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FINEX JOURNAL





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ABOUT

FINEX Research and Development Foundation, Inc.

FINEX Foundation is the social arm of FINEX that supports research and development programs and projects in financial and business management, information technology, and other related fields of endeavor.

FINEX Journal

FINEX Journal is a publication of the FINEX Foundation's Research Committee that is available online and printed copies. This journal is committed to publishing research articles on areas of finance and other topics that are relevant and timely.



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FOREWORD

Welcome to the first issue of FINEX Journal. This Journal is a FINEX Foundation's Research Committee project which will be available in print and online publications. The Committee was formed from requests of the financial educators during JFINEX conventions as they needed a way to publish their research and articles.

We are thankful to our educators and students, who submitted their research articles. We are also glad to serve as a vehicle for them to publish their relevant and insightful articles.

This Journal contains five main articles and two special feature articles from the business community which provide valuable information in finance, economics, and other business fields.

I am very pleased that this is the first step of a continuing project of the Research Committee to publish relevant and timely research articles. We still continue welcoming article submissions.

Special thanks to the members of the committee for this guidance and using their connections with academe and other organizations to solicit articles. I am deeply grateful to all the contributors for their excellent works. Each issue offers useful reports and articles to the business community.



Eduardo V. Francisco
Chairman, Research Committee



TABLE OF CONTENTS

07

MAIN ARTICLES

EFFECTS OF TRADE LIBERALIZATION ON MANUFACTURING
VALUE ADDED IN THE PHILIPPINES

Vince Allen F. Encina

21

CLUSTERING OF IMPORT-EXPORT CONTAINER TRAFFIC:
CASE OF CAVITE AND LAGUNA

Gregorio S. Ochavillo

36

IMPLEMENTING THE MODIFIED NELSON-SIEGEL-SVENNISON
MODEL IN CONSTRUCTING THE PHILIPPINE YIELD CURVE

Armin Paul D. Allado and Ruel V. Maningas

49

DETERMINANTS OF FINANCIAL WELL-BEING OF
ENTREPRENEURS IN DAVAO REGION

Lady Margrett G. Cagape

55

VALUE-RELEVANCE OF ADVERTISING EXPENDITURE OF
PHILIPPINE-LISTED FOOD AND BEVERAGE

Sheevun Di O. Guliman

65

SPECIAL FEATURE ARTICLES

PHILIPPINES EQUITY STRATEGY

BDO Securities

76

THE GREAT INFRASTRUCTURE DEBATE

GlobalSource Partners



EFFECTS OF TRADE LIBERALIZATION ON MANUFACTURING VALUE ADDED IN THE PHILIPPINES

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ABSTRACT

Empirical literatures emphasized that trade liberalization can be beneficial on manufacturing sector and in the economy. However, there were still different approaches to measure trade liberalization and its effects on manufacturing sector in different countries. This study aims to estimate the effects of trade liberalization on manufacturing value added in the Philippines by applying trade openness and dummy variable for trade reform program to measure trade liberalization. The study also applied gross capital formation and exchange rate as another independent variable. Using time series regression and Error Correction Model (ECM) approach, it was concluded that trade openness and gross capital formation have positive long and short run effects on manufacturing value added. On the other hand, dummy variable for trade reform program and exchange rate were found to have an indirect long and short run effects on manufacturing value added. The findings provided a significant understanding that trade liberalization can be a crucial part of manufacturing sector. The study recommended that government policies may lower tariff and non-tariff barriers to provide competitive environment for domestic manufacturing firms and help foster manufacturing sector growth. Government may also implement roadmap plans that intends to bring investments to support trade reform programs and the manufacturing sector.

Keywords: Manufacturing Value Added; Trade Liberalization; Trade Openness; Trade Reform Program

1. Introduction

The Philippine's outstanding economic performance over the past few years has made the country as a more favorable market for foreign companies and investors, who are seeking for greater opportunities. Foreign trade has been one of the major features for economic development in the Philippines. Multilateral, unilateral, regional and bilateral agreements pursue the Philippines to form trade policies among its foreign partners (Department of Trade and Industry [DTI], 2017).

According to Anowor, Ukwani, and Martins (2013), trade liberalization is defined as the

reduction or removal of restrictions or barriers on the exchange of goods and services across nations. The process of trade liberalization includes the reduction or removal of tariffs, elimination of import quotas, elimination of multiple exchange rates, and removal of requirements for administrative permits for imports. The policies of trade liberalization aim to achieve high productivity, eliminate inefficiency and trade barriers in the production process that leads towards competitive and free market economy. Hozouri (2016) emphasized that trade liberalization is a phenomenon at the international level that yield nation's economy and to the sectors development through the international



division of labor and specialization across nations. It has been one of the most prominent strategies used in developing nations to promote economic growth and foster development on its economic sectors. Many theories have been proposed about trade liberalization in the international level that aim to find the basis, direction and quality of benefits to the countries from the international trade.

Trade has been an important factor in manufacturing sector, this is because manufacturing sector is highly mechanized and can easily adapt to technology changes in the industry. Most manufacturing sector engage frequently in trade to maximize the benefits of trade activities. Based on David Ricardo's law of comparative advantage, trade liberalization might lead to static gains in nation's resource allocations at the expense of important dynamic gains, which are valuable for the manufacturing sector development to gain access to modern technology and nations can attain an ideal pattern of production by free trade (Seif & Fazlzadeh, 2011). According to Kniivilä (2007), the development of industries and specialization in a country are often essential for economic growth and for long term reduction of inequality. The level of trade openness of a country has an influence on the pattern of development in industries and in specialization of a country which are important.

Numerous existing researches have empirically investigated the effect of trade liberalization (Mangabat, 1999; Watts, 2000; Medalla & Balboa, 2007; Safdari, 2011; Despeignes, 2013; Shaheen, Ali, Kauser, & Ahmed, 2013) and most of these studies are focused on impact of trade liberalization on economic and agricultural sector. However, there are certain existing literatures that emphasized the issue on manufacturing sector and find that trade liberalization has positive effect on manufacturing sector (Nair, Madhavan, & Vengedasalam, 2006; Chandran, 2009; Asongo, Jamala, & Waindu, 2013; Okoye, Okorie, & Nwakoby, 2017). On the other hand, there are also certain studies that focused the issue on manufacturing sector and found that trade liberalization has negative effect on manufacturing sector (Bongsha, 2011; Umer, & Alam, 2013). In Malaysia, trade liberalization found to have positive impact on manufacturing value added using trade openness to measure

trade liberalization. Trade liberalization helps developing countries to access imports of advance technologies from other countries that may boost production of outputs. In Nigeria, trade liberalization found to have mix results in the literature. In other countries, it was argued that trade liberalization does not always bring benefits and development for manufacturing industries. The study of Alawin et al. (2017) confirms to the conclusion that trade liberalization have positive effect on manufacturing sector.

Empirical literatures discussed about the relationship of trade liberalization and manufacturing sector have presented various models with different variables and measurements. Most of the literatures only consider trade openness, measured by the sum of export and import divided by GDP, as the indicator of trade liberalization. However, this study aimed to fill this gap provided by empirical literatures using two indicators of trade liberalization in this study, trade openness and implementation of trade reform program as dummy variable, in analyzing the effects of trade liberalization on manufacturing value added in the Philippines.

2. Theoretical and Conceptual Framework

2.1 Theoretical Framework

2.1.1 Endogenous growth theory. Romer (1990) modified version of endogenous growth model is the framework that researchers frequently used to explain the relationship of trade policy and sector growth. Romer's version of endogenous growth model emphasized that international free trade can act to speed up growth. Endogenous growth theory model emphasized that human capital, innovation and investment in assets for production and technology are some significant drivers of economic growth.

It was supported by the modified version of Lucas (1988), that the positive externalities and spillover effects of international trade and investment bring new quality and improvement in technology and production to the economy, it also brings acquisition of new skills for the workers in the country. As the manufacturing sector is highly mechanized, endogenous growth theory can significantly explain the effect of international trade in industries growth



because endogenous growth model shows that trade can bring technological changes and technological progress are linked to the manufacturing sector growth. Manufacturing which is a subsector of industry sector, can easily adapt to technological changes, physical and human capital investments that international trade activities can bring and explained by the endogenous growth model. There are existing literatures that used the endogenous growth theory in their study about trade liberalization to growth (Tahir, Ruiz Estrada, Khan, & Afridi, 2016; Majeed, Ahmed, & Butt, 2010). This theory emphasized how economic factors and activities can influence manufacturing sector growth, which makes it relevant to the study.

2.1.2 Law of comparative advantage. In 1817, British economist David Ricardo developed a trade theory that explains why countries can still benefit from foreign trade through comparative advantage. David Ricardo emphasized the importance of specialization for a country in producing a particular good at lower opportunity cost. Theory of comparative advantage also demonstrate that different countries can still gain from foreign trade even though they have difference on efficiency in producing a good. David Ricardo assumed that country's factors of production would not be easily be transferred over foreign borders, that is why countries can gain benefits from free trade transactions. A nation can still benefit from free trade if the country specializes in goods that they have the least cost disadvantage, even if they have no cost advantage in producing a particular good. (Schumer & Roberts, 2004). The relevance of this theory in the study was it emphasized the possibility of obtaining benefits from trade liberalization and the relationship of free trade on output

2.1.3 New trade theory. Developed by Paul Krugman in 1970s, is one of the economic theories that argued the idea of liberalizing trade among countries. Krugman's New Trade Theory mainly highlight the aspect of increasing returns of scale and network effect on international trade that was left out by most of classical trade theories. New Trade Theory emphasized the context of increasing returns may modify the patterns of classical theory of comparative advantage about free

trade (Krugman, 1993). New Trade Theory did not contradict the element of comparative advantage about benefits of multilateral trade liberalization the on economy and its sectors, however this explained that free trade does not always beneficial to be implemented in the economy.

New Trade Theory emphasized that reduction of trade barriers is better than economic interventionism because government intervention in foreign trade may lead to nonmarket failures and retaliation that can prevent economic and sectoral growth (Krugman, 1987; Jayme Jr, 2001). This theory emphasized the uncertainty of trade liberalization concept, which makes this theory relevant in the study of effects of trade liberalization on manufacturing value added.

2.2 Conceptual Framework. The study of Seif and Fazlzadeh (2011) examined the relationship of trade openness and manufacturing value added. The trade openness was used to proxy trade liberalization in the study which was calculated by the sum of exports and imports as a share of GDP. Using bound test and cointegration test approach, it was found that trade openness positively affects manufacturing sector. It was emphasized that with a high volume of exports of industrial goods can foster advancement in terms of productivity, technology, labor, and quality of products and services produce in the manufacturing sector.

In the study of Umoru and Eborieme (2013) using dummy variable for structural adjustment program that implemented trade reform program as indicator of trade liberalization to analyze its effect in industrial output. To exhibit policy shock of the extent period of structural adjustment program, the dummy variable for trade reform program found to have a positive impact on industrial sector. According to Bongsha (2011) who also proven that trade reform positively affects manufacturing sector, that competitiveness of the manufacturing firms and demand for a commodity will rise if the price of a good decreases its demand will increase. Trade liberalization also expands the sources of supplies which are also tradable goods that are used in production in manufacturing sector. It was hypothesized that trade openness and trade reform program positively affect manufacturing value added.



Lastly, other independent variables; gross capital formation and exchange rate of Philippine peso per U.S. dollar also found to affect manufacturing sector. In the study of Ilechukwu (2015), it was emphasized that exchange rate have direct relationship with manufacturing sector because when domestic government was determining the right exchange rate value, it is important to

analyze the international market fluctuations in implementing foreign exchange policies. According to the study of Edeme and Karimo (2014), gross capital formation positively affects manufacturing sector because gross capital formation increases the performance of manufacturing sector by acquiring machineries and equipment for industry production.

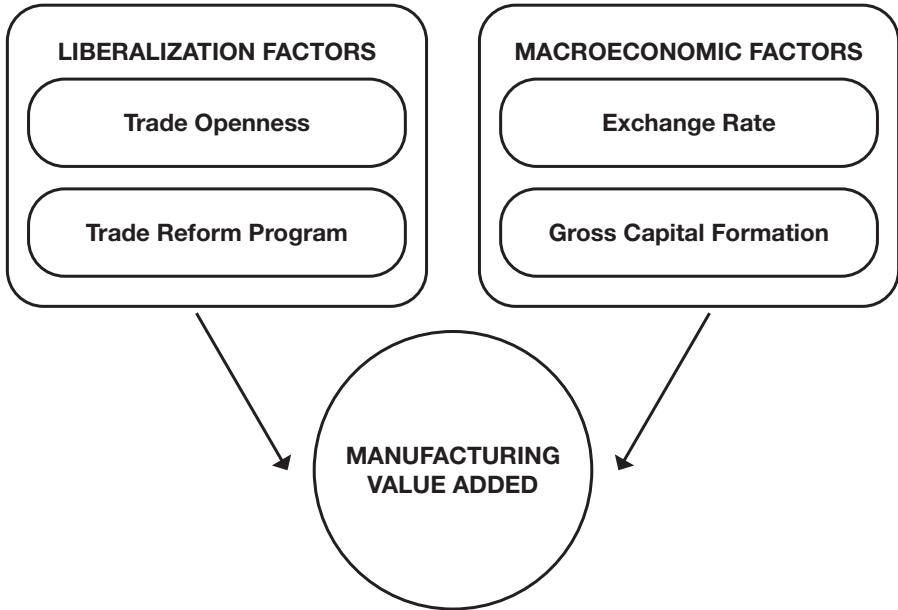


Figure 1. Research paradigm of the effects of trade liberalization on manufacturing value added in the Philippines

3. Data Description and Analysis

The study applied descriptive and causal/explanatory research using annual dataset from 1980 to 2017. Descriptive analysis was employed to describe the trend of manufacturing value added, trade liberalization, exchange rate and gross capital formation under the study. Causal/explanatory research was also applied to explain the functional relationship between the dependent variable, manufacturing value added, and the independent variables; trade openness, dummy trade reform program, exchange rate and gross capital formation.

The study used secondary data that obtained from World Development Indicators (WDI) and Bangko Sentral ng Pilipinas (BSP) online database. Data on trade openness, exchange rate and gross capital formation were obtained from WDI while manufacturing value added data was gathered from BSP online database.

The study was limited to the relationship between trade liberalization and manufacturing sector value added in the Philippines. Two indicators of trade liberalization were applied; the standard method of measuring trade liberalization, trade openness which was computed by the sum

of exports and imports of goods and services divided by GDP and dummy variable for trade reform program which 1 if the year regulated trade reform program and 0 otherwise, were used to measure trade liberalization in the Philippines. The other independent variables applied in the study were exchange rate of peso per U.S. dollar and gross capital formation in constant Philippine peso. On the other hand, the dependent variable used was manufacturing value added in constant Philippine peso.

The general model used for analyzing the effects of trade liberalization on manufacturing value added expressed as:

$$MAN=f(TRO,EXR, GCF, DUMMYTRP) \quad (1)$$

Where:

MAN = Manufacturing sector value added (in billion PHP)

TRO = Trade Openness (in %)

EXR = Exchange Rate (PHP per USD)

GCF = Gross Capital Formation (in billion PHP)

DUMMYTRP = Dummy for Trade Reform Program (1 if the year regulated trade reform program, 0 otherwise)

3.1 Ordinary least squares (OLS). The study used OLS method to estimate the unknown parameter in the regression model. The model was in their logarithmic form to eliminate the heteroscedasticity among the variables in the study. The proposed multiple regression equation for analysis of the effects of trade liberalization on manufacturing sector value added was written as:

$$\ln MAN_t = \beta_0 + \beta_1 \ln TRO_t + \beta_2 \ln EXR_t + \beta_3 \ln GCF_t + \beta_4 DUMMYTRP_t + \varepsilon \quad (2)$$

Where:

ln = Natural Logarithm

MAN = Manufacturing, value added (in billion PHP)

TRO = Trade Openness (in %)

EXR = Exchange Rate (PHP per USD)

GCF = Gross Capital Formation (in billion PHP)

DUMMYTRP = Dummy for Trade Reform Program (1 if the year regulated trade reform program, 0 otherwise)

ε = Error term

3.2 Augmented Dickey-Fuller test. Augmented Dickey-Fuller test was applied to know the

stationarity of statistical data series that was used in the study. It is mathematically expressed as:

$$\Delta \ln MAN_t = \beta_1 + \beta_2 t + \delta \ln MAN_{t-1} + u_t \quad (3)$$

$$\Delta \ln TRO_t = \beta_1 + \beta_2 t + \delta \ln TRO_{t-1} + u_t \quad (4)$$

$$\Delta \ln EXR_t = \beta_1 + \beta_2 t + \delta \ln EXR_{t-1} + u_t \quad (5)$$

$$\Delta \ln GCF_t = \beta_1 + \beta_2 t + \delta \ln GCF_{t-1} + u_t \quad (6)$$

3.3 Johansen cointegration test. The Cointegration test can incorporate if there are long-run relationship between variables. Cointegration test is important to consider in using non-stationary time series data in any economic model.

3.4 Error correction model (ECM). ECM was applied to estimate the long run and short run relationship between variables. In analyzing for the long run relationship of dependent and independent variables, the significance of error correction term the model served as the basis to be considered for having long run relationship. It is mathematically represented as:

$$\Delta \ln MAN_t = \beta_0 + \beta_1 \sum_{i=1}^p \Delta \ln TRO_{t-i} + \beta_2 \sum_{i=1}^p \Delta \ln EXR_{t-i} + \beta_3 \sum_{i=1}^p \Delta \ln GCF_{t-i} + \beta_4 \sum_{i=1}^p \Delta DUMMYTRP_{t-i} + ect_{t-1} + u_t \quad (7)$$

Where:

ln = Natural logarithm

$\Delta \ln MAN_t$ = First difference of Manufacturing Value Added

$\Delta \ln TRO_t$ = First difference of Trade Openness

$\Delta \ln EXR_t$ = First difference of Exchange Rate

$\Delta \ln GCF_t$ = First difference of Gross Capital Formation

$\Delta DUMMYTRP_t$ = Dummy for Trade Reform Program

ect_{t-1} = Lagged error correction term

3.5 Residual diagnostic test. The residual diagnostics method of this study includes tests for serial correlation, heteroscedasticity and normality distribution. For testing the serial correlation, Breusch – Godfrey Serial Correlation LM test was used in the study. Followed by test for the heteroscedasticity using Breusch – Pagan – Godfrey test. Lastly, Skewness/Kurtosis tests was used for testing normality distribution.



4. Empirical Results and Analysis

4.1 Trend of Manufacturing Value Added, Trade Openness, Implementation of Trade Reform Program, Official Exchange rate, Gross Capital Formation in the Philippines

4.1.1 Manufacturing value added. Figure 2 shows a generally increasing trend of manufacturing value added, although there were only few slumps in some periods. The highest value recorded for manufacturing value added in the Philippines was in 2017 with a value of Php 2, 045.517 billion while the lowest value reported was in 1985 with a value of Php 531.062 billion for 38 years period.

Philippine manufacturing sector value added reach a downfall from Php 641 billion in 1983 to Php 531 billion in 1985 at constant prices because of economic crisis. Solon and Floro (1993) stated that the 1983 economic crisis primarily impact the manufacturing sector than agriculture and service sectors. The reason was because there was a shortage of imported inputs and there was an absence to access capital that Philippine manufacturing sector needed, because Philippine manufacturing sector was a capital intensive than being labor intensive industry. There was also a decline in demand because of the building up in inventories that resulted to less production for manufacturing sector. According to Philippine Board of Investments ([BOI], 2017) the development of AEC provided manufacturing sector more production and investments regionally and encourage Philippines to be an international manufacturing hub. With the establishment of AEC, Philippine manufacturing sector perform well in 2015. In 2017, Philippine manufacturing sector reached its highest gross value-added contribution to GDP with 2 trillion pesos at constant prices. According to PSA (2017), the main drivers of the manufacturing value added growth in 2017 were chemical industry with growth rate of 13.9%, furniture and fixture industry with 32.9 growth rate, 14.4% growth rate of radio, television, and communication equipment industry and the food manufacturing with 2.9% growth rate. The growth and continuous production of manufacturing sector in 2017 was linked to the growth of demand for construction related materials and export-oriented products.

4.1.2 Trade openness. The trend of trade openness shows to have an erratic movement from the periods 1980 to 2017. The highest degree of trade openness attained in the Philippines was in 1997 with a value of 108.25% degree of openness to trade. On the other hand, the lowest recorded value was 45.91% degree of trade openness in 1985.

When Philippines started its first major trade reform program during 1981, Solon and Floro (1993) stated that it was due to the transaction with World Bank's structural adjustment loan of 200 million U.S. dollar that first trade reform program was initiated, which was also year that President Ferdinand Marcos lifted Martial Law. Philippine international trade experienced a gradual fall from 1981 to 1985 that reached to 45.91% degree of openness to foreign trade because of political crisis in 1980s and continuous rise of government external debt that reached 27.2 billion U.S. dollar in 1986 during Marcos administration. Due to the combined economic and political issues such as assassination of leading opposition of Ferdinand Marcos and large foreign debt, Philippines hit an economic crisis in 1983 to 1985 that resulted to the declined of Philippine trade activities which also caused by trade deficit during 1982 to 1984 with the growth of imports at 18.9% and growth of exports at 7.7% only in 1984 (Intal & Llanto, 1998).

Diao, Li and Yeldan (2000) stated that the main reason that the highest degree of trade openness in the Philippines was recorded in 1997 was due to the 1997 Asian financial Crisis that begun in Thailand. It affected most of countries in South East Asia and also countries in East Asia such as South Korea, Hongkong, Taiwan, China and Japan through the foreign financial system, international trade and capital mobility.

According to Mijares (1999), due to decline of currency value of Philippine peso against U.S. dollar and devaluation of stock markets, Philippine economic activities begun to experience some negative effects. The Philippine peso experienced dramatic decrease from 29.47 Pesos per U.S. dollar in 1997 to 40.89 Pesos per U.S. dollar in 1998. One of the major economic activity that 1997 Asian financial crisis affected was the Philippine foreign trade



which involved the boost of Philippine export, led by merchandise goods, due to the slump of Philippine peso against U.S. dollar and makes the import expensive. Philippine exports destination countries during the 1997 financial crisis was in Europe that neutralized the negative effect of Asian financial crisis. The 1997 Asian financial crisis did not stop block trade liberalization that year and cause Philippine economy to be more open to foreign trade.

4.1.3 Trade reform program. Dummy variables were used to measure the effects of trade reform program. Executive Orders and trade policies implemented during structural adjustment program were used as the basis for trade reform program. In 1981, under Marcos Administration, was the adaptation of first major trade reform program which begun to liberalize the trade structure through elimination and reduction of trade barriers such as tariff and non-tariff barriers on regulated products. This trade reform program was part of the World Bank structural adjustment program. Under the first phase of trade reform program, there had been liberalization on the Philippine trade system by lowering tariff barriers and eliminating number of quantitative restrictions or non-tariff barriers. The implementation of trade reform program during 1981 that committed to reduce levied tariff on goods from ranges zero to 100% to just 10% to 50% range. Following the first narrowing of tariff structure, trade reform program continuously open Philippine trade market by lifting quantitative restrictions or non-tariff barriers on regulated goods begun in 1986 (Solon & Floro, 1993).

The continuation of second phase of trade reform program was through implementation of EO 470 in 1991 and EO 8 in 1992 that lasted up to 1995, that further liberalized and narrowed down the tariff structure and quantitative restrictions on goods (Aldaba, 2013). The EO 8 was also promulgated together with EO 470 as part of trade reform program, which regulated the removal of quantitative restrictions for 153 agricultural commodities, except for rice, was converted to bound tariff rates, which are types of tariffs that be based on trade negotiations and tariff equivalents. There was also realignment of tariff levied on 48 agriculture commodities in 1992 (Cororaton, 1999). Trade reform program

was continued until 1998 as part of the third phase of trade reform program begun in 1995 through the implementation of EO 264 and EO 288 that continued to lower tariff barriers. Specific objective of of EO 264 and EO 288 was regulating four levels of tariff schedule, imposing 3% for raw materials, 10% for raw, 20% for intermediate goods and lastly, 30% for finished products (Aldaba, 2012).

4.1.4 Official exchange rate. Figure 4 shows to have volatile trend from 1980 to 2017. The highest exchange rate recorded was in 2004 with an amount of Php 56.04 per US\$ while the lowest exchange rate attained was in 1980 with an amount of Php 7.51 per US\$. During 1998 Asian financial crisis, The Philippine peso was one of the currencies that floated in international market during the financial crisis, which resulted to the decline of Philippine peso value against U.S. dollar from 29.47 Pesos per U.S. dollar in 1997 to 40.89 Pesos per U.S. dollar in 1998 (Bautista, 2003). Due to the fiscal deficit in the Arroyo administration, increased in government debt led to decline value of Philippine peso against U.S. dollar. Philippines outstanding and foreign debt increase in 2004 (Diokno, 2008).

