A Simplified Vector Autoregressive Model Application on The Philippine Economic Performance During the Period 1965-2010

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Abstract*: Let this study be known to many that the economic performance of the Marcos administration during the period 1965-1986, was significantly much better than that of the post-Marcos administration. It used a co-integration analysis and a comparison between the Marcos administration and other administrations' economic performance. The time series variables are comprised of the Philippine GDP (ppp) or GDP, GDP yearly growth or GR, level of inflation or INF, capital formation as a percentage of GDP or CAP, and industry's share in the economy or IND. It clearly summarized a much better economic performance under the Marcos administration, which many had regarded as a culprit. In the first research question, at an optimal lag of one (1), the ADF test shows that all unit root variables are stationary at first differences on the 5% level of significance, which therefore characterizes the time series data under Marcos administration as integrated at the first difference or I (1). So, all economic indicators seemed to be good predictors. The hypothesized equilibrium model for regressing the GDP (ppp) resulted as: *GDP (1.000)=GR(2634.1)+INF(23137.7)+CAP(1241.1)+IND(-5884.4),* shows degree of stability. The Granger-causality test statistics were applied to answer research question two on causality. It pointed to the need of continued industrialization in the country as CAP and IND Granger-caused Philippine GDP (ppp). While research question three simply compared the Marcos and other administrations' economic performance, which mostly indicated better economic indicators. The study concluded that the Marcos administration's economic performance were relatively better than those subsequent administrations. Let us ask the Lord for an intellectual maturity to comprehend what President Ferdinand E. Marcos had done for the Philippines. God bless all of us.

***Keywords*: Capital formation or CAP, GDP (in ppp or purchasing power parity) and its growth (GR), industry weight in the Philippine economy or IND, inflation rate or INF, order of integration or I (d), and major industrial projects or MIPs..**

I. BACKGROUND OF THE STUDY

The background of the study observed the historical setting in the form of time series of the Philippine economy during the period 1965-2010, comparing the administration of President Ferdinand E. Marcos (Marcos) with those of the other administrations, in response of the negative comments many have generally made on him. The other administrations refer to those of President Corazon C. Aquino (1986-1992), President Fidel V. Ramos (1992-1998), President Joseph E. Estrada (1998-2001), and President Gloria Macapagal (2001-2010). The determinants of the country's gross output or the GDP (ppp), GDP growth rate or GR, inflation level within the country or INF, capital formation as a percentage of GDP or CAP, and the industry's share within the economy or IND, using the simple econometrics analysis, had clearly interpreted the co-integration of the performance. It dealt with their non-stationarity, co-integration and Granger-causality relationship.

Economics Under and After the Martial Law

After winning the presidential election and becoming the tenth President of the Republic of the Philippine, President Ferdinand E. Marcos' administration was known with the eleven MIPs, increased industrialization and infrastructures nationwide; i.e. North Luzon Expressway, the Maharlika Highway, and so on. Other edifice complexes were the Lung Center of the Philippines (1981), the National Kidney and Transplant Institute (1981), the Manila International Airport (1981), the Coconut Palace (1978), the National Arts Center in Laguna (1976), the Philippine Heart Center (1975), the Philippine International Convention Center (1974), the San Juanico Bridge (1969), and the Cultural Center of the Philippines (1966).

Economic Performance During the Martial Law Enforcement (1971-1982). Due to rising tension and chaos, called "anarchy" – by virtue of the approval of the Philippine congress, President Ferdinand E. Marcos proclaimed a martial law with the issuance of Proclamation No. 1081 dated September 23, 1072 (Samonte, S., 2020). A snapshot of the economic performance under the Marcos administration revealed that even under this difficult time of martial law, the country had economically experienced an unbelievable economic growth with its GDP (ppp) growth of 20.8% p.a. (1971-1976) and 16.8% p.a. (1977-1982). It was transparently obvious that this performance was triggered by the increase of the country's GDP (ppp) from an average USD 92 billion before the martial law to an average USD 251 billion or USD 574 billion as of 1986. Refer to Table 7.

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Economic Performance After the Martial Law (1982-1986). After the massive build-and-build industrialized projects of the Marcos administration, President Ferdinand E. Marcos was blamed for the rising external debts of the Philippines. With the 44.2% weighted-average industry contribution of the country, which seemed to have been developed from external debts, it was able to generate USD 575 billion GDP(ppp) in the period 1983-1986. The sad thing about people ridiculing the country's increasing debt under the Marcos administration is their ignorance that the level of debt as a ratio to GDP (ppp) is actually half (50.7%) of that of the four Philippine Presidents' administration at the ratio of 108.5%. For the same period of time or around 20+years the Marcos administration had generated as much as 17.5% p.a. economic growth, or more, compared to that of 11.4% p.a. of the other four Presidents' administration. Refer to Table 7.

