# Jan Carlo B. Punongbayan, Ph.D.

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Version as of 18 June 2025

ACADEMIC	University of the Philippines School of Economics
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Assistant Professor III APPOINTMENT Feb 2022-present

#### **EDUCATION** University of the Philippines School of Economics

Ph.D. Economics 2015-2021 M.A. Economics 2011-2013 B.S. Economics, summa cum laude 2005-2009

#### TEACHING Undergraduate:

Econ 100.1: Introduction to Macroeconomic Theory and Policy

Econ 101: Macroeconomics I Econ 102: Microeconomics I Econ 103: Macroeconomics II

Econ 118: Special Topics in Economic History (The Philippine Economy in the

1970s and 1980s)

Econ 138: Special Topics in Econometrics (Causal Inference in Economics)

Econ 199: Undergraduate Seminar

## RESEARCH

Education economics (basic and higher education, market design of college ad-INTERESTS missions), Philippine economic history (martial law economics), macroeconomics

(inflation), development economics (poverty and microfinance)

#### ACADEMIC SERVICE

#### **UP School of Economics**

Director for Finance and Chair of the Finance Committee Feb 2023-Feb 2024

Director for Graduate Admissions and Fellowships

and Chair of the Graduate Committee Feb 2022-Jan 2023

#### Philippine Center for Economic Development

Division Chief III for Finance and Administration Feb 2023-Feb 2024

#### UP Center for Integrative and Development Studies

Co-convenor, Higher Education Research

and Policy Reform Program

Jan-Dec 2024

	UP Admissions Evaluation Committee Member	Sep 2023-Jan 2024
	Social Science Diliman Associate Editor	Jan 2022-present
	UP Economics Toward Consciousness Faculty Adviser	2023-present
GOVERNMENT POSITIONS PREVIOUSLY HELD	National Economic and Development Authority Head Executive Assistant	Jun 2014-Jul 2015
	Securities and Exchange Commission Economist	Apr 2012-Jul 2013
	Institute to Study Inequality, Poverty, and Social Protection Philippine Center for Economic Development Junior Research Assistant	Jan 2011-Jul 2011
OTHER PROFESSIONAL EXPERIENCE	Usapang Econ Co-founder and Editor-in-Chief	Sep 2018-present
	Rappler.com Contributor since Aug 2013 Thought Leaders columnist since Sep 2016	Jan 2013-present
	FEU Public Policy Center Research Coordinator	May 2018-Apr 2019
	Mitchell Madison Group Business Analyst	Oct-Nov 2010
OTHER TEACHING EXPERIENCE AT UPSE	Senior Lecturer Econ 101 (Intermediate Microeconomics) with Dr. Ma. Christina F. Epetia	1st Sem, AY 2020-2021
	Econ 191 (Development Economics)	2nd Sem, AY 2014-2015
	Teaching Fellow Econ 100.1 (Intro to Macroeconomics), with: Dr. Emmanuel S. de Dios Prof. Solita C. Monsod	2nd Sem, AY 2020-2021 1st Sem, AY 2020-2021

Dr. Renato E. Reside 2nd Sem, AY 2019-2020 Dr. Dante B. Canlas 2nd Sem, AY 2016-2017

Econ 100.2 (Intro to Microeconomics), with:

Dr. Aleli D. Kraft

Dr. Agustin L. Arcenas

Dr. Cayetano W. Paderanga

2nd Sem, AY 2017-2018

1st Sem, AY 2016-2017

2nd Sem, AY 2013-2014

Econ 198 (Special Topics in Econ History), with:

Dr. Emmanuel de Dios 1st Sem, AY 2017-2018

Instructor

Micro Refresher Course May-July 2014

for incoming graduate students

CONSULTING CA

CARD Inc.

EXPERIENCE Consultant Nov 2024-Mar 2025

Study on the economic impact of CARD financial institutions

Philippine Social Science Council

Consultant Forthcoming

Study on the impact of drug rehabilitation and treatment

centers (with the Dangerous Drugs Board)

Asian Development Bank

Labor Market Economist (Resource Person) Sep 2024-Jan 2025

Laos TVET Study (with Dr. Bilal Khan)

WeSolve Foundation

Research Consultant, MalASAkit Loan Study Apr-Sep 2024

(with ASA Philippines Inc.)

