

IFPD: An R Package for Indonesia Food Prices Data

Fadhlul Mubarak¹, Vinny Yuliani Sundara², Nurniswah³

¹Department of Agribusiness, Universitas Jambi, Indonesia

²Department of Statistics, UIN Sulthan Thaha Saifuddin, Indonesia

³Department of Social Science Education, UIN Fatmawati Sukarno, Indonesia

Abstract

The IFPD package aims to introduce food price data in Indonesia to the world where the food price data in Indonesia no longer has missing values because LOCF imputation has been carried out so that it can be directly used in time series or panel analysis.

Key Words: IFPD package, World, Missing values, LOCF imputation

IFPD: Endonezya Gıda Fiyatları Verileri için bir R Paketi

Özet

IFPD paketi, Endonezya'daki gıda fiyat verilerinin artık eksik değerlere sahip olmadığı, LOCF hesaplamasının yapıldığı ve böylece verilerin doğrudan zaman serisi veya panel analizinde kullanılabileceği şekilde dünyaya tanıtılmasını amaçlamaktadır.

Anahtar Kelimeler: IFPD paketi, Dünya, Eksik değerler, LOCF tahmini

Introduction

The National Strategic Food Price Information Center has provided food price data in Indonesia both numerically and visually, such as **Figure 1** (PIHPS Nasional, 2024). However, the data still has missing values at several points in time and cannot be directly analyzed by researchers. One technique that is suitable for missing values in the time series data is the last observation carried forward (LOCF) as conducted by Mubarak in 2022-2023 for the price of rice in Banda Aceh, stock prices in PT ANTAM Tbk, PT BTPN Syariah Tbk, PT Astra Internasional Tbk, PT Bank Syariah Indonesia Tbk, Gold Price in United States, United Kingdom, Indonesia, Saudi Arabia, and Turkey (Auliah et al., 2023; Mubarak, Aslanargun, & Şıklar, 2022; Mubarak, Aslanargun, & Sundara, 2022; Mubarak et al., 2021, 2023; Murfadiyah et al., 2023; Nasution et al., 2023; Wahyuni et al., 2023).

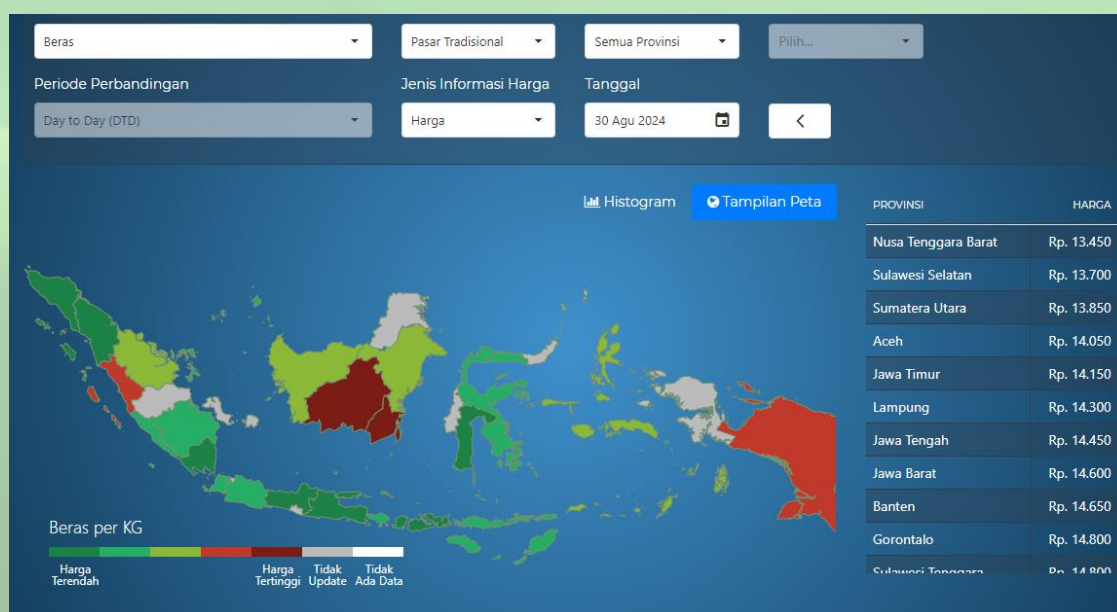


Figure 1. Display of National Strategic Food Price Information Center (PIHPS)



