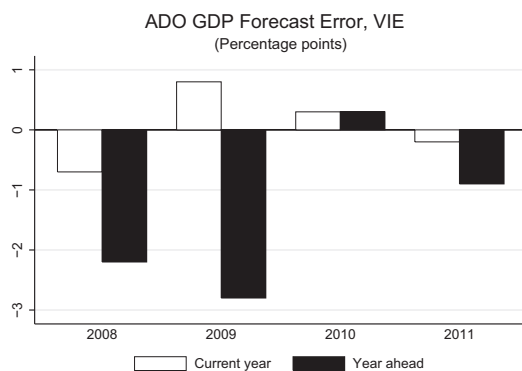
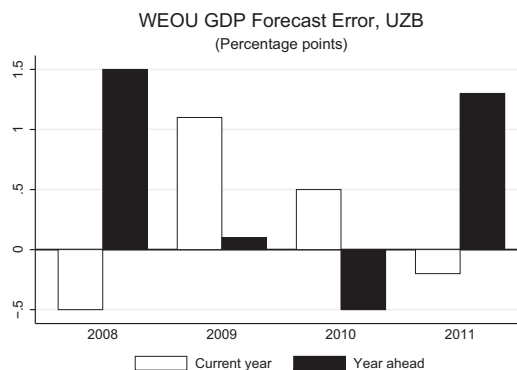
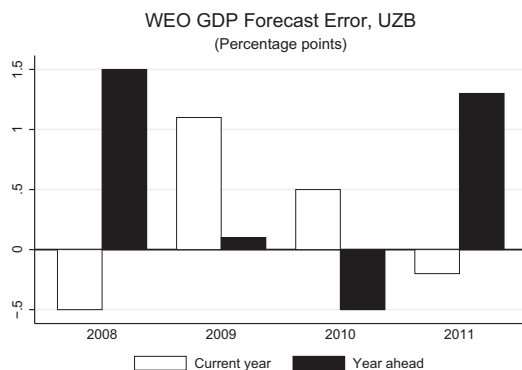
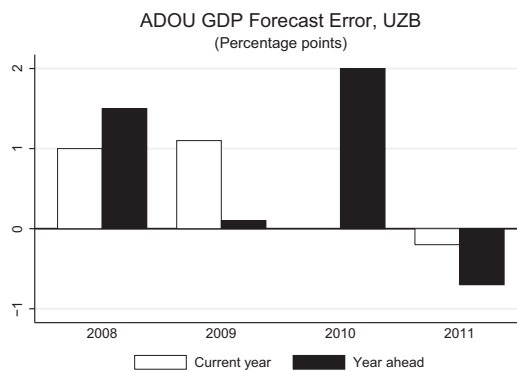
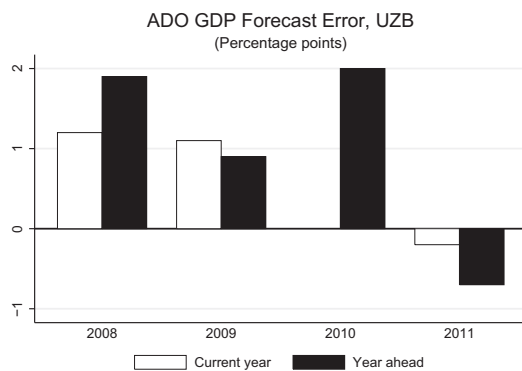


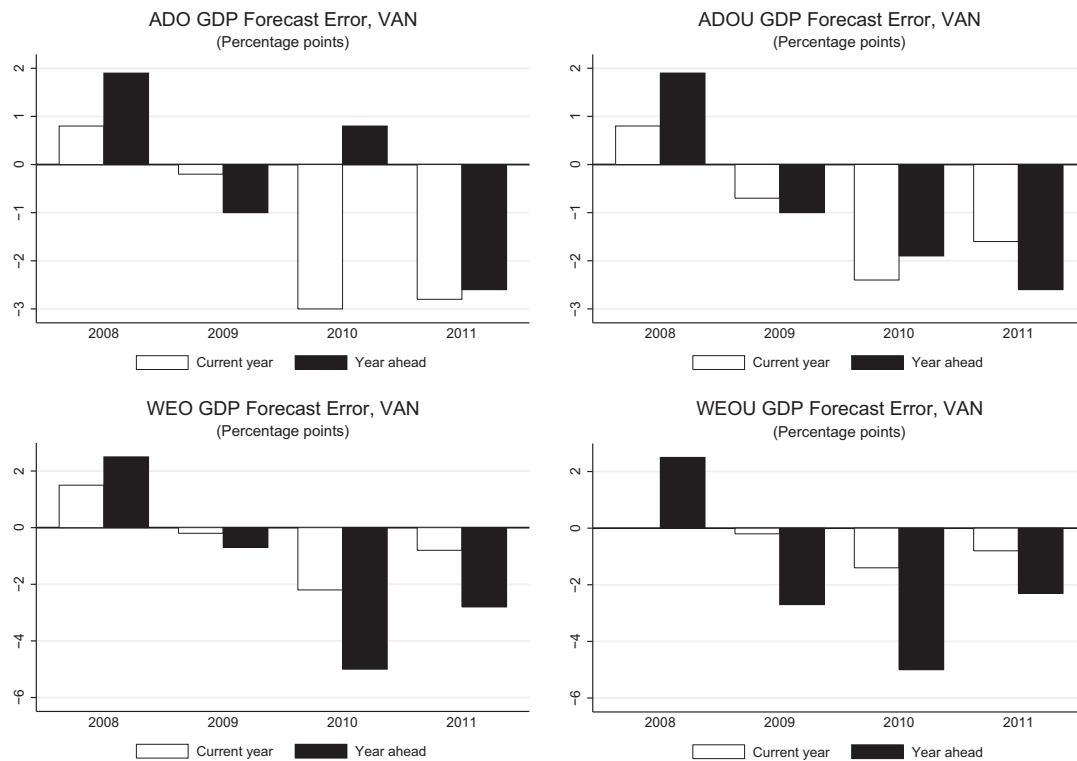










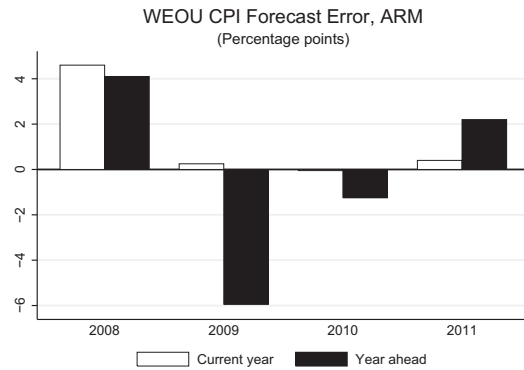
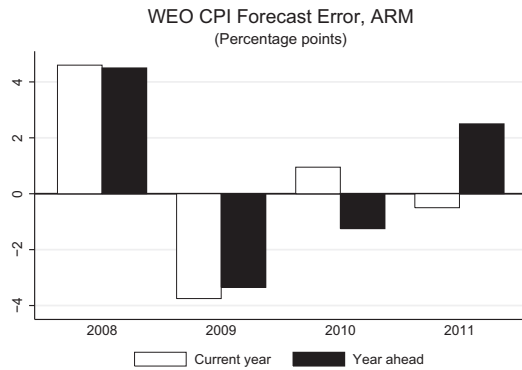
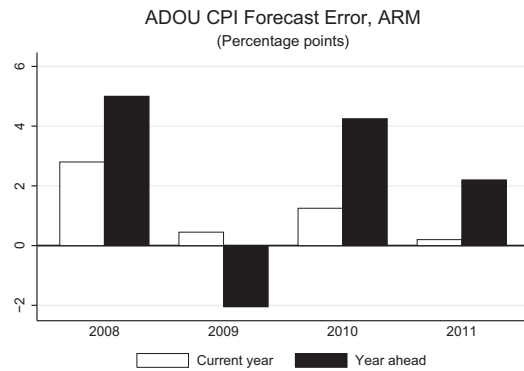
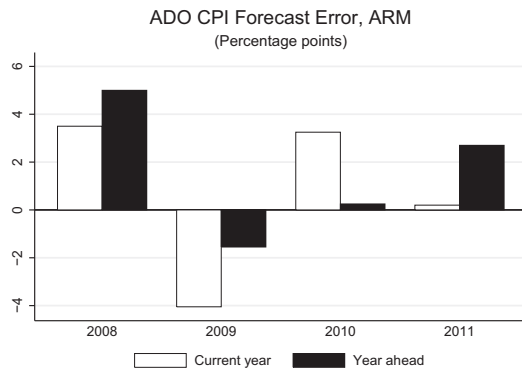
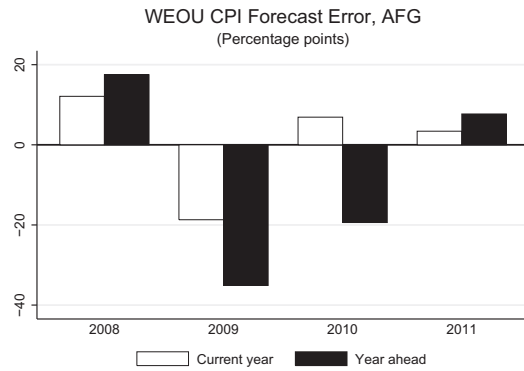
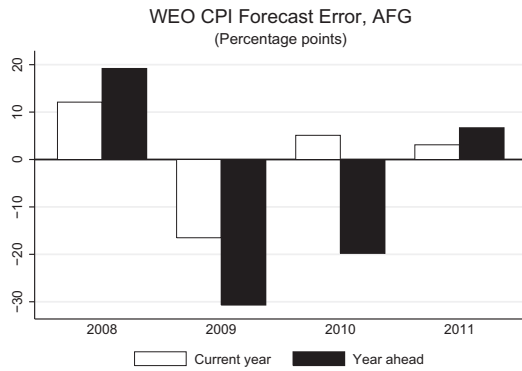
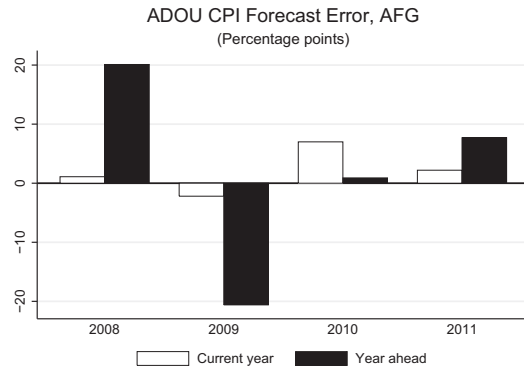
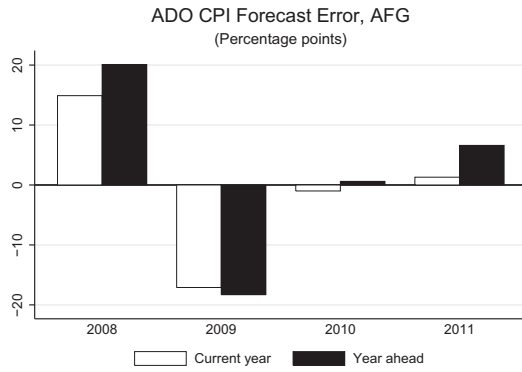