Head researcher, Philippine Microfinance Oct 2023-Nov 2024

Survey (with CARD Inc. and ASA Philippines Inc.)

Asian Productivity Organization Apr 2023-Nov 2023

Development of E-course on Managing the

Demographic Transition and its Impact (The Silver Economy)

Innovations for Poverty Action (Manila) Oct 2022-Dec 2022

Philippine Socioeconomic Panel Survey

Office of Rep. Wilbert T. Lee (AGRI Party-list)

Oct 2022-Sep 2023

Economics consultant

#### British Embassy Manila

Jan 2022-Mar 2022

Researcher

Philippine Country Development Diagnostics

(with Marianne Vital, Dr. Jeff Arapoc, Dr. Cherry Madriaga)

#### Philippine Center for Economic Development

Sep 2021-Feb 2022

Research Assistant, UPSE Strategic Review Project

(with Economists Without Borders)

#### FEU Public Policy Center

Jan 2018-Apr 2018

Writing and publication of policy note on higher education in the Philippines

Energy Policy and Development Program (EPDP)

Copyediting of Casebook in public finance Nov 2017-Mar 2018

with Prof. Emmanuel F. Esguerra (editor)

Research on the role of electricity prices Aug 2015–Mar 2016

on structural transformation

Philippine Competition Commission Aug 2016-Apr 2017

Office of the Chairman (Dr. Arsenio M. Balisacan)

The Asia Foundation Feb 2016-Mar 2016

Research on human capital investments, K to 12, and performance-based budgeting,
Coalitions for Change - Education

#### World Bank Office (Manila)

Jul 2013-Jun 2014

Research Assistant

Poverty Reduction and Economic Management Unit

## National Economic and Development Authority

Mar-May 2013

Multidimensional Poverty Index (MPI) research of

Sec. Arsenio M. Balisacan

# Honors and awards

- Nominee, Vea Technology and Evolutionary Economics Centennial Professorial Chair (Academic Years 2022–2023 and 2023–2024)
- Inkwell of Change Award, 11th PARAGALA: Central Luzon Media Awards, 6 December 2024
- UP Diliman Centennial Professorial Chair (1 January 2024 to 31 December 2024 cycle)
- The Outstanding Young Men of the Philippines 2023, JCI Philippines and TOYM Foundation

- For False Nostalgia: Best Filipino Books of 2023 (CNN Philippines Life),
   Favorite Filipino Books of 2023 (Esquire Philippines)
- Special Citation for "The role of power prices in structural transformation: evidence from the Philippines," Outstanding Scholarly Work Awards for the School of Social Sciences, Ateneo de Manila University, 2020
- Nominee, Gawad Chanselor Award Para sa Natatanging Mag-aaral, UP Diliman, 2009 and 2018
- East Asia and Pacific PREM Spot Awards, FY 2014, World Bank. Citation: "For their outstanding contributions to the Philippines Development Report whose content and quality was widely acknowledged, including by the EAPVP and the regional management team."
- José Encarnación Jr. Award for Excellence in Economics, 2009
- Gerardo P. Sicat Award for Best Undergraduate Thesis, 2009
- PGMA Award for Academic Excellence, 2009

# RESEARCH GRANTS AND FELLOWSHIPS

- Grantee, Philippine Center for Economic Development (PCED) Faculty Research Grant. Title of research: "Grade inflation in the University of the Philippines." Duration: Nov 2024 to Oct 2025.
- Visiting Fellow, Philippine Studies Programme (PSP Economy and Sustainable Development), ISEAS—Yusof Ishak Institute. Duration: October 2024 to January 2025.
- Research Fellow, Ateneo and EDCOM2 Research Fellowship. Duration: October 2024 to September 2025.
- Fellow and Grantee, Governance Reform, Innovation, and Transformation Research Laboratories (GRIT Labs), National College of Public Administration and Governance (NCPAG). Duration: July 2024 to June 2025.
- Head Researcher, Philippine Microfinance Survey. WeSolve Foundation. Duration: Jan to Oct 2024.
- Fellow, Social Weather Stations. Duration: 2024 to present.
- Grantee, Philippine Center for Economic Development (PCED) Faculty Research Grant. Title of research: "Decomposing Philippine inflation into its demand and supply components." Duration: Sep 2023 to Aug 2024.

