*Carmelita Esclanda-Lo has lead the Data Analytics Subunit at the Department of Economic Statistics of the Bangko Sentral ng Pilipinas (BSP) since 2022. Before joining the BSP, she worked in the National Economic and Development Authority (Ministry of Economics) for ten years. She holds a M.Sc. in Data Science from the Asian Institute of Management in Makati (Philippines).*

*Chelsea Anne Ong has been a Data Scientist in the Bangko Sentral ng Pilipinas since 2020, specializing in Python for data cleaning, statistical analysis, and machine learning, and is certified as AWS and Azure Cloud Practitioner. She holds a M.Sc. in Data Science from the Asian Institute of Management in Makati (Philippines).*

*Gabriel Masangkay has been a Junior Central Bank Associate at the Bangko Sentral ng Pilipinas since 2023. He obtained his Bachelor’s Degree in Economics from the University of Santo Tomas, Philippines. His research interests are in the application of machine learning and artificial intelligence techniques to macroeconomics and monetary policy.*

Dear Carmelita, Chelsea and Gabriel, please accept my warmest congratulations on this prize.

SJIAOS: As a starter for this interview, can you both tell us why you chose to join the Central Bank of the Philippines (BSP)?

*Carmelita****:*** *As a data scientist and seasoned civil servant from the National Economic Development Authority (i.e., Ministry of Economics in the Philippines), I chose to join the Bangko Sentral ng Pilipinas (BSP) (i.e., Central Bank) to harness my analytical skills and policy expertise to help advance data-driven decision-making, shape monetary policies, and drive innovative strategies in promoting financial stability.*

*Chelsea: I chose to join the BSP because I have always wanted to contribute to the greater good while having opportunities for professional growth. As a data scientist, I tackle problems from an analytical standpoint which gives another dimension to the traditional approach the seasoned central bankers offer.*

*Gabriel: I have always wanted to become a civil servant ever since considering a career path. The opportunity to work in an organization where I can make a meaningful impact through public service inspired me to pursue a career at the BSP, which is dedicated to improving the lives of Filipinos.*

SJIAOS: Your Special Commendation Award-winning manuscript is on *E-Commerce Price Index Prediction with Time Series Mining and Automated Machine Learning*. Can you tell us a bit more about the content and the motivation for this specific research?

*Carmelita, Chelsea and Gabriel:**The research aims to overcome the limitations of traditional price index methods by utilizing near real-time data from e-commerce platforms, which offer timely insights into price fluctuations compared to survey-based approaches. The study extracts significant trends from e-commerce data by employing a pipeline of Time Series Mining and Automated Machine Learning to generate an alternative price index. As an initial step, we developed an alternative e-commerce index focused on food commodities to pioneer the use of e-commerce data and advanced analytics to modernize how we understand the current price trends.*

SJIAOS: What were the main challenges you experienced in doing this research?

*Carmelita, Chelsea and Gabriel:**The three main challenges that we encountered were the following :*

*- Data Quality and Variability: E-commerce data can be vast and heterogeneous, posing challenges regarding data quality, completeness, and consistency. Ensuring that the data used for analysis is accurate and representative was a significant hurdle.*

*- Complexity of Price Dynamics: Prices in e-commerce platforms can exhibit complex and volatile patterns influenced by factors such as promotions, seasonality, and market dynamics. Capturing and modeling these intricate price behaviors was challenging.*

*- Model Selection and Optimization: Implementing Time Series Mining and Automated Machine Learning techniques required careful selection and tuning of models to achieve robust and reliable predictions. Balancing model complexity with interpretability was another consideration.*

SJIAOS: And how were you informed about the YSP prize and what finally stimulated you to write the paper?

*Carmelita, Chelsea and Gabriel:**Upon receiving the email about the YSP prize, Mr. Rossvern Reyes, our former supervisor, encouraged us to submit a paper. Since the formulation of the BSP Big Data Roadmap in 2019, the development of a higher frequency CPI has been in the pipeline because the BSP recognized that using big data will aid in monitoring volatile price changes. Also, as with any roadmap, it serves as a guide in operationalizing the use of big data as well as its related activities, e.g., information technology (IT) infrastructure building, in the BSP. In 2023, we consulted the Philippine Statistics Authority (i.e., the Statistics Agency) on CPI generation, collaborated with the Department of Trade and Industry for the data generated in their electronic platform, and gathered enough datasets from private companies with e-commerce data for a pilot run. It is also timely that we learned about the YSP prize since submitting it to the IAOS could help us further review and improve our models.*

SJIAOS: Did you experience good coaching and support from your team and management?

