TECHNICAL ASSISTANCE REPORT

CAMBODIA
Report on the Residential Property Price Index (RPPI) Mission (January 15–19, 2024)

APRIL 2024

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Acronyms and Abbreviations

MEF   Ministry of Economy & Finance

NBC   National Bank of Cambodia

RPPI   Residential Property Price Index

TA   Technical Assistance

Summary of Mission Outcomes and Priority Recommendations

1.   **A technical assistance (TA) mission was conducted from January 15–19, 2024, to assist the National Bank of Cambodia (NBC) with the further improvement of their Residential Property Price Index (RPPI).** The mission was conducted under the auspices of the Data for Decisions (D4D) Trust Fund. The mission completed the following tasks: (i) undertook a review of the methods used for the RPPI (ii) identified areas for improvement consistent with international best practice, (iii) provided practical training to staff in the NBC, (iv) assessed the suitability of the template used for data collection from the commercial banks, and (v) analyzed the potential for accessing and using more comprehensive data sources.

2.   **The authorities are strongly committed to making improvements to the methodology (and associated R scripts) used for the published RPPI for Cambodia.** Reliable property price indices and other indicators of real estate markets are essential for the assessment of developments and risks in property markets and understanding the linkages between property markets and financial soundness, as well as to IMF surveillance.

3.   **The NBC published a new monthly RPPI data series in June 2022.** The data source used for the price index were details on residential property loans collected from Cambodian mortgage lending institutions. The loan data contains the required property characteristics for the compilation of quality-adjusted prices using the hedonic approach. The current publication for the RPPI is very timely. The NBC receive the data from the lending institutions 10 days after the reference month and the results are disseminated at the start of the following month. NBC staff requested a full review of the methods and software used for the compilation. This request was made due to internal concerns about the trajectory of the price index and a desire to improve the skills and knowledge of the property prices team.

4.   **The mission identified improvements to the methods used for the RPPI.** The published index uses the time dummy hedonic method with an 18-month window length to compile quality-adjusted indices. While the authorities should continue to use this approach, there were a number of areas where improvements to the methods will enhance the quality and useability of the index. These include the (i) the filtering and cleaning of the loan data, (ii) the stratification of the sample, (iii) the outlier detection method and (iv) model specification for the hedonic regressions. The authorities should also include the additional loan data collected from micro-finance institutions.

5.   **Amendments should be made to the filtering and cleaning of the loan data.** Loans that were issued by the banks for the purpose of building a property should not be included in the scope of the index. It was also decided to amend some of the filters for particular variables e.g., the minimum threshold for the land area of a property was lowered from 40 to 20 square meters. In addition, some property characteristics should be merged into homogenous groups e.g., location categories should be created within and outside Phnom Penh using the information on provinces, districts / khans, and communes / sangkats.

6.   **The authorities should apply a more detailed stratification of the loan data.** The published RPPI has two strata as follows: (i) Phnom Penh and (ii) Other Provinces. However, there are sufficient observations within Phnom Penh to support a more granular stratification. Therefore, it was proposed to extend the stratification to four strata as follows: (i) Central and East Phnom Penh, (ii) Inner Suburbs Phnom Penh and (iii) Outer Suburbs Phnom Penh and (iv) Cambodia excluding Phnom Penh. The more

detailed stratification will allow for the dissemination of more granular sub-indices within Phnom Penh. This will provide users with valuable information on the contribution of different areas of the capital region to the overall inflation rate for residential property.

7. The NBC should update the specification of the hedonic model and use Cook's Distance for outlier detection. The existing model for the RPPI is overfitted with too many independent variables. This can lead to misleading R-squared values, regression coefficients, and p-values. The method for identifying outliers uses the interquartile range by month and strata. However, this method is excluding a very high proportion of the sample e.g., up to 18.3 percent in some months. It is recommended to replace the interquartile range method and use Cook's Distance instead. This regression-based method identifies outliers with greater precision and, therefore, preserves the sample to the extent possible.

8. Price indices for houses were compiled during the mission using updated methods.
The published national index for Cambodia shows inflation of 16.0 percent between 2020M1 and 2021M6, while the updated index shows inflation of 11.0 percent. The NBC should implement the updated methods into their regular compilation of the RPPI. However, the NBC should analyze the results of the updated indices before deciding whether to revise the retrospective data. By applying the new methods from the start of the time series, the RPPIs would be compiled more consistently over time.