#### **SCHOLARSHIPS**

- Health Policy and Development Program (HPDP) Phase II Fellowship
- Philippine Center for Economic Development

#### Publications Journal articles

- Punongbayan, J.C. 2025. "Supply and demand components of Philippine inflation, 2001–2024." Applied Economics Letters. https://doi.org/10 .1080/13504851.2025.2487241
- Punongbayan, J.C. 2024. "The Philippine Journal of Development in the Early 21st Century (2002-2023)." Philippine Journal of Development, 48(2): 1-24. https://doi.org/10.62986/pjd2024.48.2a
- Punongbayan, J.C. 2024. "Balancing excellence and equity in predictive college admissions: insights from the University of the Philippines." *Education Economics*, 1-24. https://doi.org/10.1080/09645292.2024. 2421165
- Punongbayan, J.C. 2024. "Conversations with social scientists: Economist Emmanuel S. de Dios, PhD." Social Science Diliman, 19(1): 92-101. https://journals.upd.edu.ph/index.php/socialsciencediliman/article/view/9919
- Ravago, M.V., A. Brucal, J. Roumasset, and J.C. Punongbayan. 2019. "The role of power prices in structural transformation: evidence from the Philippines." *Journal of Asian Economics*, 61: 20–33. https://doi.org/10.1016/j.asieco.2019.02.001
- Punongbayan, J.C. 2009. "School inputs and student performance in public elementary schools in Palawan: a quantile regression analysis." *Philippine Review of Economics*, 46(1): 189-218.

#### **Book**

• J.C. Punongbayan. 2023. False Nostalgia: The Marcos "Golden Age" Myths and How to Debunk Them. Quezon City: Ateneo de Manila University Press. (published 25 Feb 2023; 6th printing as of 2025)

#### Book chapters

- Punongbayan, J.C. In print. "Marcos mixtape: Emerging parallels between the economic policies of Marcos Sr. and Marcos Jr." in L. Candelaria, K.C. Alvarez, and J. Pring (eds.). Remembering the Marcos Era: The Memory and Legacy of Marcos and Martial Law. Routledge.
- Punongbayan, J.C. 2024. "Much a Duterte About Nothing: Continuity, Complacency, and Crisis in the Philippine Economy," Chapter 2 in A. Arugay and J.E. Franco (eds.) Games, Changes, and Fears: The Philippines From Duterte to Marcos. Singapore: ISEAS – Yusof Ishak Institute.
- De Dios, E., M. S. Gochoco-Bautista, and J.C. Punongbayan. 2023. "Martial law and the Philippine economy" in F. Llanes (ed.) *The Marcos Years: The Age of Crisis and Repression*. SAMASA Alumni Association, Inc.
- Punongbayan, J.C., E.F. Esguerra, and G.M. Llanto. 2022. "Competition and regulation in the Philippine microfinance sector" in H. Hill, M.V.

- Ravago, and J.A. Roumasset (eds.) *Pro-poor Development Policies: Lessons from the Philippines and East Asia.* Singapore: ISEAS Yusof Ishak Institute.
- Punongbayan, J.C., J.G. Williamson, and K.R.L. Jandoc. 2022. "Convergence of spatial inequality in the Philippines during the American colonial period," in H. Hill, M.V. Ravago, and J.A. Roumasset (eds.) Pro-poor Development Policies: Lessons from the Philippines and East Asia. 390-413. Singapore: ISEAS Yusof Ishak Institute.
- Punongbayan, J.C. 2022. "The Marcosian 'golden age' myths: What they are, why they persist, and how to dispel them" in L.C. Castañeda and P.N. Abinales (eds.) The Marcos era: A reader. Quezon City: Ateneo de Manila University Press.

#### Discussion papers

- Albert, J. R. G., Bayudan-Dacuycuy, C., Angeles-Agdeppa, I., Punongbayan, J. C., Cabalfin, D. L. D., Vargas, A. R. P., Duante, C. A., Ferrer, E. B., and Fernandez-Patalen, C. M. 2024. "Measuring poverty within Filipino households: Examining resource sharing and economies of scale." Philippine Institute for Development Studies Discussion Paper No. 2024-37.
- Monsod, T.C., E.S. de Dios, C.D. Magno, Punongbayan, J.C. et al. 2024.
   "How to change a constitution by hand-waving (Or, the unbearable lightness of evidence in support of lifting foreign ownership restrictions)" UP School of Economics Discussion Paper 2024-01.
- Punongbayan, J.C. et al. 2023. "Maharlika Investment Fund: Still beyond repair." UP School of Economics Discussion Paper 2023-02.
- Tan, E., K. Canales, K. Cruz, and J.C. Punongbayan. 2011. "Why are boys falling behind girls in schooling?" UP School of Economics Discussion Paper 2011–12.