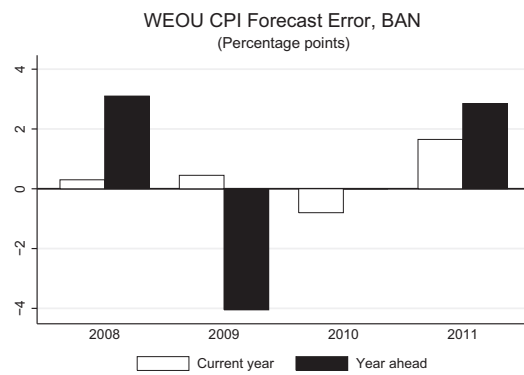
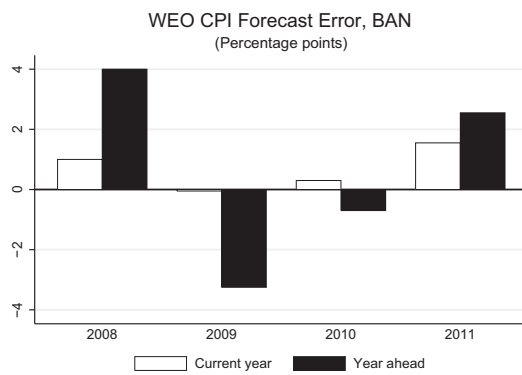
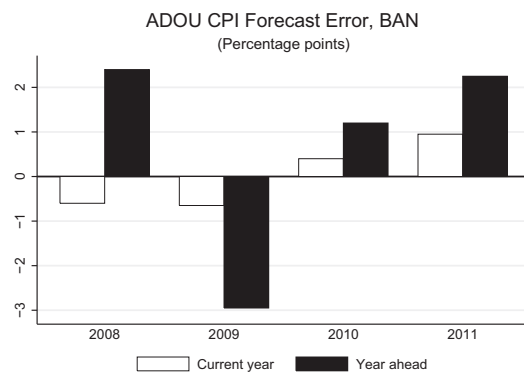
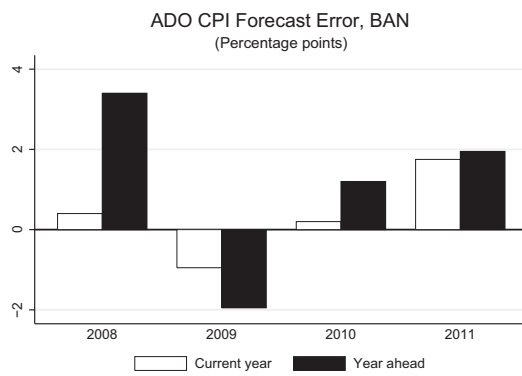
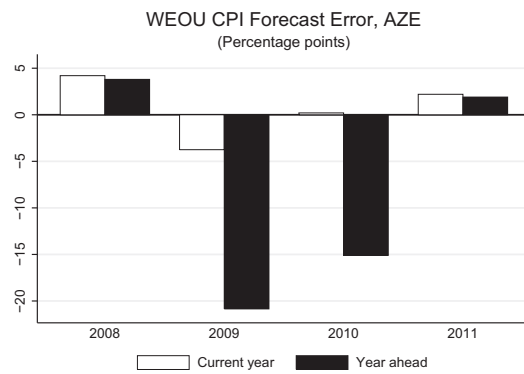
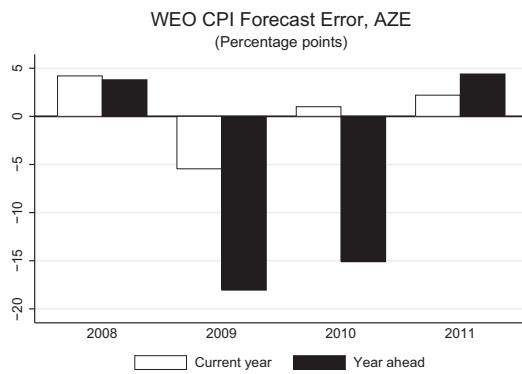
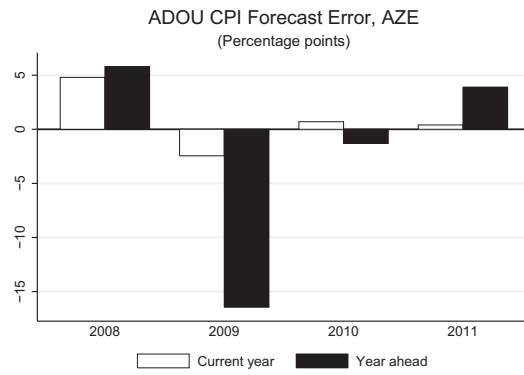
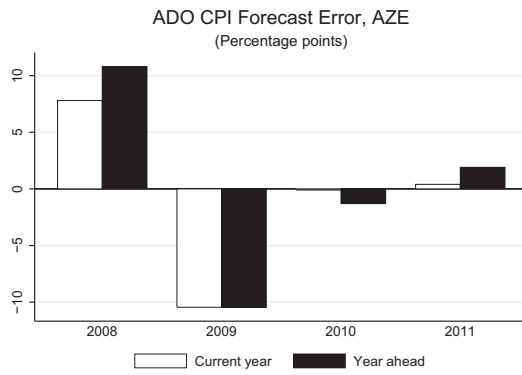
ADO = Asian Development Outlook, ADOU = Asian Development Outlook Update, GDP = gross domestic product, WEO = World Economic Outlook, WEOU = World Economic Outlook Update.

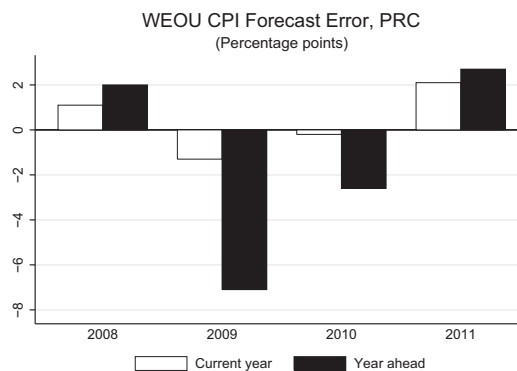
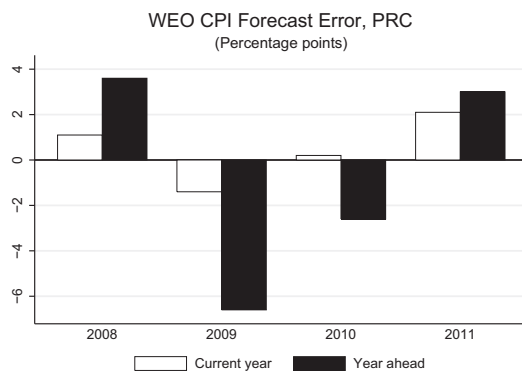
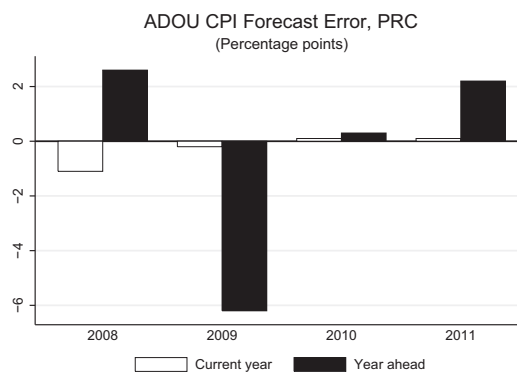
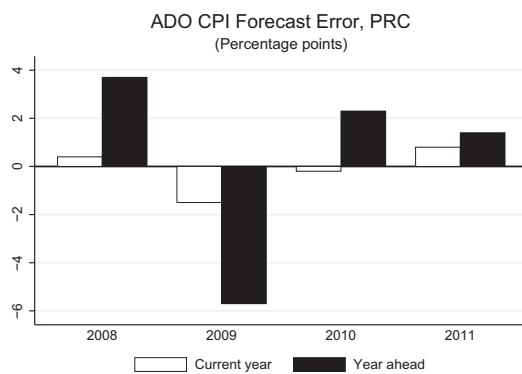
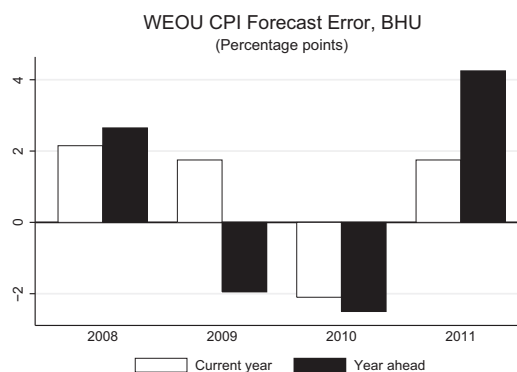
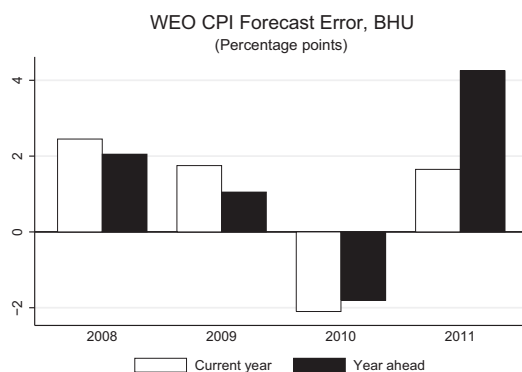
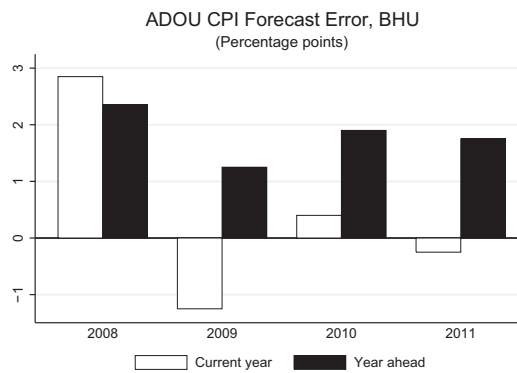
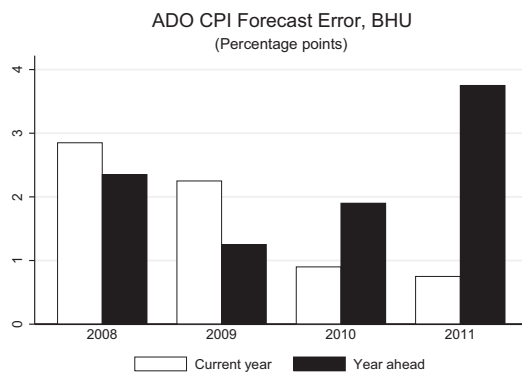
Note: For the list of economies and their corresponding three-letter, see Appendix 1.

