

Annual Conference Committee for 2018

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With Special Participation of Ferdinand S. Co

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Message



Warmest Greetings!

It is with great pleasure that I welcome our participants and guests to this year's annual gathering that highlights *Emerging Trends in Statistical Development*, in the name of the Philippine Statistical Association, Inc. (PSAI).

We in the PSAI have been very privileged to undertake this Annual Conference in solidarity with the collective efforts of all professional social science associations under the Philippine Social Science Council (PSSC). As the PSSC celebrates its 50th Founding Anniversary under the theme *50 Year Legacy of the Social Sciences in Changing Times*, I am certain that our own theme echoes with the same passion for capturing today's growing enthusiasm with emerging technology that will be our own legacy in a world that continues to evolve in a changing data landscape.

Consistent with our belief that nation building is the handiwork of efficient governance at the national and local levels, we join hands with our government executives, counterparts in the academe, and other development partners by exhorting the participation of their respective staff to discover their potentials and to attend our short training courses by choosing from among the four (4) parallel training sessions that highlight *i) Spatial Statistics, ii) Infographics, iii) Descriptive and Exploratory Techniques in R, and iv) Correcting Common Misconceptions in Statistics: For K-12*.

We are also raising the bar for our undergraduate students by helping them imbibe the passion for the Statistics profession by continuing to support the Best Student Paper Competition, now on its 3rd year. Winners in this competition will be recognized and conferred awards during our Closing Ceremony.

To cap our 3-day event, we have packaged a Panel Discussion on Data Privacy and we have assembled experts who will help us better respond to emerging issues that has continue to influence our respective turf.

To all our participants and guests, maraming salamat.

Mabuhay ang PSAI! Mabuhay tayong lahat!

Lisa Grace S. Bersales
 LISA GRACE S. BERSALES, PhD

President
 Philippine Statistical Association, Inc. (PSAI)



The City of Tagbilaran warmly welcomes all the delegates, organizers and members of the Philippine Statistical Association, Inc. as you hold your Training and Annual Conference on September 19-21, 2018.

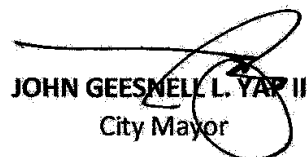
Statistics has always played a significant role in social and economic development. The data and information you provide are essential to be able to promulgate formidable evidence-based policies. Thus, it is imperative that all levels of government have access to adequate and current statistical information to be able to make timely decisions.

Your theme “Emerging Trends in Statistical Development” reflects your unwavering commitment to pursue professional excellence as you discuss innovations, recent developments and new methodologies in obtaining and analyzing data.

We are also happy that despite the rush of work, you are able to come together for continuing learning, professional bonding and fellowship. We are optimistic that this conference will serve as a wonderful opportunity for you to examine areas for improvement and to share strategies that will contribute to empowering our national statistical system.

Welcome to the City of Peace and Friendship, Welcome to Tagbilaran City!

Tagbilaran City
August 23, 2018


JOHN GEESNELL L. YAP II
City Mayor

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Editor, *The Philippine Statistician*

Joselito C. Magadia, PhD

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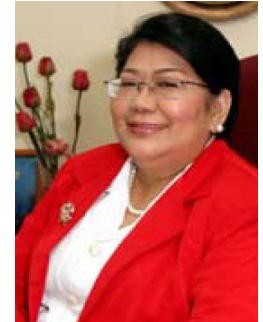
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Acknowledgments

As we in the Philippine Statistical Association, Inc., (PSAI) hold our 2018 Annual Conference on *Emerging Trends in Statistical Development*, our theme resonates in solidarity with the 50th Founding Anniversary of the Philippine Social Science Council, Inc.: *50 Year Legacy of the Social Sciences in Changing Times*. We take strides alongside emerging technology, and in the process we craft our own legacy and make a bold statement of the essentiality of the Statistics profession in the changing data landscape, and more importantly, in data science.



The National Organizing Committee helps build the PSAI legacy with your untiring support. You are the building blocks: the co-organizers, sponsors, patrons and donors; the Local Organizing Committee; institutional members and partners for your continued trust in PSAI activities; the CHED for never ceasing to find merits in our Training and Annual Conferences by endorsing this event to academic institutions; the Philippine Statistical Research and Training Institute (PSRTI) for making possible the awards for the 3rd Best Student Paper Competition; the National Privacy Commission for clarifying the law that circumscribes the operations inherent in the Statistics profession, the Philippine Social Science Council, Inc. with its Conference Grant; the Sub-Committee on Scientific Programs for tirelessly evaluating all the papers submitted for presentation, thus upholding the quality and raising the bar in the vetting process; the Resource Persons of the parallel training sessions and the panel discussion for their unselfish sharing of their time and expertise; the Higher Education Institutions (HEIs) for encouraging and supporting the participation of their students in the Best Student Paper competition that confers recognition to research works undertaken by their undergraduate students; and, our participants and guests from the national and local government offices, the academe, the private sector, development partners, and all stakeholders in the development process, for responding favorably to our invitation.

As a professional association, the PSAI recognizes the need to heighten the awareness of participants and guests to emerging technology and current concerns that are of great import to the statistics community. Parallel training sessions that will help us and the uninitiated among us to transition into what the technology unfold before us are offered as a pre-Conference activity. The short courses and their respective Resource Persons are: (a) *Spatial Statistics* with Mr. Dennis Dizon of Geodata Systems Technologies, Inc.; (b) *Infographics* with Mr. Gian Lousse Roy of the UP School of Statistics, (c) *Descriptive and Exploratory Techniques in R* with Ms. Charlene Mae Celoso of UPSS; and (d) *Correcting Common Misconceptions in Statistics: For K to 12* with Dr. Josefina V. Almeda of the PSRTI.

We take a bow to the following for the privileged support they consistently accord the PSAI:

Co-Organizers:	Geodata Systems Technologies, Inc. Philippine Statistics Authority
Sponsors:	ABS-CBN Broadcasting Corporation Philippine Statistical Research and Training Institute
Patron:	Manila Electric Company Pilipinas Teleserv, Inc.
Donor:	De La Salle University Government Service Insurance System I-Metrics Asia-Pacific Corporation Land Bank of the Philippines UP Statistical Center Research Foundation, Inc.
Conference Grant:	Philippine Social Science Council, Inc.

We commend our paper writers, student researchers and their respective advisers for sharing the results of their studies, and for their diligent compliance with the requirements set by the Chair and Members of the Sub-Committee on Scientific Program. We are certain that the discussions that will ensue from these paper presentations will lead to heightened awareness of innovative techniques that could contribute to greater participation of our development partners and stakeholders, participants and guests in our collective efforts to bring about inclusive growth at all levels.

We convey our sincerest thanks and grateful appreciation to the following:

The Honorable John Geesnell I. Yap II, Mayor of Tagbilaran City, for the warm welcome accorded to all of us, our participants and guests;

The Honorable Edgardo M. Chatto, Governor of Bohol for his encouraging message conveyed despite his busy schedule;

The Honorable Undersecretary Rosemarie G. Edillon for finding time to grace this occasion and to share her rich experience that will continue to be of inspiration to the Philippine statistical system;

The Commission on Higher Education (CHED) for unwavering support and continued endorsement of the PSAI Training and Annual Conference notwithstanding changes in the leadership;

The zealous commitment, dedication and passion to improve the craft of paper writers and researchers exemplified by the Sub-Committee on Scientific Program under the chairmanship of Dr. Joselito S. Magadia and the equally committed members from various academic institutions who willingly shared their time and their expertise to ensure that the vetting process for the selection of papers for presentation, and the winning papers in the 2018 Best Student Paper Competition are upheld with highest esteem;

ACKNOWLEDGMENTS



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ACKNOWLEDGMENTS



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The readiness of PSA Bohol and Region 7 staff and fellow PSAI members at the national and regional/chapter levels to share their time and expertise as Session Organizers/Chairs, Session Coordinators, Rapporteurs.

The PSAI institutional and individual members, friends and colleagues for their unflinching help and willingness to take part in all activities for the success of the Training and Annual Conference;

The wholehearted cooperation and support of the officers and staff of the Philippine Statistics Authority at the national and regional levels; Ms. Cynthia E. Chua for sharing her talent in designing and translating the theme into visuals that capture innovations in the emerging technology; the kind response to our call for help and the unselfish assistance that made possible the preparations at the local level under the indefatigable leadership of Regional Director Ariel E. Florendo who willingly heads the LOC for the third time, and his staff in the province of Bohol, Cebu and in the provincial offices in PSA Region 7; and, the counterpart support and invaluable assistance rendered by the Provincial Statistics Officers and staff led by PSO Jessammyn Anne C. Alcazaren of Tagbilaran City.