#### Policy notes and briefs

- Punongbayan, J.C, and Z.N. Suzara. 2025. "Rethinking ayuda for sustainable development," INCITEGov Policy Brief. https://bit.ly/rethinking-ayuda
- Albert, J.R.G., J.C. Punongbayan, and M.S. Muñoz. 2024. "Returns to education in the Philippines (2005-2022): declining benefits, increased inequities," Philippine Institute for Development Studies Policy Note No. 2024-09. https://doi.org/10.62986/pn2024.09
- Punongbayan, J.C. 2016. "Making K to 12's Senior High School work,"
   The Asia Foundation Policy Note No. 1. The Asia Foundation Philippines.

#### Proceedings

- Punongbayan, J.C. 2024. "The economy under President Marcos Jr." in "Reality check: Assessing President Marcos Jr.'s First Year in Office (Proceedings of the Roundtable Discussion, Reality vs. Expectation: BBM's 2023 SONA, held on 17 July 2023)." UP Center for Integrative and Development Studies.
- Punongbayan, J.C. 2021. "Does 'Imperial Manila' justify federalism?" *Manila: Selected Papers of the 28th Annual Manila Studies Conference*, 17(1): 75–87. Held on 28–29 November 2019 at Intramuros, Manila.

#### Technical reports

- Loquias, M., A. Ramolete, P.J. Cayton, J.C. Punongbayan, et al. 2024. "UP Admissions Evaluation Project: Final Report." Technical report on recommendations for the UP System's admissions processes.
- De Los Reyes, F. and J.C. Punongbayan. 2020. "Proposed set of weights in computing the overall LAE score." Technical report for the UP College of Law.
- Punongbayan, J.C. et al. April 2014. "Foreign direct investment and foreign ownership restrictions in ASEAN" in "Preserving stability and promoting growth," World Bank East Asia Pacific Economic Update.

#### Theses

- Punongbayan, J.C. 2021. "Essays in market design and college admissions," PhD dissertation. UP School of Economics. Adviser: Dr. Karl Robert L. Jandoc. Other committee members: Dr. Emmanuel S. de Dios and Dr. Emmanuel F. Esguerra.
- Punongbayan, J.C. 2013. "Dynamic response of professional labor supply to global demand shocks: the case of Filipino nurses," master's thesis. UP School of Economics. Adviser: Dr. Joseph J. Capuno. Reader: Dr. Geoffrey Ducanes.
- Punongbayan, J.C. 2009. "School inputs and student performance in public elementary schools in Palawan: a quantile regression analysis," undergraduate thesis. UP School of Economics. Adviser: Dr. Emmanuel F. Esguerra.

#### In progress

- "Microfinance and consumption-smoothing in the Philippines" (with We-Solve, CARD, and ASA Philippines)
- "Matching of K-12 tracks and strands and college degree programs" (with Dr. Jefferson Arapoc)

#### Unpublished works

- Balisacan, A.M. and J.C. Punongbayan. 2014. "Rising from the doldrums: the resurgence of the Philippine economy." Unpublished working paper.
- Punongbayan, J.C. 2014. "Pork barrel, poverty, and inequality." Unpublished working paper.
- Punongbayan, J.C. 2014. *Microeconomics: a handbook*. Unpublished course notes.
- Punongbayan, J.C. 2013. "Returns to education and wage structure in the Philippines: a quantile regression perspective." Unpublished working paper.
- Rahemtulla, H., M.C. Epetia, and J.C. Punongbayan. 2013. "Small area estimation of poverty in the Philippines." Unpublished Special Focus Paper. World Bank.