4.1.5 Gross capital formation. Figure 5 shows a generally increasing trend of gross capital formation, although there were slumps in some periods. The highest amount recorded for gross domestic investment in the Philippines was Php 2,486.53 trillion in 2017 and the lowest was in 1985 with a value of Php 346.859 billion for the 38-year period covered in the study. According to Magnoli Bocchi (2008) due to the economic collapse and political crisis caused by Marcos administration, decreased of public and private investment contribution to GDP, which are parts of gross capital formation, from 7.7% in 1982 to 3.6% for public investment and 6.8% for private investment in 1985. For 2017, the continuous increased of capital formation driven by durable equipment that rise from 377 million pesos in 1st quarter of 2017 to 388 million pesos in 4th quarter of 2017 at constant prices. Following subsector that increased investment in capital formation was construction that increased from 179 million pesos in 1st quarter of 2017 to 226 million pesos in 4th quarter of 2017 at constant prices (PSA, 2017).



Table 1. Descriptive statistics for growth rate of manufacturing value added, trade openness, exchange rate, gross capital formation and dummy for trade reform program

Variables	Mean	Std. Dev.	Min.	Max.
Manufacturing Value Added	964.61	399.27	531.06	2045.52
Trade Openness	72.86	19.64	45.91	108.25
Exchange Rate	34.44	14.82	7.51	56.04
Gross Domestic Investment	889.13	480.22	346.86	2486.5

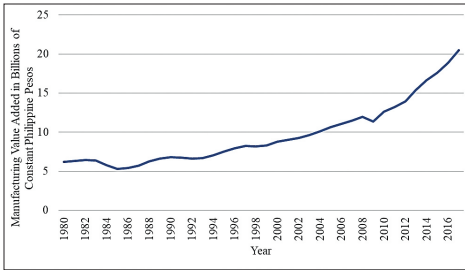


Figure 2. Manufacturing value added trend in Philippines

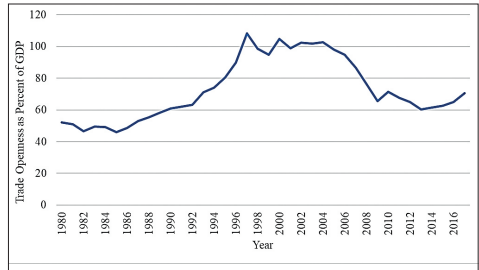


Figure 3. Trade openness trend in Philippines

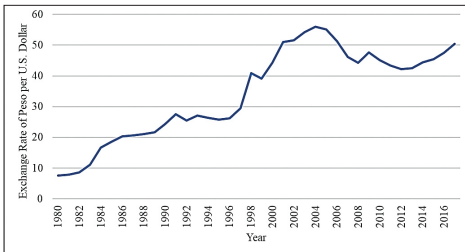


Figure 4. Exchange rate of Peso per U.S. dollar trend in the Philippines

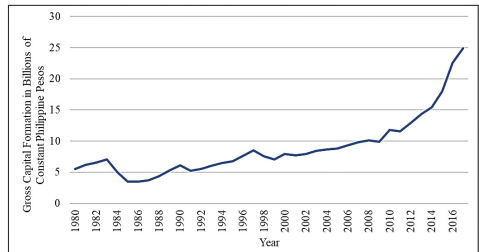


Figure 5. Gross capital formation trend in the Philippines

4.2 Effects of Trade Liberalization on Manufacturing Value Added in the Philippines

4.2.1.1 Regression analysis of trade openness, exchange rate, gross capital formation and dummy for trade reform program on manufacturing value added. According to the R-squared of .7411, only 74.11% of variation in manufacturing value added was explained by trade openness, exchange rate, gross capital formation and dummy of trade reform

program. The entire model shows to be very highly significant at 5% probability level. The results also indicate that the model was not spurious since the R-squared of .7411 is lower than Durbin-Watson statistics with the value of 2.033821.

4.2.1.2 Regression analysis of trade openness on manufacturing value added. The positive coefficient of trade openness determined that there was a direct relationship between trade



openness and manufacturing value added which indicated that an increase in trade openness by 1% will lead to an increase of manufacturing value added by .1461%. This result was similar to the findings of Chandran (2009) concluded that the higher degree of trade openness in an economy may lead to increase in manufacturing output because countries that were more open to trade, benefits from adopting advance technologies used in producing goods and it may increase specialization for sectors which may also lead to being export oriented sector.

4.2.1.3 Regression analysis of exchange rate on manufacturing value added. The negative coefficient of exchange rate appeared to have an indirect relationship to manufacturing value added which they both move to different direction. The regression results indicated that as Peso per U.S. dollar increases by 1, manufacturing value added will decrease by .1143258%. The result was similar to the findings of (Wong et al., 2015) that concluded that lower domestic currency may increase value added of manufacturing sector. The effect of weaker domestic currency in the foreign market may benefit the manufacturing sector by increasing its output because manufactured products produced in a country with lower domestic currency may be cheaper to foreign consumers which increases the demand for the output and sectoral growth.

4.2.1.4 Regression analysis of gross capital formation on manufacturing value added. OLS regression shows gross capital formation have

a positive coefficient which indicates that gross domestic investment and manufacturing value added moves in the same direction as gross domestic investment changes. The increase of gross capital formation by 1% will lead to by .1897445% increase in manufacturing value added. Similar result found in the study of Takam Fongang, Kamdem and Litchepah Tambo (2017), concluded that increase in domestic investment may lead to increase manufacturing value added share to GDP. More physical and technological investment in an economy may drive the performance of manufacturing sector and increase its output.

4.2.1.5 Regression analysis of dummy for trade reform program on manufacturing value added. Based on the regression result that there was an indirect relationship between dummy for trade reform program and manufacturing value added because of the negative coefficient of dummy for trade reform program. The trade reform program decreases an estimated .0243005% on manufacturing value added. This concluded that adaptation of trade reform program in the Philippines appeared to have negative impact on manufacturing sector value added. The result was supported by Aldaba (2013), stated that during trade reform program trade barriers such as tariff rates and non-tariff barriers where reduce or eliminated which resulted to weaker manufacturing sector output and productivity in the Philippines. The competitiveness of Philippine manufacturing sector has decrease due to the limited manufacturing sector employment, investment, productivity and output growth.

Table 2. OLS results in regression of trade openness, exchange rate, gross capital formation and dummy for trade reform program on manufacturing value added

Variable	Coefficient	Standard error	p-value
C	.039	.006	.000
D(LOG(TRO))	.146	.070	.045
D(LOG(EXR))	-.114	.045	.016
D(LOG(GCF))	.189	.044	.000
DUMMYTRP	-.024	.009	.016
R-squared	.7411	Durbin-Watson stat	2.034
F-statistics	22.90	Prob (F-Statistic)	.0000



4.2.2 Augmented Dickey-Fuller test. The test for stationarity of a dependent and independent variable in a time series model is important before conducting any test in time series model. The table 3 shows that manufacturing value added, trade openness, exchange rate and gross capital formation variables were stationary or did

not have unit root at first difference. The critical values at first difference of all variables were lower than Augmented Dickey-Fuller test statistic which indicated that the null hypothesis of unit root at 5% were rejected at first difference and accepted the alternative hypothesis of no unit root at 5%.

Table 3. Augmented Dickey Fuller test at first difference

Variable	Order of integration	Critical value	ADF t test
LOG(MAN)	First difference	-3.540328	-4.255393
LOG(TRO)	First difference	-3.540328	-4.699636
LOG(EXR)	First difference	-3.540328	-4.543935
LOG(GCF)	First difference	-3.540328	-4.467005

4.2.3 Johansen cointegration test. The test for cointegration of the time series model was conducted using nonstationary variables to analyze the long run parameters in the model. The type of cointegration test used was the version of statistician Johansen, which is the Johansen cointegration test. Based on the cointegration test result, trade openness, exchange rate, gross

capital formation and dummy for trade reform were cointegrated with manufacturing value added because trace statistics and max-eigen statistics were greater than their critical values. This indicate that the null hypothesis of no cointegration and at most 1 cointegration was rejected at 5%, which indicates that there were at least two cointegrating equations.

Table 4. Johansen cointegration test of manufacturing value added, trade openness, exchange rate, gross capital formation and dummy for trade reform program

Hypothesized no. of CE(s)	Trace statistics	Critical value	Max-eigen statistics	Critical value
None	86.8658	68.52	37.1141	33.46
At most 1	49.7517	47.21	28.7956	27.07
At most 2*	20.9561	29.68	14.5604	20.97
At most 3	6.3958	15.41	5.0038	14.07
At most 4	1.3919	3.76	1.3919	3.76

4.2.4 Error correction model. The ECM must be performed to estimate long run and short run effects of trade openness, exchange rate, gross capital formation and dummy for trade reform on manufacturing value added. The long-term relationships of time series variables were presented in the error correction model. The estimated model used manufacturing value added as the dependent variable. The error correction mechanism in the model was negative, less than 1 and statistically significant with a p- value of .038, which suggested that

deviations from equilibrium can be corrected at adjustment speed about 24.499% per year. The estimate was the speed at which the system can return to equilibrium after a deviation. The adjustment speed of 24.499% per year will take 4.08 years to adjust back to the long-run equilibrium relationship after a shock to the system. The R-squared of .3540 in the model which indicated that only 35.40% of the manufacturing value added was explained by trade openness, exchange rate, gross capital formation and dummy of trade reform program.



The error correction model does not appear to exhibit autocorrelation and heteroscedasticity. However, residual was shows to be not normally distributed.

The model suggested that there was a long and short run relationship running from trade openness to manufacturing value added because of the significant of the error correction term. It was concluded that trade openness influenced the growth of manufacturing value added in the Philippines. The result was backed by Seif and Fazlzadeh (2011) for Iran. The study found the relationship of openness to trade and manufacturing value added.

It was also found that there was existing long and short run relationship from exchange rate to manufacturing value added. It also appeared that exchange rate causes manufacturing value added in the long run. In the study of Ilechukwu (2015), there was relationship between exchange

rate and value added in manufacturing sector. There was also long and short run relationship found running from domestic investment to manufacturing value added which indicated that gross capital formation appeared to cause growth of manufacturing value added. The result was confirmed by Tahir, Ruiz Estrada, Khan, and Afridi (2016) that domestic capital formation or investment have causes value added in manufacturing.

The model indicated that there was relationship between trade reform program and manufacturing value added which appeared running from trade reform program to manufacturing value added. It was found that trade reform program causes value added in the manufacturing sector in the Philippines. The findings confirmed with that of Umoh and Effiong (2013) in Nigeria that structural adjustment program such as trade reform program affects manufacturing value added.

Table 5. Error correction model of manufacturing value added, trade openness, exchange rate, gross capital formation and dummy for trade reform program

Independent variable	Dependent variable		
	D(LOG(MAN))		
	Coefficient	t-statistics	p-value
ECT	-.24499	-2.08	.038
D(LOG(MAN(-1)))	-.33930	-1.47	.140
D(LOG(TRO(-1)))	-.26542	-2.18	.029
D(LOG(EXR(-1)))	-.03262	-.38	.701
D(LOG(GCF(-1)))	.15806	1.89	.059
DUMMYTRP	.01191	.43	.666
Constant	.00577	.79	.429
R-squared	.3540		
F-statistic	15.345		

5. Policy Implications and Conclusions

The study had estimated the effects of trade liberalization on manufacturing value added in the Philippines using an annual dataset that covered 38 years from 1980 to 2017. Using time series regression and ECM approach, it was concluded that trade openness has positive long

and short run effects on manufacturing value added. Trade openness may lead to an increase in manufacturing output produce because countries with a high degree of trade openness may benefit through adaptation of advance technologies used in production which may lead to being export oriented sector. Trade openness cause domestic manufacturing sector to perform



well in exporting goods that can contribute to development of manufacturing sector. Therefore, government policies may lower tariff and non-tariff barriers to provide competitive environment for domestic manufacturing firm and to help foster manufacturing sector growth. Moreover, government and private institutions may also invest on research and development for manufacturing sector to innovate and further strengthen manufacturing sector competitiveness and exports in foreign market.

The dummy variable for implementation of trade reform program was used as another indicator of trade liberalization appeared to have a significant negative long and short run impact on manufacturing value added and exhibited negative shock in the short run. The implementation of trade reform program in the Philippines appeared to weaken the manufacturing sector output and competitiveness due to limited investments and productivity growth. Trade reform program also resulted to high rate of manufacturing firm exit which were less capital intensive and less productive. Therefore, the study recommended that government may implement policies and roadmap plans that intends to bring foreign and domestic investments to support trade reform programs and the manufacturing sector. Government agencies may also encourage private and public sector to invest assets

and stocks for industrial development and manufacturing trade activities to set as one of the foundations for the cost of implementing trade reform and to also maximize the benefits of trade policy reform.

For gross capital formation, it was concluded that gross capital formation has a long run positive impact on manufacturing value added. High domestic investments for technology and other assets that can be used in production may lead to greater manufacturing performance that are more productive and have more output. The study recommended that the government may develop policies and programs that aims to boost capital investments to support manufacturing sector activities and its trade transactions. Moreover, strengthening of investment spending infrastructures and machineries that are valuable in producing goods to sustain sectoral output growth.

The study also concluded that exchange rate appeared to have an indirect long and short run relationship with manufacturing value added. Due to higher value of domestic currency in the foreign market, manufacturing sector trade activities may decrease because domestic manufactured goods may get expensive for foreign consumers due to high value of local currency.

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CLUSTERING OF IMPORT-EXPORT CONTAINER TRAFFIC: CASE OF CAVITE AND LAGUNA PROVINCES

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ABSTRACT

Major ports in Metro Manila have been overwhelmed due to the country's strong economy manifested with higher GDP over the years. Economic activities in the country have been concentrated in Metro Manila increasing import-export container traffic. This has resulted in congesting the ports aggravated by road congestions. This has been a recurring problem and never been resolved. Such a problem brought tremendous economic impact to the country in general. This problem has been affecting port users and all types of stakeholders. Economic progress often requires good planning and dynamic investments in infrastructures like road networks.

Anchored on the concepts of 'distributed development' and 'clustering' this study has developed a cluster model of the movements of container traffic within the clustered provinces of Cavite and Laguna. In addition, this paper has conducted a selection of the ideal location for the international container terminal necessary to provide the container handling need of the port users patronizing the terminal.

This study has utilized a case study approach. Secondary data were utilized in this study integrated whereof observations on numerous field visits.

An overview of both internal and external factors that influenced the selection of the new location was deemed necessary. The whole process consisted of an environmental scanning through analysis of the market size, market condition, and the industry. Analytical tools like Porter's Five Forces and PESTEL were extremely of help in this study.

Results revealed that Ternate, Cavite was an ideal location for the establishment of an international container terminal considering its strategic and proximate location. Thus, drawing the business decision and developing a clustering model along with this premise. Consequently, through modeling, this international container terminal in Ternate, Cavite would direct movements of import-export container boxes away from Manila ports by about 1,394,501 TEUs by the year 2030.

Finally, the results of this study would also ease down the recurring problem in the ports of Manila. This is because of the substantial volumes of trailer trucks expected out of the main roads in Metro Manila.

Keywords— Clustering, Container terminal; Distributed development; Manila; PESTEL; Port operations; Porter's Five Forces

1. Introduction

Global freight transportation has increased steadily. This highlights the importance of ports in the conduct of international supply chains. Ports also generate employment opportunities and promote economic growth at the regional and national levels. Direct and indirect benefits

of a port lead to the emerging of adequate development and investment strategies for port operations (Acciaro 2008; Bottasso et al. 2013; Ferrari et al. 2010; Irannezhad et al. 2017; Lee et al. 2014; Li et al. 2015).

As pointed out in Li et al. (2015), 90% of world trade volumes were transported by ships. This



highlights the importance of seaports as a gateway to international supply chains. Thus, seaports have had critical roles in national economic development as well as in international trade (Hu and Zhu 2009) because the majority of goods in transit between countries have been transported via ocean-going ships (Dang and Yeo 2017).

In transport economics, port competition has been important due to the large volumes of goods involved in port throughput. Competition unfolds between port users, players, locators, stakeholders, and operators, among others, and increasingly also between entire supply chains. Thus, an element that contributes most to making the chain the cheapest possible, will have the highest chance of being included. This is derived from a preliminary analysis of port selection criteria, where cost turns out to be the most important criterion (Basilio et al. 2005; Dang and Yeo 2017; Haezendonck and Langenus 2018; Meersman et al. 2010).

In a study conducted to assess factors influencing the container terminal efficiency at Mombasa. Results showed 86.7% of the respondents believe that improving the infrastructures at the port will minimize the congestion problems that sometimes occur. It recommended that port authorities continuously invest in the modern quay and gantry cranes to supplement the current ones in order to enhance the productivity of the port operations and in expanding the physical infrastructure such as adequate berthing facilities, wharves, yard capacity, quayside, railway, as well as hinterland connections expansion (Nyema 2014).

Moreover, due to the competitive nature of port operations, port authorities and operators have realized the need for becoming proactive and put in place strategies to enhance market competitiveness. Sustainability in the business of port services and operations remain the primary consideration. To achieve this, examining both internal and external environments using business tools like PESTEL, SWOT analysis, Porter's Five Forces, etc. can help determine the positive signs affecting the existence of business (Dadvar and Ganji 2010; Deerod 2018; Irannezhad et al. 2017).

In the Philippines, the economic activities in the country are primarily through seaborne trade.

The country is archipelagic composed of about 7,100 islands. The National Capital Region (NCR) located in Luzon has been the host of the country's majority of socio-economic activities. In order to complement the steady economic growth, an international gateway port plays a vital role in global trade providing fast delivery of goods and services, as well as, quick turn-around of ships making a port call. In <https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?locations=PH> the current Gross Domestic Product (GDP) rate of the Philippines in 2017 was 6.9% valued at \$348.48 billion (USD). While in 2018, the current GDP rate was 6.34% valued at \$346.48 billion (USD).

Moreover, the ports in Manila have served as the biggest and most important shipping gateways for international trade in the country. These ports form the core of the Philippine Port System registering a 5.7% rise in box volumes in 2017 to 4.8 million 20-foot equivalent units (TEU) to place Manila among the world's top 30 international container ports. These ports have achieved a 9% growth in import and export container volumes in the first 10 months of 2018 that has resulted in terminal congestion due to overwhelmed road traffic problems in Metro Manila (Arbo et al. 2016; JICA & NEDA 2014; Richter 2016; Wallis 2019).

Since Metro Manila continues to become congested and the economy grew by folds without corresponding road infrastructures, it is but natural for businesses and industries to look for an alternative. Considering the high investment requirements in developing a new port, as pointed out in Arbo et al. (2016), establishing another container terminal outside Manila remains an alternative. The location of this new terminal should be more accessible and cost-effective to the majority of port users, shipping companies, logistics, suppliers, big businesses, and industries, as well as operating economic zones.

2. Background

The ports in Metro Manila have been dominating the international seaborne trade in the country. These ports served as the primary international gateways for import-export containerized cargoes of big businesses, industries, and operating economic zones in the neighboring Cavite, Laguna, Batangas, Rizal and Quezon



(CALABARZON) Region. Consequently, this has resulted in port congestions exacerbated by the worsening road congestions around Metro Manila. The root cause of congestion was the lack of dedicated port access roads to the ports. If this certainly affects the flow of the entire supply chain, the country's economic growth and development (Arbo et al. 2016; JICA & NEDA 2014; Richter 2016; Ward 2014).

Aggravating to this problem were increasing container throughput; concentrating movements of inbound-outbound container traffic to and from the ports in Manila; and 3) the concentration of industries and operating economic zones in close proximities to these ports. Consequently, this problem has been causing delays in the deliveries of container traffic. It further lowers productivity rates among all port users and stakeholders, whereby affecting supply chains. Hence, government and port operators must proactively plan to prevent worsening this problem by finding solutions.

Along this line, the growing clamor for phasing out and moving the Manila ports to the underutilized ports of Subic and Batangas due to worsening traffic congestions were highlighted (JICA and NEDA 2014). Subsequently, establishing another container terminal outside Manila would give other locations numerous opportunities for development and possible synergies for interconnections with other locals (Nifosi 2014).

With this end in view, this paper adhered to the concepts of 'distributed development and of 'clustering'. The former refers to an innovative place-sensitive development policy approach that counters the potentially negative spiral of geographically restricted development (Feldman 2014; Feldman and Storper 2017; Iammarino, Rodríguez-Pose, Storper and Michael 2017). While the latter concept, as redefined by Porter (2000), is a geographically proximate group of interconnected companies and associated institutions in a particular field, linked by commonalities and complementarities, and defining its boundaries that can range from a single city or state to a country or even a group of neighboring countries. The latter description extends the concept outside a limited region and takes into account the effect of global markets (Porter 2000; Boja 2011).

Moreover, clustering is an economic phenomenon placed in a competitive context in which many businesses simultaneously compete and collaborate to gain different economic advantages (Porter 2000; Boja 2011). In addition, Boja (2011) economic development based on cluster models represent a policy adopted by many economies that theoretically bring multiple benefits in terms of regional development, competitiveness in the industry. It can also generate an economic environment that will adapt more easily to events such as economic crises or other economic and social transformation. Although existing cluster the analysis highlighted their advantages, the interconnection of factors, and their effect on the cluster, the economic theory has not yet provided a model that allows both the analysis and the definition of a process for implementing a successful cluster.

The objectives of this paper were to develop a clustering model of the movements of import-export container traffic in the clustered provinces of Cavite and Laguna; and to select a location down south of Cavite for the establishment of an international container terminal to service the container handling need of the industries.

Moreover, this paper is a case study method utilizing secondary data from government sources, amongst others. Integrated with this study was primary data through numerous field observations over the years. Porter's Five Forces and PESTEL were used in the analysis of the macro and microeconomic conditions influencing this case.

The Porter's Five Forces was for better understanding how the five competitive forces would influence the profitability of this alternative international container terminal. It provides awareness of the five forces that help understand the structure of its industry and draw out a position that is more profitable and less vulnerable to attack. This includes the threat of new entrants, bargaining powers of buyers, the threat of substitute products or services, bargaining powers of suppliers, and rivalry among existing competitors. It is useful in determining the balance of power among the five forces. How these might affect the business environment (Porter 2008; Deerdorf 2018; STC n.d.) and decision-making in establishing another international container terminal in Ternate, Cavite.



On the other hand, PESTEL was an analytical tool that helped identify the key external and internal factors that were taken into account to achieve success in a project or initiative. They were used together, applied in a group setting to support effective strategic planning, decision-making, and action planning. PESTEL is a cost- and time-efficient means for highlighting key issues relating to the context of a project or initiative that, if not identified and addressed, could critically affect the chances of success (UNICEF n.d.). PESTEL allows business planners to identify the macroeconomic variables to take into consideration for the development of the business (opportunities vs. potential risks) for which realization remains relatively uncertain. Then, the model can initiate the conceptualization of different scenarios based on these uncertain variables to better predict the future and make the right decisions today in the interest of the future (Alanzi 2018).

The evaluation of the candidates' location has focused on the demographic information, location, and distance from the existing ports in Metro Manila and in Batangas City, and proximity of the core businesses, industries, and operating economic zones. This was crucial towards clustering the movements of import-export container boxes down south in the provinces of Cavite and Laguna. Likewise, a favorable decision has accorded enormous economic opportunities beneficial to the communities around the new terminal.

Finally, a clustering model (Fig. 4) was developed showing how the import-export container traffic in proximity to the selected location of the new alternative terminal would be directed. Clustering

the inbound and outbound container traffic through this new international container terminal guarantee faster and more efficient delivery of container boxes with a captured market for business viability.

3. Evaluation of the Case

3.1 Environmental Scanning - Market Size

The United Nations Conference on Trade and Development (UNCTAD) has recorded the country's container port traffic in 2018 at 8,637,520.000 TEU, an increase from the previous record of 8,090,420.000 TEU for Dec 2017. The data reached an all-time high in 2018 and a record low of 4,306,964.646 TEU in 2009 (UNCTAD 2016; unctad.org/en/Pages/statistics.aspx).

Subsequently, Manila's container traffic in 2018 was at 5.05 million TEUs. This has placed Manila in the 28th spot among the World's Top 50 container ports in 2018. The recorded increase covering a 5 year period starting 2014 at 3.65 million TEUs, 2015 at 4.23 million TEUs, 2016 at 4.52 million TEUs, 2017 at 4.82 million TEUs (AJOT n.d.).

Moreover, Table 1 showed increasing volumes of the import-export container traffic of the Manila South Harbor (MSH), the Manila International Container Terminal (MICT), and the Batangas Container Port (BCP) for the years 2012, 2017, 2018, and 2019. The MSH and MICT ports have registered an increase in volume at 193,254 TEUs for 2017-2018 and 169,301 TEUs for 2018-2019. While Batangas Port has registered the biggest increase from 2012 to 2017 at 190,559 TEUs. In addition, it went up by 51,298 TEUs from 2017 – 2018 and 63,178 TEUs from 2018 – 2019.