TABLE 1. Priority Recommendations

Target Date	Priority Recommendation	Responsible Institution
Jun-2024	Complete the calculation of the updated indices for the most recent period and compare with the published RPPI.	NBC
Dec-2024	Implement the improved methods into their regular compilation of the RPPI.	NBC
Dec-2024	Decide whether to revise the retrospective data.	NBC

9. Further details on the priority recommendations and the related actions/milestones can be found in the action plan under Detailed Technical Assessment and Recommendations.

Section I. Detailed Technical Assessment and Recommendations

TABLE 2. RPPI Workplan for Cambodia, 2024

Priority	Action/Milestone	Target Completion Date
Topic: Data sources		
M	Continue to use the loan data to compile the RPPI in the medium term.	Feb-2024
M	Include the additional loan data from micro-finance institutions in the sample as part of the overall update of the methods.	Dec-2024
M	Estimate the existing coverage of the RPPI using a combination of the loan data and administrative data sources.	Dec-2024
M	Devise a longer-term strategy to close the gap in coverage by researching the potential of new data sources e.g., website listings.	Dec-2024

Priority		Action/Milestone	Target Completion Date
Topic: Compilation methods			
	M	Transactions outside the scope of the RPPI should be excluded and some property characteristics should be merged into homogenous groups	Largely complete
	M	Apply a more detailed stratification of the loan data.	Completed
	M	Use Cook's Distance for outlier detection.	Completed
	M	Update the model specification for the hedonic regressions and apply robustness checks to the results.	Largely complete
	M	The sub-indices (i.e., strata indices) should be aggregated using weights to higher-level indices including the national RPPI.	Completed
	H	Update the new R-code to calculate the updated indices for the most recent period and organize an external review of the R scripts.	Feb-2024
	H	Complete the calculation of the updated indices for the most recent period and compare with the published RPPI.	Jun-2024
	M	Monitor the differences between the updated and published indices.	Aug-2024
	M	Re-run the compilation with the micro-finance institutions included in the sample and calculate the updated RPPIs.	Dec-2024
Topic: Dissemination			
	H	Implement the improved methods into their regular compilation of the RPPI.	Dec-2024
	H	Decide whether to revise the retrospective data.	Dec-2024
	H	Disseminate more detailed RPPIs	Feb-2025
	H	Draft and publish a detailed methodological document on the authorities' website.	Feb-2025

A. INTRODUCTION

10. A TA mission was conducted from January 15–19, 2024, to assist the authorities in Cambodia to complete a review of the methods used to compile the RPPI. The mission was conducted under the auspices of the Data for Decisions (D4D) Trust Fund. A pre-mission meeting was held on December 14, 2023, attended by officials from the mission team and the NBC. The objectives for the mission were discussed and agreed. An agenda was drafted and circulated in advance.

11. A team of five staff from the Statistics Department of the NBC attended the meetings each day. Senior managements, including the Director General of Policy and International Cooperation of the NBC, also attended meetings. There was a strong commitment from all participants to make improvements in the methods used to compile the RPPI for Cambodia.

12. The NBC published a new monthly RPPI data series in June 2022. The data source used for the price index are details on residential property loans collected from Cambodian mortgage lending institutions. Recently, NBC staff raised concerns about the trajectory of the price index and requested a full review of the methods and software used for the compilation. In advance of the mission, the NBC provided detailed information on the data collection, compilation procedures and statistical software programs. This allowed initial assessments to be developed before arriving in Cambodia. The mission

benefited hugely from the ability of the NBC to implement recommendations directly in the statistical software during the course of the meetings. By the end of the week, an updated national index and regional sub-indices were compiled using improved methods.

13. There was a focus on increasing the capacity and knowledge of the authorities.
The mission provided practical training on the methodological approach to compiling the RPPI. While the NBC possess all the required skills to calculate the index, the mission will continue to support the authorities, as necessary, as the agreed workplan is being implemented.

B. DATA SOURCES

14. The authorities should continue to use the loan data to compile the RPPI in the medium term.
Data are obtained from a monthly survey of lending institutions. Data are available from 2019; however, the RPPI is currently compiled with data from January 2020. The data collected in 2019 was not useable as it was lower quality. The average number of monthly observations in 2020 was 830, increasing to 1,030 in 2021 and 1,260 in 2022. The average number of monthly observations fell to 880 in 2023.