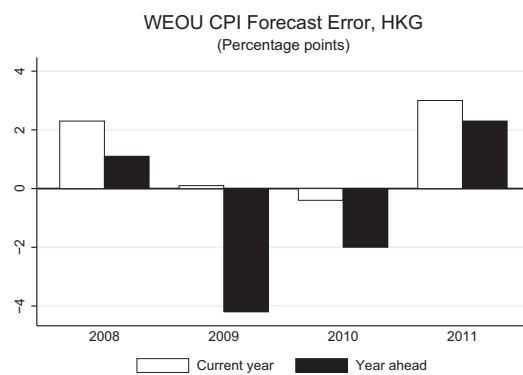
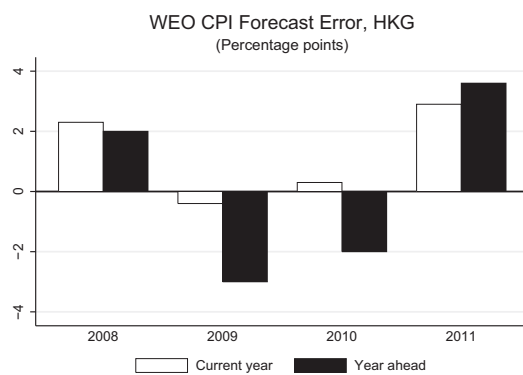
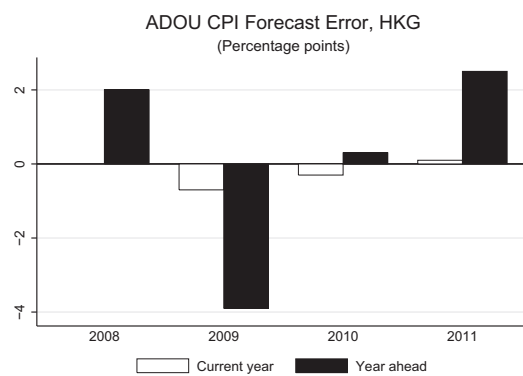
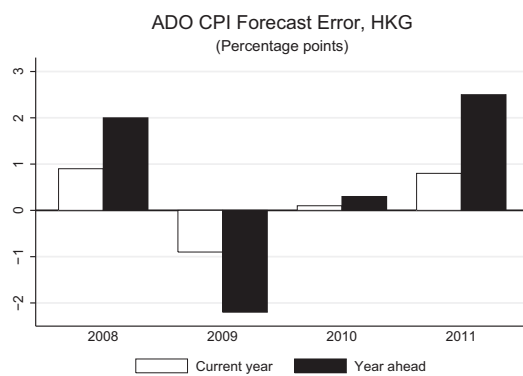
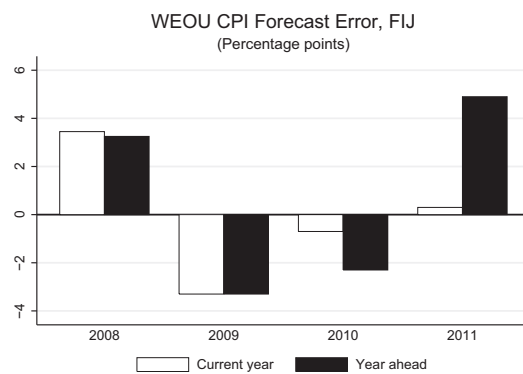
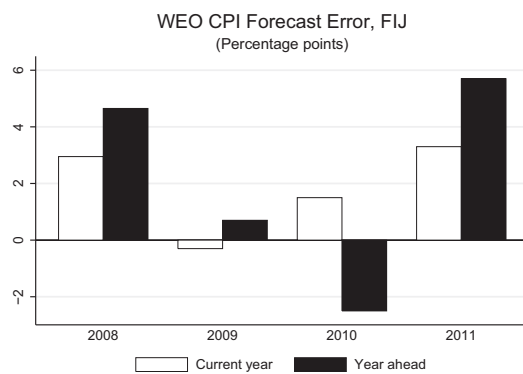
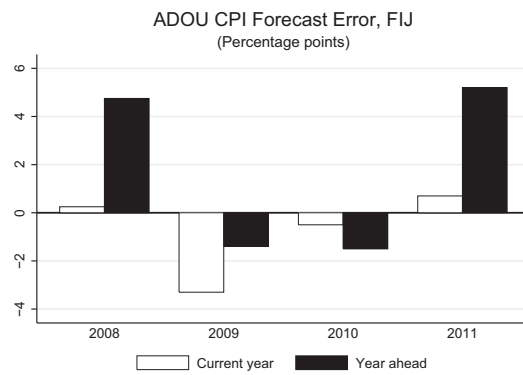
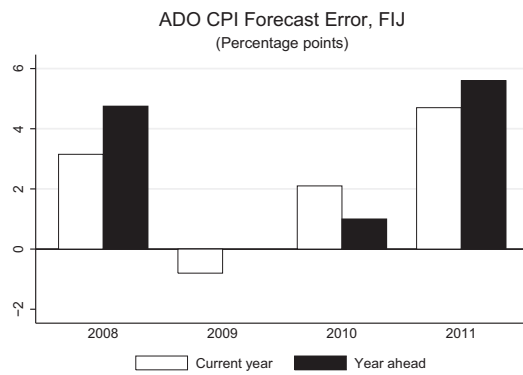
Source: Author's calculations

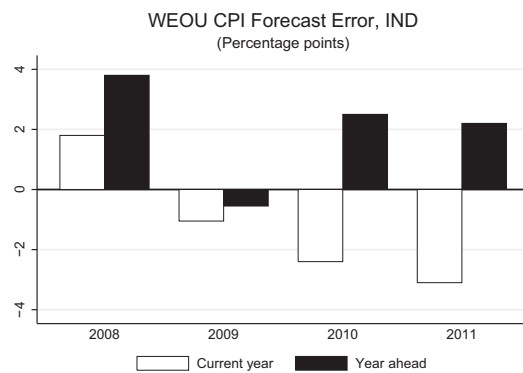
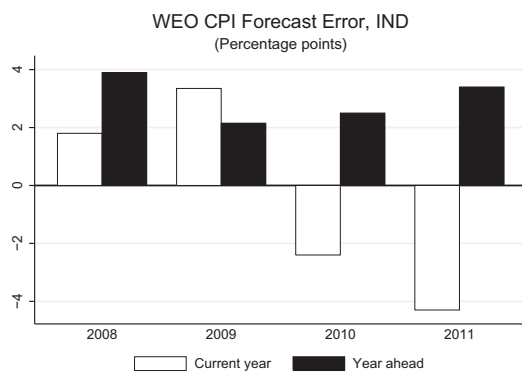
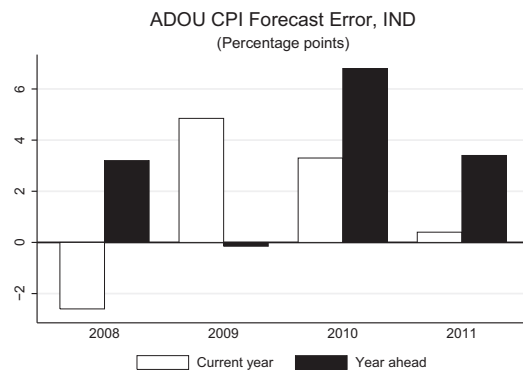
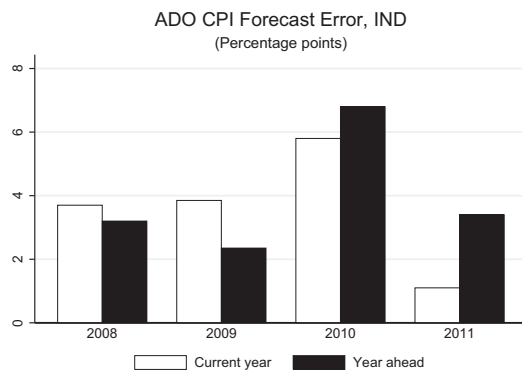
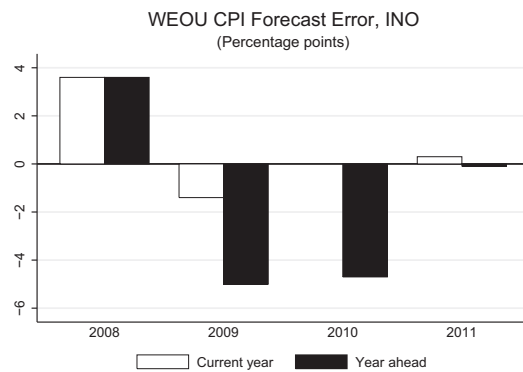
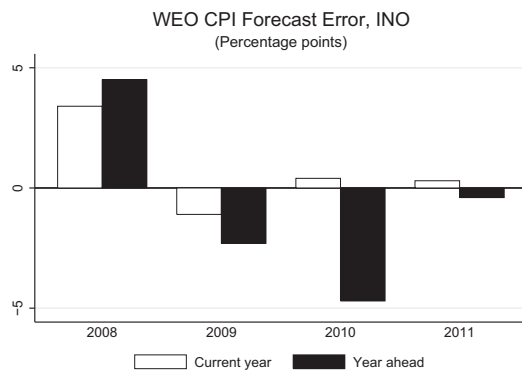
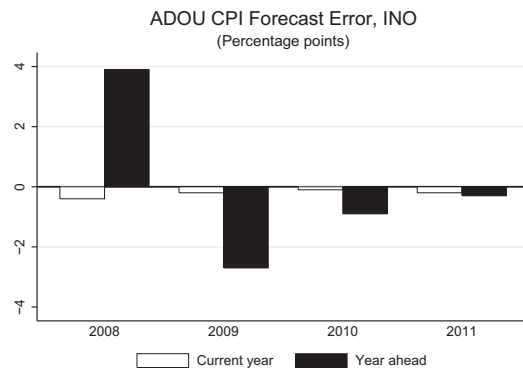
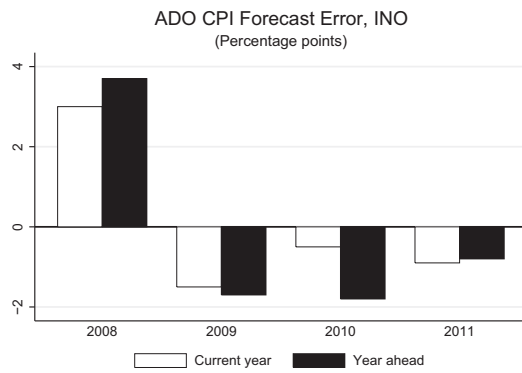
APPENDIX 7: CPI INFLATION FORECAST ERRORS BY REPORT, ECONOMY, YEAR