Table 1. Comparative import-export container traffic (TEU) for the years 2012, 2017, 2018 and 2019

Sources: PPA 2017; PPA 2018; author's calculation

Ports	2012		2017		2018		2019	
	Volume	% Market Share	Volume	% Market Share	Volume	% Market Share	Volume	% Market Share
MSH	914,521	34.46	1,107,619	30.92	1,204,426	31.47	1,300,668	32.04
MICT	1,732,897	65.29	2,277,843	63.58	2,374,290	62.03	2,447,349	60.28
Sub-Total	2,647,418		3,385,462		3,578,716		3,748,017	
BCP	6,754	0.25	197,313	5.50	248,611	6.50	311,789	7.68
Total (TEUs)	2,654,172	100.0	3,582,775	100.0	3,827,327	100.0	4,059,806	100.0



As shown in Table 1, MICT has also the biggest percentage market share at 65.29%, 63.58%, and 62.03% for 2012, 2017, and 2018, respectively. The Batangas Container Port has the smallest percentage market share of 0.25%, 5.50%, and 6.50% for 2012, 2017, and 2018, respectively. However, BCP has registered a significant gain in market share for the years 2017 and 2018 as compared to 2012, data showed that the port still has lagged behind its major competitors in Manila.

In addition, as shown in Table 1, MICT has registered the biggest percentage market share for 2012, 2017, 2018, and 2019. While the BCP has the smallest percentage market share for the same period. Though the BCP has registered significant gains in market share for the years 2017, 2018, and 2019 since it started in 2012. Data showed that the port still lagged behind its major competitors in Manila.

Results in Table 1 showed a steady increase in container traffic in TEUs in the ports in Manila and of BCP. This called for a corresponding plan to increase container traffic facilities in order not to be overwhelmed in the near future. The market shares of MICT and MSH remained almost at the same level as that in 2012, 2017, 2018, and 2019. This meant

that both ports kept their market dominance over the years. In contrast, while the BCP has achieved a significant increase in market share in 2017, 2018, and 2019, yet port users did not patronize it for their containerized cargo movements.

Moreover, the volume of inbound-outbound containerized cargoes in the CALABARZON region ranges from 646,508 to 912,626 TEUs in 2009-2014. This has increased in folds parallel with the country's increasing economy JICA (2013a). Such increasing volumes of container traffic came from the number of operating economic zones, among others, in the region.

Table 2 shows 53 operating economic zones, 21 proclaimed economic zones, and 80 development in progress in the CALABARZON region. The industries in this region would provide a steady source of import-export container traffic, as captured market, for the new terminal.

On the other hand, in the context of market size, as reported in the Calabarzon Regional Economic Situationer 2017, CALABARZON has contributed to the country's GDP in 2014, 2015, and 2016 with 15.9%, 15.5%, and 14.8%, respectively. In fact, the region was second only to the National Capital Region (NCR) in this regard.

Table 2. Economic zones in CALABARZON region

Sources: www.peza.gov.ph

	Operating EZ*	% share	Proclaimed EZ*	% share	Development in Progress*	% share	
Cavite	14	26.41	8	38.10	26	32.50	32.34
Laguna	19	35.85	8	38.10	17	21.25	31.73
Batangas	15	28.30	4	19.05	25	31.25	
Rizal	4	7.55	1	4.75	6	7.50	
Quezon	1	1.89	-		6	7.50	
Total	53		21		80		

3.2 Market Condition

In the analysis of market conditions, the major ports in Manila continue to dominate the international container traffic as shown in Table 1. The combined market share of MSH and MICT remains very high at 92.32% in 2019 down from

93.50% in 2018 and 94.50% in 2017. While the BCP remains underutilized. In the JICA's Master plan for the strategic development of the national port system, the BCP was project to attain a volume of 1,246,194 TEUs by 2030. The 2019 performance in container traffic of BCP was at 311,789 TEUs.



However, the CALABARZON region expects an increasing container traffic over the years. The region has registered an increase from 646,508 to 912,626 TEUs in 2009-2014. On this basis, the container traffic in the region is expected to grow by folds primarily due to the presence of operating economic zones, among others.

3.3 Industry Analysis

In the analysis of the industry, the Porter's Five Forces shown in Figure 1 was used.

3.3.1 Threat of New Entrants

Aspiring entrants, armed with new capacity and hungry for market share, can ratchet up the investment required for the terminal to stay in the game (Porter 2008). However, this is not likely to cause a problem in the balance of power. Establishing an international container terminal is both capital and operational extensive. It requires a huge amount of capital investments for the infrastructure development, procurement of state-of-the-art container lifting equipment, and technologically advanced systems of operations. Because of globalization, the terminal has to be fully equipped with modern container handling facilities, fully automated processes, competitive and efficiently productive. Government support is a vital factor. The government can provide laws, regulations, and policies to create an economically viable port industry environment.

3.3.2 Threat of Substitute

This is also not likely to emerge or happen in this industry. There is no available substitute terminal with import-export container handling facilities close to Ternate, Cavite now. There is not even one in any location along the entire stretch of Cavite Province shoreline. On the other hand, the nearest Ports of Manila is continuously improving its facilities but the worsening road traffic congestions in Metro Manila remains unmitigated.

3.3.3 Competitive rivalry within the industry

This is similarly not likely to tilt a balance of power in establishing another international container terminal. The ports in Manila have problems in port congestions (Arbo et al. 2016; Bouquet 2013; Deerod 2018; Ward 2014). This

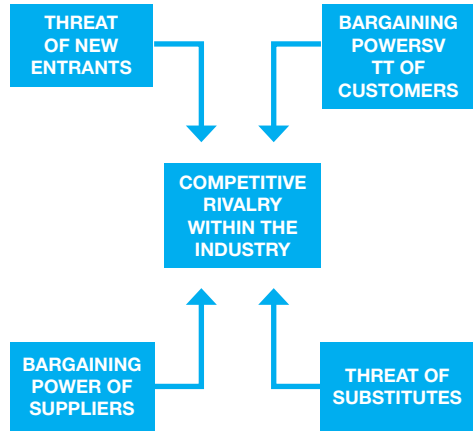


Figure 1. Porter's Five Forces

is synonymous with the road congestions problem in the entire Metro Manila. This phenomenon is getting more complicated as the country's economic growth continues to rise.

On the other hand, the BCP is about 127 kilometers away from the core of big businesses and industries in the southern portion of Metro Manila and the northern portion of the CALABARZON region. Travelling through this distance in moving import-export container traffic would add up to the transportation costs and travel time resulting in lower productivity.

3.3.4 Bargaining Power of Suppliers

This is not likely to cause unbalance of power to the industry. Suppliers of any kind of materials, ranging from construction to computer soft wares and consumables, would come to engage business with the terminal. These suppliers would compete with each other just to gain a contract with the terminal. Thus, these suppliers cannot wage a bargaining power to the container terminal (Deerod 2018; STC n.d.). On the other hand, powerful suppliers may constrain the terminal's profits if they charge higher prices (STC n.d.).

3.3.5 Bargaining Powers of Customers

This is likely to cause a balancing of power for the terminal. According to Porter (2008), savvy customers can force down prices by playing the company and its rivals against one another. Generally, customers are important to any

business venture to succeed. In port or terminal operations, port users, forwarders, charterers, shipping, among others, are important business partners for business survival. They are sources of revenue for the continued operations of the terminal. Customers indeed can cause bargaining power. Terminal management must handle this bargaining power in the most acceptable level to both parties (Deerod 2018).

3.4 Pestel

As shown in Fig. 2, the interactions of different factors such as Political, Economy, Social, Technology, Environment, and Legal within the micro and macro environments could be dynamically supportive towards establishing another alternative international container terminal in Ternate, Cavite.

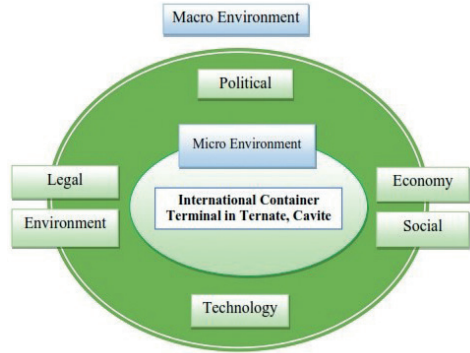


Figure 2. Pestel's Framework

3.4.1. Political (P)

Establishing another international container terminal in Ternate, Cavite falls under the political factor. Because the tremendous financial investment requirements for port developments, strong political support is highly an advantage.

In the analysis of the political factor, the "Build, Build, Build" program of the current administration promotes investments in big-ticket infrastructure projects in the country. Road networks and ports development were big-ticket infrastructures initiated throughout the country that would provide more access and improves transportation time. The presence of a strong political support is what makes a difference in the port and infrastructure developments. Everything became complimentary and supplementary.

3.4.2 Economical (E)

The country's economy continues to grow in 2018 as reflected in a GDP rate of 6.2% and GDP per capita at US\$3,103. This has placed the Philippines in number 39 in the GDP ranking of 196 countries (countryeconomy.com/gdp/philippines). Along this line, the country's import-export trade remains robust and increasing in volumes especially in containerized cargo traffic as shown in Table 1.

The presence of substantial numbers of operating economic zones in the Cavite and Laguna provinces has provided a captured

market difficult to match. One can expect steady sources of containerized traffic to and from these economic zones.

3.4.3 Social (S)

Nowadays, the way of life is amazingly different. People are more into internet connectivity and the use of social media in every undertaking in their lives. People communicate with others through smartphones or various social media platforms. The world is getting smaller now and then because of innovative technologies, digitalization, and internet connectivity.

Everybody can now do or transact business even inside their homes. Business processes can be in one's smartphone. Big businesses and industries can have their management and operations fully digitalized, web-based, and computerized and paperless processes.

In line with this, the container terminal in Ternate, Cavite could strongly adopt the social trend of digitalization and globalization. Business processes in the terminal would be fully digitalized and internet-web-based. Customers, port users, truckers, shippers, among others can transact business online. This would result to the optimization of productivity and efficiency.

3.4.4 Technology (T)

Technology and industries go together nowadays. One could not exist without the other. Anybody who is into business or industry must equally think of technology to become competitive. At present, technology innovates



very quickly. This is now a common phenomenon around us. Businesses and industries are now heavily investing in advanced technology where doing business can be fully digitalized and computerized through the internet.

In terms of container terminal operations, technologically advanced facilities and equipment must be a top priority. The terminal should have state-of-the-art container cargo handling, ship mooring, warehousing facilities, and equipment to ensure high productivity and efficiency. E-commerce can be part of the terminal operations processes. For one, the Electronic Data Interchange (EDI) is a standard for the electronic interchange of information between different companies, e.g. orders, invoices, or confirmations. Other technology advancements that can be used in the terminal are I-Card and Pre-announce; OCR – Optical Character Recognition; Automated gate; and perhaps E-seal. A Terminal Operating System (TOS) also, an advantage for the terminal to competitive.

As regards to sustainability, technologies that could transform the terminal into a 'green port' are available. These are shore power connections for ships alongside to achieve zero-emission while ships are in port, wind turbines and, solar panels. Adopting technology for renewable energy would make the terminal energy-self-generating port.

3.4.5 Environmental (E)

The establishment of the terminal in Ternate, Cavite is with several environmental issues. These issues are critical considering its strategic location in the Manila Bay. With this in mind, it is prudent to refer to the Cavite Sustainable Development Strategy (CSDS). The CSDS serves as the long-term strategic framework for the management of coastal and marine areas of coastal municipalities in Cavite, including Ternate, Cavite. It sets out relevant planning policies and strategies at the provincial and municipal levels and offers guidance on how to address various threats and issues affecting the coast (PEMSEA 2017).

Operations of an international container terminal affect people, flora, and fauna. No one can ignore these legitimate issues. The terminal has to be environmentally sensitive. The

development of programs for the protection and preservation of the environment must be prioritized to balance the three Ps like people, planet, and profit.

3.4.6 Law (L)

Operations of the international container terminal are subject to national, local, international laws, and regulations. Among the laws, regulations and codes need to observe, as follows:

- 1) Republic Act (R.A.) 10635 - an Act establishing the MARINA as the Single Maritime Administration Responsible for the Implementation and Enforcement of International Convention on Standards of Training, Certification, and Watchkeeping for Seafarers;
- 2) Executive Order (EO) 172 - declaring the ports of Batangas and Subic as extensions of Manila ports during times when there is port congestion and other emergency cases determined by the PPA;
- 3) RA 9184 - (Government Procurement Reform Act) which defines as a matter of policy, in all cases, the following principles: transparency and competition through public bidding, monitoring, accountability, etc.;
- 4) Presidential Decree (PD) 505 (1974), as amended by PD 857 - PPA is a government-owned and controlled corporation (GOCC), among others;
- 5) Port Safety, Health, and Environmental Management Code (PSHEM Code); and
- 6) International Ship and Port Facilities Security Code (ISPS Code).

In terms of ensuring international quality standards for all the processes in the container handling operations, the terminal has to submit for certification under the ISO 27001, ISO 20000, and ISO 22301. Once certified would give the terminal competitive advantage in the market.

3.5 Location of the Alternative Port

Table 3 revealed the results in the evaluation of the locations of prospective cities and municipalities for the establishment of an alternative international container port. Establishing this alternative container terminal would serve as the gateways for the import-export containerized cargoes coming from and



to the big businesses and operating economic zones located in the clustered provinces of Cavite and Laguna. This would also provide a solution to the recurring problem of congestions

in the ports of Manila. This would also significantly reduce the number of trailer trucks in the main streets of Metro Manila easing traffic congestions.

Table 3. Evaluation of candidate location

Criteria	Candidate Locations (all in Cavite Province)				
	Cavite City	Rosario	Tanza	Naic	Ternate
Shoreline length (kilometers)	20.081	3.442	11.244	9.122	23.627
Water area (hectares)	16,051.8174	6,017.8690	10,552.8100	6,324.6200	10,331.2300
Water depth (coastal)	1 – 4 meters	1 – 4 meters	1 – 4 meters	1 – 4 meters	2 - 5 meters
Land utilization	urban development	for urban and industrial development	for urban and industrial development	for urban and industrial development	for urban and industrial development
Coastal/sea utilization	traditional fishing zones	traditional fishing zones	traditional fishing zones	traditional fishing zones	traditional fishing zones
Transportation network	available	available	available	available	available
Access roads to port	with access road	with access road	with access road	with access road	with access road
Navigational lanes	accessible	accessible	accessible	accessible	accessible
Distance to ports in Manila (approx.)	32.1 kms.	33.8 kms.	36.8 kms.	45 kms.	62.7 kms.
Distance to port in Batangas City (approx.)	120 kms.	111 kms.	98 kms.	99 kms.	121 kms via CALABARZON EXPY/STAR Tollways
Development and environmental issues	* Proposed Cavite Reclamation Project with 1,331 hectares. * Proposed reclamation of Cavite City for port development with 2,000 hectares.	* Included in the Proposed Cavite Reclamation Project with 1,331 hectares.	Available wide seafront land spaces for development into port facility without reclaiming huge water area.	Available wide seafront land spaces for development into port facility without reclaiming huge water area.	Available wide seafront land spaces for development into port facility without reclaiming huge water area.

There were four municipalities and one city, all in the province of Cavite, considered for selection of the most ideal location for the alternative gateways servicing the clustered provinces. These were the municipalities of Rosario, Tanza, Naic and Ternate and Cavite City. These locations were all closer in proximities to big industries and operating economic zones in Cavite and Laguna provinces in the CALABARZON region as a captured market.

As shown in Table 3, Ternate, Cavite (Fig. 3) has emerged as the ideal choice for locating and establishing an international container terminal. It has natural wide coastal and water areas for port development. This does not pose environmental concerns to the communities and authorities. Destructions of marine ecosystems in the vicinity would be unlikely. It also accessible to all types of import-export port users anywhere in the region. The location is about 62.7 kilometers





Figure 3. Location of Gateway Terminal for the Clustered Provinces

away from the ports in Manila. It is also about 121 kilometers away from Batangas port. Considering its distance from the ports in Manila and Batangas, has given this container terminal a natural freedom from tight market competition.

The proximity of container terminal to businesses and industries and Meersman et al. (2010), cost turns out the most important criterion in the analysis of port selection criteria. Time and distance translated into trucking costs to the advantages of the shippers or charterers. In Arbo et al. (2016), one of the factors considered by shippers and port locators in selecting a port is the proximity of the port to their warehouses.

Inasmuch as Ternate, Cavite is in the outskirts of the economic and industrial centers of development the region, its location free from road congestions would attract patronage of port users. It also would reduce significantly travel time for quick turn-around of trucks. Thus, reducing transportation costs at the minimum and higher productivity.

On the other hand, Cavite City and Rosario were both too crowded already. They both have massive proposed reclamation projects already lined-up. Both of them also were very close in distance to the ports of Manila. Any further port development in these areas would probably pose a bottleneck duplicating the problems experienced in the ports of Manila.

3.6 Clustering of Import-Export Container Traffic

As observed, the container traffic continues to increase due to the steady economic growth; business and industry locators in these areas would form the core of port users directing their import-export container shipments through the international container terminal in Ternate, Cavite.

Figure 4 shows the clustering model developed in this study. In the model, import-export container traffic was clustered, as well as the provinces of Cavite and Laguna in the CALABARZON region. Inasmuch as the import-export container traffic were clustered, this meant that shipping these boxes in or out from business and industries warehouses or plants all located within the clustered provinces would be directed through the Ternate terminal. This strategy would ensure faster deliveries of import-export container boxes, quick turn-around of ships making a port call, bring out economic and infrastructure development down south to the provinces, increase productivity, reduce transportation costs to port users, significantly reducing road congestions in Metro Manila, and easing out of congestions in the ports of Manila.

The up-and-down arrows in Fig. 4 represent the import-export container traffic to and from businesses and industries in the clustered provinces. This indicated that trailer trucks transporting container boxes would only be running in the major roads, connecting the industries' warehouses to the container terminal at Ternate, Cavite. Once implemented, this would translate a

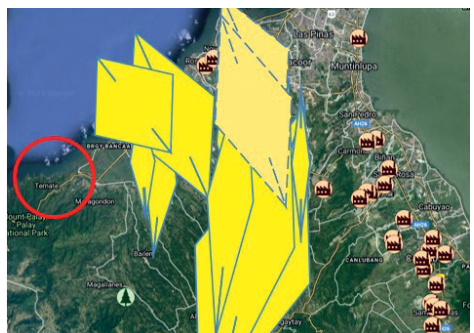


Figure 4. Clustering model

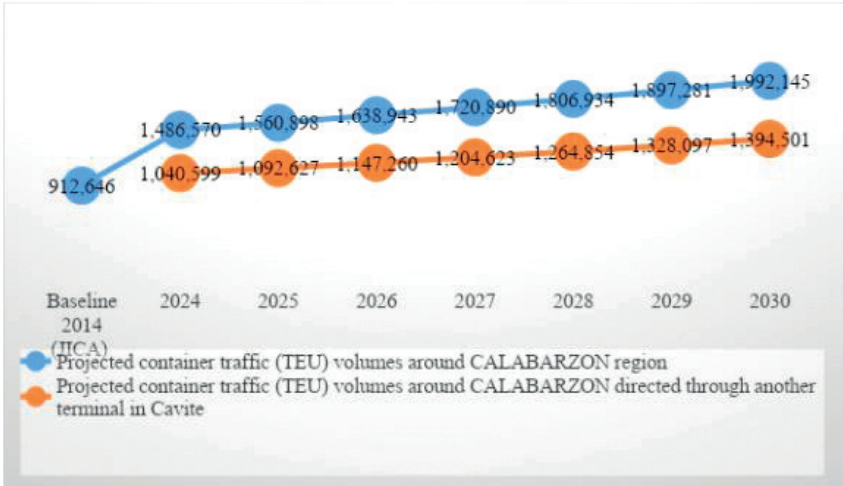


Figure 5. Container traffic volumes around the CALABARZON region

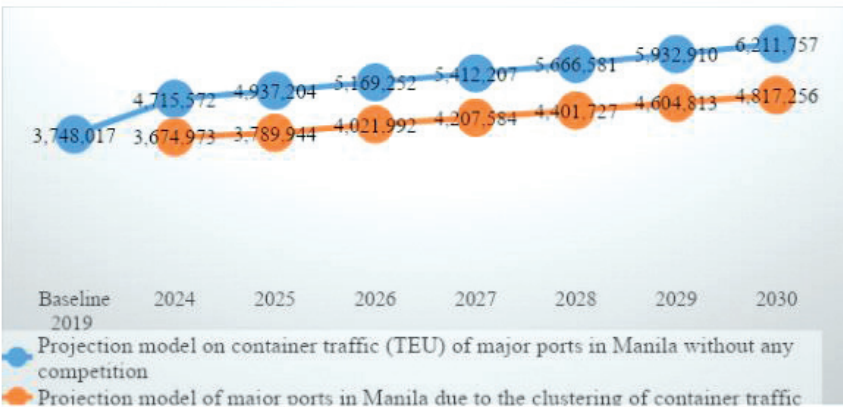


Figure 6. Container traffic volumes in major ports of Manila

reduction of a significant number of trailer trucks out in the major roads leading towards the ports in Manila. Subsequently, this would significantly decongest the ports in Manila resulting in faster deliveries of inbound-outbound container boxes.

Moreover, as shown Fig. 4, if in the event that businesses and industries in the southern part of Metro Manila so desire, they could direct their import-export container traffic need to the new gateway terminal in Ternate, Cavite. These are the cities of Taguig, Parañaque, Muntinlupa,

and Las Piñas. This meant faster deliveries of container boxes and higher productivity to these businesses and industries.

On the other hand, Fig. 5 shows the projection model for container traffic volumes of all the operating economic zones in the whole of the CALABARZON region until the year 2030 to reach 1,992,145 TEUs. This volume is substantial enough to support a profitable containerized cargo handling services of any container terminal.



While the projected volume of container traffic supposedly directed through the ports in Manila was at 1,394,501 TEUs. The bulk of this would come from the number of operating economic zones from the clustered provinces of Cavite and Laguna. If such volume of container traffic were directed to the Ternate terminal instead, it could mean a steady source of containerized boxes for import-export handling services of the new terminal. This volume represents 70% of the operating economic zones in the clustered provinces as a captured market.

Moreover, Fig. 6 shows the projection model providing a perspective until 2030. Major ports of Manila could achieve increase container traffic volumes of 6,211,757 TEUs until 2030.

Subsequently, because of the clustering of container traffic volumes within the clustered provinces, the ports of Manila could experience a decrease in volumes of container traffic to 4,817,256 TEUs in 2030. This meant that such volume of container traffic would still provide these ports in Manila a source of income relative to the container handling operations.

4. Recommendations, Implementation Plan and Conclusion

4.1. Recommendation

Strong economic growth translates to increase import-export trades, especially in containerized boxes. Container traffic of the ports in Manila continues to increase. The ports in Manila remain dominating the market of handling containerized cargoes. While the port in Batangas remains underutilized as an alternate port, despite its increasing container traffic volumes both import and export.

Consequently, the increasing container traffic volumes in the international gateways in Manila has resulted in a 'bottleneck' situation due to road congestions in the metropolis. Thus, affecting quick deliveries of inbound and outbound containerized shipments. Considering all these aggravating circumstances, the time has come for everybody to look forward to addressing this problem. Over-concentration of import-export trades in container boxes in these ports is no longer advantageous to all stakeholders.

In view of this, the findings of this paper supported the following: 1) clustering of the movements of import-export container traffic volumes; 2) clustering of the provinces of Cavite and Laguna; and 3) establishment of a new international container terminal in Ternate, Cavite.

4.2. Implementation Plan

1. Conduct market and industry analysis.
2. Perform PESTEL and Porter's Five Forces.
3. Evaluate the municipalities and city as candidate locations for the new international container terminal.
4. Develop a clustering model for the movements of import-export container traffic.
5. Implement the clustering model.
6. Build the Ternate terminal with minimal destruction of the marine environment in the immediate vicinity. Reclamation of water area need not be massive. The reclaimed area should only be sufficient to hold the STS operations and stacking area, among others.
7. Build a breakwater to protect ships already alongside the berth from strong wind and current.
8. Conduct strategic planning for the terminal and develop effective workforce planning.
9. Establish alliances with terminal operators, shipping lines, business, and industry locators, forwarders and logistics, suppliers, and other port users in order to cultivate harmonious relationships with all of them.
10. Develop dynamic training and development programs for the terminal's workforce and port users, such as:
 - 10.1 R&D program;
 - 10.2 environmental awareness; and
 - 10.3 internet-web-based management/operational system for cargo booking, dispatching, tracking, among others.
11. Formulate a development plan to transform the terminal into a sustainable 'green' port.
12. Conduct port planning and design as the next phase of this independent perspective.

4.3 Conclusion

The economy is growing by folds like what is happening in the National Capital Region (NCR) where Metro Manila is located. The development has been largely concentrated within this region and in the metropolis leaving behind others. Economic development without corresponding



infrastructure development would soon result in overwhelming everything even a breakdown in the supply chain.

As it was presented in this paper, now is the time economic and infrastructure development must be pursued relentlessly out down south of NCR and Metro Manila. Economic development at all times cannot be concentrated in one economic region only. Effective and efficient flow of supply chains in these regards is highly important. However, this would require an international gateway that is most accessible to the economic and industrial centers in the region. The less accessible these gateways could bring negative

results detrimental to the ever-growing economy of the country.