15. The authorities have collected additional loan data from micro-finance institutions.
This data predominantly covers loans to purchase property in areas outside of Phnom Penh. The NBC should include this information in the sample to enhance the quality of the sub-index for Cambodia excluding Phnom Penh. Due to the significant increase in the sample, it would be preferable to include the additional data as part of the overall update of the methods. By bundling this change as part of a larger improvement in the methods, it would avoid multiple updates to the published RPPI.

16. The current publication for the RPPI is very timely. The NBC receive the data from the lending institutions 10 days after the reference month and the validation checks are normally completed by the 20th day after the reference month. The property prices team use the loan data to compile the RPPI and the results are disseminated at the start of the following month e.g., results for November are published in early January. The data are also used to compile a report on newly issued property loans for the Financial Stability unit.

17. The loan data contains the required property characteristics for the compilation of quality-adjusted prices using the hedonic approach. There are four sections on the reporting template: (i) administrative information, (ii) borrower information, (iii) loan information and (iv) property information. The section most relevant for the RPPI is property information which includes the price of the purchased property, location variables (province / city, district / khan, commune / sangkat, village, and street number), size variables (floor area, plot size, number of bedrooms, width of the property) and other variables (property type, title of property, floor number / number of floors, date of construction). The date used to assign each transaction to a reference month is the drawdown date for the loan. The reporting template collects the total price of the purchased property, the price of the purchased land and the appraisal price of the property. The total price of the purchased property, defined as the final market price, is the most suitable price measure for the RPPI.

18. The coverage of the loan data is limited to the part of the residential property market financed by loans from the commercial banks. The segments of the market not covered by the sample include (i) cash purchases, (ii) transactions financed by loans from developers (iii) transactions financed by foreign banks. It is recommended that the NBC estimate the existing coverage of the RPPI using a combination of the loan data and administrative data sources. It may be possible for the NBC to obtain an estimate of the overall size of the residential property market from the property tax data available at

General Department of Taxation under the Ministry of Economy & Finance (MEF) i.e., number and value of residential property transactions. This information can then be compared to the loan data collected by the NBC.

19. There are few observations in the loan data for condominiums and apartments. As the sample is too small to accurately estimate price change, the published RPPI only covers houses.
One reason for this might be that foreigners purchase a large proportionate of the supply of condominiums on the market. These transactions would likely be financed by foreign banks and, therefore, would not be covered by the loan data collected by the NBC. According to the Cambodian Constitution, foreigners are not allowed to own land in Cambodia. This means that foreigners cannot buy land or houses that are built on the ground. However, foreigners can own apartments or condominiums that are above the ground floor, as long as they are registered as co-owned properties with local partners and the foreign ownership does not exceed 70 percent of the total floor area. This law was introduced in 2010 to encourage foreign investment and development in the real estate sector.

20. The NBC should devise a longer-term strategy to close the gap in coverage by researching new data sources. Given that the NBC may not be able to readily access transaction-level data from administrative sources, it was felt that listings information from real estate websites may be the best option to research initially.

Recommended Actions:

- Continue to use the loan data to compile the RPPI in the medium term.
- Include the additional loan data from micro-finance institutions in the sample as part of the overall update of the methods.
- Estimate the existing coverage of the RPPI using a combination of the loan data and administrative data sources.
- Devise a longer-term strategy to close the gap in coverage by researching the potential of new data sources e.g., website listings.

C. COMPILATION METHODS

21. The methods and procedures used to compile the RPPI for Cambodia were reviewed during the mission. The authorities are currently using the time dummy hedonic method with an 18-month window length to compile quality-adjusted indices. While the authorities should continue to use this approach, there were a number of areas where improvements to the methods will enhance the quality and useability of the index. These include the (i) the filtering and cleaning of the loan data, (ii) the stratification of the sample, (iii) the outlier detection method and (iv) model specification for the hedonic regressions.

22. Data inspection was performed by visualizing price vis-à-vis key characteristics in the dataset. The key characteristics analyzed included location, size and other variables as outlined in paragraph 16. To provide information on the quality of the loan data and to gain insights into the relationship between characteristics, data visualization plots (histograms, bar charts, scatter plots etc.) and descriptive statistics (e.g., mean, and median price per district) were produced during the mission.