And, the usual hard work and tireless dedication of the PSAI National Secretariat.

Maraming salamat!


CARMELITA N. ERICTA

Chair
2018 PSAI Annual Conference Committee

Program of Activities

TRAINING

September 19, 2018 - Wednesday

8:00 AM - 4:30 PM

Simultaneous Training on

1. **Spatial Statistics** (Resource Person: Mr. Dennis P. Dizon)
2. **Infographics** (Resource Person: Mr. Gian Louise A. Roy)
3. **Descriptive and Exploratory Techniques in R** (Resource Person: Ms. Charlene Mae Y. Celoso)
4. **Correcting Common Misconceptions in Statistics: For K-12** (Resource Person: Dr. Josefina V. Almeda)

ANNUAL CONFERENCE

Day 1, September 20 - Thursday

8:00 – 9:00	Registration
9:00 – 10:00	Opening Ceremony
10:00 – 10:30	Coffee Break
10:30 – 12:00	Plenary Session sponsored by the Philippine Statistics Authority
12:00 – 1:30	Lunch Break
1:30 – 3:00	Scientific Sessions 1 <ul style="list-style-type: none"> Session A: Student Paper Session B: Inflation Session C: Latest Technology Session D: Redesign
3:00 – 3:30	Coffee Break
3:30 – 5:00	Scientific Sessions 2 <ul style="list-style-type: none"> Session E: Student Paper Session F: Statistical Models in Practice Session G: Spatial Session H: The Environment
6:00	Fellowship Dinner <ul style="list-style-type: none"> Message <i>Statistics Profession in the Changing Data Landscape</i> Policy Statement Special Number Oath taking of new members Launching of enhanced PSAI Website Group Photograph

Day 2, September 21 - Friday

08:00 – 09:00	Registration
09:00 – 10:15	Plenary Session Sponsored by Geodata Systems Technologies, Inc.
10:15 – 10:30	Coffee Break
10:30 – 12:00	Panel Discussion on Data Privacy
12:00	Lunch
	Closing Ceremony <ul style="list-style-type: none"> Synthesis Recognition of Co-Organizers/Sponsors Announcement of Winners of the 2018 Student Best Paper Competition Announcements and Closing Message
02:00 pm onwards	Consultation with PSAI Officers
	Optional Tour

ACKNOWLEDGMENTS



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**PHILIPPINE STATISTICAL RESEARCH
AND TRAINING INSTITUTE**

ACKNOWLEDGMENTS



SEPTEMBER 19–WEDNESDAY

TRAINING

September 19, 2018 - Wednesday
8:00 AM - 4:30 PM

1. Spatial Statistics

Resource Person: Mr. Dennis P. Dizon
Rapporteur: Bryan John T. Bacurnay
Cristine L. Catalan
Venue: Sandugo 1

This seminar will discuss the contextualization of data analysis with location. Participants will learn how to calculate and map basic spatial statistics using ArcGIS, as well as other common statistical applications such as MS Excel and R.

2. Infographics

Resource Person: Mr. Gian Louisse A. Roy
Rapporteur: Venus P. Gloria
Kevin O. Marasigan
Venue: Sandugo 2

This will enable the participants to learn how to clearly and concisely present data to a general audience in an interesting and insightful way; and, will also teach the participants some tips and tricks in creating information dissemination materials.

3. Descriptive and Exploratory Techniques in R

Resource Person: Ms. Charlene Mae Y. Celoso
Rapporteur: Cynthia A. Pohanes
Crislor D. Vilas
Venue: Seglim VIP

This seminar is an introduction to data science analytics that will apply descriptive statistics and exploratory data analysis (EDA) in R software.

4. Correcting Common Misconceptions in Statistics: For K-12

Resource Person: Dr. Josefina V. Almeda
Rapporteur: Fidel R. Antopina, Jr.
Gaudiosa C. Oculares
Venue: Leeng VIP

This seminar will elucidate common statistical concepts by discussing their underlying theories and correcting common misconceptions. Topics include hypothesis testing, p-value, Sloven's formula, among others.

OPENING CEREMONY

9:00 AM –10:00 AM
20 September 2018
Venue: Sandugo

Doxology	REGIONAL STATISTICAL SERVICES OFFICE STAFF
National Anthem	
Welcome Remarks	Hon. JOHN GEESNELL L. YAP, II Mayor, Tagbilaran City
Message/Introduction of the Keynote Speaker	Ms. LISA GRACE S. BERSALES, PhD President, PSAI
Keynote Address	Ms. ROSEMARIE G. EDILLON, PhD Undersecretary, Planning and Policy National Development Office I National Economic and Development Authority

Master of Ceremonies

MARY ANTONETTE C. JUNGAO and CIELITO O. EVANGELISTA
Philippine Statistics Authority Bohol

ACKNOWLEDGMENTS



PHILIPPINE STATISTICS AUTHORITY

POSTER PAPER

**Confirmatory Factor Analysis of Nueva Vizcaya State University
Faculty Evaluation Instrument**

Deo Urbano
Nueva Vizcaya State University

Abstract

This research on Nueva Vizcaya State University (NVSU) Faculty Evaluation Instrument was conducted a to determine if the actual model significantly fit to the existing model, b to determine the best model that represents the NVSU Faculty Evaluation and c to determine the factor loading in the identified model.

The data were drawn from the NVSU Educational and Testing Center. The raw data of the evaluation from first semester of school year 2014 to first semester of school year 2015 were used. The data were reduced to 507 sample size from 17, 931 populations using the systematic sampling technique. The NVSU has an existing model for the faculty evaluation which is a hierarchical factor model. And there were three hypothesized models of faculty evaluation which are the general, oblique factor and orthogonal factor model.

The researchers used confirmatory factor analysis using Analysis of Moment Structure Software in answering the objectives of this study. The best model among four competing hypothesized factor models is the Oblique Factor Model with an equation below.

Total Weight (Oblique Factor Model) = 22.35 C1 + 24.975 C2 + 24.05 C3 + 27.7 C4.

The factors (Commitment, Knowledge on the Subject of the Teacher, Teaching for Independent Learning and Management of Learning) of the instrument were very strong positively correlated.

Keywords: *General Model, Hierarchical Factor Model, Oblique Factor Model, Orthogonal Factor Model*

DAY 1

SEPTEMBER 20–THURSDAY

10:30 – 12:00 **Plenary Session sponsored by the
Philippine Statistics Authority (PSA)**

Session Chair: Benjamin Arsenio Y. Navarro

Rapporteur: Fidel R. Antopina, Jr.

Frannie G. Pastor

Venue: Sandugo

**Emerging Trends in the Philippine Statistical
Development Program (PSDP) 2018-2023: Focus on
Measuring Sustainable Tourism**

Lisa Grace S. Bersales, PhD

Open Forum

Awarding of Tokens of Appreciation

12:00 – 01:30 Lunch Break

DAY 1

SEPTEMBER 20–THURSDAY

1:30 – 3:00

SCIENTIFIC SESSION 1

SESSION A: STUDENT PAPERS

Session Chair: Rechel G. Arcilla, PhD

Rapporteur: Crislor D. Vilas

Cristine L. Catalan

Venue: Leeng VIP

**Diesel Prices and Food Inflation on Non-Food Inflation Rate:
A Vector Autoregressive Analysis**

Patrisha Anne Estrada

Arielle B. Baldo

Marvey Mercado

School of Statistics, University of the Philippines Diliman

**Spatial Point Pattern Analysis of Drug Related Crimes in
October 2017 in Manila City**

James Alister Pangilinan

Joemari Olea

Hannah Jane Primavera

School of Statistics, University of the Philippines Diliman

**Determinants of Depressive Symptoms in Undergraduate
UPLB Students: A Joint Correspondence Analysis**

Jaca Maison A. Lailo

Institute of Statistics, University of the Philippines Los Baños

Open Forum

Awarding of Tokens of Appreciation

3:00 – 3:30

Coffee Break

POSTER PAPER

**Geometer's Sketchpad (GSP) and Interactive Whiteboard
Integration on Trigonometry**

Alexis J. Abella

Carlos Hilado Memorial State College - Talisay Campus

Abstract

The rapidly changing technological developments have affected education. Information and Communications Technology (ICT) is not only a tool for teaching and learning, but also acts as a driving force for an educator to play his or her role in education. The application of ICT, using Geometer's SketchPad (GSP) and Interactive Whiteboard (IWB), is intended to refine and elevate both students' learning and educators' teaching qualities on Trigonometry. This research investigates the effectiveness of ICT integration using Geometer's Sketchpad (GSP) and Interactive Whiteboard (IWB) on Trigonometry to BSIS 1 students of Carlos Hilado Memorial State College, Academic Year 2017 – 2018. Employing the quasi-experimental research design, the respondents of the study were the 100 selected BSIS 1 students out of 110 officially enrolled students using Two Group Control Group Design and Pair matching process. The results showed that the performance of both control and experimental groups on Trigonometry are low before intervention and both are average after intervention. The analysis result of the performance before integration showed no statistically-significant differences, which in turn proves the equivalence of the two groups. Meanwhile, the analysis result of the performance after intervention showed the following: There are statistically-significant differences between the experimental group and the control group at a significance level of 0.05 for the interest of the experimental group. It was found that ICT using Geometer's Sketchpad and interactive whiteboard have a positive effect on teaching Trigonometry to experimental group than to the control group.