This IFPD package aims to introduce food price data in Indonesia to the world where the food price data in Indonesia no longer has missing values because LOCF imputation has been carried out so that it can be used directly in time series or panel analysis. In addition, food price data in Indonesia does not yet have a package in R programming. Even though there are already many packages related to data collection in R programming such as lidR (Roussel et al., 2020), ODMMeans (Heredia et al., 2024), MoveR (Heredia et al., 2024), easyclimate (Cruz-Alonso et al., 2023), PbIso (Armistead et al., 2023), neonPlantEcology (Mahood et al., 2024), etc.

IFPD Package

In the IFPD package version 0.1.0, there are several variables that can be seen in **Table 1**. The types of food recorded include rice, chicken, beef, eggs, shallots, garlic, chilies, cayenne pepper, cooking oil, granulated sugar, with several classifications. Furthermore, food price data in each province is represented by food prices in each capital city. For example, food prices in Aceh are represented by food prices in Banda Aceh, food prices in Bali are represented by food prices in Denpasar, and so on (**Table 2**).

Table 1. Variables in the IFPD package

Variabel	Explanation
Tanggal	Date
Beras	Price of rice
Beras Kualitas Bawah I	Price of lower quality rice I
Beras Kualitas Bawah II	Price of lower quality rice II
Beras Kualitas Medium I	Price of medium quality rice I
Beras Kualitas Medium II	Price of medium quality rice II
Beras Kualitas Super I	Price of super quality rice I
Beras Kualitas Super II	Price of super quality rice II
Daging Ayam	Price of chicken meat
Daging Ayam Ras Segar	Price of fresh purebred chicken meat
Daging Sapi	Price of beef
Daging Sapi Kualitas 1	Price of 1st quality beef
Daging Sapi Kualitas 2	Price of 2nd quality beef
Telur Ayam	Price of chicken eggs
Telur Ayam Ras Segar	Price of fresh purebred chicken eggs
Bawang Merah	Price of shallots
Bawang Merah Ukuran Sedang	Price of medium shallots
Bawang Putih	Price of garlic
Bawang Putih Ukuran Sedang	Price of medium garlic
Cabai Merah	Price of red chili
Cabai Merah Besar	Price of big red chili
Cabai Merah Keriting	Price of curly red chilies
Cabai Rawit	Price of Tabasco chili pepper
Cabai Rawit Hijau	Price of green Tabasco chili pepper
Cabai Rawit Merah	Price of green Tabasco chili pepper
Minyak Goreng	Price of cooking oil
Minyak Goreng Curah	Price of bulk cooking oil
Minyak Goreng Kemasan Bermerk 1	Price of branded packaged cooking oil 1
Minyak Goreng Kemasan Bermerk 2	Price of branded packaged cooking oil 2
Gula Pasir	Price of sugar
Gula Pasir Kualitas Premium	Price of premium sugar
Gula Pasir Lokal	Price of local sugar

Also, this study uses food data between January 1, 2020 to December 29, 2023. The data is daily data on food prices in traditional markets. However, these data have missing values at some times. So, this study solves this problem by using the last observation missing value (LOCF) imputation method which follows equation 1. For example, Table 4 is the imputation result applied to Table 3. Table 3 is a sample of food price data in Banda Aceh (Aceh) where Beras is the price of rice, BKB I is the Price of lower quality rice I, BKB II is the Price of lower quality rice II, BKM I is the Price of medium quality rice I, BKM II is the Price of medium quality rice II, BKS I is the Price of super quality rice I and BKS II is the Price of super quality rice II.

$$B_i^* = \begin{cases} \text{if complete data then } B_i^* = B_i \\ \text{if missing data then } B_i^* = B_{i-e} \end{cases} \quad (1)$$

where B_i^* is the result of imputation of rice prices and B_{i-a} is a recursive process of finding data lags until no missing values occur.