23. Transactions outside the scope of the RPPI should be excluded. The current index includes loans that were issued by the banks for the purpose of building a property. However, these should be excluded as there is no transaction for a residential property. The funds are being used to purchase materials and pay for a builder to construct a property. In addition, it was decided to amend some of the

filters for particular variables. The minimum threshold for the land area of a property was lowered from 40 to 20 square meters. New thresholds were added for the number of bedrooms (greater than 9 bedrooms were excluded) and the number of floors (greater than 4 floors were excluded).

24. Some property characteristics should be merged into homogenous groups. Due to the low number of transactions per month for some categories, these characteristics should be grouped into similar groups. It is recommended to group them according to meaningful categories and groupings that prevail common price segments. In particular, categories should be created for location. Within Phnom Penh, these categories can be created using a combination of khan and sangkat. Outside of Phnom Penh, they can be created by merging the provinces. Depending on the number of observations in the strata, about 6-10 categories would be appropriate. In addition, four categories were created for number of floors and seven categories were created for number of bedrooms.

25. The authorities should apply a more detailed stratification of the loan data. There was detailed discussion during the mission on an appropriate stratification for the loan data, with various options being assessed. This is an important decision as the strata are used both for the compilation and dissemination of the indices. The published RPPI has two strata as follows: (i) Phnom Penh and (ii) Other Provinces. However, there are sufficient observations within Phnom Penh to support a more granular stratification. Therefore, it was proposed to extend the stratification to four strata as follows: (i) Central & East Phnom Penh, (ii) Inner Suburbs Phnom Penh and (iii) Outer Suburbs Phnom Penh and (iv) Cambodia excluding Phnom Penh. Appendix B contains more detail on the districts proposed to be included in each of the new strata within Phnom Penh. Table 3 shows the number of observations per year in each of these strata.

TABLE 3. Number of Observations Per Year and Strata (Before Outlier Detection)

Strata / Year	Central & East Phnom Penh	Inner Suburb Phnom Penh	Outer Suburb Phnom Penh	Cambodia excluding Phnom Penh	Total
2020	2,495	3,669	2,313	1,483	9,960
2021	2,304	3,837	3,519	2,671	12,331
2022	2,362	3,748	5,525	3,492	15,127
2023	1,394	2,635	3,815	2,700	10,544
All years	8,555	13,889	15,172	10,346	47,962

26. The authorities should use Cook's Distance for outlier detection. The existing methodology uses the interquartile range by month and strata to identify outliers. However, this method is excluding a very high proportion of the sample. Within Phnom Penh, this method excludes between 6.9 percent and 15.9 percent of the data. Outside Phnom Penh, the method excludes between 10.3 percent and 18.3 percent of the data. It is recommended to replace the interquartile range method and use Cook's Distance instead. This regression-based method identifies outliers with greater precision and, therefore, preserves the sample to the extent possible. The mission applied this method to the data and the results are shown in Table 4. As can be seen, the proportion of identified outliers ranges from 4.1 percent to 7.0 percent across all strata and years.

TABLE 4. Identified Outliers Per Year and Strata, Percent of Observations.

Strata / Year	Central & East Phnom Penh (%)	Inner Suburbs Phnom Penh (%)	Outer Suburbs Phnom Penh (%)	Cambodia excluding Phnom Penh (%)	Total (%)
2020	6.6	5.8	7.0	5.9	6.3
2021	5.9	5.2	4.1	6.6	5.3
2022	8.8	7.2	5.0	7.0	6.6
2023	6.6	5.8	6.0	6.0	6.0
All years	7.0	6.0	5.4	6.5	6.1

27. The NBC should update the current model specification. The existing model for the RPPI is overfitted with too many independent variables. This can lead to misleading R-squared values, regression coefficients, and p-values. For example, within Phnom Penh, there are 14 administrative divisions called khans, which are further subdivided into 105 sangkats. The existing model includes the sangkats, which means that the regression model can have a very high number of dummy variables for location. It is recommended to remove the sangkat variable and replace it with a more aggregated location variable such as khan or categories created using a combination of khan and sangkat. Outside of Phnom Penh, location categories can be created by using a combination of province and district. In addition, while testing new model specifications, it was found that the coefficient for the width of the property was not statistically significant and could be removed from the model. The preferred model includes the property characteristics as follows: (i) location e.g., district / khan / province (ii) floor area (iii) plot size (iv) number of floors (v) number of bedrooms (vi) title of the property[1] and (vii) property type. Appendix A shows a sample regression output for Central & East Phnom Penh for the 18-month window from 2020M1 to 2021M6.