Keywords: *(ICT, pair matching, quasi-experimental, two group control group design)*

POSTER PAPER

**Research Literacy and Skills Among Educational Research –
Proponents of Nueva Vizcaya: Towards Localized Policy Review,
Reformulation and System Enhancement**

Rommel S. De Gracia
DepEd – Schools Division Office of Nueva Vizcaya

Abstract

This study aimed to assess research literacy and skills, and level of difficulty in conducting research among educational research-proponents of the Schools Division of Nueva Vizcaya. The study employed the descriptive-comparative research design. The respondents of the study are educational practitioners in the basic education who are research-proponents and were selected through on purposive sampling. Research literacy and skills were assessed through research document using a standardized rubric, while level of difficulty in conducting research was determined through a validated researcher-made questionnaire. The research literacy and skills among research-proponents were at approaching proficiency level. They find difficult to organize and present data in tables, graphs and charts, and to identify applicable statistical tools to analyze the data. The research literacy and skills of research-proponents are of the same level regardless of the number of researches made and of educational attainment while research training conducted in school and presence of research committee upgrade the research literacy and skills of school administrators. The linear combination of research literacy and skills among research – proponents do not differ for educational attainment and presence of research committee in schools. The study brought out the need to have a localized research support system which includes the organization of a school-based research committee.

Keywords: *approaching proficiency level, statistical tools, number of researches Introduction*

DAY 1

SEPTEMBER 20–THURSDAY

1:30 – 3:00

SCIENTIFIC SESSION 1**SESSION B: INFLATION**

Session Chair: Charlene Celoso
Rapporteur: Bryan John T. Bacurnay
Kevin O. Marasigan
Venue: Sandugo 1

Disaggregated CPI facts about Philippine Inflation and the Use of Microdata for Macroanalysis

Joselito R. Basilio
Bangko Sentral ng Pilipinas

Inflation, Poverty and the Train Law

Dennis S. Mapa, PhD
School of Statistics, University of the Philippines Diliman

Modeling Philippine Inflation Using Nonlinear Models: Threshold Autoregressive and Markov Regime-Switching Approaches

Dennis S. Mapa, PhD
School of Statistics, University of the Philippines Diliman

Open Forum
Awarding of Tokens of Appreciation

3:00 – 3:30

Coffee Break

DAY 1

SEPTEMBER 20–THURSDAY

1:30 – 3:00

SCIENTIFIC SESSION 1

SESSION C: LATEST TECHNOLOGY

Session Chair: Ferdinand S. Co

Rapporteur: Venus P. Gloria

Cynthia A. Pohanes

Venue: Sandugo 2

Harnessing Big Data for Development

Jose Ramon G. Albert, PhD

Philippine Institute for Development Studies

Use of Latest Technology in Data Capture for Consumer Prices: Philippine Experience

Ellen Varona

Philippine Statistics Authority

Map-Based or Location-Based Census Operation Using Modern GIS Platform

Mari-Belle D. Dy

Philippine Statistics Authority

Open Forum

Awarding of Tokens of Appreciation

3:00 – 3:30

Coffee Break

POSTER PAPER

Livestock and Poultry Information and Early Warning System (LPI-EWS 2014) Performance Evaluation

Anna Maria Lourdes S. Latonio

Central Luzon State University

Abstract

This poster provides findings of the Livestock and Poultry Information and Early Warning System (LPI-EWS 2014) Project Evaluation conducted for the Philippine Statistical Research and Training Institute (PSRTI) during the first quarter of 2015.

The project which started as Broiler and Swine Information and Early Warning System (BSI-EWS) in 2006 is a collaborative undertaking among the Department of Agriculture (DA) agencies for Livestock concerns. The lead implementers of the project are the PSA-BAS, PSRTI and BAI. Other collaborating agencies are DA-RFOs, LDC, DA-AMAS, and NMIS.

The purpose of the evaluation was to identify the strengths and weaknesses of the project, to further enhance the appropriate methodologies developed for a more responsive early warning system for broiler meat and pork in order for both private and government sectors to be properly guided in their planning and policy decision-making.

The evaluation focused on the project's strengths or weaknesses in terms of how it was able to achieve its set objectives, that are: to enhance network and access of unified data holdings within and among DA livestock agencies and statistical agencies, as well as its effectiveness in strengthening linkages with the private agribusiness stakeholders, and with regards to the goal of capacity building and target publications. The design of the evaluation is non-experimental. Data were collected during subnational LPI-EWS meetings in Regions X, IVA, and III and during a national level LPI-EWS meeting with the private agribusiness sector (PABS) at PSRTI through survey questionnaires, focus group discussions and personal interviews. An inventory of available documents of conducted activities was also performed.

Keywords: *Agriculture, Data generation, Data Organization, Unified data holdings*

SCIENTIFIC SESSION 2

SESSION H

**Development of Physical Asset and Flow Accounts for
Water Resources of the Philippines**

Virginia M. Bathan
Faith Lea B. Cabrera
Philippine Statistics Authority

Abstract

Water is one of the most essential needs of human beings and is necessary in almost all economic activities. The Philippines, abundantly endowed with water resources, obtains its water supply from rivers, lakes, dams, and groundwater reservoirs. The country has 18 major river basins, 421 principal rivers, 59 natural lakes and a network of groundwater reservoirs with total area of about 50,000 square kilometers (NSCB, 2003).

Although there are large water sources in the country, one of the key risks in water sufficiency is the exacerbated increasing and competing demand for water supply. This is due to the continuous growth of the population and expansion of economic activities. The water supply problem was brought about by decades of resource mismanagement, inadequate investments in physical infrastructure and the growing threat of climate change (SEPO 2011).

This study aims to present the development of physical asset and flow accounts for water resources in the Philippines, as well as the issues and challenges encountered. The physical asset accounts for water resources will provide information on the total available freshwater resources while the physical flow accounts measure the withdrawal of freshwater by major sectors. Both accounts follow the UN System of Environmental-Economic Accounting (SEEA) 2012—Central Framework, a multipurpose conceptual framework for understanding the interaction between the economy and the environment, and for describing stocks and changes in stocks of environmental assets. Compilation of the two accounts will eventually measure SDG Indicator 6.4.2 Level of water stress.

Keywords: *accounts for water resources, asset, flows, SEEA-CF 2012*

DAY 1

SEPTEMBER 20—THURSDAY

1:30 – 3:00

SCIENTIFIC SESSION 1

SESSION D: REDESIGN

Session Chair: Rosalinda P. Bautista
Rapporteur: Fidel R. Antopina, Jr.
Frannie G. Pastor
Venue: Seglim VIP

Redesigning of the Corn Production Survey

Sarah B. Balagbis
Philippine Statistics Authority

**Measuring Quarterly Regional Progress through
the Regional Development Index**

Justin Angelo O. Bantang
Philippine Statistics Authority

Redesigning of the Backyard and Livestock Poultry Survey

Jay R. Manlapaz
Philippine Statistics Authority

Open Forum
Awarding of Tokens of Appreciation

3:00 – 3:30

Coffee Break

DAY 1 SEPTEMBER 20–THURSDAY

3:30 – 5:00

SCIENTIFIC SESSION 2

SESSION E: STUDENT PAPERS

Session Chair: Rechel G. Arcilla, PhD
 Rapporteur: Cristine L. Catalan
 Frannie G. Pastor
 Venue: Leeing VIP

Pattern Recognition of Suicidal Ideation

April Joy Lorenzo
 Andhee Jacobe
 Pangasinan State University

The Dynamic Relationship among the Cryptocurrency (Bitcoin), Philippine Stock Market and Peso-Dollar Exchange Through Vector Autoregressive Analysis