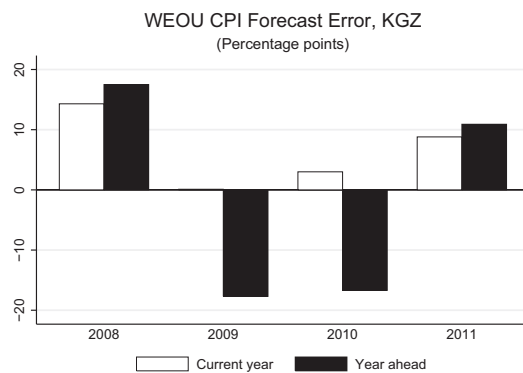
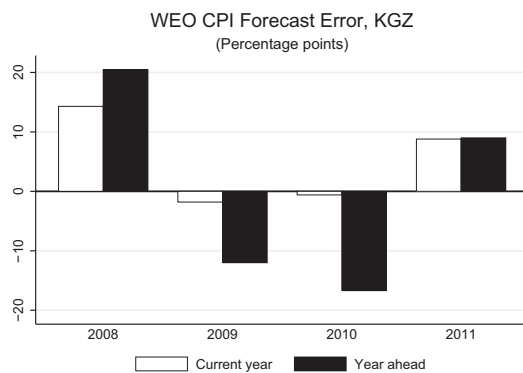
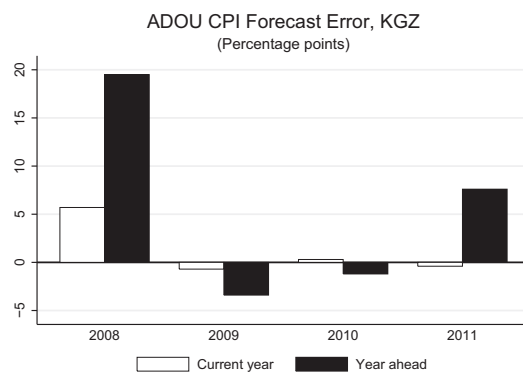
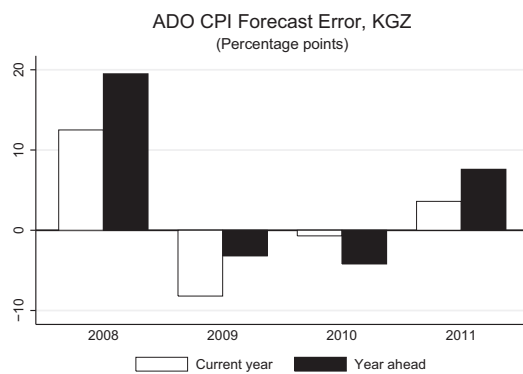
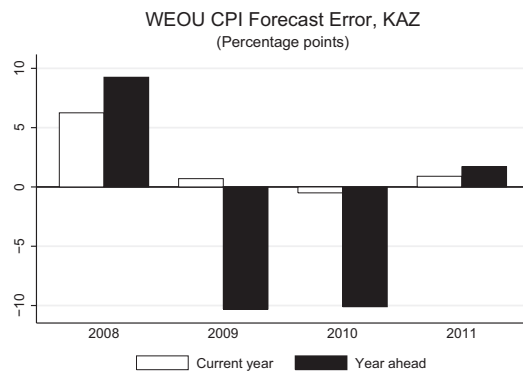
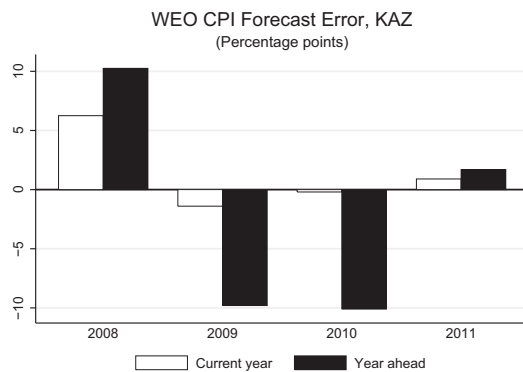
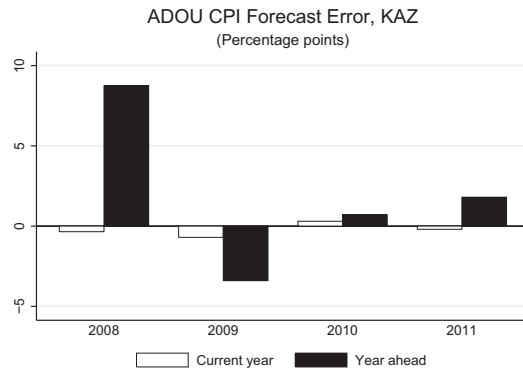
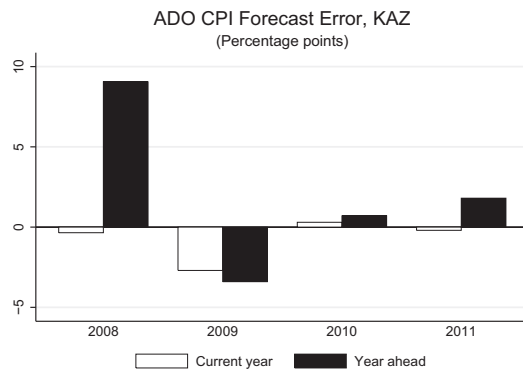


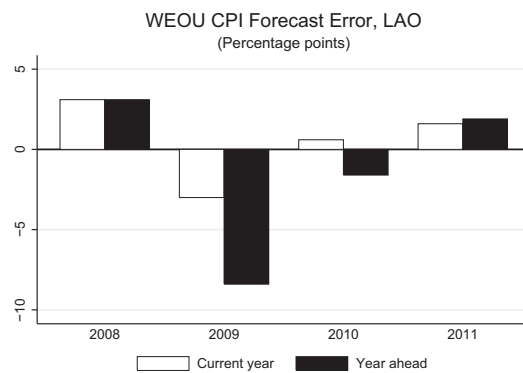
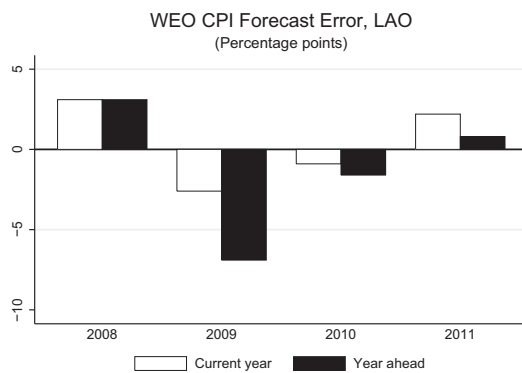
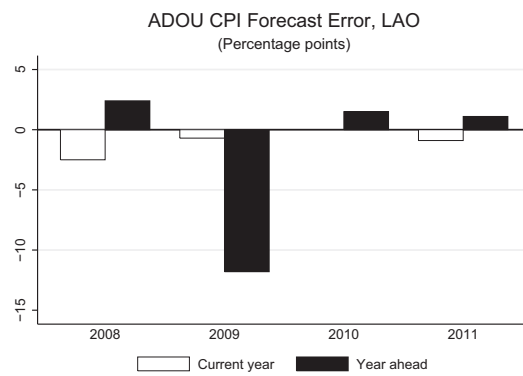
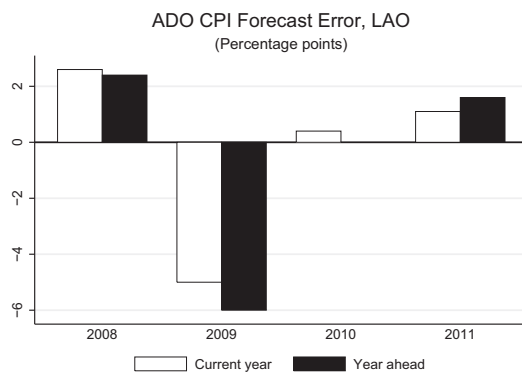
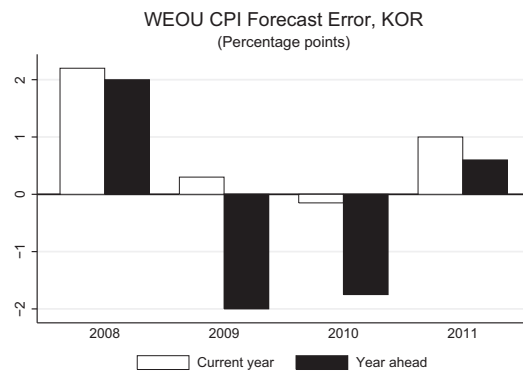
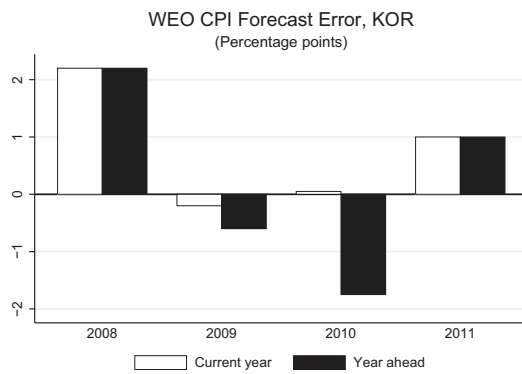
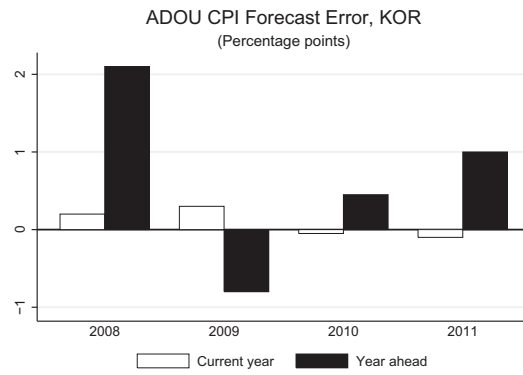
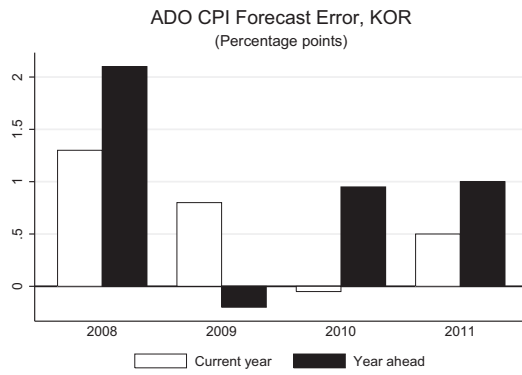