28. Robustness checks should be applied to the results of the regressions. The results of the regression should be analyzed further to ensure the estimated coefficients or shadow prices are plausible in terms of their sign and magnitude. In addition, stability checks on the coefficients for each rolling window and each stratum should be carried out. The authorities should also analyze the regression residuals to ensure the data is not displaying any particular trends.

29. The sub-indices should be aggregated using weights to higher-level indices including the national RPPI. The NBC have already implemented this approach in their published index. Table 5 shows the 2020 weights within the newly proposed strata. It can be seen that Central & East Phnom Penh, which includes some of the more expensive areas in the city, has a weight of 39.4 percent while the next largest stratum is Inner Suburbs Phnom Penh at 34.0 percent. The strata for Cambodia excluding Phnom Penh only accounts for 10.3 percent of the overall residential property market.

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[1] The title of the property can be (i) hard title, (ii) soft title or (iii) leasehold. Hard title is the most secure legal ownership and is registered with central government. With hard title, the borrower can get a better interest rate on a collateralized bank loan. Soft title is less secure than hard title. The ownership is only registered at the local or provincial level and central government can take possession of the property as required e.g. national infrastructure project. For leasehold, the tenancy is generally between 45 and 99 years. There was some debate whether the leasehold properties should be excluded from the sample, however, the NBC felt they should remain in the index. Leasehold properties are not very prevalent in the data.

TABLE 5. Expenditure Weights by Strata for 2020

Stratum Name	Weights (% of Total Expenditure)	No. of observations (% of Total)
Central & East Phnom Penh	39.4	25.1
Inner Suburbs Phnom Penh	34.0	36.8
Outer Suburbs Phnom Penh	16.3	23.2
Cambodia excluding Phnom Penh	10.3	14.9
Total	100.0	100.0

30. Price indices for houses were compiled during the mission using the updated methods.
Figures 1 to 3 compare the updated RPPIs and the published RPPIs for the 18-month period from 2020M1 to 2021M6. The published national index for Cambodia shows year-on-year inflation of 16.0 percent over this period, while the updated index shows inflation of 11.0 percent. The NBC should complete the calculation of the updated indices for the most recent period and compare the results with the published RPPIs.

Recommended Actions:

▪ Transactions outside the scope of the RPPI should be excluded e.g., loans that were issued by the banks for the purpose of building a property.
▪ Some property characteristics should be merged into homogenous groups.
▪ Apply a more detailed stratification of the loan data.
▪ Use Cook's Distance for outlier detection.
▪ Update the current model specification for the hedonic regressions.
▪ Robustness checks should be applied to the results of the regressions.
▪ Complete the calculation of the updated indices for the most recent period and compare with the published RPPI.

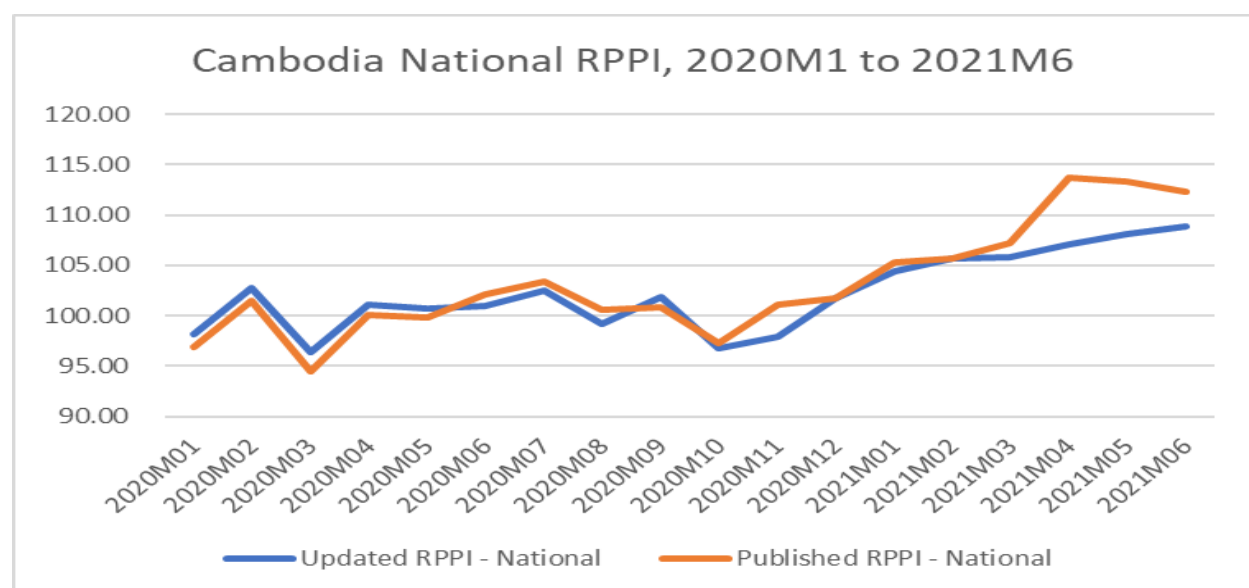**FIGURE 1.** National RPPI (2020=100), Updated & Published, 2020M1–2021M6