Marcos Eleven Major Industrial Projects (MIPs). The Marcos administration planned a total investment of USD 4,748 million for the eleven MIPs, before an unfortunate political upheaval occurred in the middle of 1980s. Corazon C. Aquino, the wife of the former senator, Mr. Benigno Aquino, Jr., who was indicted as the pioneer of the formation of a forbidden party in the Philippines, had been put into power as the eleventh President of the Philippines on February 25, 1986. Putzel, J. (1988) presented the challenges during her administration, which he summarized as the deteriorating inequality in the distribution of wealth and poverty of the people, which he defined as unfortunate political upheaval. President Ferdinand E. Marcos and his family, were so-to-speak exiled by the US invisible hands to Hawaii for security purposes.

Some research observation reflects the importance of developing the industry of producing raw materials domestically. The eleven MIPs were supposed to reinforce the effort of the country to lessen import-based foreign exchange out-drains. Roemer, M. (1979) did a survey on the resource-based industry with a special emphasis on raw materials production in developing countries. The message seems to fit well with the Philippine need for industrialization. According to Drucker, P. (1981) the success of Japan is also developing the backward industry first. It developed the two raw materials that were in shortest supply, petroleum and iron ore, in order to develop its basic steel-based industry; i.e. equipment, automobile, ships, and the related. This industrialization strategy was also implemented by South Korea when it developed its basic-steel and electronic industries early 1960s. Indonesia is yet another success story when it developed its basic-steel and basic chemical industries that it was able to save a huge foreign exchange expenditure in the mid-1980s. Tijaja, J. & Faisal, M. (2014) reported that Indonesia was hit relatively harder than the other South East Asian nations in the 1997 financial crisis, because of its relatively successful industrialization and well-performing economy. Indonesia is currently the largest industrialized economy in the Asean region with an IMF-estimated GDP (ppp) of USD 3.5 trillion as of 2021. The Marcos administration's eleven MIPs approximately seemed to resemble that of the South Korea and Indonesia's major industrial projects. With the IMF-estimated GDP (ppp) of USD 1.0 trillion as of 2020, the Philippines could have been on a similar foothold with the above-mentioned two countries, should President Corazon C. Aquino and other administrations have implemented the Marcos administration's eleven MIPs. It was indeed an unfortunate total waste. Refer to Table 1 for the eleven MIPs.

Table 1. Eleven Major Industrial Projects (MIPs)

No.	INDUSTRIAL PROJECT	Investment (USD-Mio)**	During	Area	INVESTORS
	Post-feasibility study				
1	Copper smelter	344	1980-83	Leyte	PASAR*
					Marubeni, Japan
2	Phosphate fertilizer	513	1981-84	Leyte	Badger-Mitsui
					Simchem-Toyo
					Marubeni Corp.
					Foster-Tecni-Lurgi
					Copee-Drago-Itoh
3	Aluminum smelter***	650	1984	Mindanao	NDC*
					Reynolds Metal
4	Diesel engine	9	1980-83	Luzon	Isuzu, Japan
					Machinen-Nurn.
5	Integrated pulp & paper***	250	1984	Luzon	Asean investors
6	Petrochemical complex***	1,000	1983	Bataan	USI, US
					Far East Taiwan
					PNOC*
	Feasibility in process				
7	Expanded cement industry	37	1981-83	TBD	PCIA*
8	Coconut-chemical industry	116	1982-84	TBD	UCPB*
					Henkel, Germany
9	Heavy engineering industry	23	1982	TBD	German firms
10	Integrated steel projects	1,806	TBD	TBD	NDC
					Austroplan group
11	Alcogas projects	TBD		Major cities	PAC*
	TOTAL INVESTMENT	4,748			

Source: Gathered from the World Bank and Philippine BOI offices (contained in the national budget).

*PASAR (Philippine Associated Smelting & Refining Corporations), NDC (National Development Corporation), PNOC (Philippine National Oil Corporation), PCIA (Philippine Cement Industry Association), UCPB (United Coconut Planters Bank), PAC (Philippine Alcohol Commission). **Post-feasibility study and in process total investment = USD 4,748 million. ***Three projects were deferred, involving some USD 1,900 million.

The study attempted to gather more reliable data on the status of the eleven MIPs in the critical moment before President Ferdinand E. Marcos and his family were transported to Hawaii before 1986. Unfortunately, no definite and good answer was obtained from the research.

Research Problem, Questions And Hypotheses

Due to political reasons, President Ferdinand Marcos, with the martial law, officially enforced on September 21, 1972, and ended on January 17, 1981, by virtue of Proclamation No. 2045, was politized as the country's dictator. Overholt, W.H. (1986) branded him as an authoritarian who was not concerned with an orderly succession and even didn't have any vice president in his government. In light of this branded-authoritarianism, the study sought to answer the main problem, which focused on "*whether his administration was really causing a detrimental effect to the country's economy*." Based on this problem, the study was aimed at answering the following research questions and testing the related null hypotheses at a 0.05 level of significance.

