Robert Summers Fellowship Application

Name: Carmelita G. Esclanda-Lo
Email: esclandacg@bsp.gov.ph
Current Affiliation: Bangko Sentral ng Pilipinas
LinkedIn: https://www.linkedin.com/in/carmi-esclanda-lo-566b2946/

Summary of Expertise and Research Interests in Economic Measurement

As the Head of Data Analytics Subunit at the Bangko Sentral ng Pilipinas (BSP), I focus on applying advanced statistical methodologies to enhance economic measurement frameworks. My expertise spans machine learning applications in economic statistics, time series forecasting, and the development of novel price indices for both traditional and digital markets.

My research centers on three interconnected areas of economic measurement: (1) innovative price index methodologies, (2) determinants of cross-border investment flows, and (3) data-driven approaches to economic resilience measurement.

Real Estate Price Determinants and Machine Learning Applications

At the National Statistics Month celebration in 2024, I presented research on "Decoding Real Estate Prices: Key Determinants Revealed through Machine Learning."[1] Using the BSP's Residential Real Estate Property Index (RREPI) data from 2016-2023, multiple machine learning models were explored to predict real estate prices and identify key determinants. The Random Forest model proved most effective across most regional strata, achieving adjusted R-squared values of 62-81%. The research revealed that house area, lot area, number of bedrooms, and house age consistently drive housing prices across different property types and regions in the Philippines.[2]

This work contributes to refining the hedonic method for RREPI compilation, supporting the BSP's efforts to monitor housing market trends and adjust policies for economic stability.

E-Commerce Price Indices

In collaboration with colleagues Chelsea Ong and Gabriel Masangkay, I led a study introducing a novel approach to forecasting e-commerce price indices using Dynamic Time Warping (DTW) and automated machine learning techniques in our paper "E-Commerce price index prediction with time series mining and automated machine learning" (2024).[3] This research addresses gaps in traditional economic measurement frameworks that struggle to capture rapidly evolving digital markets.

Our methodology combines time series mining with various regression models, with Ridge Regression emerging as the most effective (R-squared: 0.736). The composite e-commerce index we developed shows a 90.75% correlation with the official national food CPI, demonstrating its potential as a complementary tool for monitoring inflation trends. This work received special commendation for a paper from a developing nation from the International Association for Official Statistics in 2024, highlighting its significance in advancing economic measurement methodologies.[4]

---

[1] Esclanda-Lo, C. G., Masangkay, G. A., Ong, C. A. S., & Reyes, R. S. (2024, October 29). Exploring the evolving determinants of foreign direct investment and the investing country preferences in developing Asian economies using machine learning. Paper presented at the 35th National Statistics Month Closing Ceremony, Bangko Sentral ng Pilipinas, Philippines.

2 Bangko Sentral ng Pilipinas, "35th National Statistics Month Closing Ceremony", 29 October 2024, video, 37:35, https://www.youtube.com/watch?v=gyyy1Su8BRQ.

[3] Esclanda-Lo, C., Ong, C. A., & Masangkay, G. (2024). E-Commerce price index prediction with time series mining and automated machine learning. Journal Title, 40(4). https://doi.org/10.1177/18747655241301198. https://journals.sagepub.com/doi/full/10.1177/18747655241301198

[4] International Statistical Institute. (2024, June 24). 2024 Young Statistician Prize Results. Associations' News. https://www.isi-web.org/news/2024-06-24-young-statistician-prize-results

Cross-Border Investment Flow Determinants

In "Exploring the evolving determinants of foreign direct investment and the investing country preferences in developing Asian economies using machine learning" (2024), our team employed machine learning techniques to identify key factors influencing FDI flows to developing Asian economies.[5] This research provides insights into how traditional economic measurement frameworks can be enhanced to better capture investment dynamics in emerging markets.

The study revealed that trade openness significantly influences investment patterns, with countries having fewer import and export restrictions better attracting FDI. This aligns with empirical studies by Makoni (2018), Sahoo (2006), and others who found positive relationships between trade openness and FDI inflows.[6] As we continue to refine this study with additional FDI-related data from alternative sources, we anticipate further enhancing our understanding of investment dynamics in developing Asian economies.

Big Data Applications in Economic Resilience Measurement

My chapter "Big Data in Asian Post-Disaster Recovery and Reconstruction" (2023) systematically reviews how big data methodologies can enhance economic measurement during post-disaster recovery. This research examines how non-traditional data sources can complement official statistics to provide more timely insights into economic resilience.[7]

Current Research and Data Products

I'm currently leading several projects at Bangko Sentral ng Pilipinas that enhance economic measurement through advanced analytics:

1. Applying machine learning to improve real estate price index estimation
2. Leading initiatives to operationalize the E-Commerce Price Indices
3. Creating news sentiment indices as alternative economic indicators
4. Using AI to identify investment survey respondents from news analytics
5. Constructing economic indicator-specific lexicons to capture nuances in metrics like inflation, unemployment, and consumer sentiment

My research and practical experience connect with Robert Summers' work on international price and output comparisons, particularly in addressing measurement challenges in rapidly evolving economies. The fellowship would provide an opportunity to engage with leading scholars in economic measurement and contribute to advancing methodologies for capturing economic activity in increasingly digital and interconnected economies.

[5] Banco de España, "External Statistics after the Pandemic: Addressing Novel Analytical Challenges", 26 February 2024, video, 53:10, https://www.youtube.com/watch?v=sirx2bAo5MU&list=PLtVu6os2ZMWiwXljbqWxiLpmpI5SI3AOW&index=7.

[6] Esclanda-Lo, C. G., Masangkay, G. A., Ong, C. A. S., & Reyes, R. S. (2024, February 12-13). Exploring the evolving determinants of foreign direct investment and the investing country preferences in developing Asian economies using machine learning. Paper presented at the IFC-ECB-Bank of Spain Conference: "External statistics in a fragmented and uncertain world", Madrid, Spain. https://www.bis.org/ifc/publ/ifcb62_26.pdf

[7] Esclanda, C. G. (2023). Big Data in Asian Post-Disaster Recovery and Reconstruction: A Systematic Literature Review. In P. Tiwari, K. E. Seetharam, & D. B. Rahut (Eds.), Navigating Resilient Post-Disaster Recovery in Asia and the Pacific (Chapter 13). Asian Development Bank Institute. https://doi.org/10.56506/DWKU4071. https://www.adb.org/sites/default/files/publication/924121/navigating-resilient-postdisaster-recovery-asia-and-pacific.pdf