FIGURE 2. Phnom Penh RPPI (2020=100), Updated & Published, 2020M1–2021M6
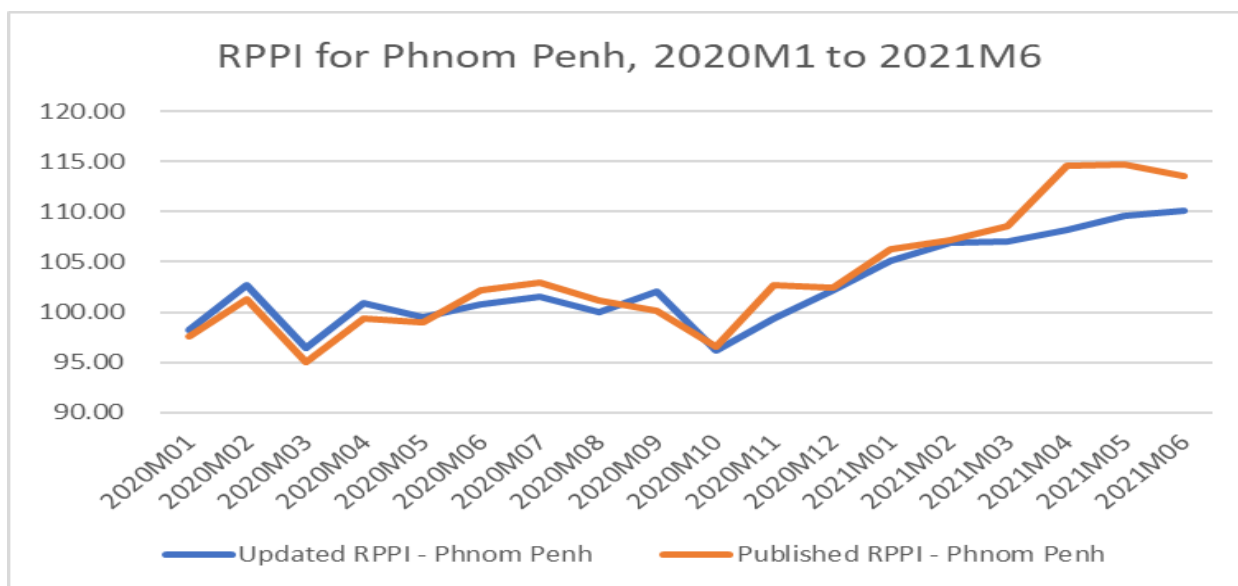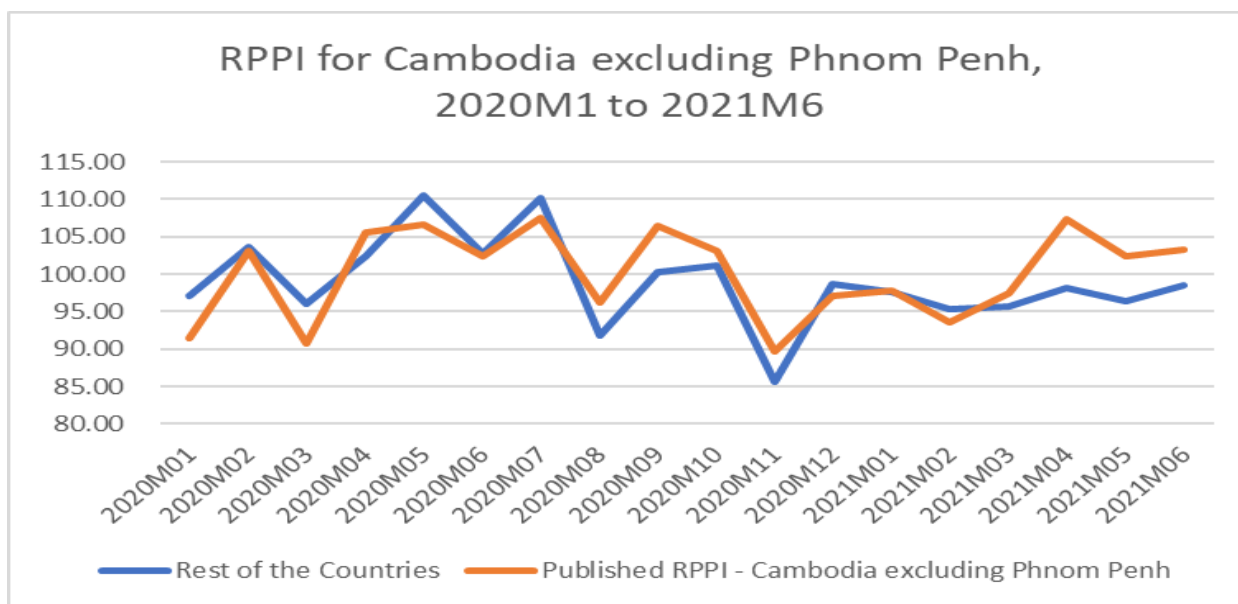