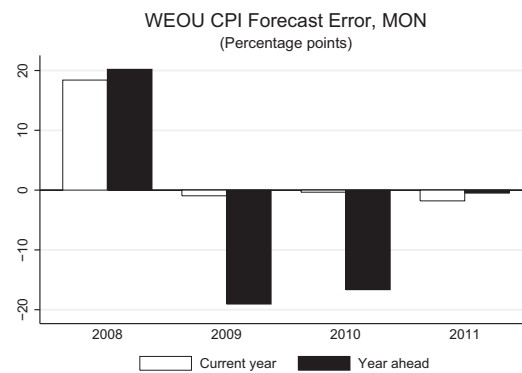
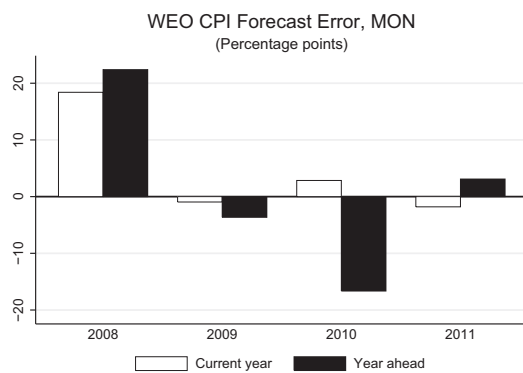
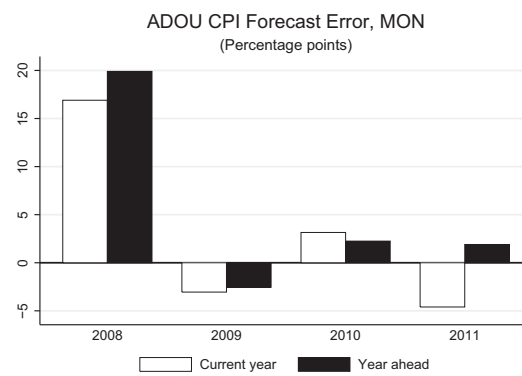
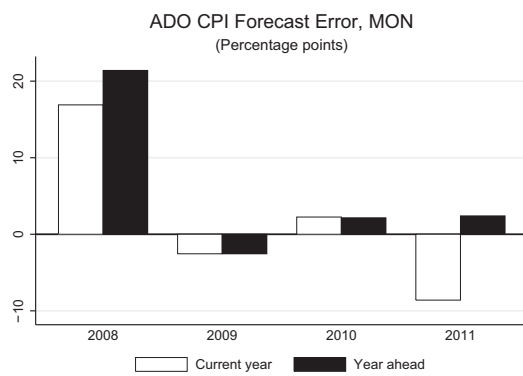
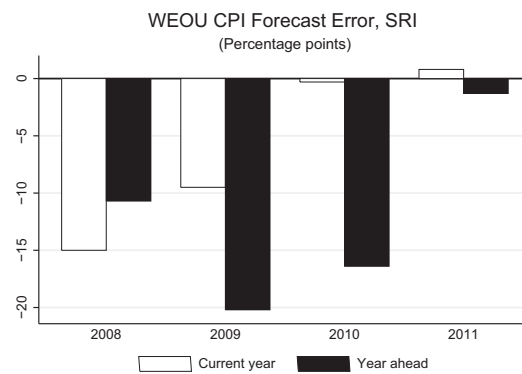
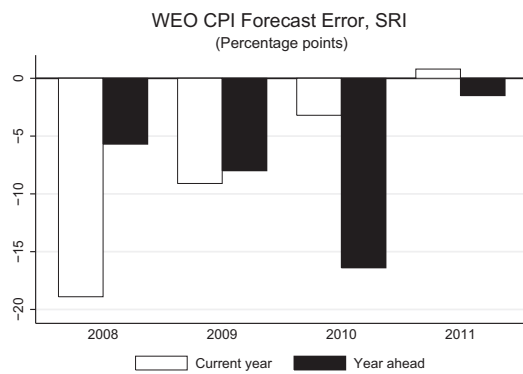
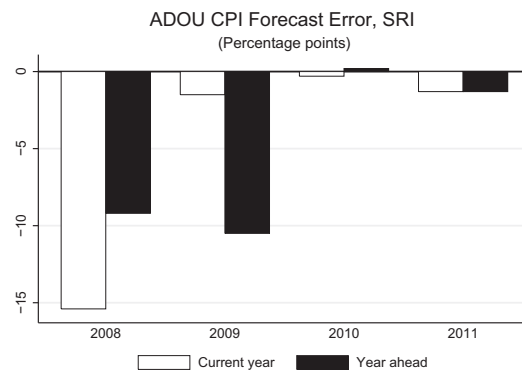
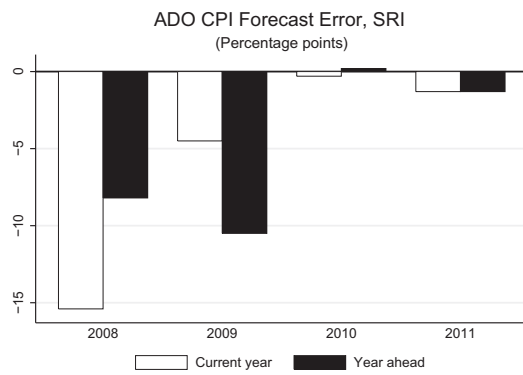


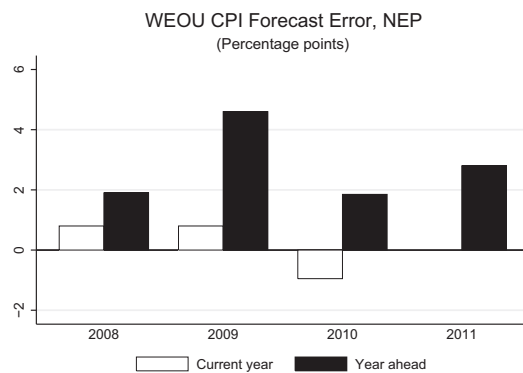
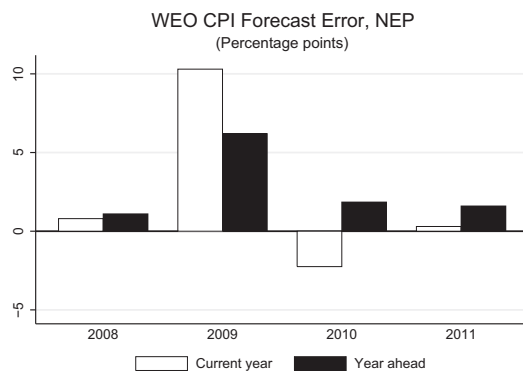
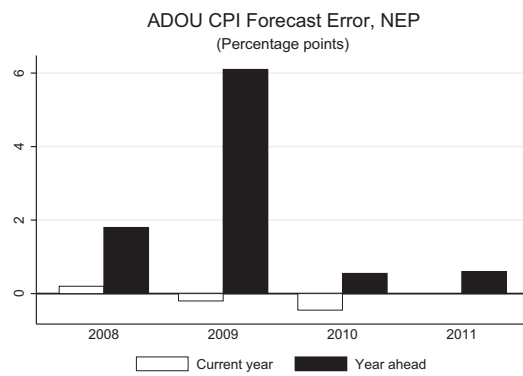
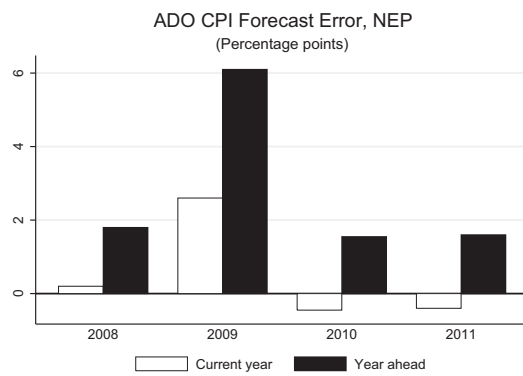
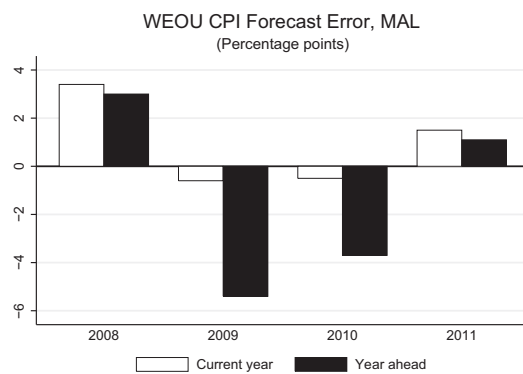
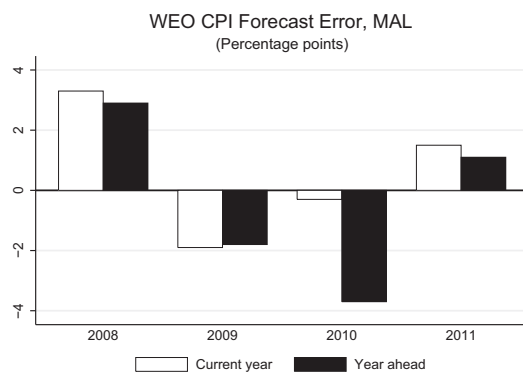
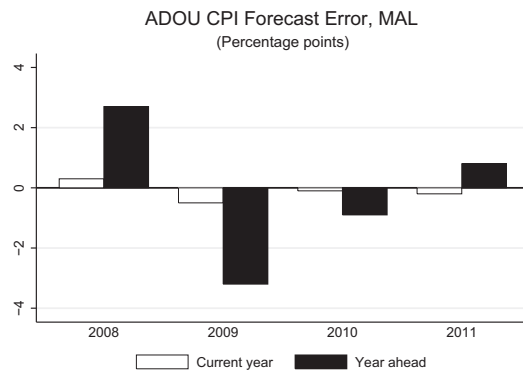
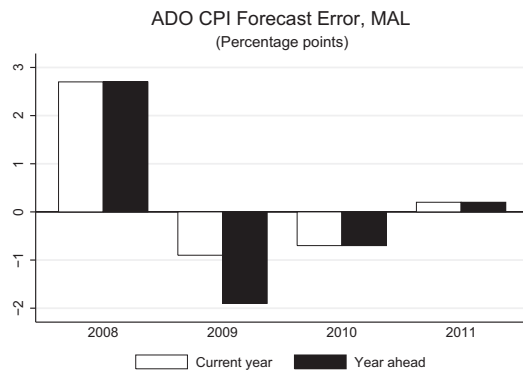


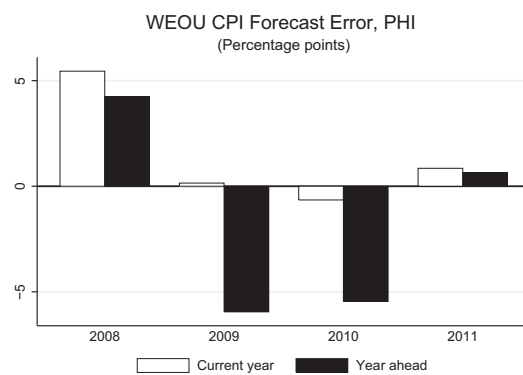
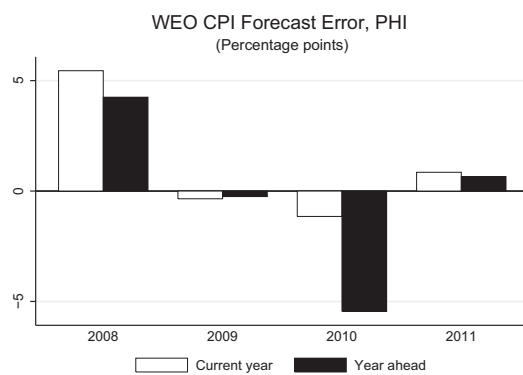
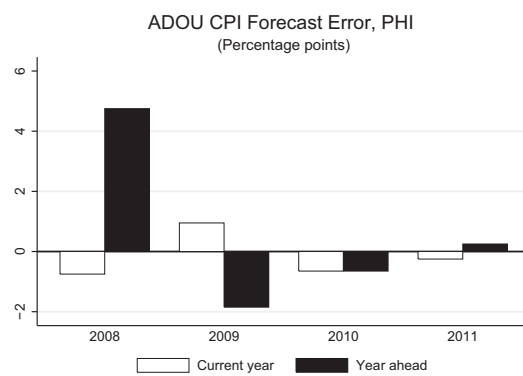
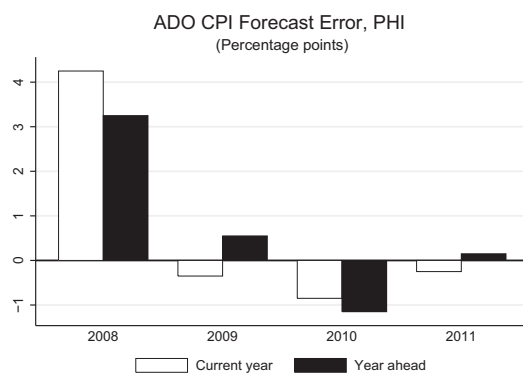
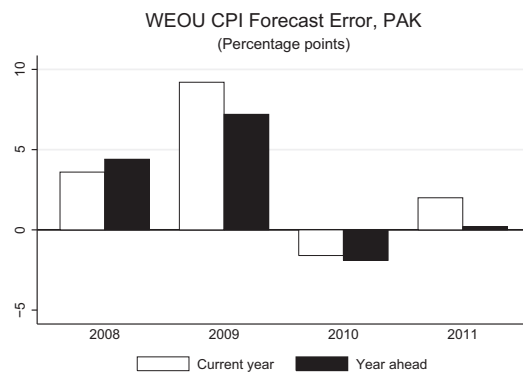
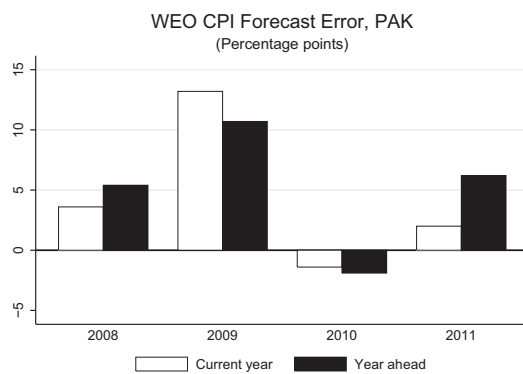
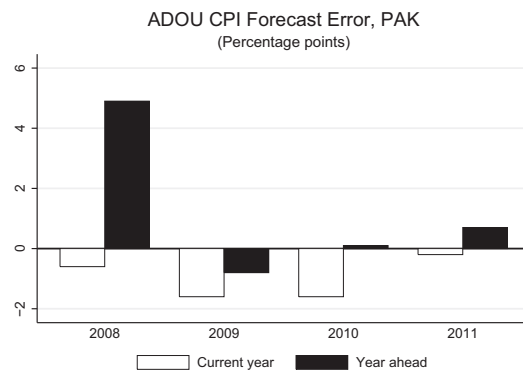
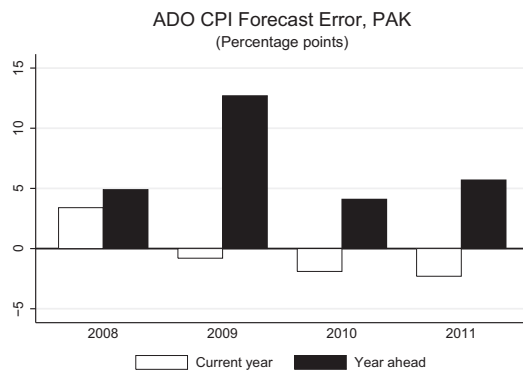


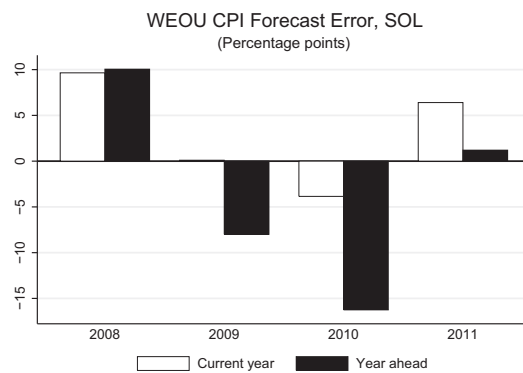
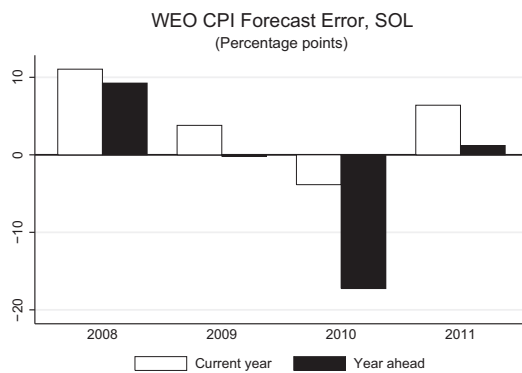
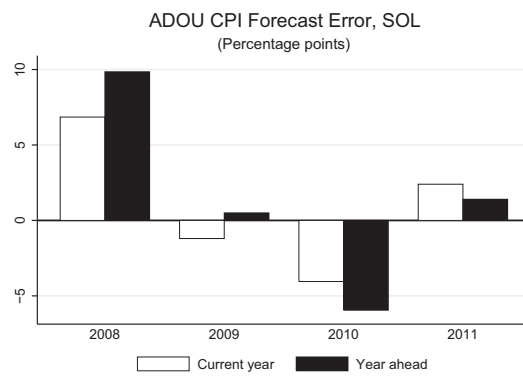
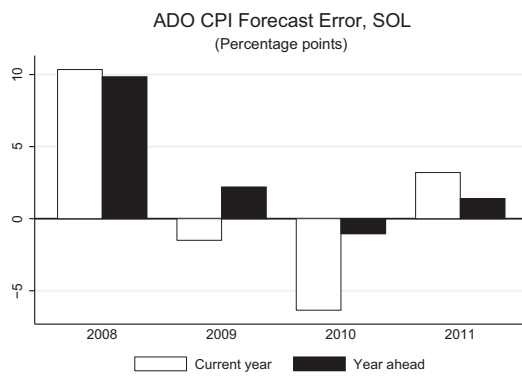
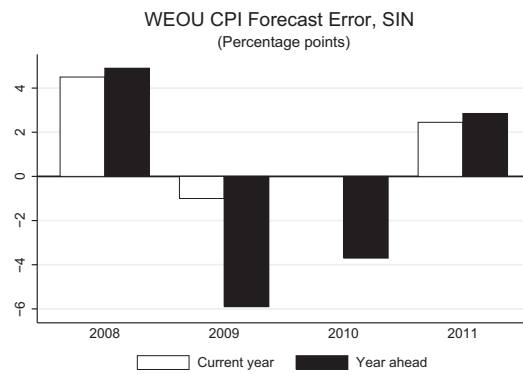
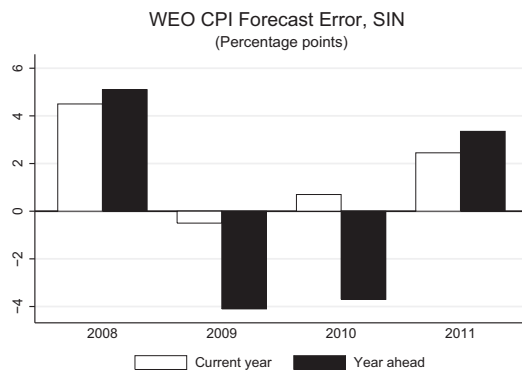
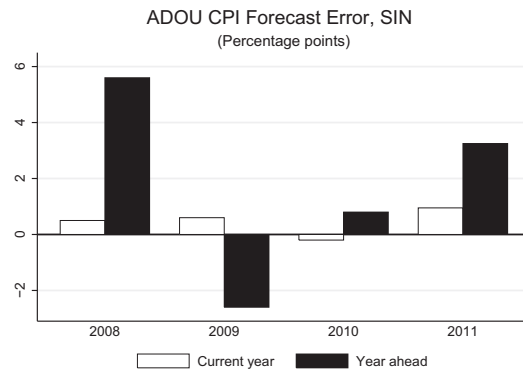
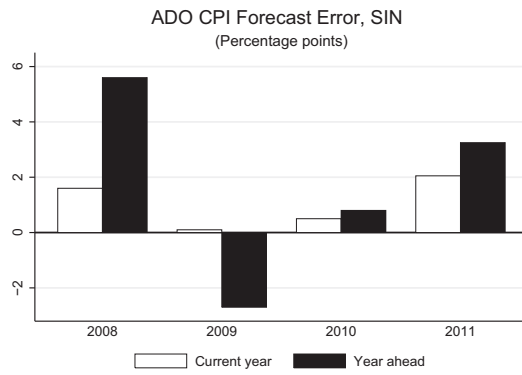


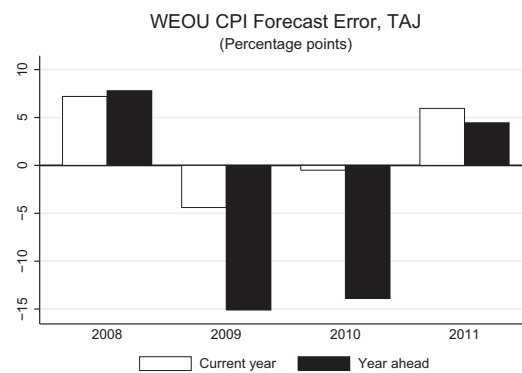
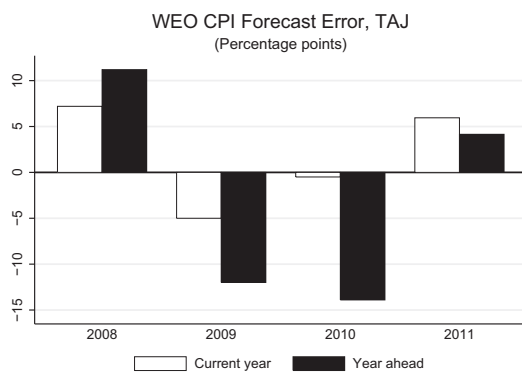
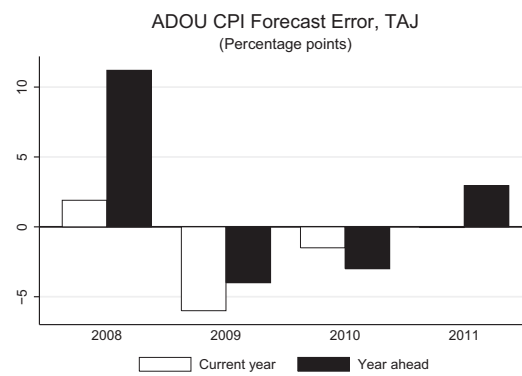
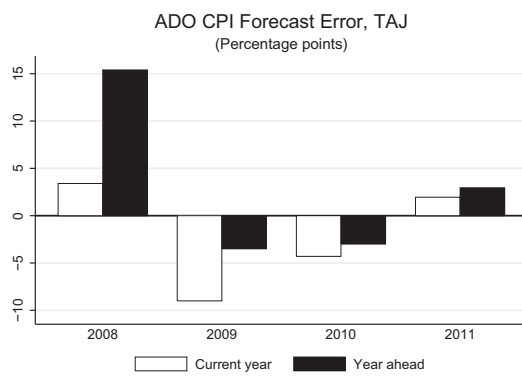
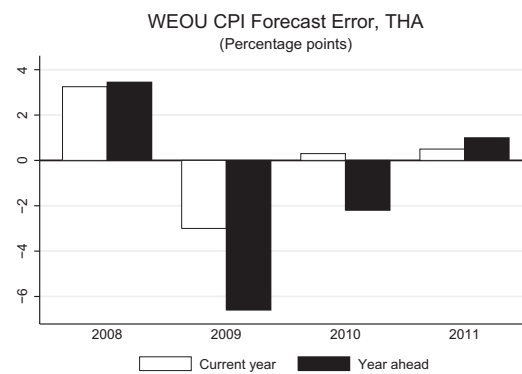
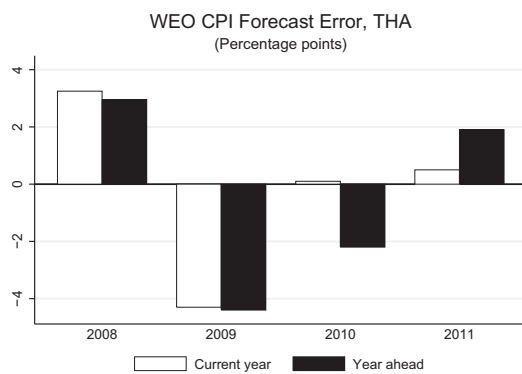
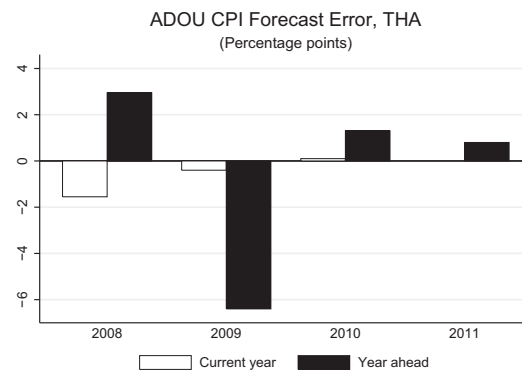
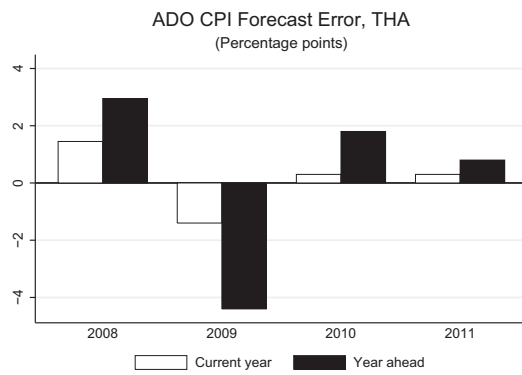