*Carmelita, Chelsea and Gabriel:**Definitely! Our team works collaboratively, where we draw on each other’s strengths. Meanwhile, our Senior Director, Mr. Redentor Paolo Alegre Jr., always ensures that our outputs are of high quality and value and his insights helped us to draft our paper better.*

SJIAOS: Can you give us more details on the predictive part of your work? More specifically, predicting the one-month ahead CPI

*Carmelita, Chelsea and Gabriel:**The main objective of the research is to generate a composite e-commerce price index (CEPI) using e-commerce data and advanced predictive modeling techniques. Further, the CEPI is a composite index derived from e-commerce price data, reflecting the overall price levels of goods sold online.*

*This analysis helps understand which products or categories within e-commerce data contribute most significantly to predicting changes in the food CEPI, that mostly coincide with the changes in the traditional food CPI. We underline the importance of specific commodities, such as coffee products, in forecasting the food CEPI.*

SJIAOS: Some other initiatives have been launched internationally, using data mining to produce a CPI, such as the Billion Price Index conducted by the MIT and Harvard University. Are you aware of these other projects, and how would you compare your work with theirs, in terms of methodology and predictive results?

*Carmelita, Chelsea and Gabriel:*There are some similarities in our paper with the Billion Price Project (BPP) in that we are both trying to construct an alternative CPI using online data. However, the BPP utilizes standard CPI methodologies and official category weights while our study leverages various machine learning algorithms in deriving the CEPI. In terms of correlation with the official CPI, our models are at par with the models in the BPP. Our alternative CPI has a positive correlation of 90.75% with the National CPI.

SJIAOS: How do you think your research might be used by the Central Bank in the near future or medium term?

*Carmelita, Chelsea and Gabriel:*In the medium term, the generated pipeline introduced in the study could also serve as a building block in the development of a higher frequency CPI that could help the BSP in monitoring changes in prices in near real-time.

SJIAOS: Most of the competitors in the YSP work in National statistical offices, whereas you are employed by the Department of Economics and Statistics of the Central Bank. Is your department in charge of producing and releasing official statistics?

*Carmelita, Chelsea and Gabriel:**Yes. The Department of Economic Statistics (DES) is the major data producer of the BSP. The DES-produced statistics can be divided into three categories:*

*- External Sector Statistics. This includes the Balance of Payments and International Investment Position statistics, Gross International Reserves, Overseas Filipino remittances, and Foreign Direct Investment.*

*- Monetary and Financial Statistics. This includes reports on the financial linkages and interdependencies of the domestic economic sectors with the rest of the world, such as the Balance Sheet Approach and the Flow of Funds .*

*- Expectations Surveys and Leading Indicators. These include reports and surveys focusing on forward-looking statistics or leading indicators of economic activities in the country, such as the Business and Consumer Expectations Survey, Consumer Finance Survey, and Residential Real Estate Price Index.*

SJIAOS: How do you see the future of big data in the work of the Department of Economics and Statistics of the Central Bank?

*Carmelita: The future of big data in the DES of the BSP holds tremendous potential for transforming economic analysis and policy-making processes. Building upon the BSP Big Data Project launched in October 2019, which leverages high-frequency data sources and cloud-based big data and machine learning initiatives, the Department is poised to enhance its capabilities significantly. These advancements will enable more granular and real-time insights into economic trends, improving the accuracy and timeliness of economic indicators used for policy formulation. Furthermore, the formulation of robust big data governance policies ensures that data privacy, security, and ethical considerations are rigorously maintained, fostering trust and compliance in data-driven decision-making. Looking ahead, continued innovation in data analytics within the Department will likely lead to more adaptive and responsive monetary policies, better risk assessment frameworks, and a deeper understanding of economic dynamics in an increasingly interconnected and digital world. As the scope and volume of data continue to expand, the DES is well-positioned to harness these capabilities to maintain its leadership in shaping effective economic policies and strategies.*

SJIAOS: Can I ask you the same question about the future of Machine Learning in the work of the Department of Economics and Statistics of the Central Bank?

*Chelsea: The future of Machine Learning in the DES of the BSP is indeed promising, specifically in generating alternative statistics to support and complement traditional economic indicators. The Department has several initiatives involving machine learning, which include constructing the News Sentiment Index and identifying key predictors of Real Estate Prices. These innovations underscore the Department’s commitment to leveraging advanced analytics to deepen economic insights and improve forecasting accuracy in an increasingly data-driven landscape. In the coming years, we expect to see more innovations leveraging ML that are geared toward delivering our mandate.*

The winning manuscript will be published in SJIAOS Vol 40/4 (December 2024).

**Thank you for this interview and best wishes for a successful career.**

*Interview conducted by Jean-Pierre Cling in July 2024*