FIGURE 3. Cambodia excluding Phnom Penh RPPI (2020=100), Updated & Published, 2020M1–2021M6

D. DISSEMINATION

31. The NBC should implement the improved methods into their regular compilation of the RPPI. However, the NBC should analyze the results of the updated indices before deciding whether to revise the retrospective data. The NBC may decide not to revise the retrospective data and just apply the updated methods to the compilation of the RPPIs from the next update of the annual weights. However, this approach would introduce a structural change in the index from the month the new methods were

introduced. By applying the new methods from the start of the time series, the RPPIs would be compiled more consistently over time.

32. The NBC can disseminate more detailed RPPIs by introducing a more granular stratification of the data. The existing publication consists of the national RPPI for Cambodia and sub-indices for (i) Phnom Penh and (ii) Other Provinces. The more detailed stratification will allow for the dissemination of more detailed sub-indices within Phnom Penh. This will provide users with valuable information on the contribution of different areas of the capital region to the overall inflation rate for residential property.

33. A detailed methodological document should be drafted and published on the authorities' website. A methodological document is an important step for ensuring transparency and providing detailed information for users on the steps for data compilation. The NBC already have a draft paper which can be used as the basis for a methodological document. The document should include information on the data source, coverage of the index, data quality and cleaning, outlier detection, stratification, weighting information, and methods for index compilation and aggregation.

Recommended Actions:

- Implement the improved methods into their regular compilation of the RPPI.
- Decide whether to revise the retrospective data.
- Disseminate more detailed RPPIs.
- Draft and publish a detailed methodological document on the authorities' website.

E. OFFICIALS MET DURING THE MISSION

Name	Position	Organization
Dr. Khou Vouthy	Director General of Policy and International Cooperation	NBC
Mr. Ith Hero	Deputy Director General of Policy and International Cooperation and Head of Statistics Department	NBC
Mr. Souk Mann	Deputy Head of Statistics Department	NBC
Mr. Ung Visoth	Deputy Head of Statistics Department	NBC
Mr. Mao Chanden	Division Chief	NBC
Ms. Meas Pichvichny	Official	NBC
Mr. Chheang Samnang	Official	NBC
Ms. Chhan Kimbuoy	Official	NBC
Mr. Tang Chung Kheang	Contract staff	NBC

Appendix A. Sample Regression Results

Sample Regression Output for Central East Phnom Penh (2020M1–2021M6)