#### Research assistance citations

- Clarete, R.L., Esguerra, E., Hill, H. 2018. "The Philippine economy: an overview" in Clarete, R.L., Esguerra, E., Hill, H. (eds.) *The Philippine economy: no longer the East Asian exception?* 2018. Singapore: ISEAS Yusof Ishak Institute.
- Balisacan, A.M. and M.V. Ravago. 2015. Agricultural policy and institution reforms in the Philippines: experiences, impacts, and lessons. Southeast Asian Agriculture and Development Primer Series, 2nd ed. Los Baños: SEARCA.
- Balisacan, A.M. and M.V. Ravago. 2015. "Current structure and future challenges of the agricultural sector." Ch. 1 in *The future of Philippine agriculture: scenarios, policies, and investments under climate change.* NEDA and IFPRI.
- Balisacan, A.M. 2014. "The growth-poverty nexus: multidimensional poverty in the Philippines." Ch. 24 in Balisacan, A.M., U. Chakravorty, and M.V. Ravago (eds.), Sustainable economic development: resources, environment, and institutions. US and UK: Elsevier.
- World Bank. 2014. "Foreign direct investment and foreign ownership restrictions in ASEAN." Ch. II-C in the April 2014 East Asia Economic Update. Washington, D.C.: World Bank.

#### COMMENTARY

- Rappler (2013-present): please see https://www.rappler.com/author/jc-punongbayan.
- Punongbayan, J.C. 2025. "Politics in the Purse: Political Budget Cycles as Constraints to Philippine Development." ISEAS Yusof Ishak Institute Perspective 2025/17, Singapore. https://www.iseas.edu.sg/articles-commentaries/iseas-perspective/2025-17-politics-in-the-purse-political-budget-cycles-as-constraints-to-philippine-development-by-jc-punongbayan/

- Punongbayan, J.C. 2025. "Rethinking Economic Planning in the Philippines." Fulcrum, ISEAS Yusof Ishak Institute, Singapore. https://fulcrum.sg/rethinking-economic-planning-in-the-philippines/
- Punongbayan, J.C. 2025. "Philippines' Car-Centric Society: Time to Switch Lanes." Fulcrum, ISEAS Yusof Ishak Institute, Singapore. https://fulcrum.sg/philippines-car-centric-society-time-to-switch-lanes/
  - Republished by South China Morning Post as "Manila must put brakes on its car-centric policies, and seek viable transport solutions" http s://www.scmp.com/week-asia/opinion/article/3295247/ma nila-must-put-brakes-its-car-centric-policies-and-see k-viable-transport-solutions;
  - Republished as is by Eco-Business https://www.eco-business.co m/opinion/philippines-car-centric-society-time-to-swi tch-lanes/)
- Punongbayan, J.C. 2024. "Addressing the Philippines' Education Crisis."
   Fulcrum, ISEAS Yusof Ishak Institute, Singapore. https://fulcrum.sg/addressing-the-philippines-education-crisis/
- Punongbayan, J.C. 2024. "So Near Yet So Far: The Philippines' Lower-Middle-Income Country Trap." Fulcrum, ISEAS Yusof Ishak Institute, Singapore. https://fulcrum.sg/so-near-yet-so-far-the-philippines-lower-middle-income-country-trap/
- Punongbayan, J.C. 2024. "Marcos-Duterte Alliance: Of Broken Ties and Vows." Asia Democracy Research Network (ADRN) Issue Briefing. Seoul. bit.ly/ADRN-IGov-IB0524
- Punongbayan, J.C. 2022. "Philippines Presidential Polls: Economic Recovery at Stake." Fulcrum, ISEAS Yusof Ishak Institute, Singapore. https://fulcrum.sg/philippines-presidential-polls-economic-recovery-at-stake/
- Suzara, Z., L. Abad, J.C. Punongbayan, R. Sanders. 2021. "In this pandemic, Duterte has his priorities all wrong." Al Jazeera website. https://www.aljazeera.com/opinions/2021/6/6/dutertes-many-pandemic-failures
- Opinions also featured in international outlets like BBC, Time, The Guardian, Deusche Welle, The Straits Times, and The Business Times.