Finally, consistent with the 'distributed development and 'clustering', allowing economic and infrastructures development to move down south would open unmeasurable economic benefits to the communities of people and places not previously experienced. Clustering of the movements of container traffics, whether import or export would strengthen support towards economic development in these areas. The more dispersed the economic and infrastructures opportunities the more the benefits would become widely enjoyed by the people.

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IMPLEMENTING THE MODIFIED NELSON-SIEGEL-SVENNISON MODEL IN CONSTRUCTING THE PHILIPPINE YIELD CURVE

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ABSTRACT

The main goal of this paper is to construct the Philippine yield curve using the Modified Nelson-Siegel-Svensson (NSS) model, a parametric method commonly used by economists to understand the dynamics of the yield curve. The NSS model incorporates six parameters to determine the location and magnitude of the curvature of the yield curve. Constructing the theoretical yield curve involves determining the optimal parameter values that will minimize the residual between fitted and actual yields.

The model takes as input the real-time trading data for all bonds transacted on a particular date and finds a smooth curve that best fits the observed yields using the six parameters in the NSS equation. Moreover, the model can identify which bonds are undervalued or overvalued based on the best fit curve. Furthermore, the optimal parameters of the model were analyzed to understand how they affect the best fit estimation.

Keywords: Yield Curve, Nelson-Siegel-Svensson, Best Fit Estimation

1. Background

Various methodologies can be used to construct the yield curve across different sovereigns. The choice of methodology is often a decision between smoothness and flexibility of the yield curve, and the choice depends on the purpose for using the yield curve. Spline interpolation is commonly used among flexible methods whereas parametric methods such as NSS models are employed among smooth-end techniques. Spline-based models are used to spot minute price differences between bonds with similar features and risk to take advantage of arbitrage opportunities. Parametric methods are conducted to understand the fundamentals of yield curve.

Another key consideration in the choice of model is the liquidity of the market. In liquid markets with robust trading activity, exploiting small pricing differences may be of greater importance. Hence, spline-based methods may be more appropriate. In less liquid markets where there

are significant disparities in trading activities of available bonds, tracking small price differences takes a lesser priority, and parametric methods may be more useful.

The Philippine bond market is a relatively less liquid market with specific benchmark securities (which usually have higher outstanding level of issuances) generating higher trading volumes and frequencies compared with other non-benchmark securities.

As an agency under the Department of Finance (DOF), the Philippine Bureau of the Treasury (BTr) aims to prudently manage the financial resources of the government by maximizing the revenues from available public funds and minimizing financing costs given the economic condition. In reducing the financing costs, the BTr strategically performs its liability management function, which involves bond issuances, buy backs, or switches.

The BTr finds a reliable yield curve model based on actual trades as useful tool to determine the



fair value of interest rates when it issues, buys back, or switches its bond issuances. Given the nature of the bond market and the purpose of the study, a parametric model is the more appropriate choice in constructing the Philippine yield curve.

2. Description of Problem

The study intended to investigate how the NSS model can be used to construct the theoretical Philippine yield curve given trading data on Treasury bonds. It aimed to shed light on how the model can be used to determine mispriced bonds and estimate the appropriate level of bids to be accepted in the issuance of Treasury bills. Finally, the study explored on which parameter in the NSS model has the greatest significance in shaping the result of the best fit yield curve.

The Nelson and Siegel (1987) assumes that the instantaneous future forward rates T years from now can be expressed as:

$$f(T) = \beta_0 + \beta_1 \exp\left(-\frac{T}{\lambda_1}\right) + \beta_2 \frac{T}{\lambda_1} \exp\left(-\frac{T}{\lambda_1}\right). \quad (1)$$

In Equation 1, the forward rate $f(t)$ approaches β_0 as time to maturity T approaches infinity. Meanwhile, the instantaneous forward rate $f(t)$ approaches $\beta_0 + \beta_1$ as time to maturity T approaches zero. The parameters β_1 and β_2 determine the location and degree of the curvature of the yield curve, respectively. Specifically, they generate a hump-shape yield curve at the point β_1 when β_1 is positive and a U-shape when β_1 is negative.

The Svensson (1994) extension incorporated two more parameters, β_2 and β_3 , to the Nelson-Siegel instantaneous forward rate curve:

$$f(T) = \beta_0 + \beta_1 \exp\left(-\frac{T}{\lambda_1}\right) + \beta_2 \frac{T}{\lambda_1} \exp\left(-\frac{T}{\lambda_1}\right) + \beta_3 \frac{T}{\lambda_2} \exp\left(-\frac{T}{\lambda_2}\right). \quad (2)$$

The Svensson function $f(T)$ considers a second curvature in the forward rate curve, the location

and degree of which are depicted by λ_2 and β_3 , respectively. The additional parameters λ_2 and β_3 can generate a second hump-shape yield curve at the point λ_2 when λ_2 is positive and a U-shape when λ_2 is negative.

The implied spot yield curve can be derived from the forward rate curve given the no-arbitrage assumption between spot rates and forward rates. Specifically, a spot rate is simply a compounding of forward rates. For instance, a two-year spot rate is equal to the return generated when money is initially deposited at the current 1-year spot rate and then rolled after at the 1-year rate a year from now. The no-arbitrage rule leads to the following yield curve or term structure of interest rates for time to maturity T :

$$y(T) = \beta_0 + \beta_1 \frac{1 - \exp(-T/\lambda_1)}{T/\lambda_1} + \beta_2 \left(\frac{1 - \exp(-T/\lambda_1)}{T/\lambda_1} - \exp(-T/\lambda_1) \right) + \beta_3 \left(\frac{1 - \exp(-T/\lambda_2)}{T/\lambda_2} - \exp(-T/\lambda_2) \right). \quad (3)$$

The extended Svensson yield curve in Equation 3 was used to determine the fair value of Philippine yield curve given the actual done trades as input to the yield curve construction.

The model is fitted by finding a set of parameters β_0 , β_1 , β_2 , β_3 , λ_1 , and λ_2 that minimize the modified objective function R

$$R = \sum_{k=1}^K (r_k - \hat{r}_k)^2 \log(1 + Q_k) \quad (4)$$

where K is the number of bonds traded on a specific day and for each bond k , r_k is the actual weighted average yield, \hat{r}_k is the theoretical rate predicted by the model, and Q_k is the traded volume of the bond on a given day. Observe that including the logarithm of the trading volume in the objective function gives more liquid bonds with higher trading volume greater weight. As a result, more emphasis is placed on tracking their yields in the model.



Table 1. Actual Bond Trades Data from Philippine Dealing System (PDS) on 5 March 2021

Global ID	Local ID	Coupon	Days	Maturity	Bid Yield	Offer Yield	Last Yield	Wtd. Ave. Yield	Last Traded Time	Total Volume (MM)	Open Yield	High Yield	Low Yield	Close Yield
RPTB 0	RPTB 0	-	5	10/3/21	-	-	0.995	0.995	11:37:44	4.03	0.995	0.995	0.995	0.995
03/10/21	03/10/21													
RPGB 3 1/2	FXTN 07-57	3.5	15	20/03/21	-	-	1.15	1.1747	15:14:23	538.9564	1.225	1.225	1.15	1.15
03/20/21														
RPTB 0	RPTB 0	-	19	24/03/21	-	-	1.1	1.1	11:40:47	70.04	1.1	1.1	1.1	1.1
03/24/21	03/24/21													
RPTB 0	RPTB 0	-	26	31/03/21	-	-	1.1285	1.1274	14:43:11	232.005	1	1.1285	1	1.1285
03/31/21	03/31/21													
RPTB 0	RPTB 0	-	40	14/04/21	-	-	0.95	0.9264	14:44:22	42.3	0.75	0.95	0.75	0.95
04/14/21	04/14/21													
RPTB 0	RPTB 0	-	61	05/05/21	-	-	0.95	0.8515	14:36:17	27.428	0.8	0.95	0.8	0.95
05/05/21	05/05/21													
RPTB 0	RPTB 0	-	68	12/05/21	-	1	1.15	1.1493	15:13:33	451.045	0.85	1.15	0.85	1.15
05/12/21	05/12/21													
RPTB 0	RPTB 0	-	75	19/05/21	-	1	1.05	1.1808	15:06:46	560.05	1.02	1.2	1.02	1.05
05/19/21	05/19/21													
RPTB 0	RPTB 0	-	82	26/05/21	-	-	1.05	1.2291	15:20:32	483.763	1.2	1.25	0.95	1.05
05/26/21	05/26/21													
RPTB 0	RPTB 0	-	89	02/06/21	-	1.07	1.081	1.0807	15:20:35	270.35	1.075	1.1	1.055	1.081
06/02/21	06/02/21													

3. Main Findings on Model Implementation

The following tables and figures will present the implementation of the NSS model in constructing a best fit yield curve given input data on actual trades of Philippine Treasury bonds. The results will show how input data is captured and how initial values of the NSS parameters are set. The analysis will also discuss how the optimal NSS parameters are determined using Excel Solver. Given the best fit yield curve that minimizes the distance between actual and fitted data points, the study will discuss how the optimal yield curve can be used to determine mispriced bonds and estimate the fair value of bids in Treasury bill auctions. Finally, a sensitivity analysis of the NSS parameters will be conducted to determine which parameter significantly drives the best fit result.

Table 1 shows the actual bond trades data on 5 March 2021 from PDS, a dealing exchange for major banks in the Philippines. One of the main functions of PDS is to ensure price discovery and transparency in the fixed income market by providing real-time transactions of banks. It provides the Local ID, Coupon Rate, Maturity, Weighted Average Yield, and Total Traded Volume of recorded transactions for each bond. This information will be used as input in the modified (NSS) model implementation.



Table 2. Local ID, Tenor (in years), Weighted Average Yield, and Total Traded Volume of Government Bonds Traded on 5 March 2021

Local ID	Tenor (in yrs)	Weighted Average Yield	Traded Volume (MM)
RPTB 0 03/10/21	0.008	0.995%	4.03
FXTN 07-57	0.036	1.175%	538.9564
RPTB 0 03/24/21	0.047	1.100%	70.04
RPTB 0 03/31/21	0.066	1.127%	232.005
RPTB 0 04/14/21	0.104	0.926%	42.3
RPTB 0 05/05/21	0.162	0.852%	27.428
RPTB 0 05/12/21	0.181	1.149%	451.045
RPTB 0 05/19/21	0.200	1.181%	560.05
RPTB 0 05/26/21	0.219	1.229%	483.763

Table 2 presents the Local ID, Tenor or Remaining Life in Years, Weighted Average Yield, and Total Traded Volume of each bond captured in Table 1. The Local ID will be used as identifier of the bonds. The weighted average yield and tenor will serve as inputs in computing for the NSS theoretical yield. The total traded volume will be used in calculating the residuals wherein bonds with higher traded volumes are given higher weights

Table 3. Initial Setting of NSS Parameters

β_0	-4.0000
β_1	4.0000
β_2	4.7000
β_3	0.0100
λ_1	80.0000
λ_2	1.000

Table 3 shows the initial values for the NSS parameters β_0 , β_1 , β_2 , β_3 , λ_1 , and λ_2 . Set $\beta_0 = -4.00$, $\beta_1 = 4.00$, $\beta_2 = 4.70$, $\beta_3 = 0.01$, $\lambda_1 = 80.00$, and $\lambda_2 = 1.00$.



Table 4. Initial Calculation of NSS Theoretical Yield and Residual based on the Parameters in Table 3.

Local ID	T	Weighted Average Yield	Theoretical Yield	Residual
RPTB 0 03/10/21	0.01	0.995%	0.013%	0.00015585
FXTN 07-57	0.04	1.175%	0.038%	0.00081299
RPTB 0 03/24/21	0.05	1.100%	0.048%	0.00047192
RPTB 0 03/31/21	0.07	1.127%	0.065%	0.00061519
RPTB 0 04/14/21	0.11	0.926%	0.099%	0.00025813
RPTB 0 05/05/21	0.17	0.852%	0.148%	0.00016589
RPTB 0 05/12/21	0.19	1.149%	0.163%	0.00059429
RPTB 0 05/19/21	0.21	1.181%	0.179%	0.00063526
RPTB 0 05/26/21	0.22	1.229%	0.194%	0.00066200
RPTB 0 06/02/21	0.24	1.081%	0.210%	0.00042515
RPTB 0 06/09/21	0.26	1.070%	0.225%	0.00032428
RTB 03-09	0.27	1.360%	0.233%	0.00073944
RPTB 0 06/16/21	0.28	1.050%	0.240%	0.00007942
RPTB 0 07/07/21	0.34	1.070%	0.283%	0.00020319
RPTB 0 7/21/21	0.38	1.400%	0.311%	0.00008221
RPTB 0 08/04/21	0.42	1.100%	0.338%	0.00020841
RPTB 0 08/18/21	0.45	1.098%	0.365%	0.00019136
RPTB 0 08/25/21	0.47	1.135%	0.378%	0.00025289
RPTB 0 09/01/21	0.49	1.230%	0.391%	0.00031478
RPTB 0 10/27/21	0.65	1.300%	0.490%	0.00027188
FXTN 10-54	0.88	1.625%	0.623%	0.00046378
RPTB 0 01/19/22	0.88	1.550%	0.623%	0.00003487
RPTB 0 01/26/22	0.9	1.650%	0.633%	0.00064297

Table 4 depicts the implied NSS theoretical yield and residual given the initial parameters in Table 3. The implied that NSS theoretical yield uses Equation 3 to compute for the $y(t)$ for a bond with a tenor t and with parameters $\beta_0 = -4.00$, $\beta_1 = 4.00$, $\beta_2 = 4.70$, $\beta_3 = 0.01$, $\lambda_1 = 80.00$, and $\lambda_2 = 1.00$. The residual for each bond is calculated using Equation 4, which imputes the difference between actual weighted average yield and NSS theoretical yield, and the total traded volume of each bond.



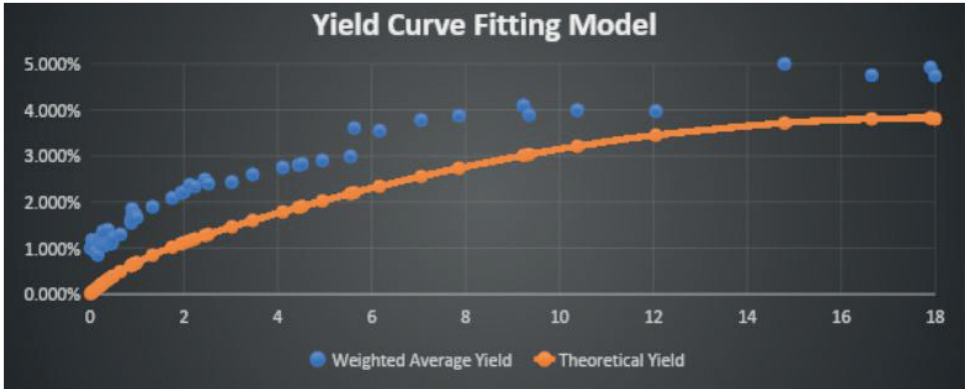


Figure 1. Initial Yield Curve Calculation based on the Parameters in Table 3

Figure 1 illustrates the resulting yield curve from NSS theoretical yields in Table 4 (in orange curve) and the actual weighted average yields (in blue points) for each tenor t . Note that the yield curve shows the fair value yield for each bond with tenor t . It can be observed that the initial yield curve is not a good fit for the actual yields in the bonds trade data.

Table 5. Sum of Residuals based on Initial Calculation of NSS Theoretical Yield in Table 4.

Sum of Residuals	0.02462558
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Based on the initial parameters set in Table 3, the sum of residuals for all the bonds in the trade data is at 0.0247.

At this point, the objective is to minimize the sum of residuals R in Equation 4 by setting the optimal parameters for $\beta_0, \beta_1, \beta_2, \beta_3, \lambda_1,$ and λ_2 , and consequently determine the optimal yield curve that will best fit the observed weighted average yields in the bonds trade data.

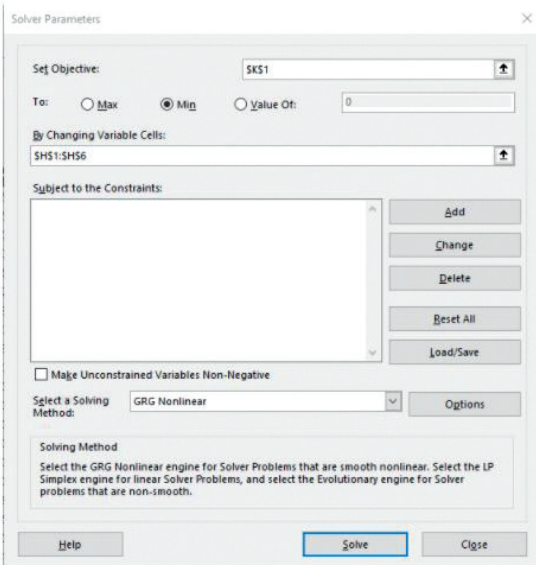


Figure 2. Excel Solver Parameters for Minimizing Sum of Residuals R

Figure 2 shows the Excel Solver Parameters used to determine the optimal values of $\beta_0, \beta_1, \beta_2, \beta_3, \lambda_1,$ and λ_2 that will minimize the sum of residuals R . Specifically, the set objective K3 (which contains the sum of residuals R) is minimized by changing the NSS parameters in cells H1 (cell containing β_0), H2 (cell containing β_1), H3 (cell containing β_2), H4 (cell containing β_3), H5 (cell containing λ_1), and H6 (cell containing λ_2). Furthermore, unconstrained parameters $\beta_0, \beta_1, \beta_2, \beta_3, \lambda_1,$ and λ_2 are also allowed to have non-negative values. The Generalized Reduced Gradient (GRG) Nonlinear method is employed to seek locally optimal solution.



Table 6. Optimal NSS Parameters

β_0	-6.8785
β_1	6.8872
β_2	7.7885
β_3	0.0213
λ_1	114.5064
λ_2	1.4782

Table 6 presents the optimal values of NSS parameters β_0 , β_1 , β_2 , β_3 , λ_1 , and λ_2 that will minimize the sum of residuals R and construct the best fit yield curve for the observed yields of bonds traded in the market. The optimal parameters are as follows: $\beta_0 = -6.8785$, $\beta_1 = 6.8872$, $\beta_2 = 7.7885$, $\beta_3 = 0.0213$, $\lambda_1 = 114.5064$, and $\lambda_2 = 1.4782$.

Table 7. Minimum Sum of Residuals R

Sum of Residuals	0.02462558
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The optimal parameters in Figure 8 gives a total residual of 4.9567×10^{-4} (a reduction of 97.99% from the initial value of R in Table 5).

Table 8. Calculation of Best Fit Theoretical Yield and Residual based on the Parameters in Table 6

Local ID	T	Weighted Average Yield	Theoretical Yield	Residual
RPTB 0 03/10/21	0.01	0.995%	0.891%	0.00000176
FXTN 07-57	0.04	1.175%	0.921%	0.00004060
RPTB 0 03/24/21	0.05	1.100%	0.933%	0.00001196
RPTB 0 03/31/21	0.07	1.127%	0.953%	0.00001656
RPTB 0 04/14/21	0.11	0.926%	0.994%	0.00000170
RPTB 0 05/05/21	0.17	0.852%	1.052%	0.00001352
RPTB 0 05/12/21	0.19	1.149%	1.072%	0.00000369
RPTB 0 05/19/21	0.21	1.181%	1.091%	0.00000514
RPTB 0 05/26/21	0.22	1.229%	1.109%	0.00000886
RPTB 0 06/02/21	0.24	1.081%	1.128%	0.00000125
RPTB 0 06/09/21	0.26	1.070%	1.146%	0.00000265
RTB 03-09	0.27	1.360%	1.157%	0.00002409
RPTB 0 06/16/21	0.28	1.050%	1.165%	0.00000159
RPTB 0 07/07/21	0.34	1.070%	1.218%	0.00000717
RPTB 0 7/21/21	0.38	1.400%	1.252%	0.00000151
RPTB 0 08/04/21	0.42	1.100%	1.286%	0.00001245
RPTB 0 08/18/21	0.45	1.098%	1.319%	0.00001744
RPTB 0 08/25/21	0.47	1.135%	1.336%	0.00001769
RPTB 0 09/01/21	0.49	1.230%	1.352%	0.00000658
RPTB 0 10/27/21	0.65	1.300%	1.475%	0.00001262
FXTN 10-54	0.88	1.625%	1.641%	0.00000012
RPTB 0 01/19/22	0.88	1.550%	1.641%	0.00000033



Table 8 shows the best fit NSS yield and residual for each bond with tenor T given the optimal parameters $\beta_0 = -6.8785$, $\beta_1 = 6.8872$, $\beta_2 = 7.7885$, $\beta_3 = 0.0213$, $\lambda_1 = 114.5064$, and $\lambda_2 = 1.4782$. Similar with Table 4, the derived NSS yield uses Equation 3 to compute for the $y(t)$ for a bond with a tenor t . Moreover, the residual also uses Equation 4, which incorporates the squared difference between NSS yield and observed weighted average yield, and the total traded volume for each bond.

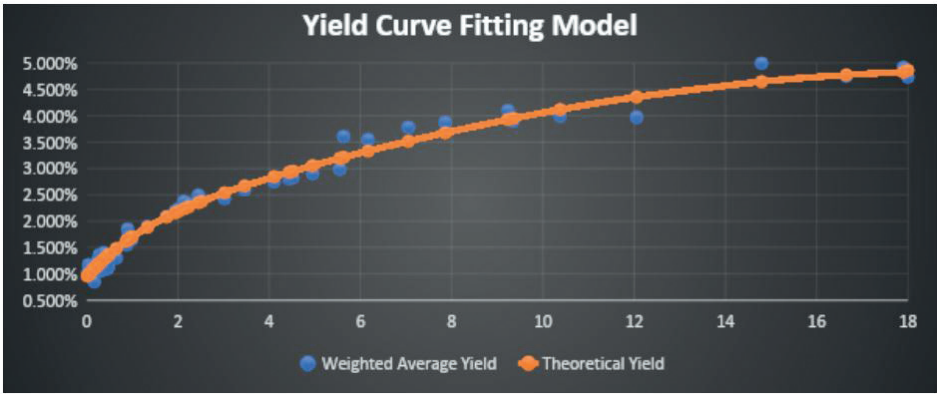


Figure 3. Optimal Yield Curve Calculation based on the Parameters in Figure 8

Figure 3 depicts the resulting yield curve from the NSS theoretical yields in Table 8 (in orange curve) and the actual weighted average yields (in blue points) for each tenor t . The yield curve with residual minimization component is a better fit to the actual data points than the yield curve in Figure 1.

Table 9. Identification of Cheapest Bonds based on the difference between Actual Yield and Fitted NSS Yield

Local ID	Remaining Life (in Yrs)	Actual Yield	Model Yield	Yield Differential
RTB 15-01	5.63	3.608%	3.211%	0.3965%
FXTN 25-08	14.79	5.000%	4.649%	0.3515%
FXTN 10-63	7.05	3.784%	3.518%	0.2662%
FXTN 10-61	6.17	3.550%	3.331%	0.2189%
FXTN 05-74	0.90	1.850%	1.642%	0.2083%
FXTN 10-64	7.86	3.876%	3.678%	0.1973%
FXTN 07-57	0.04	1.175%	0.985%	0.1895%
FXTN 20-16	9.23	4.100%	3.930%	0.1697%
RTB 03-09	0.27	1.360%	1.195%	0.1656%
RTB 10-04	2.45	2.492%	2.350%	0.1423%

Table 9 shows the ten cheapest Philippine Treasury bonds based on the yield differential between the actual yield and the fitted NSS yield. A bond is considered cheap when its actual yield is higher than the yield predicted by the model. When viewed from a yield perspective, the cheapest bonds are those with the highest difference between the actual yield and the fitted NSS yield. These bonds are considered undervalued and presents good buying opportunity for fixed income traders.



Table 10. Identification of Most Expensive Bonds based on the difference between Actual Yield and Fitted NSS Yield

Local ID	Remaining Life (in Yrs)	Actual Yield	Model Yield	Yield Differential
FXTN 20-20	12.05	3.975%	4.357%	-0.3818%
RPTB 0 05/05/21	0.17	0.852%	1.102%	-0.2504%
RPTB 0 08/18/21	0.45	1.098%	1.340%	-0.2416%
RPTB 0 08/25/21	0.47	1.135%	1.354%	-0.2189%
RPTB 0 08/04/21	0.42	1.100%	1.310%	-0.2100%
RTB 10-05	5.55	2.992%	3.193%	-0.2003%
RPTB 0 10/27/21	0.65	1.300%	1.479%	-0.1792%
RPTB 0 07/07/21	0.34	1.070%	1.249%	-0.1789%
RPTB 0 06/16/21	0.28	1.050%	1.201%	-0.1515%
FXTN 07-62	4.95	2.907%	3.053%	-0.1466%

Table 10 presents the ten most expensive Philippine Treasury bonds based on the yield differential between the actual yield and the fitted NSS yield. A bond is considered expensive when its actual yield is lower than the yield predicted by the model. When viewed from a yield perspective, the most expensive bonds are those with the lowest difference between the actual yield and the fitted NSS yield. These bonds are considered overvalued and presents good selling opportunity for fixed income traders.

Table 11. Identification of Cheapest Bonds based on the difference between Actual Price and Fitted NSS Price

Local ID	Remaining Life (in Yrs)	Actual Price	Theoretical Price	Price Differential
FXTN 25-08	14.79	87.6733	4.357%	- 2.9693
RTB 15-01	5.63	99.4612	1.102%	- 1.9976
FXTN 10-63	7.05	105.2583	1.340%	- 1.5071
FXTN 10-64	7.86	114.5089	1.354%	- 1.3166
FXTN 20-16	9.23	118.4418	1.310%	- 1.2581
FXTN 10-61	6.17	113.6435	3.193%	- 1.2013
FXTN 20-23	17.90	113.5734	1.479%	- 1.1027
RTB 10-04	2.45	120.2459	1.249%	- 0.3428
FXTN 07-58	2.13	106.0769	1.201%	- 0.2852
FXTN 05-74	0.90	98.3815	3.053%	- 0.1801



Table 11 shows the ten cheapest Philippine Treasury bonds based on the price differential between the actual price and the fitted NSS price. A bond is considered cheap when its actual price is lower than the price predicted by the model. Note that bond price is derived from actual yield by discounting the coupon and principal payments of the bond at the stated yield.

Given the difference in remaining life and coupon payments across each bond, a bond with a relatively high yield differential does not guarantee that it will also have a relatively high price differential. For instance, prices of bonds with longer remaining life tend to be more sensitive to yield changes compared with similar shorter-term bonds. Hence, a short-term bond with the same yield differential as with a long-term bond will likely have a smaller price differential.

When viewed from a price perspective, the cheapest bonds are those with the lowest difference between the actual price and the fitted NSS price. These bonds are considered undervalued and presents good buying opportunity for fixed income traders.

Table 12. Identification of Most Expensive Bonds based on the difference between Actual Price and Fitted NSS Price

Local ID	Remaining Life (in Yrs)	Actual Price	Theoretical Price	Price Differential
FXTN 20-20	12.05	133.9181	130.1231	3.7950
FXTN 25-11	19.53	124.0703	122.3620	1.7083
RTB 10-05	5.55	114.8969	113.9105	0.9864
FXTN 20-17	10.38	91.3167	90.4362	0.8805
FXTN 07-62	4.95	103.0136	102.3902	0.6234
RTB 05-13	4.44	111.3621	110.8557	0.5064
FXTN 10-65	9.35	137.2882	136.7834	0.5047
FXTN 10-60	4.52	99.1492	98.6685	0.4808
RTB 25-01	16.65	135.6626	135.3476	0.3150
FXTN 07-61	4.11	104.4898	104.1867	0.3031

Table 12 presents the ten most expensive Philippine Treasury bonds based on the price differential between the actual price and the fitted NSS price. A bond is considered expensive when its actual price is lower than the price predicted by the model. When viewed from a price perspective, the most expensive bonds are those with the highest difference between the actual price and the fitted NSS price. These bonds are considered overvalued and presents good selling opportunity for fixed income traders.



Table 13. Estimated Indicative Yields of Philippine Treasury Bills

Treasury Bill	Indicative Yields
91-Day	1.174%
182-Day	1.374%
364-Day	1.704%

Table 13 shows the estimated indicative yields of 91-Day, 182-Day, and 364-Day Treasury Bills. The indicative yields for 91-Day (or 0.2493 years), 182-Day (or 0.4986 years), and 364-Day (or 1 year) are determined by calculating for $y(0.2493)$, $y(0.4986)$, and $y(1.0)$ in Equation 3, respectively. These estimates can be used by the Philippine Bureau of the Treasury during its auction of Treasury Bills to determine the fair value of bids it should accept.

Table 14. Comparison of BVAL Rate and NSS Theoretical Rate

Tenor	BVAL Rate	Theoretical Rate	Difference
1M	1.0011%	1.0253%	-0.0242%
3M	1.0816%	1.1742%	-0.0926%
6M	1.1950%	1.3738%	-0.1788%
1Y	1.6834%	1.7041%	-0.0207%
2Y	2.1850%	2.1838%	0.0012%
3Y	2.4865%	2.5314%	-0.0449%
4Y	2.7486%	2.8150%	-0.0664%
5Y	3.0011%	3.0649%	-0.0638%
7Y	3.4789%	3.5070%	-0.0281%
10Y	3.9806%	4.0587%	-0.0781%
20Y	4.8707%	4.8645%	0.0062%
25Y	4.8716%	4.6678%	0.2038%

Table 14 presents the comparative result between BVAL Rate and NSS Theoretical Rate. Published by Bloomberg, BVAL Rate is the actual benchmark rates used by Philippine banks to construct the yield curve. BVAL is calculated using a private, proprietary scoring algorithm based on observed bid and ask prices of bonds captured by the Bloomberg platform. The NSS Theoretical Rates for 1M, 3M, 6M, 1Y, 2Y, 3Y, 4Y, 5Y, 7Y, 10Y, 20Y, and 25Y are determined by computing for the values of $y(0.0833)$, $y(0.25)$, $y(0.50)$, $y(1)$, $y(2)$, $y(3)$, $y(4)$, $y(5)$, $y(7)$, $y(10)$, $y(20)$, and $y(25)$ in Equation 3, respectively. Note that the optimal parameters for β_0 , β_1 , β_2 , β_3 , λ_1 , and λ_2 in Table 6 are used as input in Equation 3.



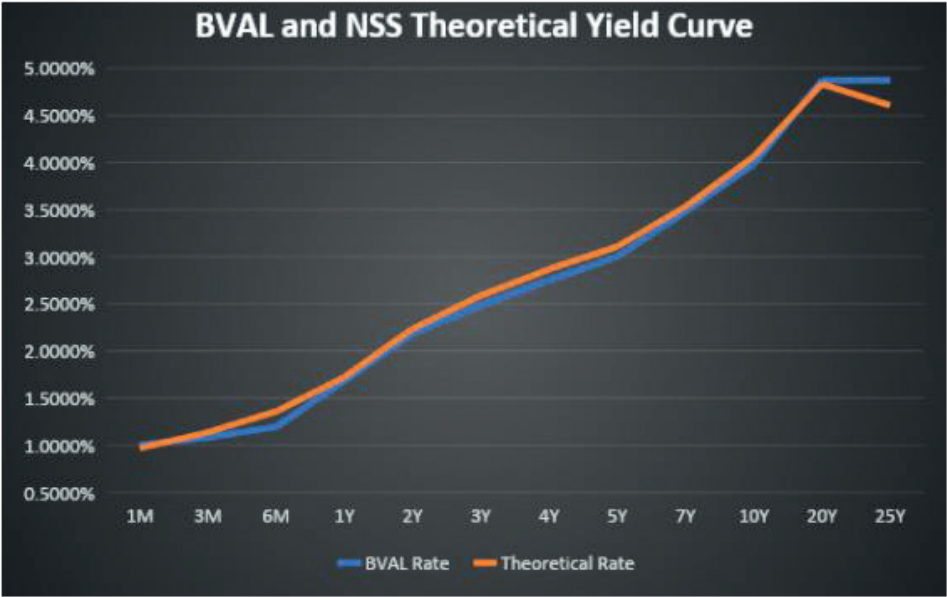


Figure 4. Comparison of BVAL Yield Curve and NSS Yield Curve

Figure 4 depicts the BVAL and NSS Theoretical Yield Curve based on the resulting benchmark rates in Figure 17. Observe that the NSS Theoretical Yield Curve provided a higher rate for each benchmark tenors (except for 20Y and 25Y). Further investigation is needed to explain how the differences in yield curve methodologies resulted to a lower BVAL rate.

Table 15. Sensitivity of Sum of Residuals to Changes in NSS Parameters β_0 , β_1 , β_2 , β_3 , λ_1 , and λ_2

Sensitivity of Sum of Residuals	Change Optimal Parameters By						
	-0.03	-0.02	-0.02	0	+0.01	+0.02	+0.03
β_0	21.79756%	9.70583%	2.45649%	0.04957%	2.48504%	9.76292%	21.88320%
β_1	21.23015%	9.45411%	2.39392%	0.04957%	2.42106%	9.50840%	21.31158%
β_2	0.05792%	0.05281%	0.05002%	0.04957%	0.05144%	0.05565%	0.06219%
β_3	0.80773%	0.37398%	0.12126%	0.04957%	0.15891%	0.44927%	0.92067%
λ_1	0.04959%	0.04958%	0.04957%	0.04957%	0.04956%	0.04955%	0.04955%
λ_2	0.04946%	0.04948%	0.04952%	0.04957%	0.04962%	0.04968%	0.04975%

Table 15 shows the resulting sum of residuals when the NSS parameters β_0 , β_1 , β_2 , β_3 , λ_1 , and λ_2 are changed by a certain magnitude. For instance, a sum of residual of 21.79756% will result when β_0 is decreased by 0.03 while keeping other parameters constant. The table shows that the residuals are highly sensitive to changes in estimates of β_0 and β_1 , and less sensitive to changes in estimates of β_2 , β_3 , λ_1 , and λ_2 . A point of further study is to analyze the underlying reason behind the high sensitivity of the sum of residuals to estimates of β_0 and β_1 .



4. Conclusion

The direct numerical implementation of the modified NSS model illustrated how the NSS parametric model can be used to derive the best fit yield curve based on observed bond trades on a given day. It showed how determining the optimal parameters of the NSS model to minimize the total residuals (weighted based on the trading activity of bonds) can lead to a smooth yield curve. The model implementation also discussed how the best fit yield curve can be used to determine cheap and expensive bonds and estimate indicative threshold bids during treasury bills and bonds auctions. In the comparison between BVAL and Theoretical Rates, results point to higher BVAL rates relative to NSS Model rates. Finally, sensitivity analysis of optimal NSS parameters suggested that the best fit estimation is highly sensitive to changes in β_0 and β_1 , and less sensitive to changes in estimates of β_2 , β_3 , λ_1 , and λ_2 .

The NSS optimal yield curve will provide the BTr a tool to determine which portion of the yield curve is above or below its fair level. Rates that are above (below) the fair level are expected to decrease (increase) and converge to its equilibrium rate. Moreover, the best fit estimation will allow BTr to have a reliable model to estimate the minimum bid rates to be accepted in the issuance of Treasury bills. Finally, the comparison between actual and theoretical yields can be used by fixed income traders to determine mispriced bonds.

5. Future Research

A future direction for research is to explore how spline-methods can be used in yield curve construction to identify any mispricing in the trading of highly liquid Philippine Treasury bonds. Another possible area of research is to compare the results of Nelson-Siegel-Svensson model with other parametric yield curve models. Moreover, further investigation is needed to generalize the result of sensitivity analysis and understand the underlying reason behind the difference behind BVAL rates and NSS model rates.

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DETERMINANTS OF FINANCIAL WELL-BEING OF ENTREPRENEURS IN DAVAO REGION

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ABSTRACT

The achievement of financial well-being is the aim of countries all over the world. In the Philippines, Bangko Sentral ng Pilipinas has begun its financial inclusion programs in pursuit of faster economic development. In economic development, the entrepreneurs are known as the driving force or the primary movers of change. In this study, the researcher wanted to determine if financial well-being models used in developed countries fit the local setting. In particular, the study analyzed if there is a relationship between Financial Knowledge, Financial Capability, and Financial Attitude with Financial Well-being of Entrepreneurs in Region XI. Descriptive-Correlational research design was used to measure association among variables and use a sample of 354 entrepreneurs in the Davao Region. Using Multiple Regression Analysis, the relationship between variables were examined and Hierarchical Regression was employed to measure moderating effects of age, sex, and business years. Results showed that the entrepreneurs of Davao Region have a moderate level of financial attitude, high level of financial knowledge, financial capability, and financial well-being. The study also found a significant relationship between an entrepreneur's financial knowledge, financial capability, financial attitude, and financial well-being. Correlation between variables was significant at 47.8% explanatory power and post hoc reliability result at 87.5%. Results of the study, however, did not find any significant moderating influence on entrepreneurs' age, sex, and business years.

Keywords: Financial Well-being, Financial Capability, Financial Knowledge, Financial Attitudes, Entrepreneur, Multiple Regression Analysis

1. Introduction

Financial well-being is one of the most critical components for the achievement of overall well-being ((Gerrans, Speelman, & Campitelli, 2014; Zemtsov & Osipova, 2016) and this has linkages to psychological wellbeing and mental health (Taylor & Wagland, 2011). In the first Gallup-Healthways Index of the State of Global Well-being in 2014, the Philippines ranked 96th in 145 countries in terms of Financial Well-being and showed that around 52% of Filipino respondents are struggling with their finances (Gallup-Healthways, 2014). Countries with high financial well-being confidence are those countries listed in the Global Entrepreneurship Network (GEN, 2017) and are economics with pioneering researches on financial literacy, financial capability, financial attitudes and financial well-being (ANZ, 2018). Considering that entrepreneurs have higher wealth and

well-being potential in developed countries as shown in the BCG (2018); GEN (2017); Helliwell, Layard, and Sachs (2016) studies, the researcher became interested in the possible relationship of entrepreneurship and high financial well-being.

2. Theoretical framework

Gerrans et al. (2014) confirmed the relationship of Financial Wellness to Financial Well-being stating that these terminologies are used in close notions in most research.

The Model for Personal Financial Wellness by (Joo, 2008) described financial wellness as an overarching concept that is comprehensive and multi-dimensional which incorporates financial satisfaction, financial attitudes, and behavior.

On the other hand, Porter and Garman (1993), found that Financial Capability is essential in a



person's Financial Well-being and found a link of the influence of Financial Capability to the achievement of Financial Well-being. This link was tested in this study through the Model for Financial Capability by the Personal Finance Research Center (PFRC, 2005) where they found that Knowledge (Financial Knowledge), Skills (Financial Capability), and Attitudes (Financial Attitudes) comprises Financial Behavior which leads to Financial Well-being.

Through the theories and models presented above, the researcher looked into possible relationship between Entrepreneur's Financial Knowledge, Financial Capability, and Financial Attitudes, to Financial Well-being.

3. Previous Studies

The interest in financial well-being has never been as pronounced as ever. This is manifested in the continuous research in the field of finance and economics from financial literacy to financial knowledge, financial capability and financial attitudes to financial well-being. However, study on financial well-being in developing countries is limited due to the lack of universal measures of its components. The need for these studies, however, has been reiterated in recommendations such as those in the studies of Mahdzan and Tabiani (2013).

Contributory to Financial Well-being studies are studies on Financial Literacy. Assessing financial literacy levels of Filipinos, Chua (2015) and Pangilinan (2011) found that though somewhat financially literate, literacy does not translate to investment acquisitions and change in financial attitudes. These were confirmed by the studies of Montalbo, Pogoy, Villarente, and Pepito (2017) and Guliman (2015) relating to MSMEs.

Loke (2017) found that a person who displays good financial management attitude has a higher likelihood to be more prepared for income shock. The relationship of financial capability, financial attitudes, and financial knowledge to financial well-being were similarly seen in the studies of Kempson, Finney, and Poppe (2017) which were improved in a later study by Kempson and Poppe (2018).

The following hypotheses were formulated, based on the questions and objectives of the research:

H₁: There is no significant relationship between financial knowledge and the overall financial well-being of entrepreneurs.

H₂: There is no significant relationship between financial capability and the overall financial well-being of entrepreneurs.

H₃: There is no significant relationship between financial attitude and overall financial well-being of entrepreneurs.

H₄: There is no significant difference in the level of the overall financial well-being of entrepreneurs when grouped according to their:

- a. Age;
- b. Sex;
- c. Years in business.

4. Data and methods

Descriptive-Correlational research design was employed to measure association among variables. Information about the demographic profile of the respondents was gathered and the relationship between independent variables and the dependent variable was measured with respect to the extend the selected profile moderates the relationship between them. Data were analyzed using SPSS statistical software.

The study employed probability sampling with qualified respondents from Davao Region (Region XI). The list was taken from businesses provided by the Business Bureaus of each key city. The criteria for the selection of respondents are: (1) Business must be a sole proprietorship, (2) The business should have be in operation for at least three (3) years, (3) Owners must be native to the area or the company is not a branch that is controlled by company outside Davao Region.

The questionnaire was a modified version (with permission) from the ANZ Financial Well-being survey (ANZ, 2018) which was run in Australia, Norway, and New Zealand. The questionnaire was modified to fit the Filipino profile, financial instruments which are present and commonly



used in the country, and financial planning activities. It was noted that the Philippines do not have financial literacy integrated in their education curriculum.

Section A1 of the questionnaire focused on demographics. Sections A2 and A3 anchored on sub-components which would be helpful in the analysis of the data. These contained common questions in financial literacy and education survey measures which looked at the financial products which respondents were exposed to, the people they talk to about finances, and their role in financial activities.

Section B questions were measures of Well-being taken from Kempson et al. (2017) modified while adhering to their recommendation for the use of a 5-point Likert Scale. The questions were divided into three parts: financial comfort (which included subjective well-being), making financial commitments, and resilience to future shocks.

Section C questions were measures of Financial Capability. This had two parts: balancing or the importance of income, and access to financial information.

Section D measured Financial Knowledge. This section was set to measure familiarity and confidence of the entrepreneurs in his/her financial management knowledge and familiarization.

Section E measured Financial Attitudes. This section was divided into two parts: risk-taking and self-restraint or control.

Cronbach's Alpha was used to test reliability of the questionnaire since it was the first time this was used in a developing country under the chosen type of respondents. The pre-test showed a 0.921 result which meant that the questionnaire was reliable. The ideal value should be larger than 0.80 (Janssens, Wijnen, De Pelsmacker, & Van Kenhove, 2008). Post-Hoc scale reliability test returned a 0.875 Cronbach's Alpha, still within the ideal value of 0.80.

Since the use of Multiple Regression Analysis was ideal for this type of study, the MRA test of Assumptions were checked.

As for Normality, the ideal data needed to be normally distributed (Berenson, Levine, Szabat, & Krehbiel, 2012). The test showed a slightly negatively skewed (left-skewed) analysis for Financial Capability while all other variables were within limits. The skewness and standard error of skewness should fall within the critical values of ± 2.58 (Burns, 2008). Burns (2008) suggested transforming the data, however, reminded that data should first be diagnosed for outliers. Casewise Diagnostics revealed Case 186 as an outlier. After the verification of the outlier and eventual taking out of such, p-values for the Kolmogorov-Smirnov (p-value 0.075) and Shapiro-Wilk (p-value of 0.075) showed that the data was normally distributed, thus, satisfying the MRA Assumption of normality. The test of collinearity looked into the VIF of less than three and no Condition Index greater than 30 (Hair, Black, Babin, & Anderson, 2010). There were no presence of multi-collinearity in the variables, thus, this MRA Assumption was satisfied.

5. Results

Data was gathered to 354 entrepreneur-respondents across the key cities in Davao Region (Region XI) namely: Davao City, Tagum City, Mati City, Digos City, Island Garden City of Salam, and Panabo City. Data was collected following strict ethical protocols which meant that randomized respondents were contacted first and asked for their willingness to take the survey and assured of the strict confidentiality of their responses and anonymity of the data collected, 55% were female, 42.7% belonged in the age bracket of 40-50 years old. 33% of the respondents came from businesses with over 15 years business life. Cash was the main payment method used by the respondents with 54% usage, while the majority used passbooks and ATM savings as their top Financial Products of choice. The responses also revealed that the respondents favored advice from family and friends more than any person or resource and have tendencies not to ask for financial information from religious or church leaders, and that all of the respondents of this study are all decision-makers.

For the variables, the results showed that Entrepreneurs of Davao Region had high level of financial knowledge, high level of financial



capability, fair financial attitude, and high financial well-being with a Regression Model:

$$\text{Financial Well-being} = -0.339* + 0.385 \text{ Financial Capability} + 0.405 \text{ Financial Knowledge} + 0.311 \text{ Financial Attitudes.}$$

The results show that the coefficient of determination (R^2) for this Model is 0.483. The ANOVA has an F-value of 108.887 (p-value 0.000) which means that all the independent variables used together in this model are significantly related to the dependent variable. Thus, it is able to explain the variance with 48.3% explanatory power.

A coefficient of determination (R^2) of 48.3% could only be used for explanation rather than prediction ((Aczel & Sounderpandian, 1999). However, it should be noted that the differences between R^2 and Adjusted R^2 showed little change. This means all variables in the model have practical significance (Black, 2009).

In summary, financial capability, financial knowledge, and financial attitudes have significant relationship to financial well-being, thus rejecting H_1 , H_2 , and H_3 . As for H_4 some of the components were rejected while others a summary of the results are shown below:

There is no significant difference in the level of overall financial well-being of entrepreneurs when grouped according to:		F	Significance	Decision
H_4	Age	FinAtt: 1.190	0.315	Failed to reject
		FinCap: 0.699	0.593	Failed to reject
		FinKnow: 3.016	0.018	Reject
Sex		FinAtt: 1.841	0.176	Failed to reject
		FinCap: 2.707	0.101	Failed to reject
		FinKnow: 0.045	0.832	Failed to reject
Years in Business		FinAtt: 2.385	0.051	Failed to reject
		FinCap: 7.127	0.000	Reject
		FinKnow: 3.266	0.011	Reject

6. CONCLUSIONS AND DISCUSSIONS

The relationship between financial knowledge, financial capability, and financial attitudes to financial well-being were assessed in this study. Also, the role of demographic characteristics including: age, sex, and business years on the score change on the variables were investigated. The results revealed several important points. First, there is positive relationship between financial knowledge, financial capability, financial attitude, to financial well-being. Second, there were demographics which had impact to some variables particularly, Age to Financial Knowledge, Years in Business to Financial Capability, and Years in Business to Financial Knowledge.

The research validated the Model of Financial Wellness of Joo (2008) where financial attitudes,

financial behavior, and financial knowledge affect financial wellness. The research also validated the Model of Financial Capability by PFRC (2005) whereby financial capability is linked to behavior which is also linked to Financial Well-being.

The research highlighted the consistency of findings from international literature and OECD, SIFO, and the ANZ Group (Atkinson, McKay, Collard, & Kempson, 2007; Kempson et al., 2017; Kempson & Poppe, 2018; A Lusardi, 2012; Annamaria Lusardi, Michaud, & Mitchell, 2015; Annamaria Lusardi & Mitchell, 2008) with regard to the factors leading to Financial Well-being such as Financial Knowledge, Financial Capability, and Financial Attitudes. Through the significant correlations found in the findings, the study has verified that, indeed, even in a developing country, similar components are still vital in the



achievement of Financial Well-being. Further, the results have also added to the researches on Entrepreneur's Financial Well-being in Davao City, Philippines.

For future researchers, the study can be used as basis for the exploration of other professions and other sectors of society. It is also good to replicate the study to a broader scope which will include information on the national level just as other nations have been monitoring their financial well-being as a country.

Further research can check the moderation effects of some variables. Perhaps additional variables not mentioned in this study can be used, particularly an entrepreneur's income. In many national surveys, there is refusal to answer

when the respondent needs to disclose revenue.

As for the low coefficient of determination (R^2), additional variables may help to increase the explanatory and the predictability power of the model. Perhaps consideration of other variables might help improve the model as long as degrees of freedom are not sacrificed. Another possible solution is the assessment of each respondent through perceptual mapping, perhaps through MDS outliers not found in the evaluation of this study.

In addition, it is also recommended that future researchers try to find associations between and among independent variables to check their inter-relatedness, perhaps using the SEM technique.

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VALUE-RELEVANCE OF ADVERTISING EXPENDITURE OF PHILIPPINE-LISTED FOOD AND BEVERAGE FIRMS

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ABSTRACT

Advertising expense is regularly thought as an effective marketing activity but at the same time an often expensive outflow for the corporation. This article examines the value-relevance of advertising spending to the firm-value of listed Food and Beverage companies in the Philippines from 2009 to 2018. Using the random-effects GLS panel regression with clustered-robust standard errors, results suggested that advertising spending, financial leverage, and their interaction were not value-relevant. However, the firm's earnings showed to be value-relevant but with low significance. Results of this study appear to support the current accounting treatment of advertising cost as an expense. This paper also support prior empirical studies on the information content of earnings. Implications of these findings are also discussed.

Keywords: Value-relevance, Advertising, Earnings, Philippines, Accounting standards
JEL: G12, M37, M41

1. Introduction

Today's business competition has pushed companies to intensify the use of advertisement as a channel in raising product or service awareness to generate revenues and expand the breadth and depth of its market share. Advertising is said to be one of the most evident yet expensive marketing activity, effective brand equity that may benefit the company in the long run (Wang et al., 2009). Hence, this substantial outflow in the books of the corporations is a pressing concern for both management and investors. Investigating the possibility of long-term economic benefits that advertising expenditures may provide (in other words, value-relevant) is a possible concern for both in the academe and in practice. In general, the current accounting practice is to capitalize expenditure only if it provides future economic benefits; otherwise, it is favored to treat it as an expense in the current period. Consequently, advertising spending is treated as an expense in the books of the companies. A majority of the literature focused on the effect of advertising spending to customer response yet concerns still arise about the financial impact and value-relevance of such substantial

advertisement spending. Barth et al. (2001) cited that an accounting amount is considered value-relevant if it predicts an association on the market values of equity. These authors also maintained that based on their knowledge, Amir et al. (1993) were the first to cite value-relevance in describing the said association.

Similar to many value-relevance papers, this study also aims to investigate whether advertising spending, along with other variables, relate to firm value. Nonetheless, most of the focus of these studies were from the developed economies. This paper hopes to contribute to the limited knowledge of value-relevance of accounting information in the lens of Philippine corporations, which spend heavily on advertising expenditure. Lee (2019) cited that Southeast countries like Indonesia, Malaysia, Philippines, Thailand, and Vietnam, were projected to have significant increase in advertising spending yet these countries receive minimal research attention in terms of advertising. In fact, Philippines' total advertising spending in the first nine months of 2011 posted as much as PhP 190 Billion for tri-media advertisements, specifically, print, radio and television (Oxford Business Group,



n.d.). In 2016, the Philippines, though tied with Singapore and Vietnam, ranked first in terms of net expenditure on advertising as a percentage of GDP across the Asia Pacific region (Media Nusantara Citra, 2018). Moreover, Philippines was forecasted as the 6th largest advertising market worldwide for 2019, spending 953 Million US dollars (GroupM, 2018). Philippines also ranked 6th worldwide in the advertising markets with highest major media growth within 2019 and 2022 (Zenith, 2019). These information support the significance of this study, especially that Philippine firms spend considerable amount of its resources in advertisements. Moreover, to limit the effect of varying industry sector, this study mainly focused on the Food and Beverage (F&B hereafter) companies in the Philippines especially that as observed, a major fraction of Philippine tri-media advertisements belong to the F&B sector. According to the Philippine Statistics Authority or PSA (2019), the F&B companies represent a substantial economic significance in the country as it represents around 50.9 percent and 37.5 percent of the country's Gross Value Added (GVA) in the Manufacturing Industry as of 2018 at current and constant prices, respectively. In fact, the F&B companies have constantly been the major contributor of the GVA in the Manufacturing Industry in the Philippines in the last decade (PSA, 2019). Food and beverage sector is also the leading Philippine household expenditure in 2019 (PSA, 2019).

Hence, the objectives of this paper are:

1. To determine whether advertising expenditure is value-relevant to Philippine food and beverage listed firms.
2. To determine if financial leverage and earnings relate to firms' value.
3. To investigate if financial leverage moderates the relationship between firm's advertising expenditure and firm's value.

The rest of this paper is organized as follows. Section 2 explains the research framework and hypotheses development. Sections 3 and 4 presented the methodology employed and the results, respectively. Section 5 of this paper contains the discussion and implications. Lastly, Section 6 includes conclusion and recommendations.

2. Research Framework and Hypothesis Development

2.1 Information Theory

The streams of substantial literature on value-relevance and information content of accounting numbers depict that accounting is a communication system where information in the financial statements may send signals to the market. It is on the information content of accounting numbers that this study is anchored upon. The information content of a message at large and specifically of the financial statements were developed from the concepts of Information Theory proposed by Shannon (1948). From the seminal work of Shannon (1948), many accounting researchers have applied the concepts of Information Theory and studied the information content of accounting numbers. In fact, Beaver (1968), being one of the pioneers who studied about the information content of accounting information cited the importance of information content of earnings and how it stirred issues in many accounting measurements. The groundbreaking work of Ball and Brown (1968) also cited that the usefulness of the accounting numbers is not due to its timeliness but rather on the content. The papers of Shannon (1948), Beaver (1968), and Ball and Brown (1968) served as the foundation of succeeding literature that used the market reaction to firm's announcement as proxy for the information content of such announcement.

2.2 Firm Value and Advertising Expenditure

It has been often said that the ultimate goal of a corporation is to maximize the stockholders' wealth. Therefore, most of management decisions, especially for listed firms, are often guided by this notion. Management are willing to invest on expenditures that they believe would increase the value of the firm. Nonetheless, there are various ways on how to value a firm. On a similar note, various studies used different financial metrics in evaluating the value-relevance of an accounting expenditure. For this study, the dependent variable, that is, market-to-book (MB) ratio, is used as proxy to firm's value. Other similar studies that also used MB ratio as proxy for firm value were Peterson and Jeong (2010), Core et al. (2003) and O'Brien (2003) among others. The MB ratio or also known



as the price-to-book ratio is a useful way of measuring company's performance and it may provide a snap idea whether the company is overvalued or undervalued relative to its book value. Another benefit of using MB ratio as a firm performance' measure is that it integrates both historical accounting and forward-looking market indicators (Ceccagnoli, 2009). Sharma et al. (2013) cited that the MB ratio is a good gauge of how the market assigns value to the net assets of the firm. Sharma et al. (2013) also cited that it has been a tradition to use MB ratio as a measure of firm performance in strategy literature, corporate diversification literature and studies about top management teams. Other similar studies used Tobin's Q as a proxy to firm value. However, Sharma et al. (2013) maintained that MB ratio has served as a rough proxy for Tobin's Q for decades. Also, the MB ratio and Tobin's Q are essentially parallel metrics (Chung & Pruitt, 1994; Varaiya et al., 1987). The MB ratio is not only a good measure for company performance but also commonly used as a measure of the present value of anticipated potential abnormal profits (Lev & Sougiannis, 1996) and often preferred by equity analysts (Pech et al., 2015).

For years, advertising spending was often related to profits, market capitalization or value, Tobin's Q, market-to-book (MB) ratio, stock prices, and stock returns among others. Many of the existing studies often cover both advertising, and research and development (R&D) expenditures to account for unrecognized intangible assets while other studies cover advertising and R&D expenditure individually. However, results of existing studies are not unanimous. Some studies argued that there is a positive relationship between advertising expenditure and stock's returns or share prices making such expenditure to be value-relevant (Sridhar et al., 2014; Luo & de Jong, 2012; Joshi & Hanssens, 2010; Srinivasan & Hanssens, 2009). However, other studies also contended that there is a negative relationship between advertising expenditure and stock returns or share prices; hence, advertising expenditures do not provide economic value beyond the period it was incurred (Han & Manry, 2004). Meanwhile, other studies showed no significant link between advertising expenditure and financial metrics used such as stock returns, share prices, market value, or even to the firm's MB ratio (Core, et al., 2003). Ali Shah et al. (2009)

also examined the value-relevance of major media advertising in the United Kingdom and found that advertising is not value-relevant for the case of manufacturing firms.

Differences in results could depend on some contextual factors. For example, Kwon (2013) found that the advertising expenses of Korean listed firms have positive value-relevance before the global financial crisis. However, Kwon (2013) posited that advertising expenses do not provide future economic benefits in the periods following the global financial crisis. Also, Osinga et al., (2011) found that advertising expenditure has no main effect on stock returns or firm's value but a positive effect was found after the de-regulation of pharmaceutical manufacturers was approved. Kim and McAlister (2011) also cited that results could depend on the level of advertising response threshold (ART). For example, firm values were negatively related to the unanticipated growth in advertising spending for firms that did not meet the ART but positively related for firms that advertise above ART (Kim & McAlister, 2011). These studies try to explain that the possible differences in results could be attributed to other contextual factors such as the industry sector, economic health, the laws regulating it, and the amount of spending devoted for advertisements.

Ho₁: There is no significant relationship between advertising spending and the firm's value.

2.3 Earnings

Firm's earnings have often been claimed to be value-relevant. Even after a number of decades had passed, the value relevance of earnings and book values have not declined (Collins et al., 1997). In 2012, Tuli et al. argued that upside changes in the earnings may send positive signal to investors that the firm is likely to have the capacity to continue and support its marketing efforts, which in turn could benefit the company. Earnings have been used by firms as signals to the market, banking on the information content of earnings. In fact, Davis, et al. (2012) when they studied the information content of earnings, they found out those earnings press releases conveyed information about firm's anticipated future performance to the market. After 50 years when their groundbreaking paper was published, Ball and Brown (2018) also contended that earnings remained to be value-relevant



for almost all of the countries included in their study. Ball and Brown (2018) further concluded that many investors still trade on the information brought by company's earnings.

H₀₂: There is no significant relationship between firm's earnings and firm's value.

2.4 Financial leverage

Financial leverage, up to some point, provides benefits to the corporation. As long as leverage does not threaten the firm's financial soundness, this could translate to tax savings, lower weighted average cost of capital and may mitigate agency problems, among others. The use of debt may translate to firm value as evidenced in the study of Dalbor et al. (2007). Lin and Chang (2011) also analyzed 196 listed firms in Taiwan and they found that debt is value-relevant at certain level but when debt ratio is higher than 33%, debt is no longer value-relevant. On the other hand, Tuli et al., (2012) contended that increases in leverage might also send negative signal to investors as it may reflect the need to borrow money to finance the company's operation. Meanwhile, Molla (2019) found no significant relationship between a firm's capital structure and corporate value.

H₃: There is no significant relationship between financial leverage and firm's value.

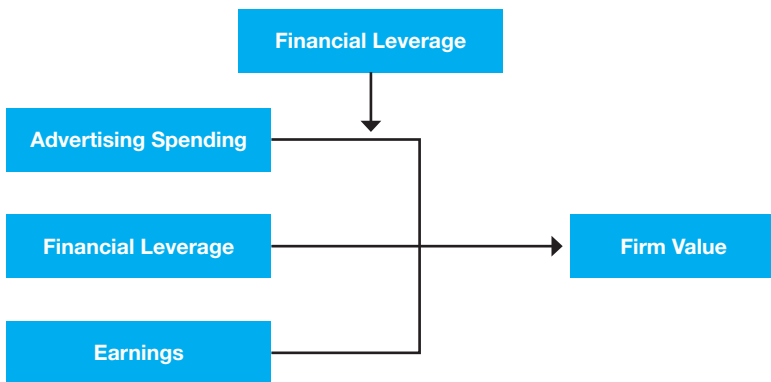
Grullon et al. (2006) also examined the interaction between capital structure and advertising competition and cited that those firms with lower financial leverage had significantly increased their advertising spending relative to their competitors

with higher financial leverage. The inclusion of moderators in a study is beneficial, as it promotes theory development (Tuli et al., 2012). Thus, Tuli et al. (2012) hypothesized that the effects of advertising spending on stock returns may vary with the presence of moderators, for example, financial leverage. Hence, this paper also looked into the how the interaction of financial leverage and advertising spending affect the value-relevance of the latter. Tuli et al. (2012) believed that a firm that simultaneously increases its advertising expense and financial leverage may send an offsetting signal to the market and thereby investors react less positively affecting the stock's performance. Srinivasan et al. (2011) also examined the interaction of advertising and financial leverage and found a negative significant relationship to profits, although they did not find a significant link to the company's stock returns. Nonetheless, Pashayev and Farooq (2019) found a non-linear effect of capital structure to advertising expense and firm value. Pashayev and Farooq (2019) argued that companies with low and high levels of debt, the advertising expenditure was not as valuable as those companies with adequate level of debt. Hence, this paper attempted to investigate if the interaction of financial leverage and advertising spending is value-relevant.

H₄: The financial leverage of a firm does not moderate the relationship between advertising spending and firm's value.

Considering the Information Theory and literature presented, this study is guided by the conceptual framework shown in Figure 1 below:

Figure 1. Conceptual Framework



3. Methodology

3.1 Data Description and Sources

The sample consisted of ten-year annual data from 2009 to 2018. It must be noted that the Global Financial Crisis occurred in 2007–2008. The crisis spawned to many countries and the Philippines was not totally spared from it. However, Yap et al. (2009) cited that in the Philippines, prices of assets suffered volatility but not as much as the 1997 East Asian crisis, and the financial sector continued to be fairly stable. Philippine stocks, being financial assets, were not greatly affected by the global financial crisis. Nonetheless, to mitigate possible bias in the results of the study brought by the global financial crisis, the data only spanned from 2009 onwards. In early 2020, the Philippine Stock Exchange Electronic Disclosure Generation Technology (PSE EDGE, n.d.) has classified 25 Food, Beverage and Tobacco (FBT) companies but only 19 companies were listed before January 2009. Out of 19, only 11 companies have complete and explicit data on advertising expenses in their notes to financial statements. Still, these 11 companies included in the sample, account for more than the majority of the recent market capitalization of the listed firms classified by PSE under the FBT subsector.

Furthermore, one of the companies used US Dollars as its functional currency. Hence, for the purposes of uniform currency for all sample data, the amounts were translated to Philippine Peso based on International Accounting Standards (IAS) 21. Almost all of the data were sourced from Compustat Global of Wharton Research Data Services (WRDS) except for advertising expense and book value per share. Data on advertising expense were lifted from the annual reports as these are not readily available from WRDS for Philippine firms. Book value per share were sourced from the PSE EDGE or annual reports, whichever is available. The data for average exchange rates and end-of-period used in translating US dollars to Philippine peso were sourced from the Bangko Sentral ng Pilipinas (n.d.). The closing market price on the last trading day of the fourth month after the end of the fiscal/ calendar year were used in solving the market value per share. The reason for using the market price per share of the fourth month following the end of the fiscal or calendar year is to ensure that the financial data have become publicly available as suggested by Core et al. (2003).

To control the effect of firm size, firm's financial leverage is measured as the ratio of total long-term debt to the total assets (Tuli et al., 2012; Srinivasan et al., 2011; Bae et al., 2011). Also, firm's earnings is measured as earnings before interest and taxes (EBIT) in proportion to total equity (Pech et al., 2015). Advertising spending were scaled using total sales. The ratio of advertising expense to sales is supported by Tuli et al. 2012; Srinivasan et al., 2011; Cohen et al., 2010. In fact, Gruca and Rego (2005) contended that the ratio of advertising expense to sales is considered as a measure of the firm's advertising intensity.

Shown below is the model used in this study

$$MB_{it} = \alpha_0 + \beta_1(ADS_{it}) + \beta_2(Leverage_{it}) + \beta_3(Earnings_{it}) + \beta_4(IAL_{it}) + \varepsilon_{it} \quad (1)$$

Where:

MB_{it} = Market-to-book ratio of firm i during year t ;

0 = intercept;

β_x = coefficient of independent variables;

ADS_{it} = advertising spending intensity of firm i during year t , expressed as advertising expense divided by total sales;

$Leverage_{it}$ = financial leverage of firm i during year t , expressed as total long-term debt divided by total assets

$Earnings_{it}$ = firm's earnings of firm i during year t , expressed as earnings before interest and taxes divided by total equity

IAL_{it} = interaction of ADS and financial leverage of firm i during year t ; expressed as $ADS \times Leverage$

ε_{it} = error term.

3.2 Model specification

3.2.1 Unit root tests. This study employed panel data analysis. Therefore, it is standard in the literature that panel data are supposed to be stationary. All variables were subjected to panel unit root tests. Levin–Lin–Chu unit root test revealed that all variables were stationary.

3.2.2 Random effects. This study intends to use either Fixed-effects (within) regression or Random-effects GLS regression instead of the Pooled Regression since the latter does not consider the heterogeneity of the 11 sample companies. Results of both Hausman and Breusch–Pagan Lagrange multiplier tests showed that the appropriate model to use is the random-effects GLS regression.

3.2.3 Other diagnostics. The model appeared to have no cross-sectional dependence but



was found to suffer from heteroskedasticity and autocorrelation. In response, the clustered robust option was used to produce robust standard error estimates.

4. Results

To provide a snapshot of the data, the descriptive statistics are shown below in Table 1.

Table 1. Descriptive Statistics of variables (all years)

	Mean	Standard Deviation
Advertising expenditure	0.032	0.029
Financial leverage	0.086	0.123
Earnings	0.146	0.183
Market-to-book ratio	4.713	11.711

As shown in Table 1 that on the average, advertising expense is around 3.2% in relation to company's sales with a very minimal standard deviation among firms in the last ten years. On the average, the long-term debt incurred by F&B firms is 8.6 percent of their total assets. The earnings before interest and taxes account for 14.6 percent of total stockholders' equity. With regard to the market-to-book ratio, F&B firms enjoy an average market price that is 4.7x of their book value. Nonetheless, the standard deviation is quite high because of the presence of the three biggest industry F&B players. Despite this, it appears that the average advertising intensity do not vary so much among firms.

In answer to the objectives of this study, results of the random-effects GLS regression (clustered robust) is shown in Table 2 below:

Market to book ratio	Coefficient	P> z
Advertising spending	14.169	0.609
Leverage	2.941	0.649
Earnings	10.814	0.072*
Advertising spending*Leverage	1,369.015	0.228
_cons	-0.741	0.735

No. of obs = 110; No. of groups = 11
*significant at an alpha of 10%

Results in Table 2 showed that the coefficient of advertising spending in relation to firm-value is positive but insignificant. This suggests that advertising spending is not value relevant. The results of this study suggest that advertising spending does not provide future economic benefits to the company. This appears to support the current accounting treatment of advertising costs as expense in the period incurred as laid out in the International Financial Reporting Standards or IFRS. Similar to the results of Molla (2019) in Bangladesh; Chadha and Sharma (2015) in India, this paper also do not find any significant relationship between financial leverage and firm value. Consequently, the interaction between advertising spending and financial leverage is also not value-relevant, providing support to the findings of Tuli et al. (2012). Following the results of the stream of literature relating earnings to firm value, this paper found earnings to be value-relevant although with a low significance, that is, based on 90% confidence level.

5. Discussion and Implications

It is important to note the limitations of this study before discussing the implications. It must be noted that this study has only covered the Philippine F&B sector and with limited number of observations primarily due to unavailability of data on advertising expenditure in the notes to financial statements in a number of F&B listed-firms. There could also be other contextual factors that may have not been captured by the accounting numbers. Hence, the findings in this study that advertising expense is not value-relevant do not necessarily imply nor suggest cutting advertising spending significantly.

Despite the limitations, the findings of this paper could still offer some important implications to standard-setting bodies and management of firms, particularly, those operating in the food and beverage sector. First, the data suggested that the amount spent by the F&B sector on advertising do not significantly translate to an increase in firm value. The results appeared to be in contrast to studies which found a positive link between advertising and firm value (Sridhar et al., 2014; Luo & de Jong, 2012; Joshi & Hanssens, 2010; Srinivasan & Hanssens,



2009). However, these studies which found positive link involved United States (US) data where there is better disclosure in terms of advertising expenses (Ali Shah & Akbar, 2008). Simpson (2008) also concurred that US firms experienced high valuation benefits during the period of mandatory disclosure of advertising expenses. In contrast, disclosure on advertising spending in the Philippines is not mandatory. Hence, insufficiency of advertising spending data that goes into the analysis of Philippine investors could have been a factor as to why it is not value-relevant. Management disclosures improve investors and analysts' outlook and help investors in understanding future implications of marketing decisions (Kimbrough & McAlister, 2009). It is also possible that investors do not value advertising expense as growth options (Tsai, 2001). Wang et al. (2009) posited that accounting research on the intangible value of advertising may have failed to look into the effectiveness of advertising in the creation of brand equity. Wang et al. (2009) cited that many accounting research have failed to capture the effect of advertising on the consumer brand attitude, which could drive the market performance and ultimately translate to shareholder value. Nonetheless, the results of this paper found support from the study of Kwon (2013) in Korea; Ali Shah et al. (2009) on manufacturing firms in United Kingdom, as well as the paper, of Han and Manry (2004) regarding Korean firms. Furthermore, the outcome of this study supports the Financial Reporting Standards Council (FRSC), being the accounting standard setting body in the Philippines, in treating advertising costs as outright expense whether public or private firms.

Similar to the results pertaining to the value-relevance of earnings, the outcome of this study suggests that Philippine investors relate earnings' announcement to firm value but with low significance. The findings offer support to the seminal work of Ball and Brown (1968) and empirical papers on the information content of earnings' announcement. Considering that earnings' announcement convey information to the Philippine investors, particularly in the F&B sector, it is suggested that management would focus its resources on yielding positive

earnings to help increase its firm value. It appears that capital market participants devote substantial attention on the information content of companies' earnings. Hence, management should boost its efforts in improving the earnings of the corporation. On one hand, it is interesting to note that on the average, the long-term debt of Philippine F&B firms only account for 8.6% of the total assets as shown in Table 1. This shows how conservative are the firms in this sector in using debt to finance the activities of the corporation. Nonetheless, this paper finds no evidence that leverage is value-relevant nor it moderated the relationship between advertising spending and firm value. Pashayev and Farooq (2019) also cited that the advertising spending of those companies with moderate levels of borrowings in their capital structure were more valuable relative to those firms with low and high levels of debt.

6. Conclusion and Recommendations

This paper employed the random-effects panel regression in analyzing the 11 listed Philippine F&B firms. The results of the study suggested that advertising spending and financial leverage were not value-relevant. Similarly, the interaction between financial leverage and advertising spending also showed to be insignificant in relation to the firm's value. However, the earnings, which is the ratio of earnings before interest and expenses to total equity, was found to be positive and appeared to be significant at an alpha of 10%. This finding support that the empirical papers relating to the information content of earnings' announcement.

It is hoped that this paper will raise the research attention on value-relevance studies in the Philippines. Hence, it is recommended that future papers will include more Philippine-listed firms in its analysis and consider other contextual factors that may have not been captured in this study. It might also be worthwhile to take a look in to the mediating effect of brand equity on the link between advertising expense and firm value. For marketing research, it is suggested to look into the moderating effects of advertising effectivity and creativity to the value-relevance of advertising spending.



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PHILIPPINES EQUITY STRATEGY

PH EQUITY STRATEGY

Abigail Chiw, CFA, Thomas Earl Huang, Gregg Adrian Ilag, Kimberly Tanhui,
Benedict Guinto, Joaquin Francisco and Rodd Vagilidad

BEARS BATTERING PCOMP

Time to position for recovery

PCOMP remains downtrodden on lack of good news

The PCOMP has slipped 5.5% since the reimposition of ECQ in NCR Plus last March and is down 12.5% YTD (vs +3.2% for MSCI EM) and is among the worst performing stock indices this year as it struggles with: 1) the country's ongoing pandemic situation and trailing vaccine rollout program; 2) further delay in easing of mobility restrictions by the government and its dragging impact on business and consumer confidence; and 3) fears of rising inflation and its potential effect on interest rates.

GDP downgrades and inflation concerns depressing equities

Philippine 1Q21 GDP contracted 4.2% y-y, below median estimates of -3.2%. Several economists have also downgraded the country's GDP outlook for FY21F to a lower range of 4.5-6.0% (vs 5.8-6.5% previously) on expectations of a slower recovery given the reimposition of tighter lockdowns in NCR Plus (from 29 March to 14 May) to curb the surging COVID-19 cases. Meanwhile, countries abroad, such as the US, are benefitting from economic reopening gains and the knock-on effects of inflation and interest rates are expected to weigh on equities. Rising rates would also put more scrutiny on equity valuations, and so earnings growth outlook will be vital in driving stocks higher.

1Q21 showing signs of earnings recovery

1Q21 earnings results have been encouraging, however, with our covered names reporting more in-line (64%) and beat (24%) results

than misses (12%). We note that most of the beats were on account of proactive cost-saving initiatives from corporates and better-than-expected revenues from companies with exposures to markets abroad. Sector trends we have observed for the quarter are as follows: 1) lending activity remains weak, though non-performing loans (NPL) formation has stabilized with banks cutting back on provisioning costs; 2) mall traffic is still thin at 35-50% of pre-COVID-19 levels; office occupancy rates have dropped to 89% from 91% in 4Q20 per Colliers data, though reservation sales of our covered names have picked up to 89% of pre-pandemic levels; 3) foodservice operators and retailers have resumed store expansion activities and continue to invest heavily in e-commerce platforms; 4) telcos are seeing sustained uptrend in data traffic and home broadband services; 5) power and utilities have benefited from a recovery in volumes and higher spot prices; 6) commodity-driven industrials continue to post volatile performance; and 7) inexpensive conglomerates (single-digit FY21F P/E) have mostly outperformed the index YTD.

PCOMP target cut to 6,800 as ECQ reimposition stalls recovery momentum

However, the reversion to stricter quarantine measures in 2Q21 and the slow pace of vaccine rollouts are likely to stall the earnings recovery momentum for most corporates. We have cut our FY21F/22F PCOMP EPS by 22.7%/9.8% (with cuts mostly from property, tourism, and related conglomerate names) and lowered our base PCOMP target to 6,800 (from 7,500 previously), implying an 8.9% upside over the next 12 months. We now estimate PCOMP EPS to rebound 23.5%/49.9% for FY21F/22F (vs 59.8%/28.4% previously), with the return



to pre-pandemic levels delayed to FY23F (vs FY22F previously).