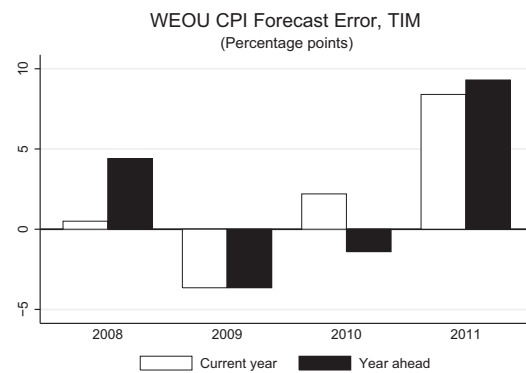
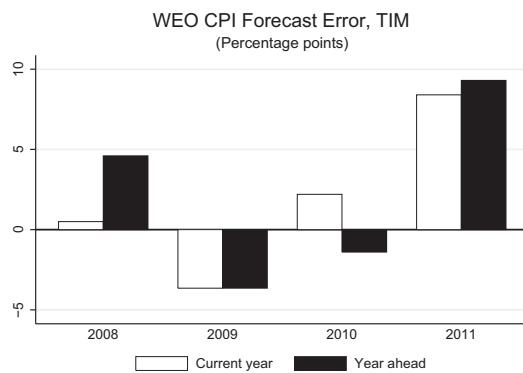
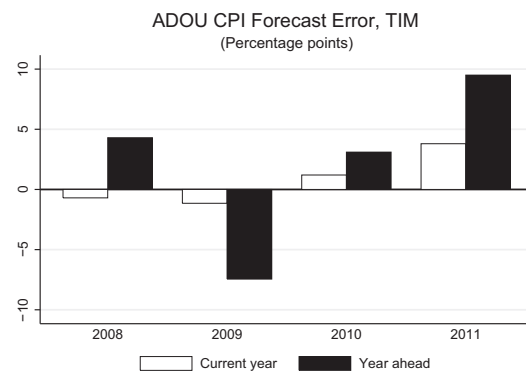
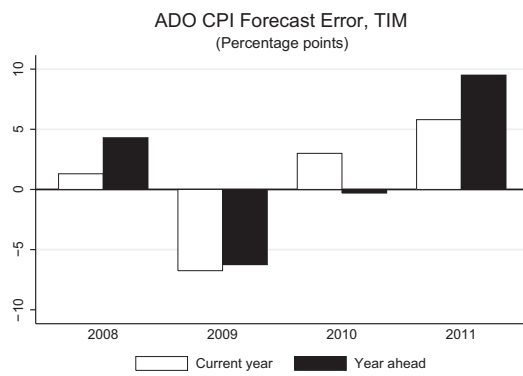
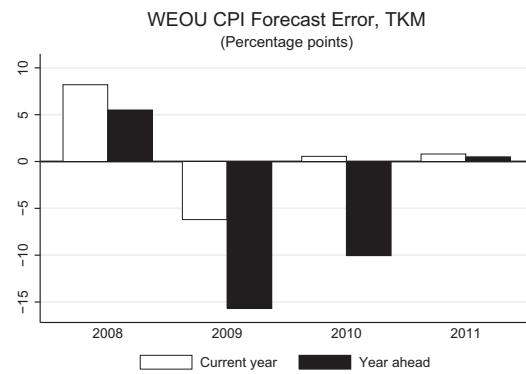
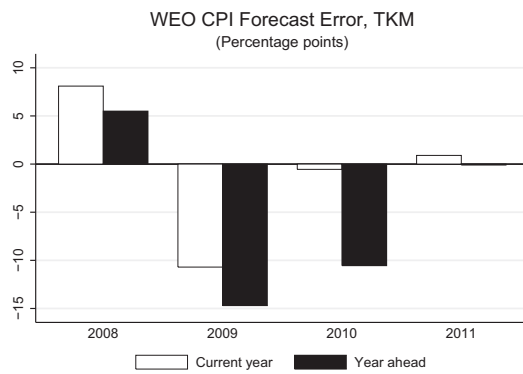
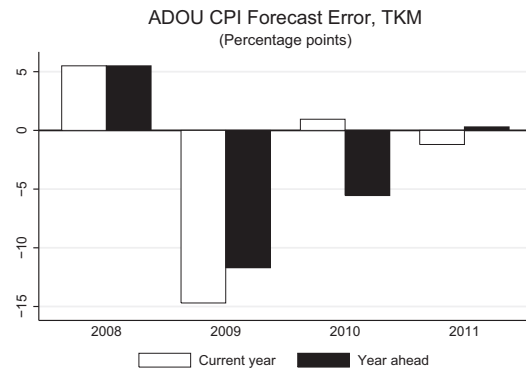
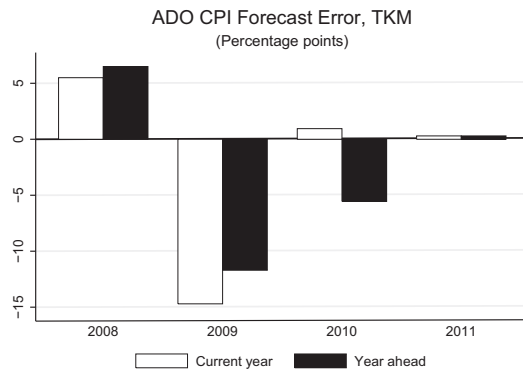


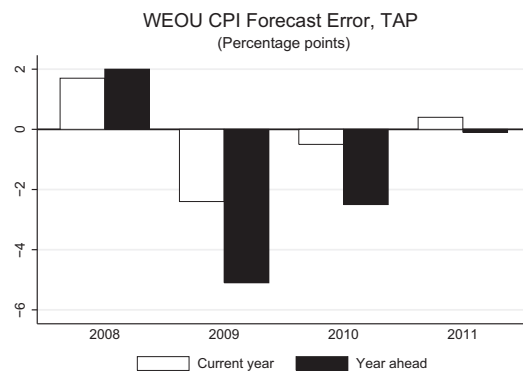
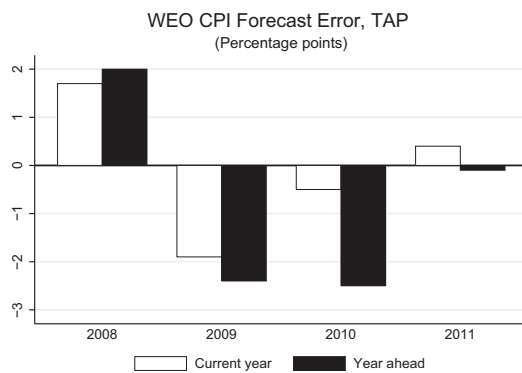
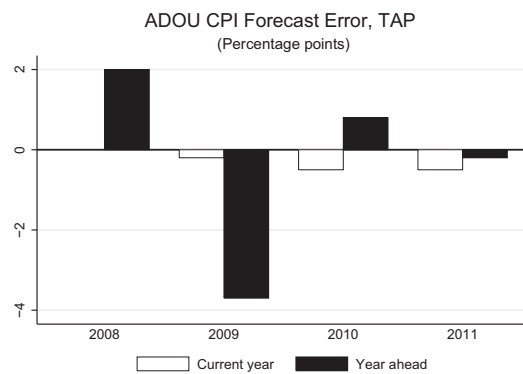
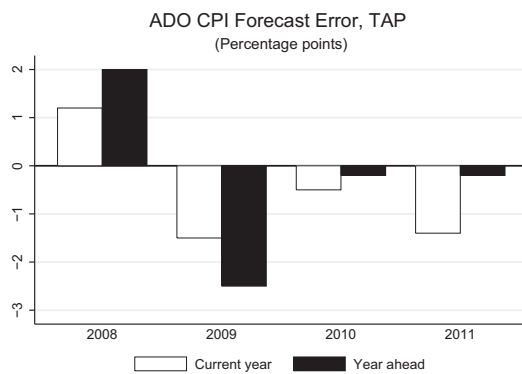
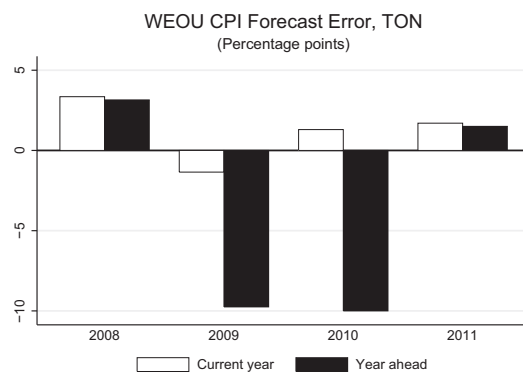
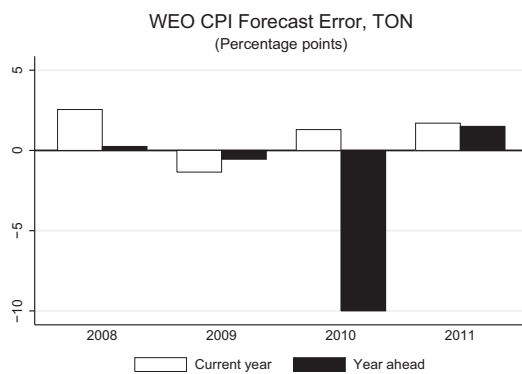
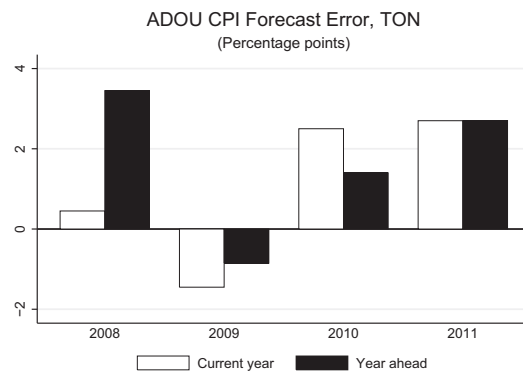
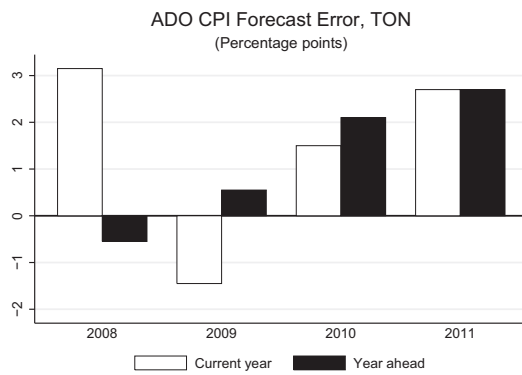