#### REFEREEING

- Philippine Review of Economics (University of the Philippines School of Economics)
- DLSU Business & Economics Review (De La Salle University School of Economics)
- Philippine Political Science Journal (UP Department of Political Science)
- One Social Science Journal (Philippine Social Science Council)

- Philippine Journal of Development (Philippine Institute for Development Studies)
- Asian Studies: Journal of Critical Perspectives on Asia (UP Diliman Asian Center)
- Kritika Kultura (Department of English, Ateneo de Manila University)
- Journal of Southeast Asian Economies (ISEAS-Yusof Ishak Institute)
- Philippine Studies: Historical and Ethnographic Viewpoints (Ateneo de Manila University)
- Philippine Journal of Public Policy: Interdisciplinary Development Perspectives (UP Center for Integrative and Development Studies)
- Sexuality, Gender & Policy (Policy Studies Organization)
- Applied Economics Letters (Routledge)
- Asian Politics & Policy (Wiley-Blackwell)

#### THESIS ADVISEES

- Jayson Christ Conti, "Unmasking the caregivers: valuing and measuring unpaid care and domestic work" (MA Demography, UP Population Institute; with Dr. Elma P. Laguna)
- Amabelle Quendangan, "The association between labor market interventions and household income and food consumption in the Philippines" (MA Demography, UP Population Institute; with Dr. Elma P. Laguna)

# Talks and conferences (selected)

- 2024 DBM Fiscal Policy Conference, 22 November 2024, University of Asia and the Pacific
- 2024 National Conference on Family Planning, 20 November 2024, Crowne Plaza Galleria
- East Asian Economic Association International Conference, Bangkok, 1 November 2024
- 2024 Philippines Update, Australian National University, Canberra, 30 October 2024
- Webinar on the Philippine economy, ISEAS Yusof Ishak Institute, Regional Economic Studies Programme, 30 September 2024
- Research Forum on the Bangsamoro Revenue Code, 12 July 2024, Park Inn by Radisson, SM North EDSA, Quezon City
- A study workshop on the quantitative macroeconomic history of the Philippines, 1900–2010; 28–29 Oct 2023, Sano Shoin Hall, Hitotsubashi University, Tokyo; Institute of Economic Research, Hitotsubashi University
- 60th Philippine Economic Society Annual Meeting and Conference, Novotel, Cubao, Quezon City

- 98th Western Economic Association International Conference, San Diego, California, USA
- UPSE Graduate Research Workshop, 7-8 December 2018, First Pacific Leadership Academy, Antipolo City; Reviewers: Dr. Maria Socorro Gochoco-Bautista, Dr. Aleli Kraft, Dr. Michael Abrigo
- "The impact of Duterte's economic policies on OFWs and their families," Bangkok Art and Culture Center, 12 May 2018
- Stata training workshop, UP Baguio Department of Economics and Political Science, 16-17 Nov 2017
- Guest panelist, thesis defense of 6 groups of BASS-Econ students at UP Visayas Tacloban College, 2 May 2016
- ISEO 2013 Summer School, Hotel Iseolago, Iseo, Brescia, Italy, 12-22 June 2013

#### **A**FFILIATIONS

- International Center for Innovation, Transformation and Excellence in Governance or INCITEGov (Member, 2024-; Trustee, 2024-)
- Social Weather Stations (Fellow, 2024-)
- Philippine Economic Society (Lifetime Member, 2023-)
- Institute for Leadership, Empowerment, and Democracy (Board Member, 2020–2023)
- Young Public Servants (Board Member and Treasurer, 2019-)
- Usapang Econ (Co-founder and Editor-in-Chief, 2018-)
- Phi Kappa Phi (Member)
- Pi Gamma Mu (Member)

# SOFTWARE SKILLS

- Highly experienced in Stata, Python, LATEX, QGIS
- Experienced in EViews, R, Mathematica, Moodle, Technistock, Bloomberg UI

# SPECIAL PROJECTS

- Organization: Co-founder of UsapangEcon.com (group of young economists popularizing economics for Filipinos; other members are include Dr. Jefferson Arapoc [UPLB], Marianne Vital, Dr. Cherry Madriaga, and Renz Calub)
- *Podcasts:* Co-host of Usapang Econ Podcast (the first economics podcast of the Philippines; available on Spotify, Apple Podcasts, Google Podcasts, Anchor, and Stitcher); co-host of Usapang Econ Muna Podcast (part of Teka Teka news podcast, produced by PumaPodcast)

#### References

### Emmanuel S. de Dios, PhD

Professor Emeritus & Former Dean UP School of Economics 

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## Ma. Joy V. Abrenica, PhD

Dean & Professor UP School of Economics ⋈ mvabrenica@up.edu.ph

## Jefferson A. Arapoc, PhD

Associate Profesor
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UP Los Baños

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