Joseph S. Ortiz
 Armstrong H. Tibay
 Marius Dane C. Lucas
 School of Statistics, University of the Philippines Diliman

Why are Filipinos Hungry: Econometric Analyses on Possible Determinants of Hunger Incidence in the Philippines

Joyce Anne L. Malit
 Patricia Joy D. Bersamina
 Lara Nina Aileen D. Verayo
 School of Statistics, University of the Philippines Diliman

Open Forum
 Awarding of Tokens of Appreciation

6:00

Fellowship Dinner

Atty. Edgardo M. Chatto
 Governor, Province of Bohol

Message

Tomas P. Africa
 Chair
 Institutional Development Committee

Statistics Profession in the Changing Data Landscape

Lisa Grace S. Bersales, PhD
 PSAI President

Policy Statement

Loboc Children's Choir

Special Number

Ferdinand S. Co
 Chair, Membership Committee

Oath taking of new members
 Launching of enhanced PSAI Website

Group Photograph

SCIENTIFIC SESSION 2

SESSION H

**Coping with Disasters Due to Natural Hazards:
Evidence from the Philippines**

Dennis Mapa, PhD
 School of Statistics, University of the Philippines Diliman

Abstract

We explored how local governments respond to disasters due to natural hazards to determine the mix of risk management and coping strategies (ex ante and ex post) they employ to improve welfare. We focused on disasters caused by hydro-meteorological hazards that occur with high frequency and high probability. Using data from a novel survey we conducted on disaster risk management practices of local government units (LGUs) in the Philippines, we developed indices of the various risk management and coping strategies of LGUs to explain what aids in their recovery from disasters.

The most prominent strategies are risk-coping activities, especially cleanup operations and receiving relief from others. Among ex ante activities, employing long-term precautionary measures improve recovery. These include building resilient housing units; investing in stronger public facilities; building dams, dikes, and embankments; upgrading power and water lines; maintaining roads; identifying relocation areas; and rezoning and land-use regulations. In contrast, interruption of lifeline services such as water and electricity contributes adversely to recovery. Evidence also shows that LGUs' profile characteristics matter. An LGU with higher local revenues has higher chances of recovery. On the other hand, being located in a province where dynasty share is high contributes negatively to an LGU's recovery. The combination of these ex ante and ex post risk management strategies informs policies on where to put priority and investments in disaster risk management.

Keywords: *Disaster, shock, coping, risk management, local government*
JEL Codes: Q54, D81, I38,

SCIENTIFIC SESSION 2

SESSION G: SPATIAL

Spatio-Temporal Analysis of Rainfall Patterns in the Philippines

Alvin Q Pequiro
Philippine Statistics Authority

Aphrodite A. Ortiz
Central Luzon State University

Abstract

Spatio-temporal analysis involves models when data are collected across time as well as space and has at least one spatial and one temporal property. An event in a spatio-temporal dataset describes a spatial and temporal phenomenon that exists at a certain time t and location x (Meliker and Sloan, 2011). In this study, the said analysis was used to analyze and predict the rainfall pattern by using the 1990 to 2012 monthly data from Philippine Atmospheric Geophysical and Astronomical Services Administration (PAGASA). The model has been satisfactorily built and was found out that it can predict up to five months (January to May 2013). The predicted pattern was then compared to the real-life rainfall scenarios in the Philippines to verify its validity.

Keywords: *predict; rainfall; spatio-temporal analysis*

DAY 1

SEPTEMBER 20–THURSDAY

3:30 – 5:00

SCIENTIFIC SESSION 2

SESSION F: STATISTICAL MODELS IN PRACTICE

Session Chair: Joselito C. Magadia, PhD
Rapporteur: Bryan John T. Bacurnay
Kevin O. Marasigan
Venue: Sandugo 1

Assessing the Forecasting Accuracy of the Multivariate ARMA Model in Predicting the Weather of Nueva Ecija, Philippines

Juan Carlos Tamayo
De La Salle University

A Fourier Series Model for the Periodic Monthly Precipitation of Bayombong, Nueva Vizcaya

Orville D. Hombrebueno
Nueva Vizcaya State University

Numerical VaR Estimation: Realized Moments and the Sinh-Arcsinh Distribution

Manuel Leonard F. Albis
School of Statistics, University of the Philippines Diliman

Open Forum
Awarding of Tokens of Appreciation

6:00

Fellowship Dinner

Atty. Edgardo M. Chatto
Governor, Province of Bohol

Message

Tomas P. Africa
Chair
Institutional Development Committee

*Statistics Profession in the
Changing Data Landscape*

Lisa Grace S. Bersales, PhD
PSAI President

Policy Statement

Loboc Children's Choir

Special Number

Ferdinand S. Co
Chair, Membership Committee

Oath taking of new members
Launching of enhanced PSAI
Website

Group Photograph

DAY 1

SEPTEMBER 20–THURSDAY

3:30 – 5:00

SCIENTIFIC SESSION 2

SESSION G: SPATIAL

Session Chair: Consorcia E. Reaño, PhD
 Rapporteur: Venus P. Gloria
 Cynthia A. Pohanes
 Venue: Sandugo 2

Crime Hotspot Mapping in Bayombong, Nueva Vizcaya

Karen D. Taclay
 Nueva Vizcaya State University

A Simulated Illustration of a Dissimilarity Index in Spatial Area Data Using Bayesian Inference

Francisco N. de los Reyes
 School of Statistics, University of the Philippines Diliman

Spatio-Temporal Analysis of Rainfall Patterns in the Philippines

Alvin Q. Pequiro
 Philippine Statistics Authority

Open Forum
 Awarding of Tokens of Appreciation

6:00

Fellowship Dinner

Atty. Edgardo M. Chatto
 Governor, Province of Bohol

Message

Tomas P. Africa
 Chair
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 Changing Data Landscape*

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Group Photograph

SCIENTIFIC SESSION 2

SESSION G: SPATIAL

**A Simulated Illustration of a Dissimilarity Index in
 Spatial Area Data Using Bayesian Inference**

Francisco N. de los Reyes
 School of Statistics, University of the Philippines Diliman

Abstract

A commonly studied characteristic of area data is the assessment of similarity (or absence thereof) among neighboring areal units. However, most methodologies do not measure uncertainties which are likely outcomes of sampling variation and do not consider spatial autocorrelation. This paper explores the ability of Bayesian models with local and global smoothing to address the said situations. It attempts to apply these models to the voting participation statistics in the Philippine Presidential Elections of 2016.

Keywords: CAR, hierarchical model, proximity matrix, segregation, voter turnout

SCIENTIFIC SESSION 2

SESSION G: SPATIAL

Crime Hotspot Mapping in Bayombong, Nueva Vizcaya

Karen D. Taclay
Richard J. Taclay
Nueva Vizcaya State University

Abstract

Based on the Philippines in Figures 2017, there are 139, 459 reported index crimes and 445, 274 non-index crimes in 2016. Looking at the data from 2014 to 2016, there was a decrease in these numbers. However, these are still alarming numbers as it places almost 566 crimes to occur per 100,000 population in the country. This paper describes the crime-related incidents and where they tend to concentrate in terms of types of crime (index and non-index crimes), location and time. It also determined the hotspots of crime-related incidents at Bayombong, Nueva Vizcaya. It was found that spatial clustered patterns exist when crime-related incidents were grouped according to type of crime (non-index and index) and time of occurrence (morning and afternoon). Moreover, hotspot analysis revealed that particular barangays are prone to vehicular accidents (non-index crimes) while most of the barangays in the town have little to no chances of predictability as to the time of the occurrence of the crime-related incidents.