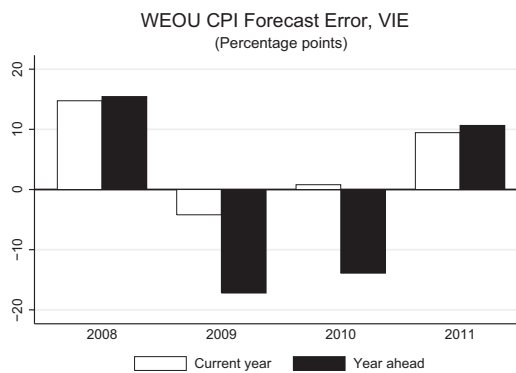
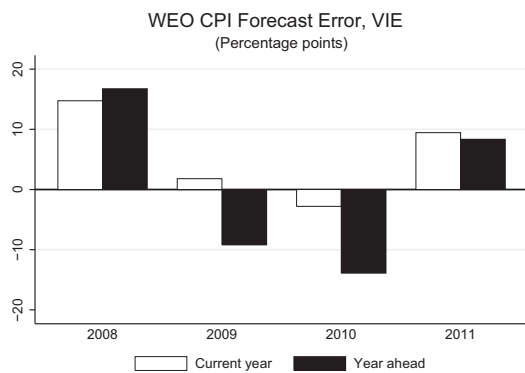
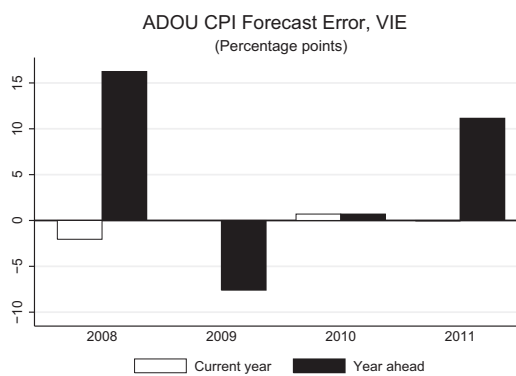
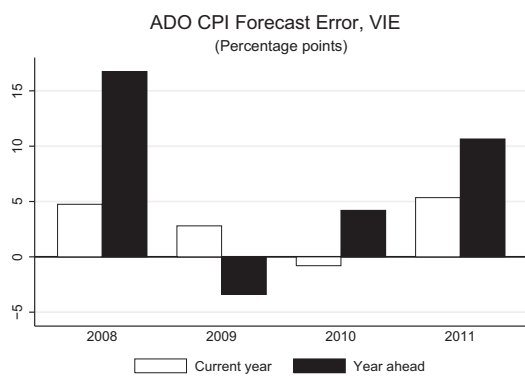
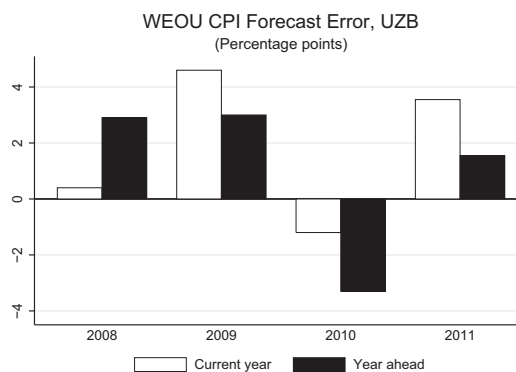
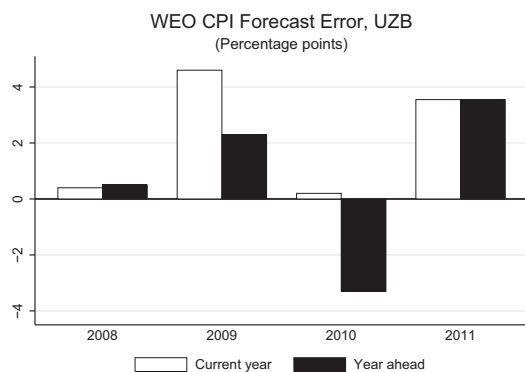
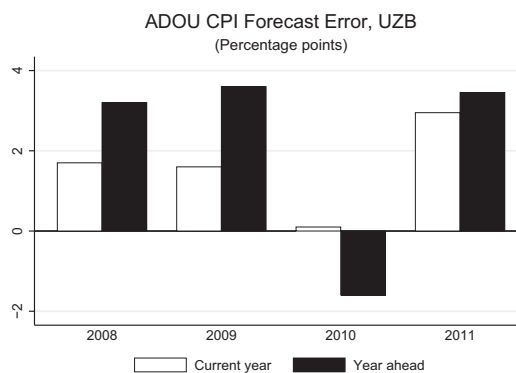
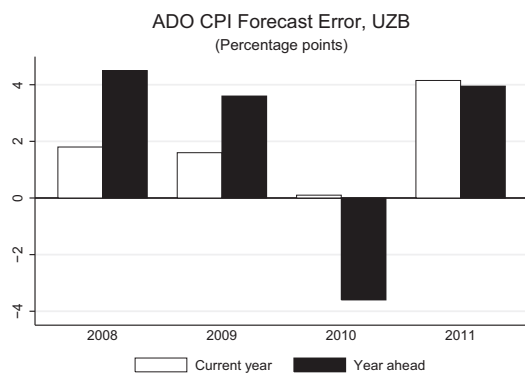


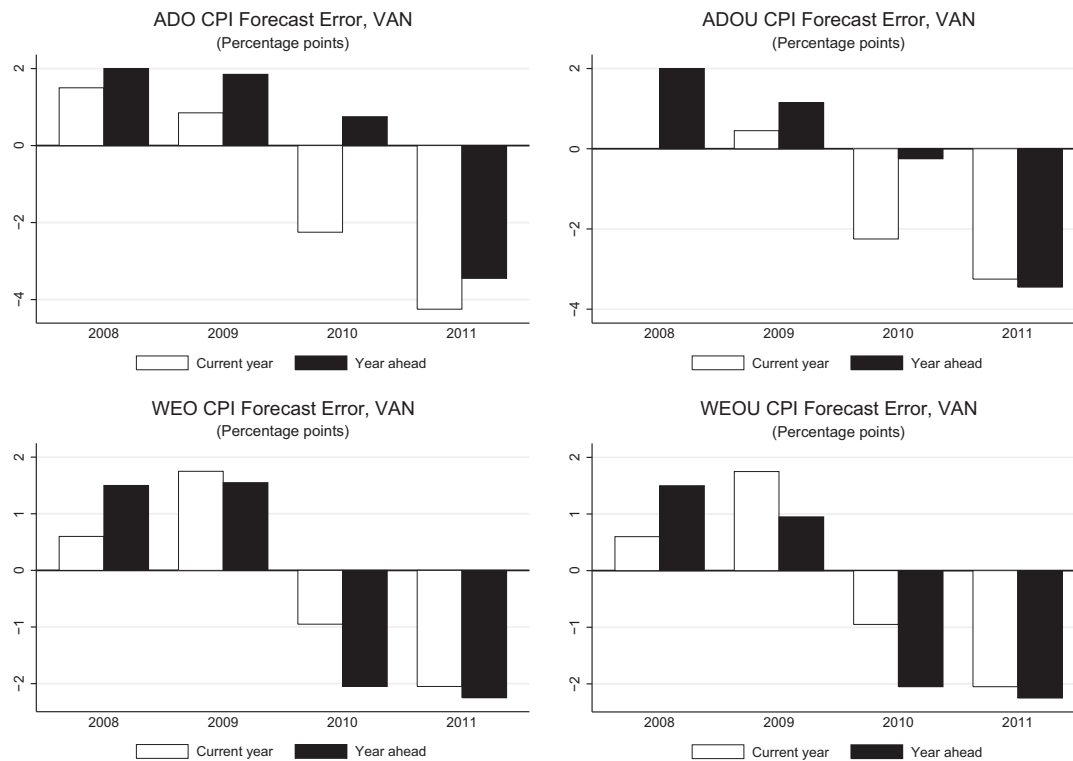












ADO = Asian Development Outlook, ADOU = Asian Development Outlook Update, CPI = consumer price index, WEO = World Economic Outlook, WEOU = World Economic Outlook Update.

Note: For the list of economies and their corresponding three-letter, see Appendix 1.

Source: Author's calculations

Asian Development Outlook Forecast Skill

The paper assesses the accuracy of *Asian Development Outlook* (ADO) forecasts against actual outcomes from 2008–2011. ADO is found to be more accurate than the International Monetary Fund *World Economic Outlook* (WEO) in estimating both current-year gross domestic product growth and consumer price index inflation of Asian economies, while WEO may have an edge over ADO when it comes to year-ahead forecasts. By and large, and notwithstanding much heterogeneity across countries and years, both forecasters display a high degree of inaccuracy during the crisis years.

About the Asian Development Bank

ADB's vision is an Asia and Pacific region free of poverty. Its mission is to help its developing member countries reduce poverty and improve the quality of life of their people. Despite the region's many successes, it remains home to two-thirds of the world's poor: 1.7 billion people who live on less than \$2 a day, with 828 million struggling on less than \$1.25 a day. ADB is committed to reducing poverty through inclusive economic growth, environmentally sustainable growth, and regional integration.

Based in Manila, ADB is owned by 67 members, including 48 from the region. Its main instruments for helping its developing member countries are policy dialogue, loans, equity investments, guarantees, grants, and technical assistance.