Table 2. Names of provinces and capital cities in the IFPD package

Province	City	Province	City
Aceh	Banda Aceh	Kepulauan Riau	Tanjung Pinang
Bali	Denpasar	Lampung	Lampung
Banten	Serang	Maluku	Ambon
Bengkulu	Bengkulu	Maluku Utara	Sofifi
DI Yogyakarta	Yogyakarta	Nusa Tenggara Barat	Mataram
DKI Jakarta	Jakarta	Nusa Tenggara Timur	Kupang
Gorontalo	Gorontalo	Papua	Jayapura
Jambi	Jambi	Papua Barat	Manokwari
Jawa Barat	Bandung	Riau	Pekanbaru
Jawa Tengah	Semarang	Sulawesi Barat	Mamuju
Jawa Timur	Surabaya	Sulawesi Selatan	Makassar
Kalimantan Barat	Pontianak	Sulawesi Tengah	Palu
Kalimantan Selatan	Banjarmaru	Sulawesi Tenggara	Kendari
Kalimantan Tengah	Palangkaraya	Sulawesi Utara	Manado
Kalimantan Timur	Samarinda	Sumatera Barat	Padang
Kalimantan Utara	Tanjung Selor	Sumatera Selatan	Palembang
Kepulauan Bangka Belitung	Pangkal Pinang	Sumatera Utara	Medan

Table 3. Sample data in the IFPD package

Tanggal	Beras	BKB I	BKB II	BKM I	BKM II	BKS I	BKS II
2020-01-01	-	-	-	-	-	-	-
2020-01-02	10600	9850	10000	10250	10300	11900	11150
2020-01-03	10600	9850	10000	10250	10300	11900	11150
2020-01-06	10750	10000	10150	10400	10400	12150	11400
2020-01-07	10750	10000	10150	10400	10400	12150	11400
2020-01-08	10750	10000	10150	10400	10400	12150	11400
2020-01-09	10750	10000	10150	10400	10400	12150	11400
2020-01-10	10750	10000	10150	10400	10400	12150	11400

Table 4. Sample data in the IFPD package after imputation

Tanggal	Beras	BKB I	BKB II	BKM I	BKM II	BKS I	BKS II
2020-01-01	-	-	-	-	-	-	-
2020-01-02	10600	9850	10000	10250	10300	11900	11150
2020-01-03	10600	9850	10000	10250	10300	11900	11150
2020-01-04	10600	9850	10000	10250	10300	11900	11150
2020-01-05	10600	9850	10000	10250	10300	11900	11150
2020-01-06	10750	10000	10150	10400	10400	12150	11400
2020-01-07	10750	10000	10150	10400	10400	12150	11400
2020-01-08	10750	10000	10150	10400	10400	12150	11400

The imputation process on January 1, 2020 did not occur in **Table 4** because there was no data available at the previous time. Furthermore, in **Table 4**, there are food prices on January 3 and 4, 2024 which are the same as food prices on January 2, 2024 due to the imputation process.

Conclusion

The IFPD package aims to introduce food price data such as rice, chicken, beef, eggs, shallots, garlic, chilies, cooking oil, granulated sugar, with several classifications in Indonesia to the world where the food price data in Indonesia no longer has missing values because LOCF imputation has been carried out so that it can be directly used in time series or panel analysis.

References

- Armistead, S. E., Eglington, B. M., & Pehrsson, S. J. (2023). PbIso: an R package and web app for calculating and plotting Pb isotope data. *Canadian Journal of Earth Sciences*, 61(1), 1–15. <https://doi.org/10.1139/CJES-2023-0029>
- Auliah, U., Rafidah, R., & Mubarak, F. (2023). Penerapan metode ARIMA terhadap perkiraan harga saham pada perusahaan Bank Syariah Indonesia (BSI). *E-Journal Perdagangan Industri Dan Moneter*, 11(1), 41–48. <https://doi.org/10.22437/pim.v11i1.30923>



- Cruz-Alonso, V., Pucher, C., Ratcliffe, S., Ruiz-Benito, P., Astigarraga, J., Neumann, M., Hasenauer, H., & Rodríguez-Sánchez, F. (2023). The easyclimate R package: Easy access to high-resolution daily climate data for Europe. *Environmental Modelling & Software*, 161, 105627. <https://doi.org/10.1016/J.ENVSOFT.2023.105627>
- Heredia, C., Moreno, S., & Yushimito, W. (2024). ODMeans: An R package for global and local cluster detection for Origin–Destination GPS data. *SoftwareX*, 26, 101732. <https://doi.org/10.1016/J.SOFTX.2024.101732>
- Mahood, A. L., Muthukrishnan, R., Macdonald, J. A., Barnett, D. T., Sokol, E. R., & Simkin, S. M. (2024). neonPlantEcology: An R package for preparing NEON plant data for use in ecological research. *Ecological Modelling*, 493, 110750. <https://doi.org/10.1016/J.ECOLMODEL.2024.110750>
- Mubarak, F., Aslanargun, A., & Siklar, I. (2021). The Best K-Exponential Moving Average with Missing Values: Gold Prices in Indonesia, Saudi Arabia, and Turkey during COVID-19. *Proceedings of The International Conference on Data Science and Official Statistics*, 2021(1), 334–342. <https://doi.org/10.34123/icdsos.v2021i1.42>
- Mubarak, F., Aslanargun, A., & Şiklar, İ. (2022). GSTARIMA Model with Missing Value for Forecasting Gold Price. *Indonesian Journal of Statistics and Its Applications*, 6(1), 90–100. <https://doi.org/10.29244/ijsa.v6i1p90-100>
- Mubarak, F., Aslanargun, A., & Sundara, V. Y. (2022). LOCF imputation for Astra Agro Lestari Tbk. (Indonesia) and Anadolu Group (Turkey) stock. *Majalah Ilmiah Matematika Dan Statistika*, 22(2), 145–160. <https://doi.org/10.19184/mims.v22i2.32305>
- Mubarak, F., Sundara, V. Y., & Nurniswah. (2023). Forecasting the Price of Rice in Banda Aceh after Covid-19. *International Journal of Computational Engineering Research*, 13(5), 30–42.
- Murfadiyah, E., Hafiz, A. P., & Mubarak, F. (2023). Perkiraan harga saham pada Perusahaan Astra Internasional Tbk. menggunakan metode moving average. *E-Journal Perdagangan Industri Dan Moneter*, 11(1), 49–58. <https://doi.org/10.22437/pim.v11i1.30925>
- Nasution, R. F., Rafidah, R., & Mubarak, F. (2023). Perkiraan harga saham pada perusahaan aneka tambang dengan metode double exponential smoothing. *E-Journal Perdagangan Industri Dan Moneter*, 11(1), 59–68. <https://doi.org/10.22437/pim.v11i1.30929>
- PIHPS Nasional. (2024). *Pusat Informasi Harga Pangan Strategis Nasional*. <https://www.bi.go.id/hargapangan>
- Roussel, J. R., Auty, D., Coops, N. C., Tompalski, P., Goodbody, T. R. H., Meador, A. S., Bourdon, J. F., de Boissieu, F., & Achim, A. (2020). lidR: An R package for analysis of Airborne Laser Scanning (ALS) data. *Remote Sensing of Environment*, 251, 112061. <https://doi.org/10.1016/J.RSE.2020.112061>
- Wahyuni, E. D., Rafidah, R., & Mubarak, F. (2023). Analisis harga saham pada PT. BTPN Syariah Tbk dengan metode EMA (exponential moving average) Tahun 2020-2022. *E-Journal Perdagangan Industri Dan Moneter*, 11(1), 29–38. <https://doi.org/10.22437/pim.v11i3.28417>