Keywords: *hotspots, index crimes, non-index crimes, spatial clustered patterns*

DAY 1

SEPTEMBER 20–THURSDAY

3:30 – 5:00

SCIENTIFIC SESSION 2

SESSION H: THE ENVIRONMENT

Session Chair: Anna Maria Lourdes S. Latonio, PhD
Rapporteur: Fidel R. Antopina, Jr.
Crislor D. Vilas
Venue: Seglim VIP

Coping with Disasters Due to Natural Hazards: Evidence from the Philippines

Dennis Mapa, PhD
School of Statistics, University of the Philippines Diliman

Development of Physical Asset and Flow Accounts for Water Resources of the Philippines

Virginia M. Bathan
Philippine Statistics Authority

Open Forum
Awarding of Tokens of Appreciation

6:00

Fellowship Dinner

Atty. Edgardo M. Chatto
Governor, Province of Bohol

Message

Tomas P. Africa
Chair
Institutional Development Committee

*Statistics Profession in the
Changing Data Landscape*

Lisa Grace S. Bersales, PhD
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Policy Statement

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Oath taking of new members
Launching of enhanced PSAI
Website

Group Photograph

DAY 1

SEPTEMBER 20–THURSDAY

POSTER PAPERS

Time: 1:00 - 1:30
5:00 - 5:30

Geometer's Sketchpad (GSP) and Interactive Whiteboard Integration on Trigonometry

Alexis J. Abella
Carlos Hilado Memorial State College - Talisay Campus

Research Literacy and Skills Among Educational Research – Proponents of Nueva Vizcaya: Towards Localized Policy Review, Reformulation and System Enhancement

Rommel S. De Gracia
DepEd – Schools Division Office of Nueva Vizcaya

Livestock and Poultry Information and Early Warning System (LPI-EWS 2014) Performance Evaluation

Anna Maria Lourdes S. Latonio
Central Luzon State University

Confirmatory Factor Analysis of Nueva Vizcaya State University Faculty Evaluation Instrument

Deo Urbano
Nueva Vizcaya State University

6:00

Fellowship Dinner

Atty. Edgardo M. Chatto Governor, Province of Bohol	Message
Tomas P. Africa Chair Institutional Development Committee	<i>Statistics Profession in the Changing Data Landscape</i>
Lisa Grace S. Bersales, PhD PSAI President	Policy Statement
Loboc Children's Choir	Special Number
Ferdinand S. Co Chair, Membership Committee	Oath taking of new members Launching of enhanced PSAI Website
Group Photograph	

SCIENTIFIC SESSION 2

SESSION F: STATISTICAL MODELS IN PRACTICE

Numerical VaR Estimation: Realized Moments and the Sinh-Arcsinh Distribution

Manuel Leonard F. Albis
School of Statistics, University of the Philippines Diliman

Abstract

The shape of profit and loss distribution of an investment is constantly evolving due to the changes in financial fundamentals, noise, and shocks. Most value-at-risk models tend to utilize only up to the second moment of the returns distribution. This paper introduces the use of the sinh-arcsinh distribution with time-varying parameters that are numerically estimated from the first four realized moments. Upon applying to the Philippine Stock Exchange Index returns series, the proposed methodology is less conservative but more efficient in capital allocation than the benchmark model TARCH-QMLE. Overall, the results show that the proposed methodology is promising in estimating market risk.

Keywords: *realized moments, sinh-arcsinh distribution, VaR, expected shortfall.*

SCIENTIFIC SESSION 2

SESSION F: STATISTICAL MODELS IN PRACTICE

**A Fourier Series Model for the Periodic Monthly Precipitation of
Bayombong, Nueva Vizcaya**

Orville D. Hombrebueno
Wilfredo A. Dumale, Jr.
Nueva Vizcaya State University

Executive Summary

The Weather Monitoring System (WMS) project of the Nueva Vizcaya State University (NVSU) has installed field monitoring system (FMS) devices all over the province of Nueva Vizcaya. These FMS devices were designed in Japan and gather various weather data such as precipitation, relative humidity, air temperature, solar radiation, wind speed, wind direction, soil temperature, soil moisture, and electrical conductivity. These weather data will serve as information for local agricultural purposes, in tune to the purpose of the WMS – a localized climate change adaptation strategy for the province of Nueva Vizcaya.

The FMS in Bayombong, Nueva Vizcaya was the first device installed in the province and it has gathered weather data from 2012 up to the present. Having these data and to realize the purpose of the WMS, a preliminary mathematical modeling of the precipitation data was carried out by the researchers.

The main objective of the study was to come up with a Fourier series model that will best describe and represent the periodic monthly precipitation of Bayombong. Specifically, the study sought to: 1) describe the monthly precipitation of Bayombong using the available WMS data; 2) perform mathematical modeling with the monthly precipitation of Bayombong and generate Fourier series models for the periodic monthly precipitation of Bayombong; 3) define which Fourier series model best describes the periodic monthly precipitation of Bayombong; 4) describe the periodic monthly precipitation of Bayombong using the obtained Fourier series model.

The available data is hourly precipitation in millimeters (mm) from 2012 to 2015. There were missing data. The performances of the `na.interp` function of the `forecast` package and the functions of the `imputeTS` package of R – used to address issues of missing data – were tested using MAE, RMSE, R2, and by comparing the graphs of the imputes to choose the most appropriate function to be used in addressing the missing data. The `seasplit` function – with algorithm set to interpolation and option set to `stine` – of the `imputeTS` package was the most appropriate and was used. Afterwards, to describe the monthly precipitation of Bayombong from 2012 to 2015, the cumulative hourly precipitation for each month were computed to represent the monthly precipitation.

Next, to generate Fourier series models, fast Fourier transform (FFT) was applied to the data and as a result, 6 cosine and 6 sine terms were identified to compose the first Fourier series model. To come up with other models, backward elimination stepwise time series regression was performed. The term with the highest p-value was the one eliminated. As a result, 11 more Fourier series models were generated.

Now, to define which Fourier series model best describes the periodic monthly precipitation of Bayombong, the criteria is that the model, after backward elimination results to a model that shows significant lags in the correlogram of the autocorrelation function (acf) of its residuals, is the one. With this, the Fourier series model that best describes the periodic monthly precipitation of Bayombong is the second to the last model generated. It is composed of the mean term, a cosine and a sine term. The cosine and sine terms of the model are the first harmonic in a Fourier series with base period 12.

Finally, the obtained Fourier series model for the periodic monthly precipitation of Bayombong identified the months of January, February, March, April, November and December as dry months and the rest as wet months considering the 150mm precipitation mark to be the boundary for classifying dry and wet months. The model also revealed a peak in the month of August and a lowest point in the month of February.

In conclusion, the study will serve as basis for modeling endeavors to be carried out by the WMS in the future when there is enough data to do forecasting. Thus, help the WMS realize its purpose.

DAY 2

SEPTEMBER 21–FRIDAY

09:00 – 10:15

**Plenary Session sponsored by the
Geodata Systems Technologies, Inc.**

Session Chair: Francisca N. Dayrit
Rapporteur: Frannie G. Pastor
Venus P. Gloria

Venue: Sandugo

**Driving Digital Transformation of Philippine Census
using ArcGIS**

Elaine Ocampo

Open Forum
Awarding of Tokens of Appreciation

10:15 – 10:30

Coffee Break

DAY 2

SEPTEMBER 21–FRIDAY

10:30 – 12:00

Panel Discussion on Data Privacy

Moderator: Carmelita N. ERICTA
 Rapporteur: Gaudiosa C. Oculares
 Fidel R. Antopina, Jr.
 Venue: Sandugo

Panelists:

Kelvin S. Magtalas

Information Systems Analyst III
 Data Security and Technology Standards Division
 National Privacy Commission

Teresita P. Lisama

Lead Data Protection Officer
 Deputy Director, Knowledge Management Group
 Bangko Sentral ng Pilipinas

Danny C. Cheng CISM CRISC COBIT5(F) DPO(TUV)

Data Protection Officer
 De La Salle University
 Director of Academe Relations, ISACA Manila Chapter

Ana Maria L. Tabunda, PhD

Treasurer and Research Director
 Pulse Asia Research, Inc.

Open Forum

Awarding of Tokens of Appreciation

12:00

Lunch Break
 Closing Ceremony

02:00 pm
onwards

Consultation with PSAI Officers
 Optional city tour

SCIENTIFIC SESSION 2

SESSION F: STATISTICAL MODELS IN PRACTICE

**Assessing the Forecasting Accuracy of the Multivariate
 ARMA Model in Predicting the Weather of Nueva Ecija, Philippines**

Juan Carlos Tamayo
 De La Salle University

Abstract

In the Philippines, most researchers rely on NWP models such as the WRF model in order to predict future weather conditions. In this study, however, the possibility of using a purely statistical multivariate model that does not rely on any NWP model is explored. This study focuses on using a multivariate ARMA model that assumes different AR and MA orders for each series in order to model the 2001 - 2015 precipitation, minimum, and maximum temperature data of Nueva Ecija. The data that was used in the analysis came from the two weather stations of PAGASA in the province which are the Cabanatuan and CLSU Munoz stations. Thus, there is a total of six series included in the analysis. In this study, forecasts were generated and their forecasting accuracy were subsequently measured. Results showed that the forecasts of the model had yearly MAPE and MASE values ranging from about 2.8% to about 3.2% and about 0.8448 to about 1.0307, respectively, which are attributes of “good” forecasts according to their respective “rules-of-thumb”. A comparison of numerical measures for the multivariate ARMA model and their counterparts with the WRF model was then performed for three different scenarios. These scenarios detail the performance of the two models for monthly forecasting and extreme event and non-extreme event forecasting. Results revealed that the multivariate ARMA model had smaller values for almost all yearly and monthly numerical measures with substantial differences present in some of these measures. The same result was also found for the majority of the numerical measures under the non-extreme event scenario. For the extreme event case, results showed that neither the multivariate ARMA forecasts nor the WRF forecasts may be considered as good forecasts. Thus, for this scenario, it was concluded that the use of both the multivariate ARMA and WRF forecasts was deemed to be more appropriate as compared to using just one of them.

Keywords: *multivariate linear parametric time series model, weather forecasting, precipitation, minimum temperature, maximum temperature*

SCIENTIFIC SESSION 2

SESSION E: STUDENT PAPER

**Why are Filipinos Hungry: Econometric Analyses on
Possible Determinants of Hunger Incidence in the Philippines**

Joyce Anne L. Malit
Patricia Joy D. Bersamina
Lara Nina Aileen D. Verayo
School of Statistics, University of the Philippines Diliman

Abstract

Widespread hunger among Filipinos is a critical problem that should be urgently dealt with by the government. In fact, 9.9 percent or almost 10 million Filipino families are experiencing hunger based on the March 2018 Social Weather Station (SWS) quarterly hunger incidence report, whereas data from the Philippine Statistics Authority (PSA) show that subsistence incidence, or the proportion of families' income that fall below the food threshold is at 5.7 percent. Possible reasons to this increase in hunger incidence include the inflating prices of basic commodities such as rice, housing, water, electricity, gas and other fuels. Inadequate employment can also be associated with this aggravating phenomenon. Thus, this study aims to unveil the influence on hunger incidence of these determinants: job misery index, as the sum of unemployment and underemployment rates, Consumer Price Index (CPI) components such as rice, and housing, water, electricity, gas, and other fuels (HWEGF) using the quarterly time series data of SWS on hunger from the first quarter of 2000 until the first quarter of 2018. Also, the relationship between hunger incidence and regional subsistence incidence is investigated using the same three determinants. Three econometric models, vector autoregressive (VAR), time varying parameter (TVP), and two-way random effects (RE) are used in determining the link of hunger to the rice, HWEGF, and job misery indices. The VAR model shows that rice index significantly affects hunger incidence, as well as shocks to rice and HWEGF indices. The TVP model also suggests the significant impact of rice and HWEGF indices on hunger incidence. Meanwhile, the random effects model shows that the subsistence incidence across regions is affected by the rice index. Based on the results of the three models, rice index has a significant impact on self-rated hunger incidence and subsistence incidence among Filipinos.

Keywords: *Self-rated hunger, Subsistence incidence, Vector AutoRegressive (VAR) model, State space, Time Varying Parameters (TVP) model, Two-way Random Effects model*

CLOSING CEREMONY

12:00 PM - 1:00 PM

21 September 20178

Venue: Sandugo

Synthesis

Ms. Milagros R. Baldemor, PhD
President, PSAI Region 1 Chapter

Recognition of Sponsors

Ms. Lisa Grace S. Bersales, PhD
President
Philippine Statistical Association, Inc. (PSAI)

Ms. Carmelita N. Ericta

Chair, Annual Conference Committee

Announcement of Winners

2018 Student Best Paper Competition

Ms. Lisa Grace S. Bersales, PhD
President

Ms. Josefina V. Almeda, PhD
Treasurer

Mr. Joselito C. Magadia, PhD
Chair, Sub-Committee on Scientific Program

Announcements and Closing Message

Ms. Francisca N. Dayrit
Vice President, PSAI

Master of Ceremonies

PETER E. ENFESTAN, Regional Statistical Services Office 7
and
CRISLOR D. VILAS, Philippine Statistics Authority Negros Oriental

SCIENTIFIC SESSION 1

SESSION A: STUDENT PAPER

**Diesel Prices and Food Inflation on Non-Food Inflation Rate:
A Vector Autoregressive Analysis**

Patrisha Anne Estrada
Arielle B. Baldo
Marvey Mercado

School of Statistics, University of the Philippines Diliman

Abstract

With the recent enactment of the tax reform for acceleration and inclusion law or TRAIN law, an expansion on value-added tax and an increase in excise tax of sweetened beverages, petroleum products, and automobiles has been implemented. Specifically, increases in diesel prices and food items are having a large impact on the people. Thus, this study aims to explore how diesel prices and food inflation will affect prices of non-food items to provide foundation for future policies and deliver auxiliary information for studying effects of the TRAIN law in the Philippines. Using monthly data and the vector autoregressive (VAR) model, results show that a one-time shock to diesel prices will have a significant contemporaneous effect on non-food inflation. The lasting effect between the two variables indicates that an increase in diesel prices can lead to increase in non-food inflation that is found to last up to the succeeding month. Findings also indicate that a one-time increase in food inflation rate will have significant effects on non-food inflation rate contemporaneously, plus a lingering effect for the two following months. Aside from these effects, the shock on food inflation also has an effect on the eleventh until the fourteenth succeeding months which is found to be a negative effect, indicating that an increase in food inflation can lead to a decrease in non-food inflation in the said months. Lastly, results also show that shocks to diesel price and food inflation explain about 23 percent of the future forecast error variance of non-food inflation rate, making the two variables important determinants of non-food inflation rate.

Keywords: *diesel, food inflation, non-food inflation, vector autoregressive*

SCIENTIFIC SESSION 2

SESSION E: STUDENT PAPER

**The Dynamic Relationship among the Cryptocurrency (Bitcoin),
Philippine Stock Market and Peso-Dollar Exchange
Through Vector Autoregressive Analysis**

Joseph S. Ortiz
Armstrong H. Tibay
Marius Dane C. Lucas

School of Statistics, University of the Philippines Diliman

Abstract

Cryptocurrencies, most notably Bitcoin, had been rising in popularity lately. Bitcoin in particular has had a large increase in price from when it first came out and still stays at a relatively large value despite its recent drops. Since its introduction to the people, bitcoin invited people for a financial investment. The Peso-Dollar Exchange is one of the determinants of the country's economic status wherein studies were made that relates it to the Stock Market which is a significant factor in a country's economy. Due to the inevitable increasing influence of Cryptocurrencies and the possible relationship of exchange rate to stocks, it is important to determine its effects to Philippine stock market, a significant indicator of the country's economy. In this study, the researchers analyze the potential dynamic relationship between Cryptocurrencies, through Bitcoin, the Philippine Stock Market, using PSEi, and Philippine Peso-US Dollar Exchange Rate. In the results of the study, it was found out that Bitcoin closing prices and Philippine Peso-US Dollar Exchange Rate have an underlying effect on PSEi through the use of Vector AutoRegressive (VAR) Model.

Keywords: *Vector AutoRegressive (VAR), Peso-Dollar Exchange, Philippine Stock Exchange, Bitcoin*

SCIENTIFIC SESSION 2

SESSION E: STUDENT PAPER

Pattern Recognition of Suicidal Ideation

April Joy Lorenzo
Andhee Jacobe
Pangasinan State University

Abstract

The sole objective of this study is to explore and classify the patterns of suicidal ideation in Twitter here in the Philippines. The machine learning algorithm used was K-Nearest Neighbour (KNN), Support Vector Machine (SVM) and Naive Bayes. The models were compared by their accuracy, class recall, precision and F-Measure as a basis for choosing the best model.

The data were tweets and collected through RapidMiner 8.0 using Search Twitter operator. Data gathered were Filipino and majority was Tagalog. Data cleaning and data preprocessing were employed after the collection of data. Classification Rule Mining was used in order to understand and classify the suicidal ideation.

The most frequent itemsets occurred are ayoko and mabuhay with a support count of 0.09 and 0.043 respectively. The resulting top trend in Filipino suicidal ideation after generating the data from repositories were (ayoko→ mabuhay) with a confidence of 0.381 and (sawa→ mabuhay) with a confidence of 0.273.

Results showed that Support Vector Machine (SVM) is the best model that gave the best results in classifying the possible suicidal ideation since it has the highest sensitivity.

Keywords: suicidal ideation, classification, best model.

SCIENTIFIC SESSION 1

SESSION A: STUDENT PAPER

Spatial Point Pattern Analysis of Drug Related Crimes
in October 2017 in Manila City

James Alister Pangilinan
Joemari Olea
Hannah Jane Primavera
School of Statistics, University of the Philippines Diliman

Abstract

According to a lot of studies and statistical reports presented by several anti-drug related agencies, drug substance abuse in the Philippines has always been increasing at an alarming rate. This study aims to analyze this phenomenon through the analysis of spatial point patterns of the locations of drug-related incidents in Manila City in October 2017. The point pattern for drug related crimes was then tested for spatial dependence with specific establishments in Manila city such as schools, churches, and police stations. Notable results presented in this paper are (i) the imposition for PDEA to lead Oplan Tokhang has significantly decreased the amount of reported drug related crimes (ii) drug related crimes are clustered on residential areas (iii) there is a possibility that drug personalities tend to lay-low after a drug related crime has been reported to the police in their vicinity and will eventually return to commit these crime after some time (iv) drug related crimes tend to happen far from colleges and universities (v) and drug related crimes happen more frequently near public high schools.

Keywords: *drugs, drug-related incidents, drugs and youth, Manila, spatial point patterns*

SCIENTIFIC SESSION 1

SESSION A: STUDENT PAPER

**Determinants of Depressive Symptoms in Undergraduate
UPLB Students: A Joint Correspondence Analysis**

Jaca Maison A. Lailo
Institute of Statistics, University of the Philippines Los Baños

Abstract

Depression is one of the most common mental disorders that is prevalent worldwide, afflicting anyone, regardless of socio-economic status or educational attainment. This is a growing concern particularly among students that school administrators recognize the immediate and urgent need to address the problem. This study was conducted in the University of the Philippines Los Baños (UPLB) to determine the factors associated with depression symptoms using Joint Correspondence Analysis. A total of 169 students were randomly selected as respondents in a probability survey conducted from February to April 2018. Undergraduate students enrolled in the 2nd semester, AY 2017-2018 were considered eligible respondents. The prevalence of students with depressive disorder in UPLB is about 8 percent, and the prevalence of students with University Student Depression Inventory (USDI) score of 111 to 150 is about 14 percent. The characteristics that were found to be associated include College where student came from, age of the student as of their last birthday, having or not having a part-time job, type of serious illnesses, number of cigarettes smoked in a typical day, number of hours allocated for internet use in a typical week, number of times spent drinking alcohol in a typical week, satisfaction with family's financial condition, degree of closeness with family, degree of closeness with peers, have consulted or have not consulted a psychiatrist over the past 6 months, and diagnosed or not diagnosed with depression were found to be associated with the USDI scores. The associations of the significant variables were illustrated using Joint Correspondence Analysis.

Keywords: *depression, prevalence, probability survey, USDI, Joint Correspondence Analysis*

SCIENTIFIC SESSION 1

SESSION D: REDESIGN

Redesigning of the Backyard and Livestock Poultry Survey

Jay R. Manlapaz
Aaron R. Poliquit
Divina Gracia L. del Prado
Abubakar S. Asaad
Philippine Statistics Authority

Abstract

The main objective of the Backyard Livestock and Poultry Survey (BLPS) is to estimate the total population of major livestock and poultry coming from backyard farms. Moreover, the existing design of BLPS assumes that crop farming households are more likely to raise livestock and poultry animals that is why BLPS uses the sampling frame of Palay and Corn Production Survey (PCPS). Given the current setting, the Philippine Statistics Authority conducted a simulation study to test the assumption of the existing design and to come up with a sampling design which efficiently estimates the population of major livestock and poultry using only a single sample taken from a single sampling frame that is different and independent from the PCPS sampling frame.

Based on simulation results, the best sampling design for carabao, cattle, chicken and swine inventory estimation in terms of average CV and MAPE is a PPS systematic sample of barangays with 20 as livestock/poultry farm household sample size per sampled barangay and the best size measure variable is the sum of all livestock and poultry inventories listed in the sampling frame. Further study is still required for the case of duck and goat inventory estimation since the overall best among all explored designs during simulation still yielded high values of average CV and MAPE for all domains.

Keywords: *Lavallee-Hidiroglou Stratification Algorithm, Probability Proportional to Size (PPS) Systematic Sampling, Simulation*

SCIENTIFIC SESSION 1

SESSION D: REDESIGN

**Measuring Quarterly Regional Progress through the
Regional Development Index**

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Abstract

Currently, a region's economic development is mostly measured through the use of the Gross Regional Domestic Product (GRDP). The GRDP can be simply defined as the total value of goods and services produced in the region. However, the GRDP is only available annually and there is a felt need for a more frequent assessment of a region's economic performance.

This paper aims to construct the Regional Development Index (RDI) which is a composite index covering two dimensions consisting of 14 indicators available on a quarterly basis. The RDI aims to measure both social and economic progress of a region through a single index computed from available data for the period 2010 to 2015. The RDI, however, does not attempt to estimate the level of progress but instead provides an indication of the trends of development.

The RDI as it is in its current stage of development could be used as a tool for analysis in measuring efforts and progress across the regions and over time to compare different dimensions regarding the level of socio-economic development of regions.

Keywords: *Development, GRDP, RDI*

SCIENTIFIC SESSION 1

SESSION B: INFLATION

**Disaggregated CPI facts about Philippine Inflation
and Some Use of Microdata for Macroanalysis**

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Abstract

In this paper, it is estimated that for the Philippines, price indices change (consumer price index or CPI at the 3-digit level of disaggregation) about 65 percent of the time. Equivalently, for about 35 percent of the time, price indices record the absence of price change. This roughly implies that the average waiting time for a price index (or for the CPI) to increase is about one to two months. Any downward adjustment of prices is not an impossibility. For every ten instances of price changes, about once to twice do price decreases occur. Most of these facts are relatively consistent with the observations for other countries and for other types of price data with greater granularity. There are of course marked differences in frequencies across items, periods and the state of aggregate economic conditions (state-dependence).

Understanding the frequency, distribution, magnitude and heterogeneity of disaggregated price changes allows for the testing of the following, among others: covariation of the frequency of price increases (or decreases) with inflation; the seasonality of price changes; and importance of rigidity in firms' price setting decisions. If stickiness of prices is large and prevalent, then price hikes should generally be smaller and temporary. This result is important because, for example, even as price changes occur "more broadly (i.e. price changes include both core and noncore items)" than before, second round effects (arising from supply shocks, from monetary policy actions and other demand side pressures) should generally be smaller and dissipate more quickly than the initial price changes.

For the extensions of this research, the corresponding results and related questions arising from the empirical exercises should further the interest and need for greater granularity in the analysis of prices and inflation. In order to exploit further the information content of more granular price datasets, big data analytics can play a big role. For instance, the availability and knowledge about supermarket data (scanner price data); "web scraping" of online prices of counterpart CPI items; and access to "raw" price data from the government will be able to answer a couple more questions about price setting patterns and behaviour in the economy.

Keywords: *duration, frequency of price changes, hazard function, menu cost, support vector regression, survival analysis*

SCIENTIFIC SESSION 1

SESSION B: INFLATION

Inflation, Poverty and the Train Law

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Abstract

The first semester of the implementation of the Republic Act 10963, also known as the Tax Reform for Acceleration and Inclusion (TRAIN Law), saw the poor (defined in this study as the poorest 30 percent of the household population) suffered the most in terms of their welfare due to the increasing prices of goods, particularly food items such as rice. Using data from the 2012 Family Income and Expenditure Survey (FIES) and the 2018 Monthly Inflation Report (Base Year 2012) of the Philippine Statistics Authority (PSA), the authors estimated that average inflation rate of the poorest 30 percent of the households during the first semester of 2018 is about 5.0 percent (using a comparative base year of 2012), compared to the average 4.3 percent for the headline inflation. Moreover, the authors forecast that 2018 full year average inflation of the poorest 30 percent of the households will reach between 5.5 to 6.0 percent, way above the 4.0 ceiling target of the government, and last seen in 2009 during the aftermath of the global rice price and oil price hikes.

The authors will further argue that government low forecast numbers for inflation rate are due to three reasons, namely: (a) the government economic managers underestimated the impact of the provision of the TRAIN Law (e.g. excise taxes on oil and sugar-sweetened beverages) on the inflation of the poor; (b) coordination failure of government agencies in implementing the safety net provision of the law (e.g. unavailability of cheaper (NFA) rice), and (c) the unfortunate timing of the TRAIN Law being implemented when prices of Crude Oil is increasing and the Peso depreciating against the US Dollar.

Using Vector Autoregressive (VAR) and Time-Varying Parameter (TVP) models, the paper will show that increasing inflation rate of the poorest 30 percent is a threat to mitigating poverty and hunger efforts. In addition, using historical data on poverty from the PSA, the study will show that during years of high inflation rates for the poorest 30 percent of the households, poverty incidence failed to reduce significantly. Since 2018 is FIES year and given the high inflation rate of the poorest 30 percent of the households, reducing poverty incidence from 21.6 percent in 2015 to about 18 percent in 2018, as per target of the government, will be highly improbable.

The higher-than-expected inflation rate experienced by the poorest 30 percent of the households has impact on the cash transfer provided by government to the poor, as part of the safety protection of the TRAIN Law. The authors will show that current cash transfer of Php 2,400.00 per year is not enough to compensate the poor for the increasing prices. Using simulations, the authors will provide alternative estimates of the appropriate cash transfers.

One important policy handle for the PSA is to further improve its reporting on the inflation rate of the poor. The authors will further argue the need to mainstream the reporting of the inflation rate of the poorest 30 percent of the households considering its impact on social welfare. This can be done by updating to the 2012 base year, the PSA Consumer Price Index (CPI) of the poorest 30 percent (from the current 2000 base year) and making the report monthly, rather than quarterly, similar to the practice of the agency in reporting the headline inflation.

Keywords: *Inflation Rate for the Poorest 30 Percent, TRAIN Law, Vector Autoregressive Model, Time-Varying Parameter Model.*

SCIENTIFIC SESSION 1

SESSION D: REDESIGN

Redesigning of the Corn Production Survey

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Abstract

Redesigning of the Philippine Statistics Authority's (PSA's) nationwide quarterly Corn Production Survey (CPS) was done to reflect the current behaviour of corn production in each province. Simulation results show that stratified Lavallo-Hidiroglou (LH) algorithm is the best stratification with probability proportional to size systematic (PPS-SYS) and simple random sampling without replacement (SRSWOR), as the best selection methods for sample barangays and sample households, respectively. Further, design-based estimation is recommended over bootstrap method, in terms of precision and accuracy.

Keywords: *sampling frame, sampling design, design-based, bootstrap method*

SCIENTIFIC SESSION 1

SESSION C: LATEST TECHNOLOGY

**Map-Based or Location-Based Census Operation Using
Modern GIS Platform**

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Abstract

This paper aims to introduce map-based or location-based conduct of census operations using modern GIS Platform. This modern approach will facilitate integration of statistical or census information and geospatial information to make spatial analysis of census results possible through the use of dynamic maps and intelligent data visualization.

This paper attempts to present methods and procedures in conducting the map-based census operation intended specifically for the future conduct of 2020 Census of Population and Housing (CPH) and the 2023 Census of Agriculture and Fisheries (CAF). With the availability of digitized census maps and the on-going conduct of geo-tagging of buildings nationwide to develop digital building footprints, the possibility of using this vector information as point in the digitized map that represent building can be used to develop procedures that would substantially link the geo-tagged buildings to the census enumeration units (i.e housing unit, household, and individual). Generally, the process generates geodatabase that contains both geospatial information (i.e., x, y, and z coordinates) and census data. To illustrate the methods and procedures of map-based census taking, this paper will use results and findings from the series of pretesting conducted for the 2020 Census of Population and Housing (CPH). While the map-based census taking is done to collect person level data, no individual information but only statistical summaries and aggregation will be released to ensure compliance with the data privacy act.

The map-based census operation using the modern GIS technology will considerably improve the statistical business processes of the Philippine Statistics Authority (PSA). The improvement will be in terms of accuracy by addressing non-sampling error such as non-coverage and over-coverage. This can be done using real time GIS-based progress monitoring dashboard for supervisors for the early detection of coverage gaps and subsequently early field intervention to mitigate coverage problems. The timely release of census results can be assured using the technology since data processing is already integrated in the technology-aided data collection using tablet device.

Keywords: 2020CPH, CAPI, Census, Census Workflow, Geo-tagging

SCIENTIFIC SESSION 1

SESSION B: INFLATION

**Modeling Philippine Inflation Using Nonlinear Models:
Threshold Autoregressive and Markov Regime-Switching Approaches**

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Abstract

Given the high impact of inflation on the poor households, inflation studies deserve more attention especially now that the Philippines is at the onset of TRAIN Law. This paper aims to study inflation rate in the Philippines using nonlinear models: (1) Threshold Autoregressive Model (TAR) and (2) Markov Regime-Switching Model (MSW). Using the Diesel price as the threshold variable, the TAR model for the change in Headline Inflation identified a threshold value of PHP 30.05, which is slightly lower than the estimated threshold of PHP 30.25 in the change in Bottom 30% Inflation model. Findings suggest that growth in Diesel price has indeed threshold effects on inflation, with its coefficient being significant only when price is above the threshold. Results of the MSW affirm that growth in price of Diesel has significant positive effect within the high inflationary regime. In both models, the growth in price of Rice remains to have positive and significant effect on inflation rate. The highest expectation is for a high inflation rate regime to succeed itself - 97% for change in Headline Inflation and 91% for change in Bottom 30% Inflation. The corresponding expected durations indicate that Headline Inflation and Bottom 30% Inflation are expected to stay in the high inflationary period for 35 months and 11 months, respectively. As the current price of diesel is above the identified thresholds, the imposed excise tax on Diesel price due to the TRAIN Law will have a 0.29 and a 0.27 percentage points impact on the change in Headline Inflation and on the change in Bottom 30% Inflation, respectively, based on the results of the TAR models. Furthermore, with the current state of inflation, the excise tax on Diesel price is expected to have a 0.14 and 0.15 percentage point impact on change in Headline Inflation and on change in Bottom 30% Inflation, respectively. Policymakers should monitor inflation and direct government policies toward stabilizing prices.

Keywords: *Inflation Rate, Threshold Autoregression, Markov Regime-Switching*

SCIENTIFIC SESSION 1

SESSION C: LATEST TECHNOLOGY

Harnessing Big Data for Development

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Abstract

Governments recognize the importance of statistics for managing their economies more effectively, especially as they seek to accelerate the pace of meeting national development goals, and global commitments exemplified in the Sustainable Development Goals (SDGs). Monitoring the SDGs and national development plans require huge demands from national statistical systems, particularly more, faster, and better data. Official statistics, sourced from censuses, sample surveys, and administrative reporting systems, are now being challenged by statistics that can be generated from a tsunami of data shared and transmitted on the web and by way of various electronic means. Big Data, typically characterized by 3V's: immense volume, velocity and variety, is not only creating business opportunities, but also showing potential as an alternative source of statistics on illness, inflation, sales, people's movements, including traffic. This paper reviews issues on Big Data, including ethics, opportunities and the role of the official statistics community in ensuring that statistics generated from Big Data will complement those generated from traditional sources and ultimately matter to everyone. It discusses how the readiness of official statisticians to leverage big data for official statistics crucially depend on technological as well as capacity issues.

Key Words: *big data, official statistics, quality, privacy, National Statistical Systems, SDGs*

SCIENTIFIC SESSION 1

SESSION C: LATEST TECHNOLOGY

Use of Latest Technology in Data Capture for Consumer Prices:
Philippine Experience

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Abstract

The generation of the Consumer Price Index (CPI) in the Philippines started as early as 1945. Since then, data capture was through the traditional paper and pencil method. With the advent of modern technology, android devices (tablets) were used in 2015 to enhance recording, validation and transmission of prices data from the district level to the field offices and to the Central Office at a faster speed and paperless mode.

This paper presents the different phases of activities undertaken in the implementation of android device tablet in the collection, processing, validation and transmission of price data for the generation of the 2006-based CPI for all income households and the 2000-based CPI for the bottom 30% income households. This paper also briefly discusses the features of the system named Price Tag for the android device tablet and the CPI Store Merger system for building up cleaned reference files.

The CPI Store Merger is a Windows-based system that cleans and merges data for the reference files of names of stores/outlets in the two CPI series (2006-based and 2000-based CPI). The output of the said system is a merged reference file containing all the sample stores in the 2006-based and 2000-based CPI.

On the other hand, the android-based data collection system called Price Tag was also developed to expedite data capture in the field and submission to the Central Office. This system enables the price collector to validate the price data collected on the spot by facilitating data validation at the provincial level and Central Office. The method decreases the errors in transcription of the traditional method of data capture. The system also captures the coordinates of the location of the sample stores visited by the price collectors through the use of the Global Positioning System which can be used by the Central Office staff or the field supervisor to check if price collector actually visited her/his assigned sample outlets/stores. An image for each item in the CPI market basket for each province is developed and incorporated in the system as a guide to the price collectors for purposes of consistency of collecting prices for a specific item.

Problems have been encountered, such as unavailability of internet connections and security in some areas, the use of tablets in collecting, processing and validating price data, nonetheless, provided more benefits that ensures the reliability of price data, provides faster transmission of data and efficiency.

Keywords: *CPI, paperless, android device, sample stores, GPS, price observations*