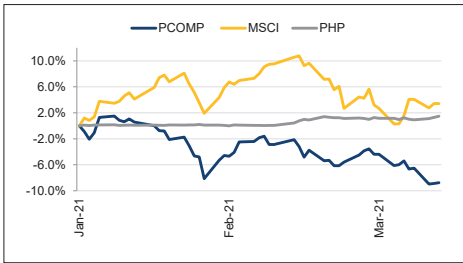
Diversified portfolio of essentials, reopening, cyclical, and deep value plays

The PCOMP is now trading at a forward P/E of 16.6x (vs 17x historical average), with several quality stocks trading at bargain valuations. With the Philippines still trailing in its vaccination program and remaining vulnerable to quarantine swings, we suggest investors hold a diversified portfolio of: 1) defensive stocks (AP, CNVRG, TEL, PGOLD, RRHI) that continue to operate well despite the pandemic; 2) reopening plays or company names with exposures to improving trade and activity in markets abroad (ICT, SCC, URC); 3) cyclical names (ALI, MEG, BPI, MBT) that will benefit from easing mobility restrictions in 2H21F; and 4) deep value conglomerates (MPI, LTG, GTCAP) that are trading below book despite their improving earnings outlook this year.

PCOMP continues downtrend on lack of good news

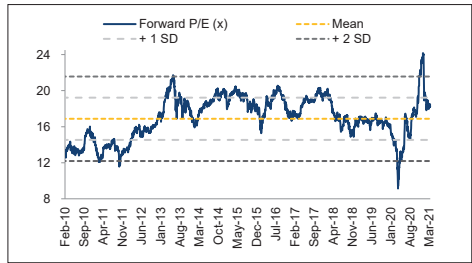
The PCOMP has slipped 5.5% since the reimposition of ECQ in NCR Plus last March and is down 12.5% YTD (vs +3.2% for MSCI EM) and is among the worst performing stock indices this year as it struggles with: 1) the country's ongoing pandemic situation and trailing vaccine rollout program; 2) further delay in easing of mobility restrictions by the government and its dragging impact on business and consumer confidence; and 3) fears of rising inflation and its potential effect on interest rates. Foreigners have been heavy net sellers for the most part and the increasing local retail participation (now comprising 43% of daily trades vs an average of 26%/18% in 2020/2019) is not enough to lift the local index. The PCOMP is now trading at a forward P/E of 16.6x, below the 17x post-Global Financial Crisis (GFC) average, with several quality stocks already at bargain valuations.

Fig. 1: PCOMP continues downtrend...



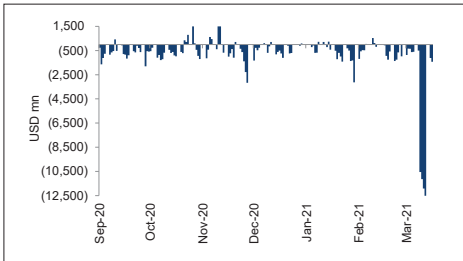
Source: Bloomberg

Fig. 2: ...and now trades below historical forward P/E average of 17x



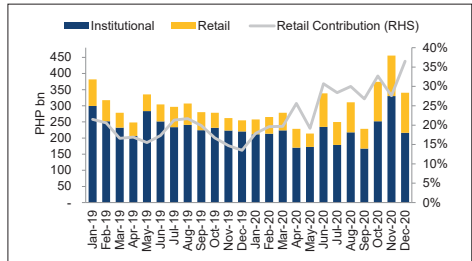
Source: Bloomberg

Fig. 3: Foreigners mostly net sellers...



Source: Bloomberg

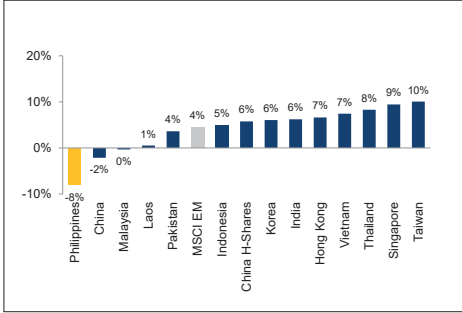
Fig. 4: ...but increasing local retails trades are supporting PCOMP of late, helping buffer market downtrends



Source: Philippine Stock Exchange (PSE)

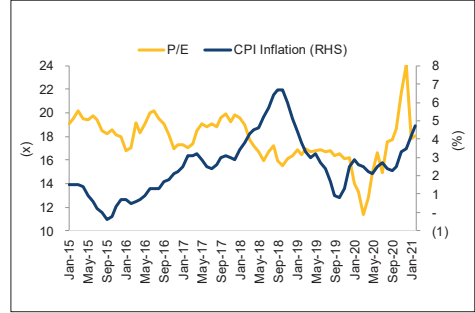


Fig. 5: PCOMP trails EM markets (YTD returns)...



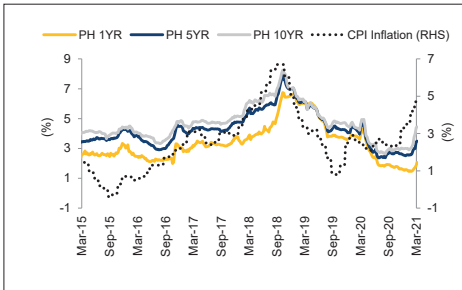
Source: Bloomberg

Fig. 6: ...with rising inflation a key risk for local equities



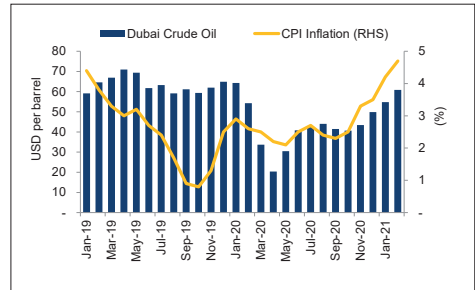
Source: Bloomberg

Fig. 7: Rising inflation expectations seen pushing up interest rates



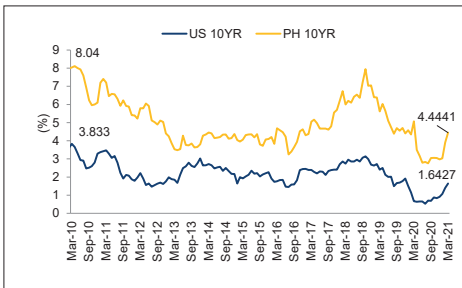
Source: Bloomberg

Fig. 8: Volatile oil prices also a concern for inflation



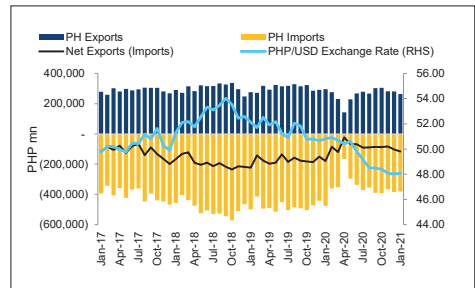
Source: Bloomberg

Fig. 9: Local rates also follow US yield trends



Source: Bloomberg; As of 19 May 2021

Fig. 10: PHP strength is not sustainable if import demand recovers



Source: Bloomberg

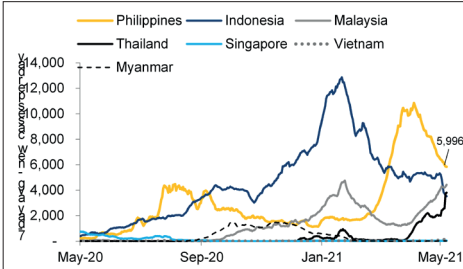


Philippine COVID-19 cases still elevated, inoculation yet to gain traction

Philippine daily COVID-19 cases have been on the downtrend after the lockdown reimposition, but is still among the highest in the ASEAN region. In the meantime, the country’s inoculation program is still lumbering at a slow pace, with only 2.1% of its total population of 100mn

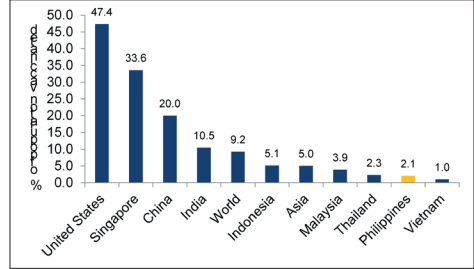
vaccinated with at least one dose (as of 15 May 2021). The government is thus a long way off in achieving its target of inoculating 70mn of its population to attain herd immunity. As such, we believe investors will closely monitor the pace of vaccine rollout and further easing of mobility restrictions, as both are crucial in lifting consumer and business sentiment.

Fig. 11: PH daily COVID-19 cases still among the highest in the region...



Source: Our World in Data; As of 18 May 2021

Fig. 12: ...and is a long way off in achieving herd immunity



Sources: Our World in Data, Reuters; Philippines data as of 15 May, Singapore data as of 17 May, all else as of 18 May 2021

Fig. 13: Vaccine deliveries still short of 140mn dose target by yearend

2Q21		3Q21		4Q21	
June		July		Oct	
Total	10.4mn	Total	13.5mn	Total	20.0mn
Sinovac	4.5mn	Sputnik V	4.0mn		
Sputnik V	2.0mn	Sinovac	3.0mn		
Pfizer	2.4mn	AstraZeneca	2.0mn		
AstraZeneca	1.3mn	Novavax	2.0mn		
Moderna	0.2mn	J&J	1.5mn		
		Moderna	1.0mn		
		Aug		Nov	
		Total	20.0mn	Total	20.0mn
		Sept		Dec	
		Total	20.0mn	Total	20.0mn
FY21 yearend target	140.5mn				
Total vaccines received (as of 16 May 2021)	7.8mn				
Doses administered (as of 16 May 2021)	3.0mn				

Sources: CNN Philippines, Inquirer, Philippine News Agency (PNA)



Fig. 14: PH GDP downgrades on slower recovery outlooks

Agency	FY21F GDP Growth Forecast (%)	
	Revised	Previous
World Bank	5.5	5.9
Fitch	5.3	5.8
ADB	4.5	6.5
Moody's	5.0	6.3
DBCC (PH Gov't)	6 to 7	6.5 to 7.5

Sources: World Bank, ADB, IMF, BusinessWorld, Philstar, Inquirer

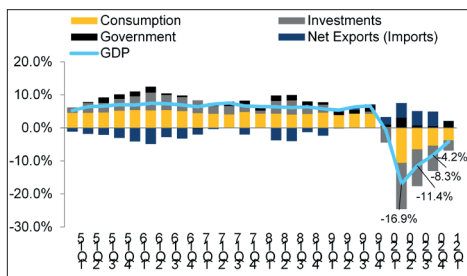
Consumption and investments still muted, gov't spending to step up

With consumer and business sentiment still weak, the persisting slump in household spending and capital formation remain a drag to GDP. Economists have thus highlighted the need for more fiscal stimulus from the government to help shore up consumption. In the meantime, the government is banking on its infrastructure push to become the main driver of economic recovery. Declining revenue collections, however, have necessitated higher borrowings, pushing government debt-to-GDP up to 60.4% in 1Q21, but still near the internationally recommended 60% threshold,

which multilateral lenders and credit-rating agencies consider as manageable debt levels. Finance Secretary Carlos Dominguez III also said that the country's debt-to-GDP ratio should remain below 60% by end of this year, as some of the additional expenditure items that widened the programmed deficit have already been financed from previously obtained loans. President Rodrigo Duterte is also mulling selling off government properties to raise funds for pandemic-related expenses if needed. In the meantime, the BSP is expected to maintain an accommodative monetary stance to support recovery, with the outlook for inflation seen reverting within its 2-4% target by yearend.

Fig. 15: PH economy remains in recession as GDP shrinks 4.2% in 1Q21...

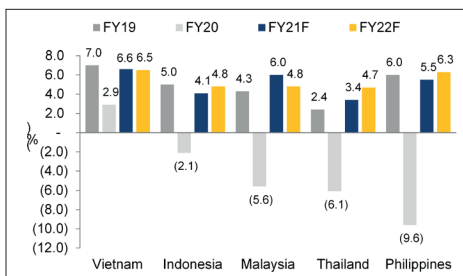
PH GDP by expenditure



Source: Philippine Statistics Authority (PSA)

Fig. 16: ...but is expected to start recovering this year as the economy gradually reopens in 2H21F

Comparative GDP outlooks

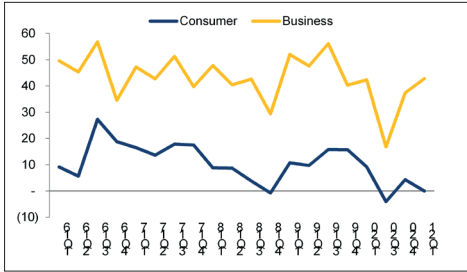


Sources: Bloomberg, World Bank



Fig. 17: Consumer confidence is still low

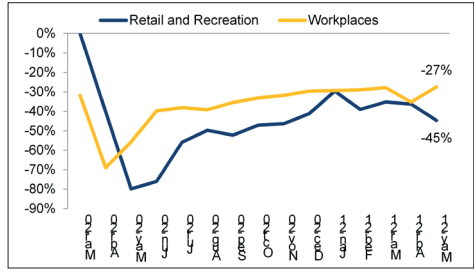
Consumer and Business Confidence Index
Outlook for next 3 months



Source: Bangko Sentral ng Pilipinas (BSP)

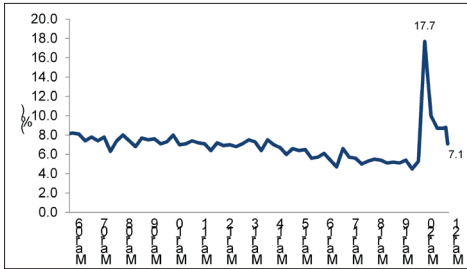
Fig. 18: Vaccine rollouts and easing quarantine measures are crucial in improving sentiment and mobility

Comparative GDP outlooks



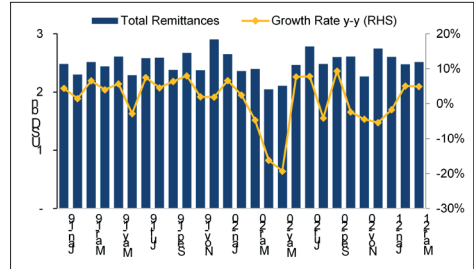
Source: Google Mobility Data

Fig. 19: Consumption still weighed by high unemployment rates as businesses cope with restrained economic activity...



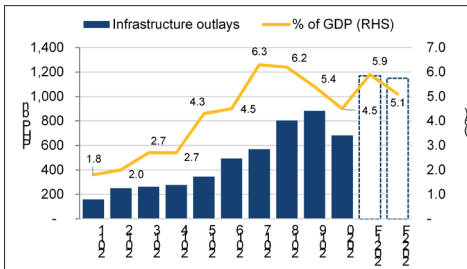
Source: PSA

Fig. 20: ... though buoyed by resilient OFW remittances



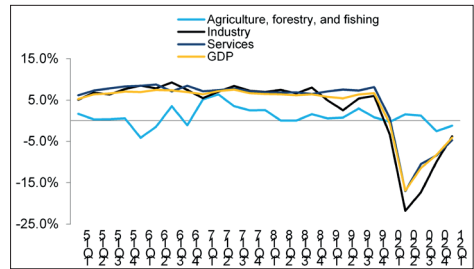
Source: PSA

Fig. 21: Government looking to ramp up infrastructure spending to stimulate recovery...



Source: Department of Budget and Management (DBM)

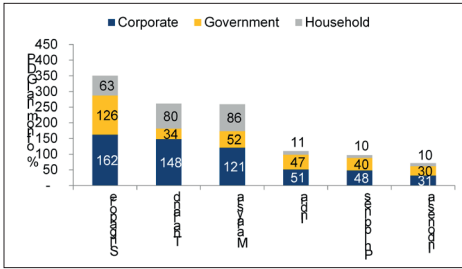
Fig. 22: ... as most sectors continue to post negative growth



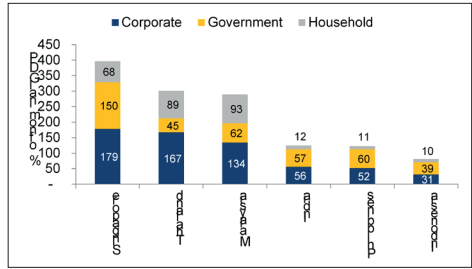
Source: PSA



Figs. 23 and 24: PH debt levels have risen, but still at manageable levels



Source: CEIC



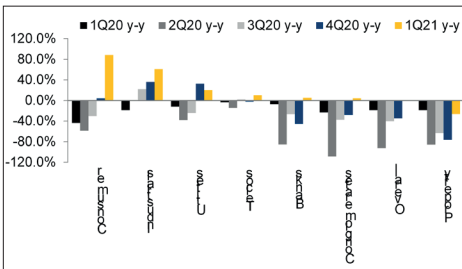
Sources: CEIC, Bureau of the Treasury PH; As of 4Q20, except PH household debt (3Q20) and PH government debt (1Q21)

PCOMP target lowered to 6,800 from 7,500

Meanwhile, the sequential improvement in earnings is sustained in 1Q21. Results have been encouraging so far, with our covered names reporting more in-line (64%) and beat (24%) results than misses (12%). We note that most of the beats were on account of proactive

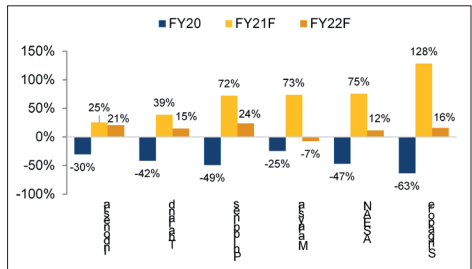
cost-saving initiatives from corporates and better-than-expected revenues from companies with exposures to markets abroad. Meanwhile, property and conglomerate names continue to underperform relative to the PCOMP, with mobility restrictions and weak economic conditions still hounding sentiment for these sectors.

Fig. 25: 1Q21 results show sequential improvement...



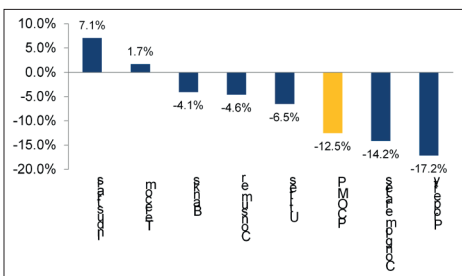
Sources: Company data, BDO Securities estimates

Fig. 26: Consensus EPS growth expectations (MSCI)



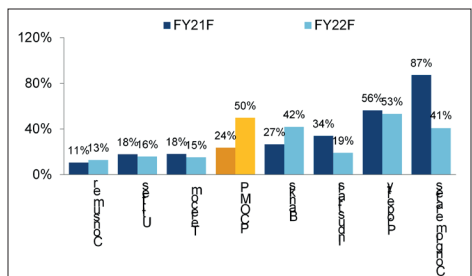
Source: Bloomberg

Fig. 27: YTD sector price performances (w/ PCOMP)



Source: Company data; Priced as of 19 May 2021

Fig. 28: FY21F/22F EPS growth per sector (w/ PCOMP)



Source: BDO Securities Estimates



We have cut our FY21F/22F PCOMP EPS by 22.7%/9.8% (with cuts mostly from property, tourism, and related conglomerate names) and lowered our base PCOMP target to 6,800 (from 7,500 previously), implying an 8.9% upside over the next 12 months. We now estimate FY21F/22F PCOMP EPS to rebound by 23.5%/49.9% (from 59.8%/28.4% previously), reflecting the delay in recovery following the reversion to stricter lockdown measures in NCR Plus during the

first half of 2Q21F and the sluggish pace of vaccine rollout in the country. However, upside risks of stronger-than-expected EPS rally could potentially propel PCOMP higher to 7,400 (bull case scenario), while downside risks of further delay in economic recovery could confine PCOMP within the current 6,200 level (bear case scenario). We also note that earnings will likely approximate pre-COVID-19 levels (FY19) only by FY23F (instead of FY22F previously).

Fig. 29: PCOMP target – Bear, base, bull scenarios

PCOMP Target Framework	Bear Case	Base Case	Bull Case
EPS estimates (PHP)			
FY20	226.29	226.29	226.29
FY21F	271.55	279.57	282.86
FY22F	393.74	419.01	438.44
EPS growth (%)			
FY20	-51.1%	-51.1%	-51.1%
FY21F	20.0%	23.5%	25.0%
FY22F	45.0%	49.9%	55.0%
Target P/E Multiple	19.0	20.0	21.0
PCOMP Target - 12 month forward	6,200	6,800	7,400
Implied upside/downside	-0.7%	8.9%	18.5%

Source: BDO Securities estimates

Diversified portfolio of essentials, reopening, cyclical, and deep value plays

With the Philippines still trailing in its vaccination program and remaining vulnerable to quarantine swings, we suggest investors hold a diversified portfolio of: 1) defensive essentials (AP, CNVRG, TEL, PGOLD, RRHI) that continue to operate well despite the pandemic; 2) reopening plays or company names with exposures to improving trade and activity in markets abroad (ICT, SCC, URC); 3) cyclical names (ALI, MEG, BPI, MBT) that will benefit from easing mobility restrictions in 2H21F; and 4) deep value conglomerates (MPI, LTG, GTCAP) that are trading below book despite their improving earnings outlook this year

- Shifting quarantine restrictions sustain strong demand for home-based connectivity. Aggressive network expansion initiatives should support growth for companies with greater exposure to fixed broadband (CNVRG, TEL), allowing them to capitalize on underserved

markets. Meanwhile, limited mobility trends may continue to weigh on the mobile segment.

- Given the continued headwinds in the Philippine economy, we prefer consumer names with: 1) exposures to improving business activity in countries abroad, such as URC and CNPF, as these can serve as a hedge against the uncertain domestic backdrop; and 2) defensive essential formats such as RRHI (71% of FY21F revenues) and PGOLD, as we believe demand will remain resilient despite quarantine swings and spending pattern shifts. We also like home improvement retailers such as WLCON, which has shown steady demand for home renovations as a result of extended work-from-home and remote learning arrangements.
- Progress in vaccine rollouts and further reopening of the economy is anticipated to facilitate recovery for quality cyclical names (companies with strong balance sheets, healthy cash flows, and improving



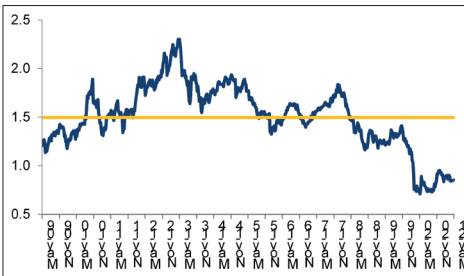
profitability), such as ALI, MEG, BPI and MBT. Cyclical stocks typically also get some benefit from an improving global outlook. Property may be used as a hedge for rising inflation, while banks are also seen as beneficiaries of a potential upward shift in the yield curve. Meanwhile, valuations are undemanding, with banks trading below book and property multiples below historical average.

- We have turned more positive on power and utilities as we upgraded SCC to Buy and resumed coverage on MWC at Buy following the signing of the revised water concession agreement. We think power-generating companies (gencos) are in a good position for an earnings rebound this year as power demand recovers. We like AP and SCC among the gencos given improving sales volumes and spot prices.
- DNL and ICT continue to be highlighted amongst Philippine industrials as both have exhibited earnings growth in 1Q21 and

healthy cash generation. Volume recovery for DNL's high-margin specialty products should continue for the rest of the year, leading to an expansion in margins. Meanwhile, ICT has delivered TEU volume growth and an expanded EBITDA margin which should bode well for long-term earnings growth.

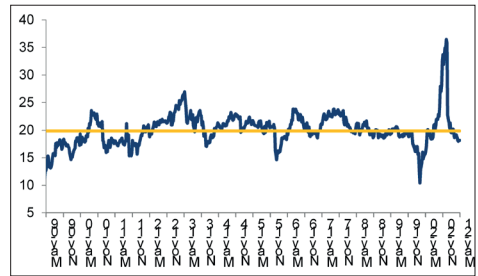
- Given the reversion to stricter lockdown restrictions, we continue to recommend conglomerates that have exhibited resilience and can ride on Philippine recovery later in the year. LTG continued delivering earnings growth in 1Q21 and we expect the relatively sticky demand for tobacco to buffer against downside risks. GTCAP's auto business has manifested sequential improvement in volumes and though we expect a challenged 2Q21F due to the lockdown, recovery should return thereafter. Meanwhile, MPI appears attractive due to the impending Philippine economic recovery, with its businesses (power, toll roads, water) critical for this to occur.