Term	Estimate	Std Error	Statistic	P-value
(Intercept)	6.0420	0.0845	71.53	< 0.00 ***
Built Area (Sq. Meters)	0.0021	0.0001	25.56	< 0.00 ***
Land Area (Sq. Meters)	0.0021	0.0001	28.90	< 0.00 ***
Reference - District BOENG KENG KANG	0	n/a	n/a	n/a
District CHAMKAR MON	-0.2091	0.0706	-2.96	0.0031 **
District CHBAR AMPOV	-0.8332	0.0569	-14.64	< 0.00 ***
District CHRAOY CHONGVAR	-0.8320	0.0574	-14.48	< 0.00 ***
District DOUN PENH	-0.0154	0.0925	-0.17	0.8675
District PRAMPIR MEAKKAKRA	-0.0186	0.1272	-0.15	0.8837
District RUSSEY KEO	-0.8165	0.0570	-14.32	< 0.00 ***
District TUOL KOUK	-0.3526	0.0610	-5.78	< 0.00 ***
Reference - Floor No. 1	0	n/a	n/a	n/a
Floor. No. 2	0.0629	0.0218	2.89	0.0039 **
Floor. No. 3	0.2164	0.0263	8.23	< 0.00 ***
Floor. No. 4	0.1776	0.0672	2.64	0.0082 **
Reference Property Type Detached	0	n/a	n/a	n/a
Property Type Semi-detached	0.1113	0.0173	6.45	< 0.00 ***
Property Type Townhouse	-0.0257	0.0156	-1.65	0.0997 .
Reference - No. Bed 1	0	n/a	n/a	n/a
No. Bed 2	0.0423	0.0610	0.69	0.4878
No. Bed 3	0.2770	0.0634	4.37	< 0.00 ***
No. Bed 4	0.4023	0.0629	6.39	< 0.00 ***
No. Bed 5	0.5675	0.0656	8.65	< 0.00 ***
No. Bed 6	0.4307	0.0664	6.49	< 0.00 ***
No. Bed 7+	0.3830	0.0817	4.69	< 0.00 ***
Reference - Hard Title (Most Secure)	0	n/a	n/a	n/a
Soft Title (Next Most Secure)	0.0153	0.0160	0.95	0.3402
Title Leasehold (>45 years)	-0.2717	0.0352	-7.72	< 0.00 ***
Reference - Period 2020M01	0	n/a	n/a	n/a
Period 2020M02	0.0545	0.0286	1.91	0.0564 .
Period 2020M03	-0.0413	0.0288	-1.43	0.1525

Term	Estimate	Std Error	Statistic	P-value
Period 2020M04	0.0187	0.0317	0.59	0.5547
Period 2020M05	0.0174	0.0318	0.55	0.5851
Period 2020M06	0.0059	0.0280	0.21	0.8326
Period 2020M07	-0.0076	0.0293	-0.26	0.7959
Period 2020M08	-0.0155	0.0318	-0.49	0.6247
Period 2020M09	0.0461	0.0304	1.52	0.1292
Period 2020M10	0.0377	0.0297	1.27	0.2046
Period 2020M11	0.0348	0.0281	1.24	0.2149
Period 2020M12	0.0419	0.0289	1.45	0.1473
Period 021M01	0.0274	0.0300	0.91	0.3616
Period 2021M02	0.0927	0.0291	3.18	0.0015 **
Period 2021M03	0.0536	0.0287	1.87	0.0614 .
Period 2021M04	0.0894	0.0399	2.24	0.0252 *
Period 2021M05	0.1029	0.0303	3.40	< 0.00 ***
Period 2021M06	0.1007	0.0291	3.46	< 0.00 ***
Residual standard error: 0.2995 on 3361 degrees of freedom				
Multiple R-squared: 0.7931, Adjusted R-squared: 0.7906				
F-statistic: 322.1 on 40 and 3361 DF, p-value: < 0.00000000000000022				
Signify. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1				

Appendix B. Stratification for Houses in Phnom Penh

Strata	Districts Included
Outer Suburbs Phnom Penh	Prek Pnov, Kamboul, Dangkao
Inner Suburbs Phnom Penh	Sensok, Por Senchey, Mean Chey
Central & East Phnom Penh	Chroy Changvar, Russey Keo, Doun Penh, Tuol Kouk, Prampi Makara, Chamkar Mon, Boeng Keng Kang, Chbar Ampov

Figure B1. Map of Phnom Penh by District: