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THE 10th M&E NETWORK FORUM

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IMPACT EVALUATION STUDY OF THE CANDON BYPASS ROAD PROJECT

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PRESENTATION OUTLINE

- Introduction
- Research Evaluation
- Data Sources and Methodology
- Preliminary Results

I. Introduction

Project Information (Basic Details)

Project Information

- ***Title:*** **Impact Evaluation of the Candon Bypass Road Project**
- ***Project Duration:*** **July to December 2023**
- ***Project Outputs:***
  - Four-lane - 7.3-km. bypass road
  - Oaig Daya Bridge (30 lm)
  - Road signages and pavement markings and four waiting sheds.
- ***Purpose of the Program and Project:***
  - Ease traffic congestion and reduce travel time from Sta. Lucia, Ilocos Sur to Santiago, Ilocos Sur from 40 minutes to 20 minutes.
  - Promote economic activities.

Site Study Map

II. Research Evaluation

a. Theory of Change
b. Evaluation Questions and Objectives

Theory of Change

Situation you want to change	Inputs	Activities	Measurable Indicators	Immediate Effects	Medium Term Outcomes	Long Term Goals
Traffic congestion along the section of the Manila North Road in Candon City, Ilocos Sur affects the growth of the local economy	Financial and human resources- (Php 717.671M)	- Acquisition of road right of way - Construction of by-pass road - Maintenance of by-pass road	4 lane -7.3 km bypass road	Reduced travel time Reduced volume of daily traffic along the main road (MNR) reduced vehicle operating cost	Reduced traffic congestion Increased economic dynamism • Increased number of businesses • Increased land value • Increased Tax (business tax and real property tax) generated by the LGU	Seamless and Inclusive connectivity Inclusive Economic Growth

Assumptions

- Funds are readily available and sufficient
- Bypass road constructed as designed
- The motorists/commuters (residents and transients) are using the bypass road
- Bypass road is regularly maintained
- Traffic management effectively implemented
- LGU ensures strict enforcement of required easement
- Governance mechanisms to attract investments are in place
- There is continuous upgrading of infrastructure
- There is effective governance that can maintain attractive business climate

Evaluation Questions and Objectives

The primary objective of the study is to evaluate the impact of the bypass road in reducing traffic congestion and increasing economic growth in Candon City, Ilocos Sur. Specifically, it aims to provide answers to the following questions:

1. Did the project reduce the annual average daily traffic along the bypassed road?
2. Did the project increase business activity in Candon City?

III. Data Sources and Methodology

a. Methodology
b. Data Sources

a. Methodology

Quasi-experimental Method - Synthetic Control Method (SCM)

- Find the "best" available comparison or synthetic control unit that will approximately match the treatment based on: (a) important pre-intervention predictors of the outcome and (b) Pre-intervention trends on the outcome.

Descriptive Research Method (Complement empirical results)

- Determine the profile of establishments in Candon City before and after the Bypass Road using the Annual Survey of Philippine Business and Industry (ASPBI)

- Gather qualitative information on the effects of the project through focus group discussions (FGD) and key informant interviews (KII).

a. Methodology

Why SCM?

- The intervention affects an aggregate unit (city)
- The intervention is an infrequent event w/ few observed instances
- Evaluating medium to long term effect, thus, single-unit time-series analysis is ill-suited
- Compare trends of outcome variables of treatment unit to similar untreated units
- Small number of control units - a combination of control units provides a more appropriate comparison
- Data driven procedure that formalizes the selection of comparison units

Identifying the Counterfactual

- Cities/Municipalities along the Manila North Road in the provinces of Region 1 will be identified using the following criteria and will serve as donor pool:
    a. LGUs along the Manila North Road (MNR) in Region 1;
    b. No existing bypass roads in the LGU;
    c. The MNR serves as the LGUs major thoroughfare; and
    d. The MNR traverses the central business district (CBD) of the LGU.

List of LGUs which met the above-mentioned criteria:

Province	Name of Municipality	Number
Ilocos Norte	Burgos, Bacarra	2
Ilocos Sur	Santa Cruz, Santa Lucia, Santiago, San Esteban, Narvacan, Santa, Santo Domingo, Magsingal, San Juan, Cabugao, Sinait	11
La Union	Aringay, Caba, Agoo, Bauang, Bacnotan, Balaoan, Bangar, Santo Tomas	8
Total		**21**

b. Data Sources

a. Independent Variables (Predictors)

Economic Sector

- Total Crop Production
- Total Livestock Production
- Total Poultry Production

Data Source: LGUs (Province and Municipality)

Social Sector

- Population Density, Population, Land area
- Proportion of Males and Females
- Number of Households and Average Household Size
- Poverty Incidence
- Small Area Estimates

Data Source: PSA CO

Education Sector

- No. of Junior and Senior HS
- Annual Literacy Rate

Data Source: DepEd School Division Offices and PSA

Health Sector

- Annual Morbidity Rate per 1000 population
- Annual Mortality Rate per 1000 population
  a. Infant Mortality Rate
  b. Under- five Mortality Rate
  c. Maternal Mortality Rate

Data Source: PSA CO

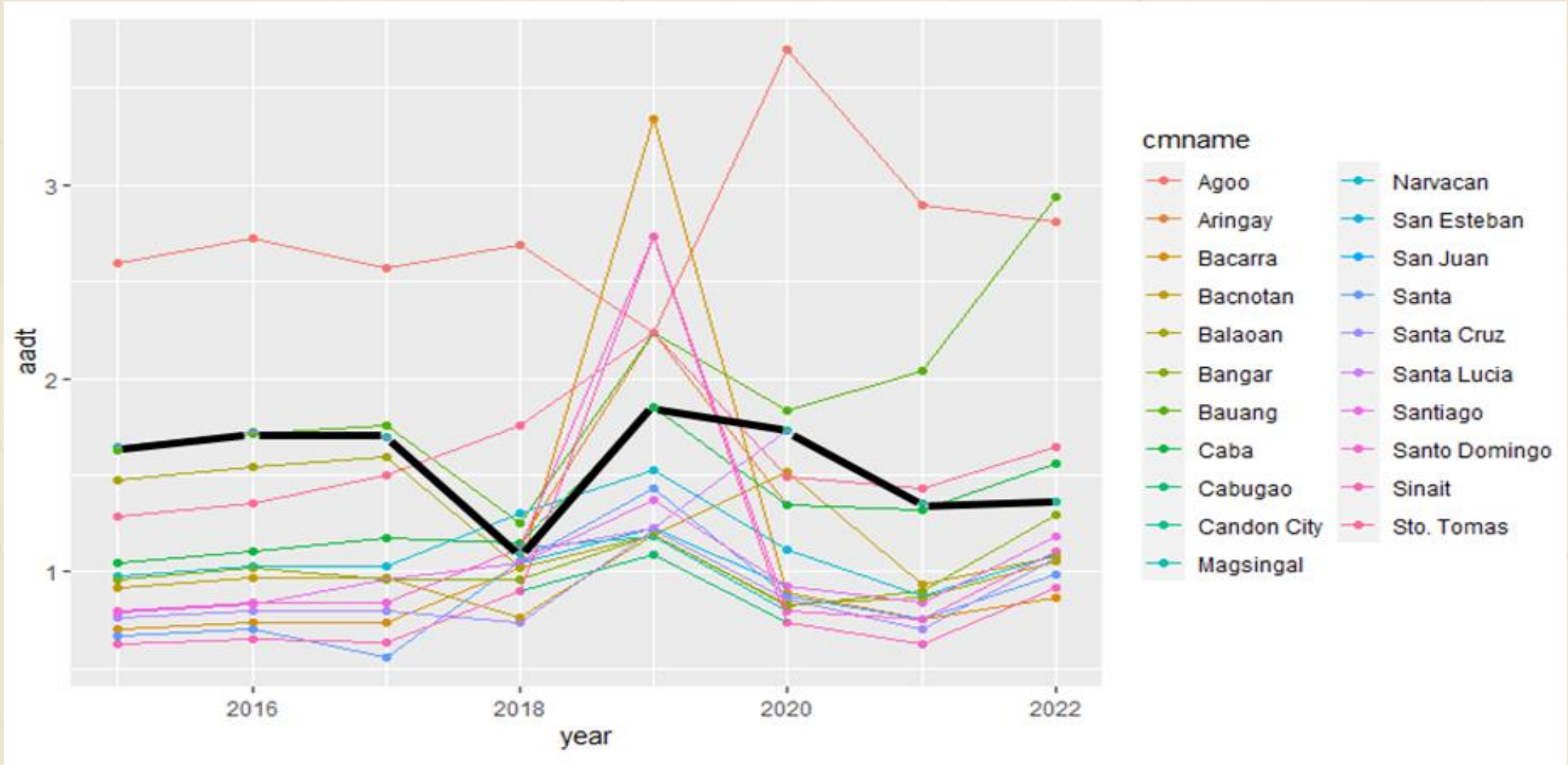
b. Data Sources

b. Dependent Variables

Data	Data Source	Coverage of Analysis
O1: AADT (O1)	DPWH Region 1 and DPWH CO	2010-2022
Revenue/Income		
O2: Local tax revenue generated (Real Property Tax)	BLGF Website	
O3: Local tax revenue generated (Tax on Business)	BLGF Website	

IV. Preliminary Results

Average Annual Daily Traffic Model (in Ten Thousands)



*Notes: *p<0.05, **p<0.01*

Average Annual Daily Traffic Model (in Ten Thousands)

Years Covered: 2015-2022

Size of Donor Pool: 20 municipalities

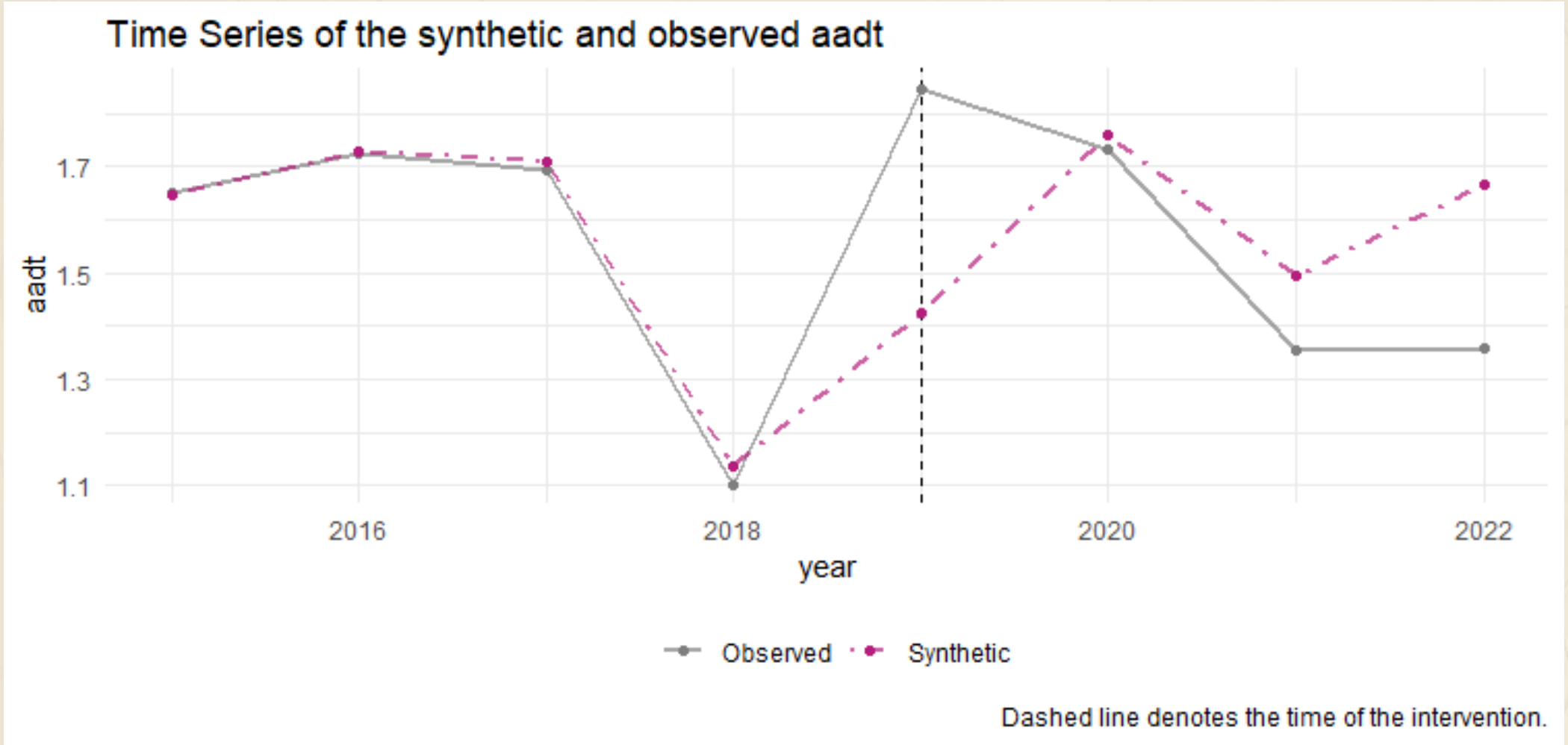
Control Units	Weights
Sta. Lucia	0.804
Bauang	0.192
Agoo	0.00384

Variable MSPE	0.000366
Control Unit MSPE	0.00180

Predictors	Weights
Log of Income Real Property Tax	0.00000113
Log of Population Density	0.0226
Infant Mortality	0.0000328
Poverty	0.0000000291
Livestock Per Capita	0.0257
Number of Privately-owned business	0.000000987
Under-five Mortality	0.000929
Maternal Mortality	0.000314
AADT Lagged Year: 2015	0.474
AADT Lagged Year: 2016	0.477

*Notes: *p<0.05, **p<0.01*

Average Annual Daily Traffic Model (in Ten Thousands)



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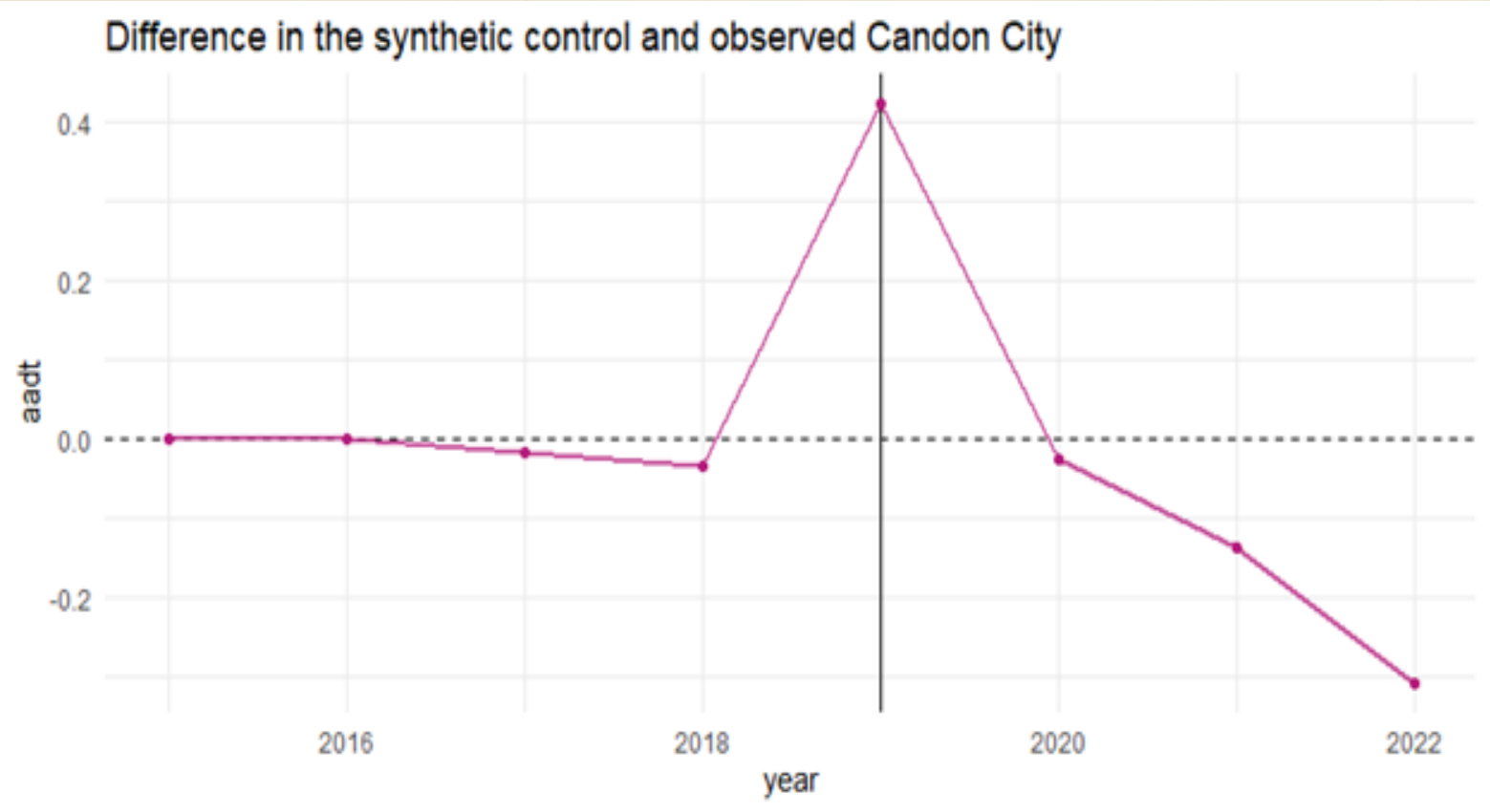


Year	Actual	Synthetic	Difference
2020	1.73	1.76	-0.03
2021	1.36	1.49	-0.13
2022	1.36	1.67	-0.31
		Average	**-0.16**

*Notes: *p<0.05, **p<0.01*

Results from FGD and KII

TRAFFIC CONDITION

BEFORE

- TRAFFIC CONGESTION

AFTER

- TRAFFIC REDUCTION
- FUEL SAVINGS
- TRAVEL SAFETY

OBSERVATIONS

POSITIVE

- TRAVEL CONVENIENCE
- REDUCTION IN VEHICLE-RELATED COST
- FOUR-LANE ROAD

NEGATIVE

- SIGNAGE INSUFFICIENCY

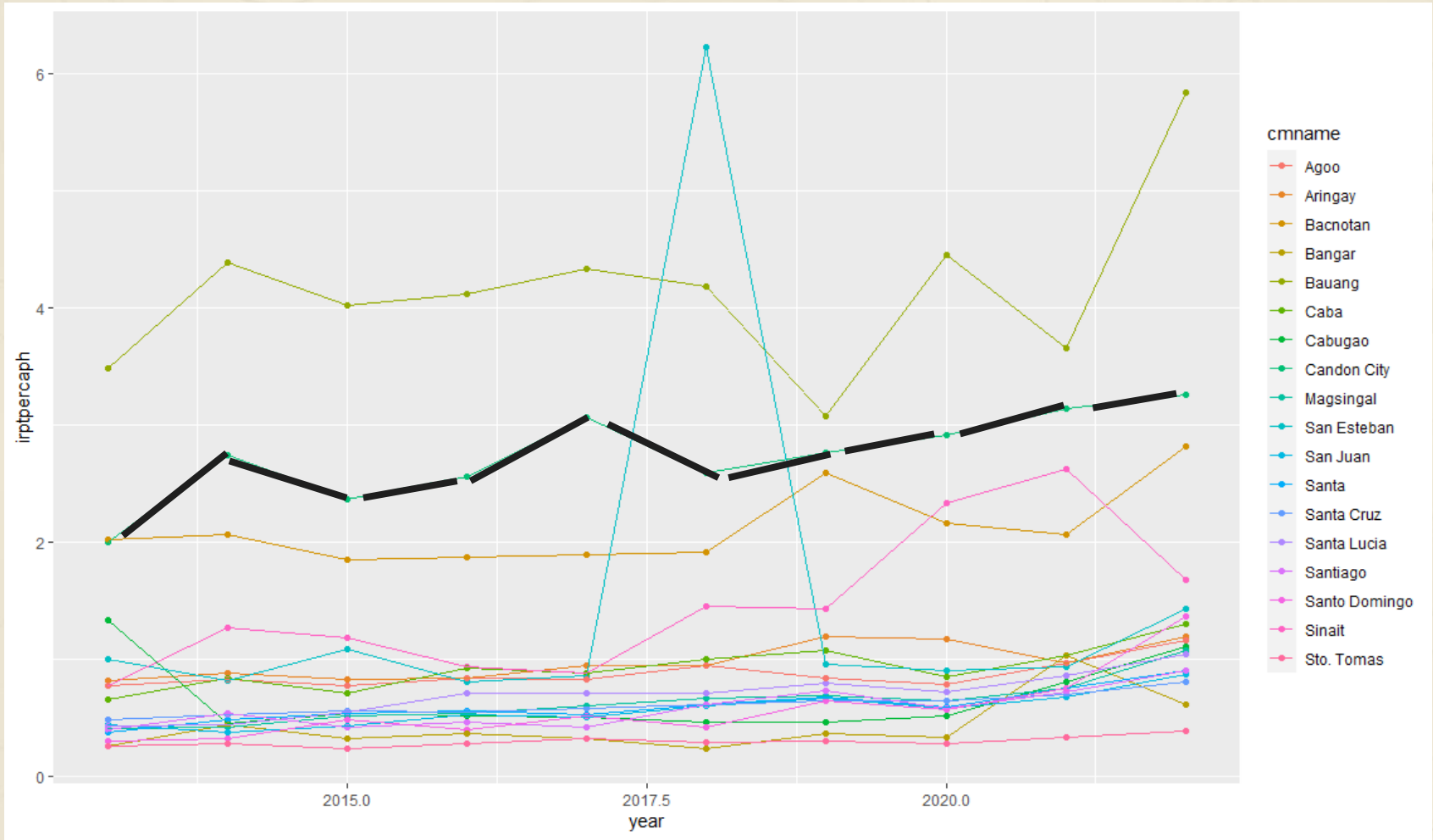
BENEFITS

- COMFORT, CONVENIENCE & ACCESSIBILITY
- TRAVEL SAFETY

CHALLENGES

- TRAFFIC MANAGEMENT IMPLEMENTATION

Income Real Property, Per Capita Tax Model (in hundred Pesos)



Income Real Property Tax, per Capita Model (in hundred Pesos)

Years Covered: 2013-2022

Size of Donor Pool: 20 municipalities

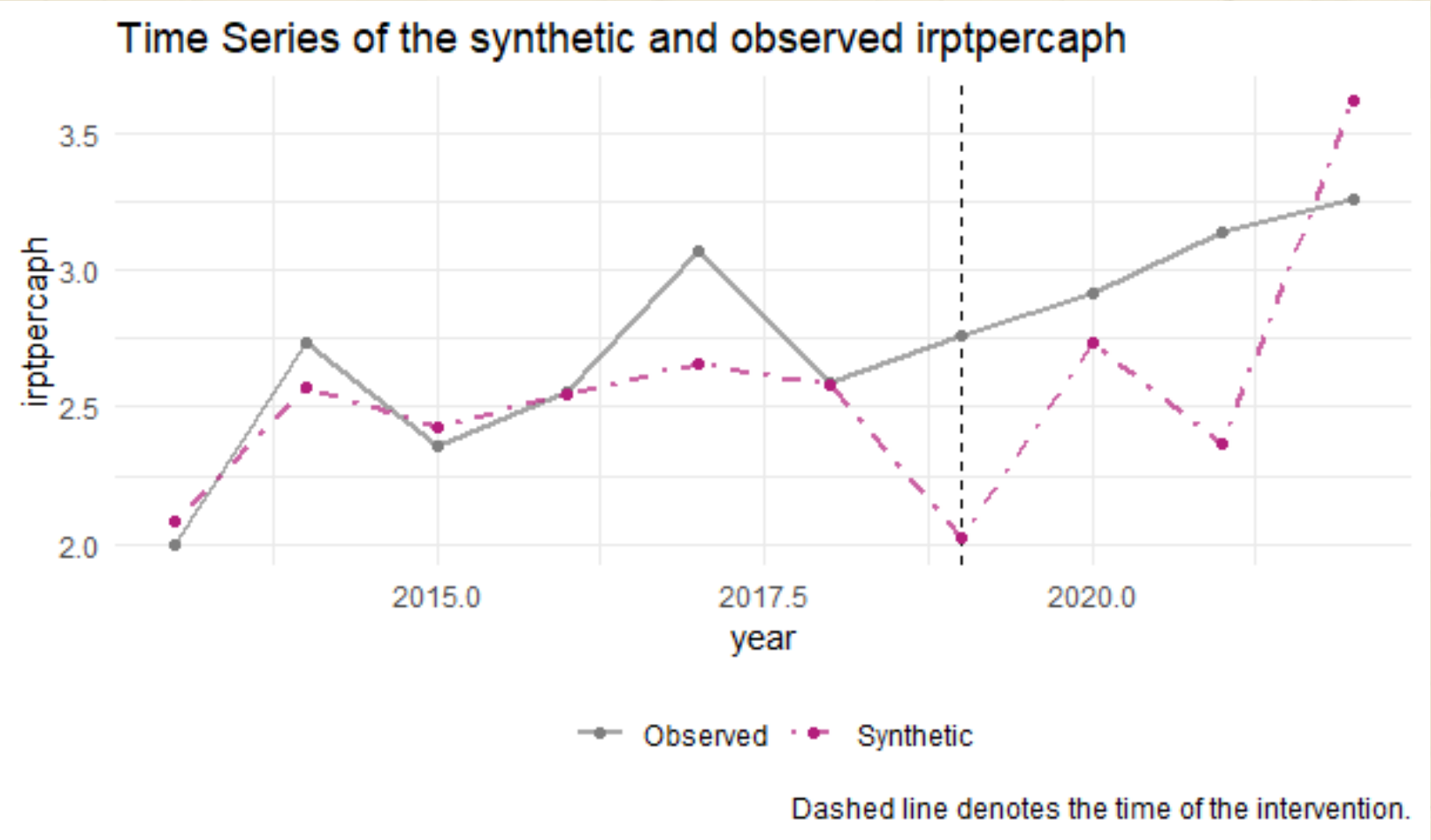
Control Units	Weights
Sta. Lucia	0.438
Bauang	0.538
Agoo	0.0233

Variable MSPE	0.0336
Control Unit MSPE	0.00387

Predictors	Weights
Log of AADT	0.156
Log of Population Density	0.00219
Log of Gross sales	0.00123
Poverty	0.00508
IRPT Lagged year: 2018	0.836

*Notes: *p<0.05, **p<0.01*

Income Real Property Tax, per Capita Model (in hundred Pesos)



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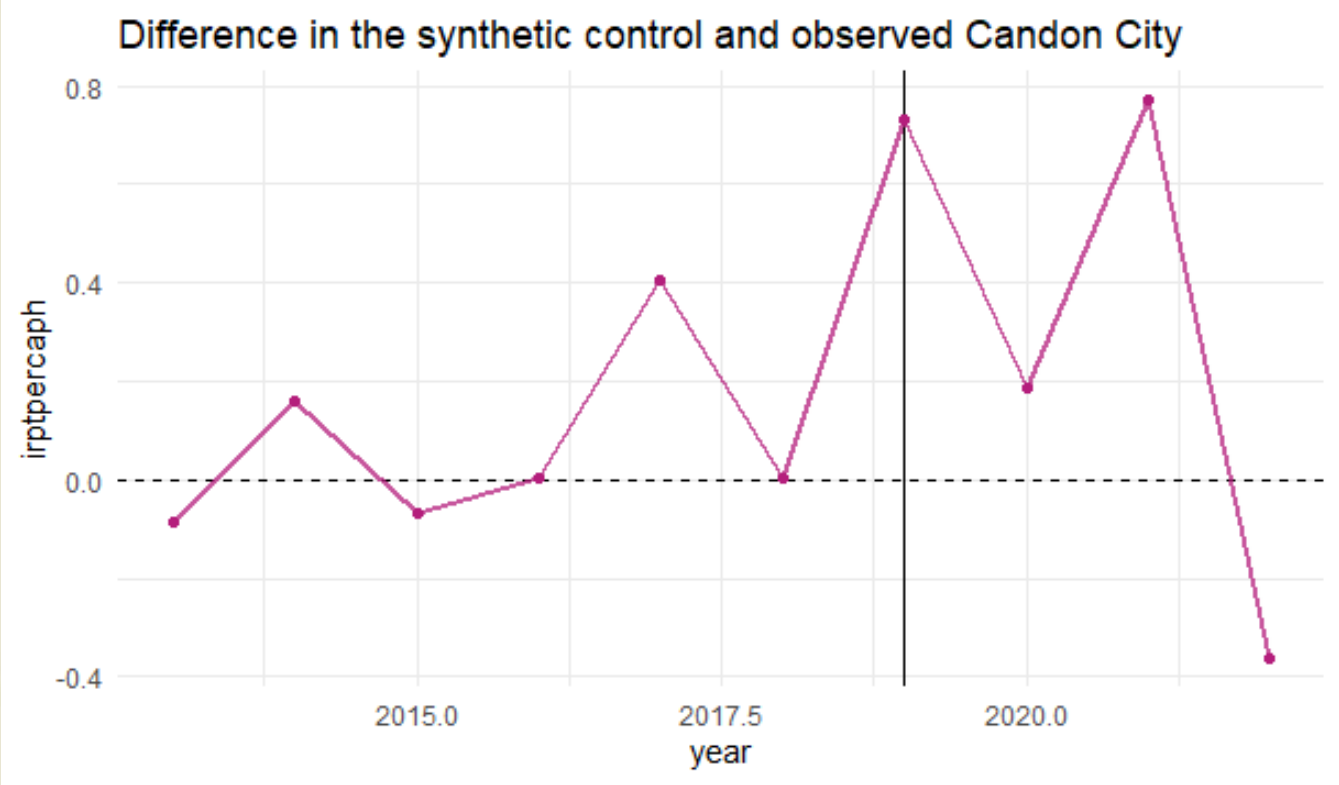
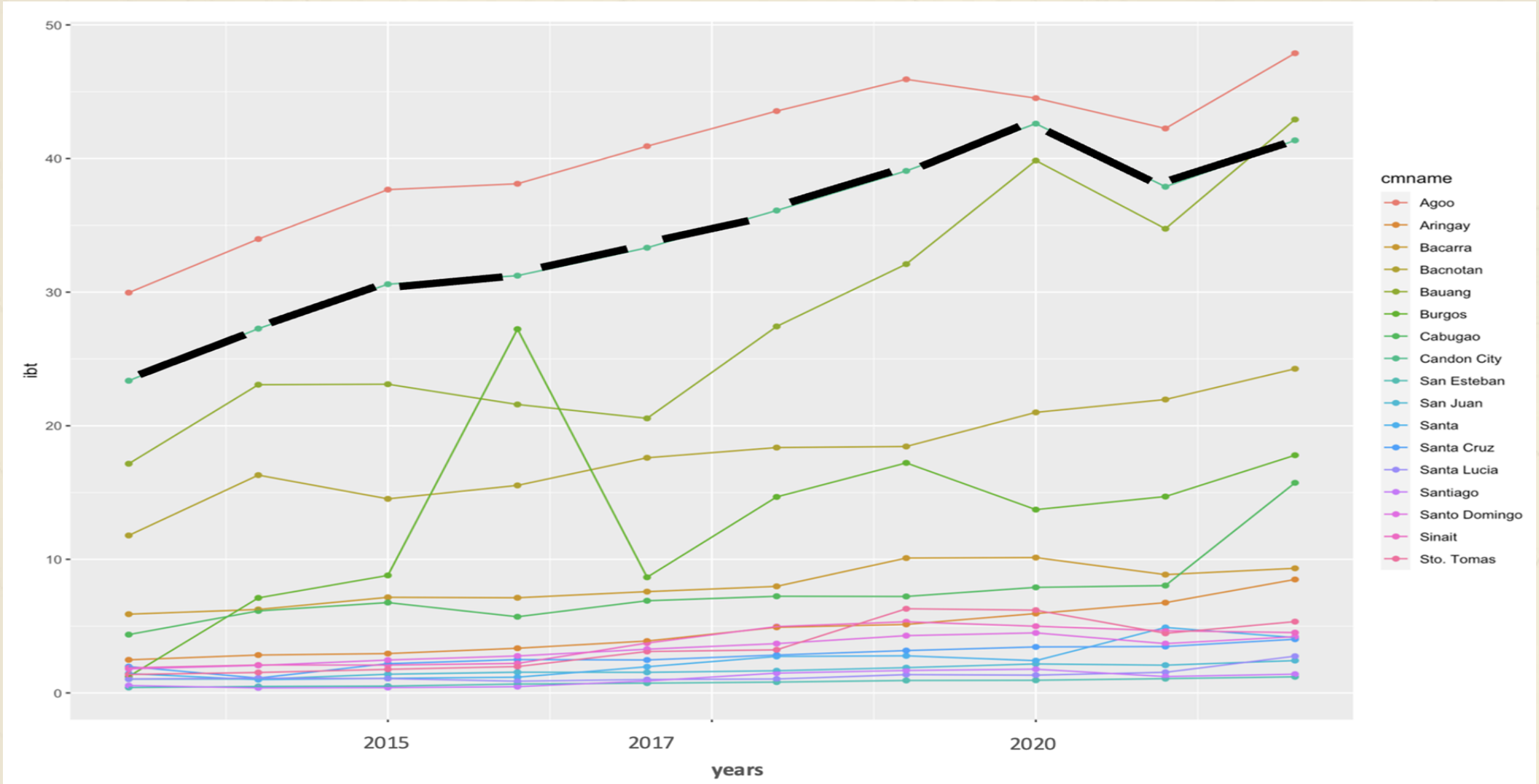
Income Real Property Tax, per Capita Model (in hundred Pesos)



Year	Actual	Synthetic	Difference
2020	2.92	2.73	0.19
2021	3.14	2.37	0.77
2022	3.26	3.62	-0.36
		Average	**0.2**

*Notes: *p<0.05, **p<0.01*

Income Business Tax Model (in Million Pesos)



*Notes: *p<0.05, **p<0.01*

Income Business Tax Model (in Million Pesos)

Year Covered: 2013-2022

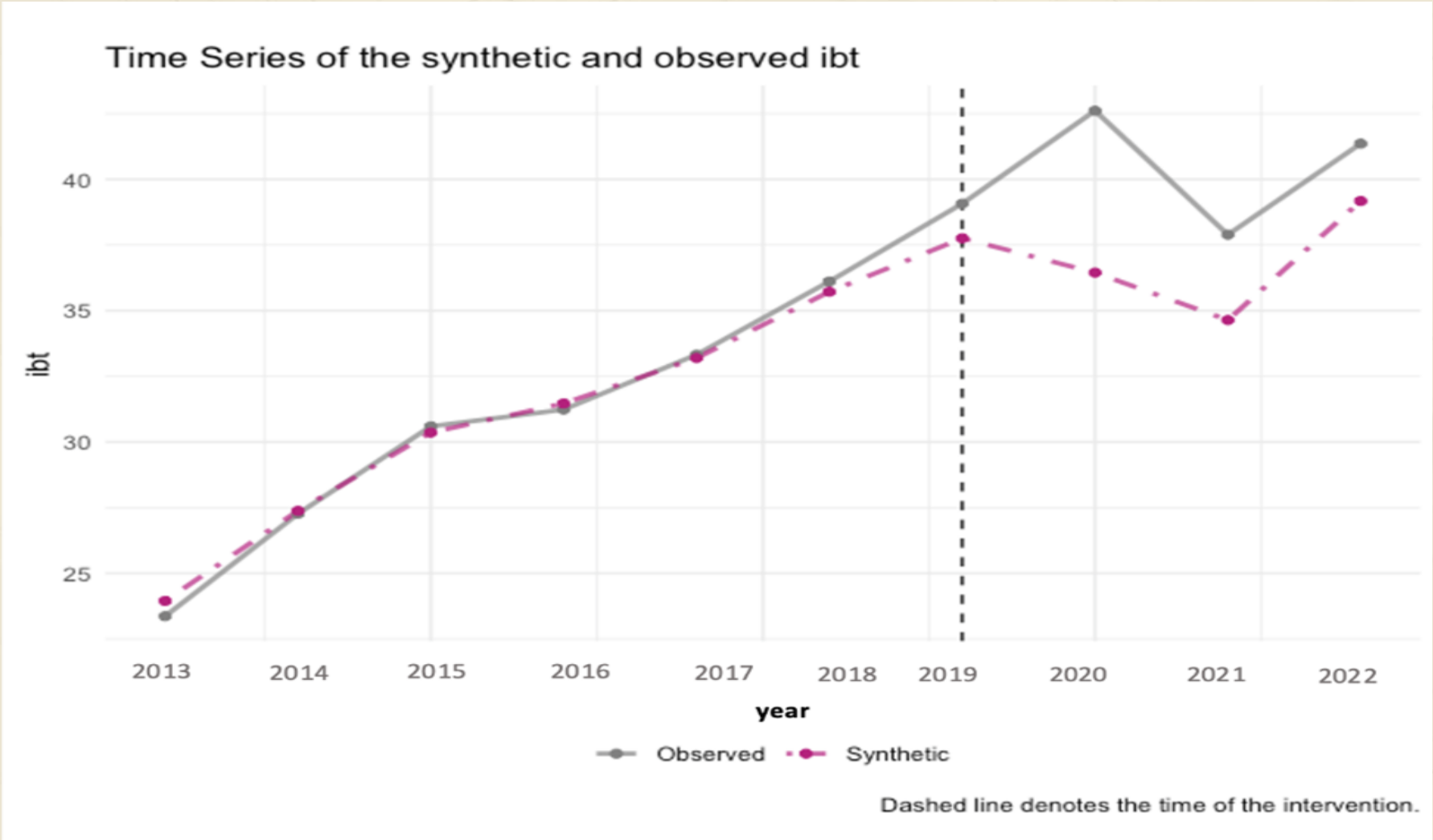
Size of Donor Pool: 16 municipalities

Control Units	Weights
Agoo	0.787
Sinait	0.173
Burgos	0.0403

Variable MSPE	0.105
Control Unit MSPE	0.301

Predictors	Weights
Log of Gross Sales	0.218
Number of Business Renewals	0.212
IBT Lagged year: 2015	0.207
Mortality Rate	0.129
IBT Lagged year: 2016	0.123
Log of Population Density	0.0519
Log of AADT	0.0471
Log of Area Planted with Rice	0.0121

Income Business Tax Model (in Million Pesos)



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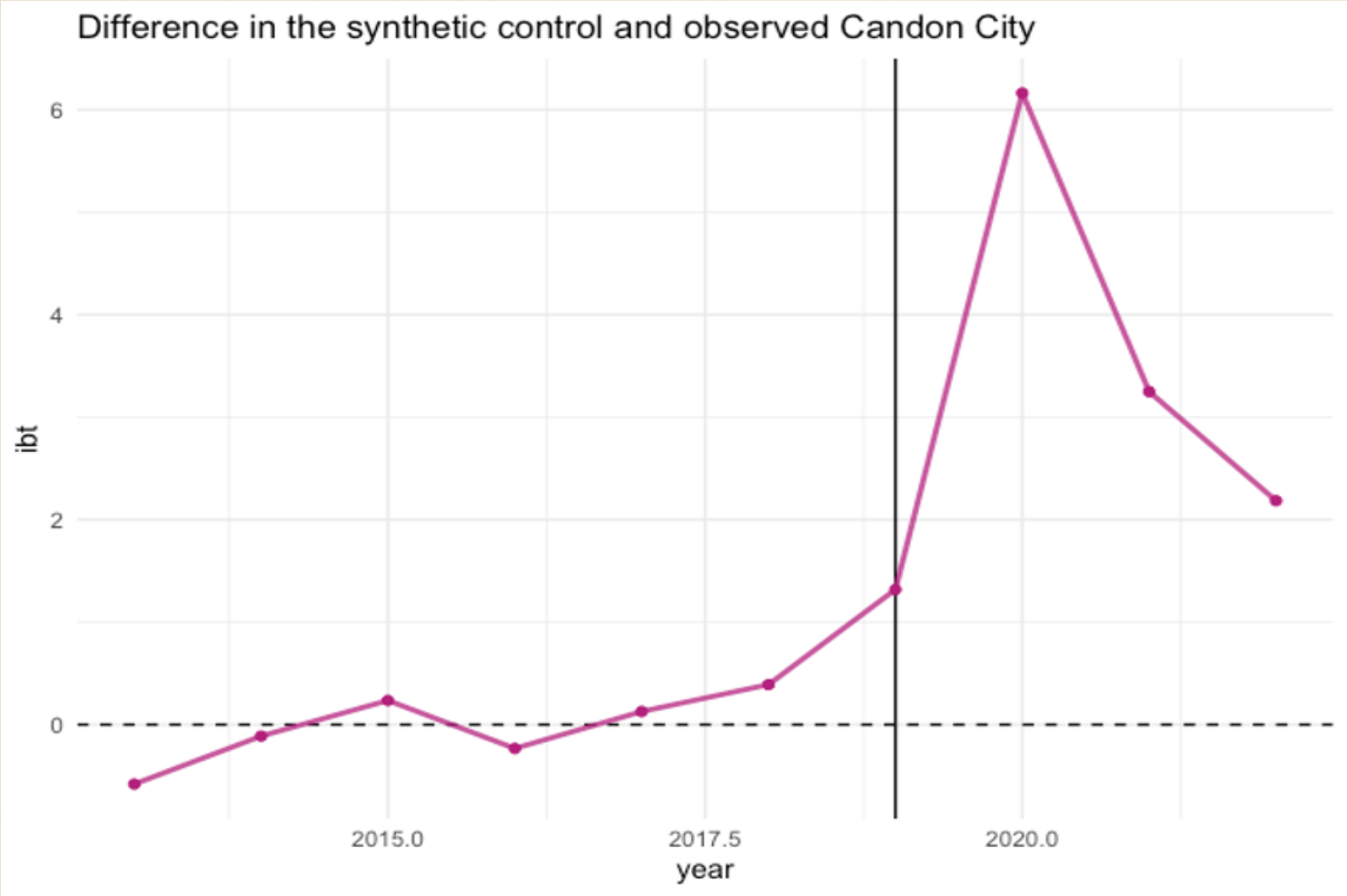
Income Business Tax Model (in Million Pesos)



year	Actual	Synthetic	Difference
2020	42.6	36.4	**6.2**
2021	37.9	34.6	**3.3**
2022	41.4	39.2	**2.2**
		Average	**3.9**

Results from FGD and KII

OBSERVATIONS

- CITY DEVELOPMENT
- ENVIRONMENTAL ISSUES

BENEFITS

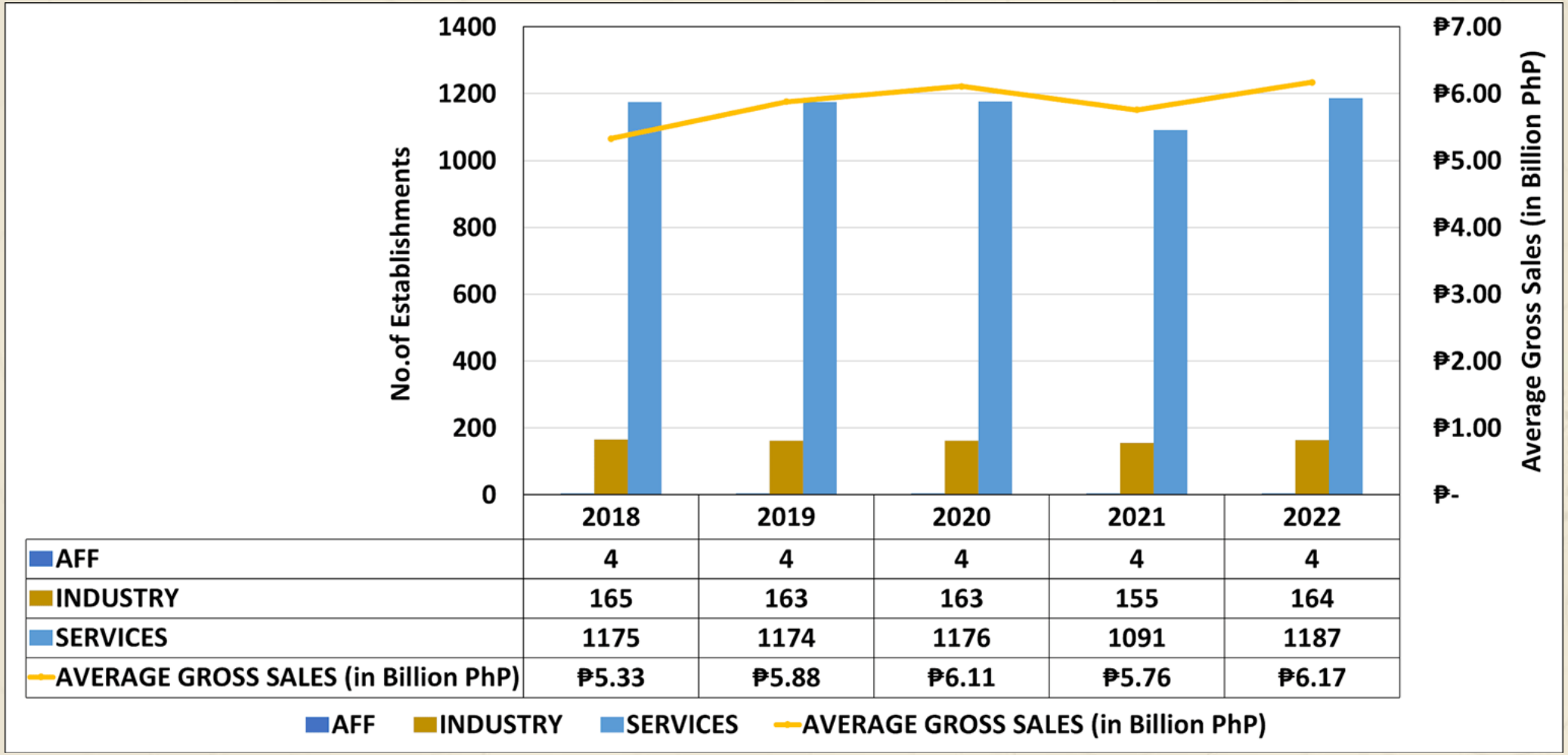
- ECONOMIC DEVELOPMENT
- INFRASTRUCTURE & FACILITIES

CHALLENGES

- AGRICULTURAL AND ENVIRONMENTAL ISSUE
- LAND USE CHALLENGES
- RISING LAND VALUE
- REDUCTION OF LOCAL BUSINESS SALES LOCATED IN CBD

Profile of Establishments

Number of Establishments by Industry and Average Gross Sales, 2018 - 2022, Candon City



	2018	2019	2020	2021	2022
AFF	4	4	4	4	4
INDUSTRY	165	163	163	155	164
SERVICES	1175	1174	1176	1091	1187
AVERAGE GROSS SALES (in Billion PhP)	₱5.33	₱5.88	₱6.11	₱5.76	₱6.17

*Notes: *p<0.05, **p<0.01*

- The Bypass Road reduced the annual average daily traffic along the bypassed portion of the Manila North Road from 2020 to 2022 by an average of 160 volume of vehicle traffic.

- The Bypass Road increased the annual per capita income from real property taxes in Candon City from 2020 to 2022 by an average of 20 pesos.

- The Bypass Road increased the annual income from business taxes in Candon City from 2020 to 2022 by an average of PhP3.9 million.

The Candon Bypass Road

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References

Abadie, A. (2021). Using Synthetic Controls: Feasibility, Data Requirements, and Methodological Aspects. Journal of Economic Literature 2021, 59(2), 391–425.

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THANK YOU