Fig. 30: PCOMP Financials P/B



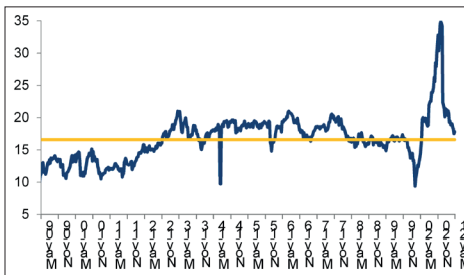
Source: Bloomberg

Fig. 31: PCOMP Property P/E



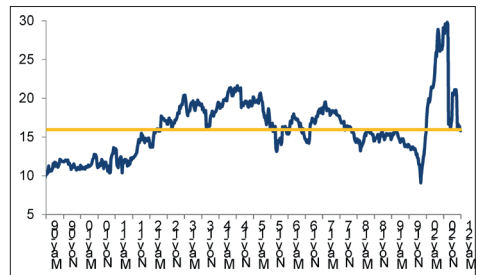
Source: Bloomberg

Fig. 32: PCOMP Holdings P/E



Source: Bloomberg

Fig. 33: PCOMP Services P/E (includes consumer, gaming, telco names)



Source: Bloomberg



Fig. 34: Summary of our sector views

Sector (Index Weight)	Relative View	Sector Outlook	Top Picks	Analysts
Conglomerates (38.5%)	Neutral	Recovery outlook and valuations are a mixed-bag for conglomerates, necessitating the need for cherry-picking. We like resiliency and recovery plays that trade at inexpensive valuations to outperform the market and highlight LTG (tobacco), GTCAP (auto), and MPI (power, toll roads, water) in this regard. All three trade at single-digit earnings multiples and NAV discounts past 20%.	LTG, GTCAP, MPI	Thomas Huang, Gregg Ilag
Property (21.2%)	Outperform	Resilient office rentals and recovering residential bookings helped alleviate the lingering weakness in mall and hotel revenues in 1Q21. Presales have been stable or improving across our coverage (~89% of pre-pandemic levels). We expect earnings recovery to gather momentum in 2H21F, led by residential on catch-up construction of ongoing projects, followed by malls on pent-up demand. While POGO exits have resulted in declines in office occupancies (89% from 91% as of end-2020 per Colliers), we believe average occupancies will eventually improve on sustained demand from BPOs, e-commerce, and logistics firms. REITs will also enable developers to recycle capital to support expansion and diversification to new emerging segments. We prefer developers with strategic land banks and integrated mixed-use business models, which are well-positioned for renewed growth as economic conditions improve.	ALI, MEG	Kimberly Tanhui, Abigail Chiuw
Banks (16.5%)	Outperform	Deterioration in asset quality appears to be manageable with big banks guiding for NPLs to peak at a range of 4-5%. We expect bank earnings to recover on: 1) easing provisioning costs as NPLs peak in 2Q21F; and 2) pick up in credit growth as consumer and business sentiment improve in 2H21F. In the meantime, banks are trading at discounted valuations with FY21F P/B of 0.9x vs 1.5x historical avg. We prefer banks with less exposure to vulnerable segments (i.e. SMEs, consumer).	BPI, MBT	Abigail Chiuw
Consumer (9.6%)	Outperform	1Q21 results have been positive for consumer names, but we expect a speedbump in 2Q21F given the reversion to stricter quarantine measures in NCR Plus. Overall, we expect average sector EPS to rebound 10.6%y-y in FY21F from -5.6% in FY20. We have factored in: 1) some contraction in margins given rising inflation, partially offset by incremental price hikes and cost reduction efforts; and 2) the resumption of expansion plans focusing on downscaled stores and underpenetrated regions and investments in complementary digital platforms. We expect vaccine rollouts and easing restrictions to lift consumer confidence and boost spending in 2H21F. For now, we highlight companies with exposure to foreign markets (URC, CNPF) that have enjoyed a faster economic recovery, as well as essential format businesses (PGOLD, RRHI) and home improvement retailers (WLCON) that have shown resilient demand despite the sporadic quarantine shifts.	PGOLD, URC, RRHI	Benedict Guinto, Rodd Vagilidad

Sector (Index Weight)	Relative View	Sector Outlook	Top Picks	Analysts
Telcos (5.1%)	Outperform	Telco service revenues to be driven by fixed broadband and supported by sequential recovery in mobile. Competitive pressures are not expected to be felt in the near term as emerging players are still in the process of building coverage. Elevated capex to continue given network expansion plans, but healthy cash flows should allow incumbents to maintain healthy dividend payouts of 60-75%.	CNVRG, TEL	Rodd Vagilidad, Abigail Chiu
Industrials (4.6%)	Neutral	Volume growth and healthy margins should translate to earnings growth this year past 30% for DNL and ICT. Healthy cash generation should not be discounted and should facilitate an upwards rerating throughout the year as this becomes more apparent.	DNL, ICT	Thomas Huang
Utility / Power (3.7%)	Outperform	We expect energy demand to hit pre-pandemic levels in 2H21F as restrictions ease. We think spot prices will likely peak in 2Q21 (hotter temperatures) before going lower in 2H21 due to higher water levels in dams and cooler temperatures. We continue to like AP, especially with its incoming new capacity from Dinginin (1.3GW), which is the only large power plant coming into the Philippine grid in FY22F-24F. We also like SCC considering higher coal production and spot prices. We think regulatory concerns are starting to ease for water distribution given the renewal of Maynilad and MWC's concession. These contracts are attractive in our view given guaranteed returns and long contract terms.	AP, SCC	Joaquin Francisco, Gregg Ilag
Tourism (0.8%)	Underperform	Recovery for Philippine tourism continues to be opaque given the reimposition of stricter mobility restrictions domestically and uneven vaccination rollout globally. Travel fears may also continue to persist even after an improved COVID-19 situation, which may put added stress on balance sheets.	-	Thomas Huang, Benedict Guinto

Source: BDO Securities research



THE GREAT INFRASTRUCTURE DEBATE

Marie Christine G. Tang

EXECUTIVE SUMMARY

Chinese leader Deng Xiaoping famously said, “It doesn’t matter whether a cat is white or black, as long as it catches mice.” It is tempting to apply this to the raging debate about whether infrastructure projects should be pursued through public-private partnerships (PPP) or official development assistance (ODA), i.e., either scheme is good as long as the projects, by themselves socially desirable and economically feasible, are built.

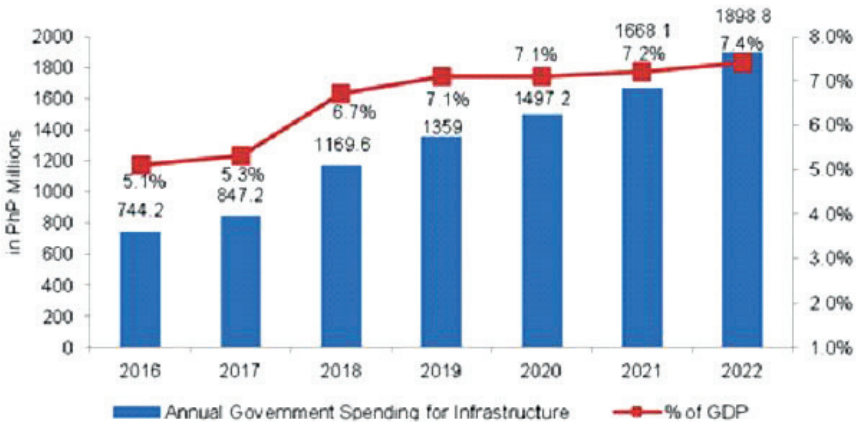
Although the question of how best to carry out infrastructure projects does matter, we think the PPP vs. ODA debate a second-order issue at this juncture. At its core, the heated discussion reflects the problem of a thin project pipeline, unhappiness with government’s sudden policy shift away from PPP, worries about Chinese ODA, and a general lack of confidence in government’s execution ability.

The great infrastructure debate

Chinese leader Deng Xiaoping famously said, “It doesn’t matter whether a cat is white or black, as long as it catches mice.” It is tempting to apply this to the raging debate about whether infrastructure projects should be pursued through public-private partnerships (PPP) or official development assistance (ODA), i.e., either scheme is good as long as the projects, by themselves socially desirable and economically feasible, are built; and some would add, operated well.

Although the question of how best to carry out infrastructure projects does matter, especially when one considers the complex risks involved in individual projects and other political economy factors, the quote nonetheless comes to mind because at this juncture the PPP vs. ODA debate is a second-order issue, in our view. In fact given government’s massive P8.4 trillion infrastructure program through the end of the

GRAPH 1. Infrastructure Program under Duterteomics



Source: Mark A. Villar presentation on “DPWH Strategic Infrastructure Programs and Policies,” Business World Economic Forum 2017, 19 May 2017.





Duterte administration, financing from both the private sector and development partners will clearly be needed. Instead, many sector experts have stressed that the relevant issue at hand is, where are the projects needing financing? Why does the situation seem like one of too much money chasing after too few goods?

This is not to say that there are no projects. There are in fact many lists of priority projects including the now familiar list of PPP projects and the more recently compiled list of build build build (BBB) projects, the centerpiece of “Dutertenomics” or the administration’s economic program. Every now and then, economic managers also present various other project groupings, e.g., NEDA Board’s big-ticket flagship projects, projects under a National Transport Policy (NTP) and projects for various donor funding (notably, China, Japan, Korea, ADB, World Bank). Presumably, these lists are culled from NEDA’s six-year Public Investment Program (PIP), which is supposed to contain all government priority investment programs and projects through 2022

A problem of prioritization?

Many analysts find these lists more confusing than enlightening particularly because the projects in the lists are in varying stages of development, many lacking basic assessments on technical, economic and financial viability. Indeed, the discussion in policy circles for many years now is that projects listed under the PIP are typically selected and included without the benefit of up-to-date sector master plans and without undergoing prioritization based on social desirability and finite fiscal resources. All the projects are in a sense “priority”, to be pursued when funding is available. Efforts to incorporate infrastructure planning in the budget process through a three-year rolling infrastructure program (TRIP) for 2018-20 have resulted in another list that has close to 5000 projects.

Looking back, the difficulty of setting priorities reflected two basic problems. One is limited fiscal resources with the public debt reaching over 95% of GDP and the tax effort dropping below 12% of GDP in 2003-04. Second is

institutional weakness in sector planning and project selection and screening, including the lack of agreed and coherent long-term master plans. This in turn was due to politicization of certain infrastructure agencies that eroded institutional memories over successive administrations. As a result, there has been some degree of ad hocery in the way infrastructure projects were pursued in the past, irrespective of whether financing came from the budget (taxes), borrowed funds (particularly ODA) or through PPP arrangements.

(a) As late as 2011, government infrastructure spending amounted to less than 2% of GDP, with budget allocations paying only for small projects. Economists dubbed infrastructure policy then as "divided by n" rule, n being the number of congressional districts that the budget needed to satisfy. As government funds dwindled, the size of affordable projects became smaller and smaller and the PIP became a sort of a "wish list."

(b) Assuming government could afford to provide counterpart financing, pursuing the large, strategically important projects depended on donor interest – Japan was and remains a crucial partner in this regard. The donor-driven approach clearly led to selection bias in favor of donor interests but there was the advantage that the projects came with technical assistance to help agencies draw up medium term sector and regional plans and identify projects in support of those plans. In fact, projects identified under these decades-old plans but have remained unbuilt continue to be identified as priority projects to date. At the same time, donor-driven projects came with financing – ODA loans that carried very concessional terms but "tied" to procurement from donor countries¹.

(c) Alternatively, where projects were commercially attractive and could attract private sector interest, PPP was used to push projects off-budget and bypass the resource constraint. To overcome institutional weakness in preparing PPP projects, government typically relied on outside consultants to do the feasibility studies, write contracts and bring the projects to market. Or, it accepted "unsolicited proposals" from private sector proponents who prepared the feasibility studies for new concept projects not included in the PIP. But the record of success

of the country's long history in actively using PPPs, dating back to the 90s in response to a debilitating power crisis, has been uneven. This is especially true of unsolicited proposals in which government assumed risks that were not adequately understood leading to fiscal issues years later associated with unmanaged and unbudgeted contingent liabilities.

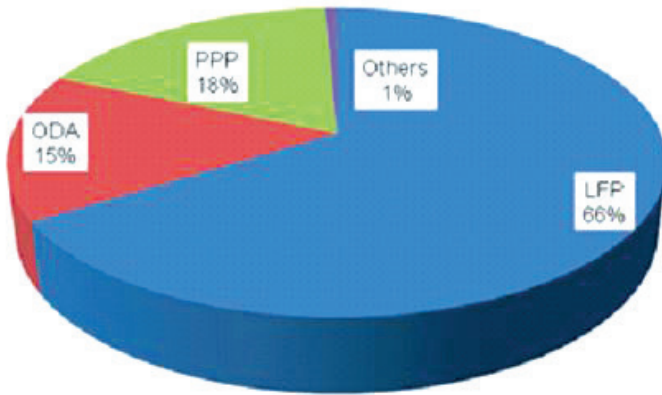
In pursuing a policy preference for PPP, the previous administration similarly tapped outside consultants, working with a revitalized PPP Center, to strengthen the institutional mechanism for reviewing and approving projects and to build up a respectable pipeline of PPP projects, in the process avoiding unsolicited proposals altogether. Through a painstaking process of learning by doing and market testing, it took around four years for the program to bloom². However, quite apart from the slowness, critics pointed out that government was pursuing PPP for its own sake, resulting in a two-track screening and approval process for PPP and non-PPP projects. Effectively, given the lack of master plans to guide project selection, the decision of how best to carry out specific projects preceded the decision of whether those specific projects made the most sense for government to pursue first, subject to budget limitations. While it is true that PPP projects free up fiscal space to the extent that sufficient risks are transferred to private partners, the two-track process nevertheless encouraged implementing agencies and congress to view PPP projects as mostly outside the budget envelope, requiring no provisions even for explicit direct liabilities assumed under the contracts (i.e., "availability payments" that are essentially borrowings from PPP proponents), much less contingent liabilities.

"And" not "or"

That government recognizes the need for both ODA and PPP is evident in economic managers' presentations showing roughly similar shares of ODA and PPP in the public infrastructure investment pie. One chart shows that out of a total of \$7.1 trillion investment projects for 2017-22, 18% will be implemented through PPP, 15% through ODA and the bulk through other local financing sources, including the budget, mostly for the numerous smaller projects.



GRAPH 1. Infrastructure Program under Duterteomics



Source: ROLANDO G. TUNGALAN PRESENTATION ON “Official Development Assistance (ODA) and Public-Private Partnership (PPP) in Financing Public Infrastructure,” MAP forum. 30 May 2017.

Too, that neither PPP nor ODA is wholly superior to the other is evident in the opposing viewpoints of experts in the field. (See Box 1) From the exchanges, one at times get the sense that PPP and ODA are seen as competing ways of delivering infrastructure even though they are in fact not substitutes. The debate seems to ignore the fact that unlike ODA financing which can be used for any and all infrastructure projects (to the extent that fiscal health allows and donor financing is available), PPPs should only be used for select projects where a careful assessment and allocation of project risks between the public and private partners result in sufficient risk transfer to the latter and overall cost savings to government (“value for money”) that frees up fiscal space for other development priorities

A good example of such a strategic donor supported project is the Philippine Japan Friendship Highway, the major artery that unites the archipelago.

² See GS Special Report “Challenging Partnerships,” 16 October 2014





BOX 1: PPP VS ODA

Issue 1: Who pays?

One source of contention is that users pay for PPP projects while taxpayers pay for ODA projects. Strictly speaking, whether users or taxpayers pay depends on the project's cost vis-a-vis its revenue profile, not on the mode of implementation. Projects that can demonstrate high revenues from market demand are able to pass a bigger share of project cost to users. In comparison, projects that hurdle the economic but not the financial viability test would need higher, if not wholly, taxpayer funding. The issue is somewhat muddled by several factors. For instance, by their very nature, PPP projects need to hurdle some minimum financial viability test to be attractive to investors; and private investors would normally look for sources of cashflows independent of government. To the extent that commercial revenues are robust, investors would not require additional government subsidies. On the other hand, if investors find these cashflows insufficient or high risk, government would still need to step in to close "viability gaps." In these cases, taxpayers pay part of the cost. One can argue that the same projects built with

ODA financing can charge user fees as well. Realistically however, due to political reasons, government may not be able to impose the same level of fees that would otherwise be allowed if the facility were privately-managed; in which case, ODA financing would mean that taxpayers shoulder a bigger share of the costs. On the other hand, there are also plenty of cases where government as regulator has failed to adjust user chargers as agreed under PPP contracts and would have to use the budget to compensate investors for any losses. In this and other cases related to realized contingent liabilities, taxpayers end up footing a bigger than expected portion of the bill.

Issue 2: Which is costlier?

In terms of investment costs, both PPP and ODA have their pros and cons, with overall costs also dependent on timely delivery. The case for PPP is the acknowledged efficiency of the private sector in managing whole-of-life project risks and costs, trading off its higher cost of capital against lower operating and maintenance costs. As well, completion risk that leads to cost overruns is seen to be smaller under PPP considering the private sector's incentive to start operating

sooner to generate cashflows early. Hence, done properly, PPP projects should deliver value for money to government in terms of total lower cost. The usual argument for ODA is its favorable financing terms, with interest charges that may be below market and long maturity periods of as much as 40 years. However, since ODA loans are typically denominated in the donor's currency, it is arguable whether the loans remain concessional after factoring in currency risks. Also, limited competition for ODA-financed projects due to the "tied" feature of these loans has been observed to inflate project costs by about 15-30%.

Issue 3: Which takes longer to prepare?

In shifting away from PPP, President Duterte's economic managers repeatedly cited the lengthy preparation time for PPP projects of nearly 30 months. However, PPP defenders claim that at their fastest from project development to groundbreaking, ODAs take even longer, between 35 to 40 months depending on the donor agency.¹ Considering that all infrastructure projects are unique, project preparation time is likely influenced more by the projects' complexity and less by the mode of financing. Likewise, experience shows that both PPP and ODA projects are equally vulnerable to right of way acquisition delays.

Issue 4: Does ODA financing threaten fiscal sustainability?

Reacting to the shift away from PPP, the president of a local conglomerate active in the infrastructure space warned of the impact on fiscal sustainability of using ODA borrowings for infrastructure. This follows from government accounting where projects financed by ODA are added to the public debt at full cost from day 1 while PPP projects are largely treated off-budget (excepting any necessary upfront subsidy), with no budget provisions for contracted future payables (i.e., availability payments) nor contingent liabilities. But while public debt would indeed be higher if infrastructure were ODA-financed rather than PPP-financed, the assessment of fiscal risk goes beyond the headline number, with sovereign credit analysts digging into the terms and conditions of public debts as well as the risks from all types of contingent liabilities and their



expected costs. The exercise would allow them to value the concessional nature of ODA loans and apply some risk premium to unrecognized risks from PPP projects. In the end, what is important for fiscal sustainability is that projects are properly vetted for social and economic soundness and implemented well. Economically productive projects will pay for themselves over time.

Issue 5: Hybrid, best of both worlds?

Economic managers have touted the benefits of pursuing a hybrid structure to capture the best of both PPP and ODA (and/or government budget). Thus, to do away with lengthy PPP structuring and negotiations, government would build the facilities on its own, financing with own funds or ODA which reduces financing charges, then auction off the facilities to the private sector to benefit from the latter's efficiencies in operations and maintenance. According to skeptics, aside from the equally lengthy if not lengthier ODA processes, what the hybrid structure fails to consider are (a) the efficiencies gained from a proper allocation of risks over project life to the party best able to manage them that minimizes projects' whole-of-life costs, (b) the incentive to perform on the part of the private proponent who has skin in the game and (c) the avoidance of inter-operability





issues where operators are held accountable for facilities they did not design nor build.²

So why the heated debates? We think the noise is mainly a symptom of the problem of a thin project pipeline that we have noted in past reports. Despite the long project lists, only a few are at a stage where financiers can come in and do their due diligence. Hence, when the President's economic managers started to talk about shifting away from PPP and then started deleting projects from the PPP list, private players who had in the last six years invested time and resources in studying these projects felt shortchanged, especially since some of the projects were in relatively advanced stages of the PPP process.³ Moreover after inviting investors to submit unsolicited PPP projects, it is unclear how government, which lacks the necessary technical capability, will actually evaluate the proposals that have been piling up in the dozens.

In addition to ranking investors, not a few outside observers have been troubled as well by the sudden policy shift which they saw was a consequence of the Duterte administration's foreign policy pivot to China and its preference for

Chinese financing that do not carry extraneous conditionalities, e.g., on human rights. These voices, reminding policy makers of the country's sad experience with costly China-financed infrastructure projects⁴ that had to be abandoned due to allegations of corruption, added to those arguing against using ODA.

MOVING FORWARD

While the lack of policy continuity would add to assessments of political risk under this administration, one can in fact see the merits of de-emphasizing PPP as the principal driver of the country's infrastructure aspirations. After all as already noted, not many projects lend themselves to a PPP structure; and as government pursues more and more higher risk greenfield projects, a PPP arrangement may not necessarily bring value for money for government, particularly if it is forced to absorb a big share of the demand risk in order to make projects bankable.

Likewise, the desire of government planners to put the planning and budgeting phase of prioritizing projects before the financing decision is but proper. Some of the steps taken to

overcome infrastructure agencies' institutional weakness in project preparation, supervision and quality control are also encouraging. For example, government has asked the Asian Development Bank for a \$100-million Infrastructure Preparation and Innovation Facility to help in preparing feasibility studies, project design and procurement⁵. The NEDA Investment Coordination Committee (ICC) has also drawn up guidelines exclusively for China-assisted projects⁶ ensuring that the ICC, chaired by the finance secretary and co-chaired by the planning secretary, will be the single clearing house for China-supported investment proposals. Also, from what we have seen of the proposed hybrid structure for the Clark airport project, there appears to be a lot of safeguards to ensure design and construction quality⁷ as well as to minimize interface risks by bidding out the O&M contract early so that the operator will be involved even in the early phases of the project.

So far so good? Many would like to give this administration the benefit of the doubt and see what it can do in the next 6-12 months. But then,

there is one nagging question that has been raised time and again in infrastructure forums, to which economic managers have time and again failed to give a satisfactory answer – does government have the capability to implement the projects? And inquirers only need to mention the Department of Transportation to be understood.⁸ The problem of course becomes more acute the more non-PPP projects are pursued since government will not be able to leverage its limited technically-skilled manpower by offloading project supervision and management to the private sector. This may just be the Achilles heel of Duterteonomics and argues for continuing to pursue PPP in parallel with ODA, particularly for projects that have clear commercial value that the private sector would find attractive. This would not necessarily be inconsistent with the administration's China pivot as many private companies in the power and telecommunications sector are already actively sourcing inputs from cost-efficient Chinese firms.⁹

Looking at the Duterte administration's achievements on the infrastructure front this



past year, it is hard to be optimistic that it can in fact attain its ambitious targets that would bring average 2017-22 infrastructure spending close to 7% of GDP from only around 3% in the last six years. Nevertheless, we think that if it could

only sustain quality infrastructure spending at 5% of GDP annually over the next five years, it would still be a major gain for the economy, both in laying the foundation for future growth and in contributing to achieving its 7-8% growth target.

The article, first published for Global Source Partners subscribers in July 14, 2017, was written under the guidance of Romeo Bernardo, the Lead Philippine Advisor of GlobalSource Partners, and reflects the former Finance Usec's decades-long experience in public infrastructure policy making, project selection and financing as well as involvement in private sector project development and structuring.

¹ Vaughn F. Montes presentation on "The merits of ODA and PPP for Infrastructure Financing and Development," MAP forum. 30 May 2017

² Ibid

³ Projects that will no longer be pursued through PPP include the regional airport project (consisting of a package of 5 airports that was ready for bidding but was unbundled under the new administration), the rehabilitation of the Ninoy Aquino International Airport and the Kaliwa Dam (new water source for Metro Manila that will seek Chinese ODA financing). Likewise, the Clark airport project, proposed as an unsolicited PPP, will be pursued using a hybrid structure (government build and the private sector handles O&M).

⁴ For example, government incurred a loss of over \$200 million on a Chinese ODA-financed train project that was supposed to connect Manila to Clark Airport. The project, terminated in 2012 was badly contracted, driven by rent seeking brokers. It was mired in disputes, and in the end abandoned and completely written off. The ZTE telecom project was a government-to-government national broadband project signed in China in 2007 that was early on exposed to be exorbitantly overpriced and thus cancelled. Critics further point to the poor record of China ODA in other countries with weak local institutions, especially in Africa but also various Asian countries. (See: <http://globalnation.inquirer.net/158772/indian-think-tank-manila-beware-beijing-funded-projects>)

⁵ The loan comes with a \$5 million technical assistance grant to build the project development and implementation capacity of implementing agencies.

⁶ http://www.neda.gov.ph/wp-content/uploads/2016/11/Guidelines-for-Project-proposals-for-ICC-review-and-approval_availment-of-Chinese-support.pdf

⁷ E.g., turnkey project with EPC, transactions adviser, independent engineering firm oversight

⁸ As one pundit put it, "it is hard to imagine how the Department of Transportation can do even half of its ambitious project list if one year into its term, the agency still has not delivered the drivers' licenses and car plates, nor added passenger cars to the MRT along EDSA, a campaign issue against the last administration."

⁹ A key ingredient of successful partnerships with Chinese firms is the presence of third-party technical experts in the particular fields, acting as the agents of concerned Philippine companies, to supervise the work and ensure that the Chinese perform on time and deliver quality outputs. Under a PPP structure, the private sector partner effectively takes on this supervision role on behalf of government and ensures that the involvement of qualified Chinese firms is achieved competitively



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