First, did the economic non-stationary time series variables of the Philippine output generation, in terms of its GDP (ppp) terms, during the period 1965 – 1986, integrate at a certain order? The null hypothesis (H0) is expressed as "*the economic non-stationary time series of Philippine GDP (ppp) during President Ferdinand Marcos administration did not integrate at a certain order*." So, the unit roots, co-integration and Granger-causalities of the time series variables do not seem to be present.

Second, did the selected Philippine economic indicators during the Marcos administration Granger-cause the GDP (ppp)? The null hypothesis (H0) is expressed as "*the selected Philippine economic indicators during the Marcos administration didn't Granger-cause the GDP (ppp)*."

Third, how was the performance of the Marcos administration compared with that of the other administrations in terms of the Philippine leading, coincident, and lagging economic indicators?

Underlying Theories & Conceptual Framework Of The Study

The study focuses on the economic comparison of the Marcos and post-Marcos administrations. The underlying theories and conceptual framework present the variables of the time series comprising of the comparative economics between the Marcos and other Philippine Presidents' administrations. Refer to Figure 1.

Underlying Theories

Theories underlying the potential economic indicators explain how the concepts work and relate to the conceptual framework of the study. The related theories underlying the full co-integration of the Philippine economic development are rested with the Keynesian as well as neo-Keynesian, which are linked with the Solow development theory. Schwalbenberg, H.M. & Hatcher, TM. (1991) emphasized that the economic development of the Philippines as an emerging market economy is dependent on industrialization. They even mention the importance of liberal economy, which the Philippines is not yet ready to adopt in its system. Manna, J.V.N.C. (2020) reinforced the latter's point on industrialization by arguing that industrialization, capital interventionism and national project are inter-related. National projects financed by the governments are the spearheads of industrialization. With regard to economic development theorized by the Solow Development Model, which capitalizes on savings and capital to economically grow, Prescott, E.C. (1988) further argues that monetary capital is translated into industrialization and technology.

First, on the generation of a country's output and its process, Timlin, M.F. (1943) vividly reflects the work of John M. Keynes pertaining to the macroeconomic theory, which logically argues that total spending coming from the monetary, fiscal and debt financing, will ultimately effect on a country's output (GDP) and the related factors of production, i.e. capital formation, raw materials procurement, employment and inflation. The important advocate is the stimulation of demand and pull of any economy out of depression. Rosenstein, P.N. and Rodan (1943) enforces Timlin's proposition about the process of Keynesianism by presenting the important function of industrialization. This is where the Marcos administration should be given the due credit for developing the eleven MIPs.

Second, still in the development of proper industrialization, Raines, P. and Leathers, C.G. (1979) illustrated how the Japanese implementation of good deregulation from the old borrowed industrial technology strategy to the global market economic system, successfully worked.

Third, the players of the industrialization process, particularly the workers and consumers, are generally affected in terms of their income. Personal income in any country might greatly gap or perfectly equalize e from one earner to the others as theorized by Max O. Lorenz (Derobert, L. and Thieriot, L., 2003). It is part of what the economic criteria shall compose of, e.g. employment or labor participation rate, income inequality, and poverty rate.

Refer to Table 2.

Conceptual Framework

Based on the theories presented above, the conceptual framework of the study presents how the category of the

economic performance is determined. Based on the earlier-mentioned NBER's classification, Samuelson, P.A. et. al. (1995) categorized the changes as being triggered by the monetary (money and credits), investment multiplier, political motives, productivity, and equilibrium (prices and wages) models. The triangulation of the conceptual framework and categories is presented on Table 2.

Table 2: Triangulation of the Conceptual Framework and Categories of Economic Performance

L E A D I N G		COINCIDENT		L A G G I N G	
Code	Indicators	Code	Indicators	Code	Indicators
B	Fiscal budget	GDP	National output (ppp)	DEP	Banking deposits
D	National debt	EMP	Labor participation	CAP	Capital formation
T	Net trade balance	Inc	Income inequality GINI	INF	Inflation level
C	National consumption	IND	Industry weight	Pov	Poverty level (GINI)

Source: U.S. National Bureau of Economic Research (NBER)

With the simple econometric techniques, the study had used the co-integration of the time series, and the Granger-causality to test the two-way vectors of the Philippine economic indicators. It is only when the time series are proven to be at a certain integrated order that further comparative economic analysis can be made.

II. RESEARCH METHODOLOGY

As mentioned earlier, the study adopted a simple econometric method of research in order to compare the economic performance during President Ferdinand Marcos' administration (1965-1986) and the other administrations under the four Philippine Presidents (1986-2010). It presents the description of the economic panel data, and methods of research analysis by research question.

Economic Panel Data

The panel data are the economic indicators provided by Table 2. The Marcos administration governed from the year 1965 to 1986, while the other administrations under the four Philippine Presidents from 1986 to 2010.

Ferdinand E. Marcos (1965-86)

4 Presidents (1986-2010)

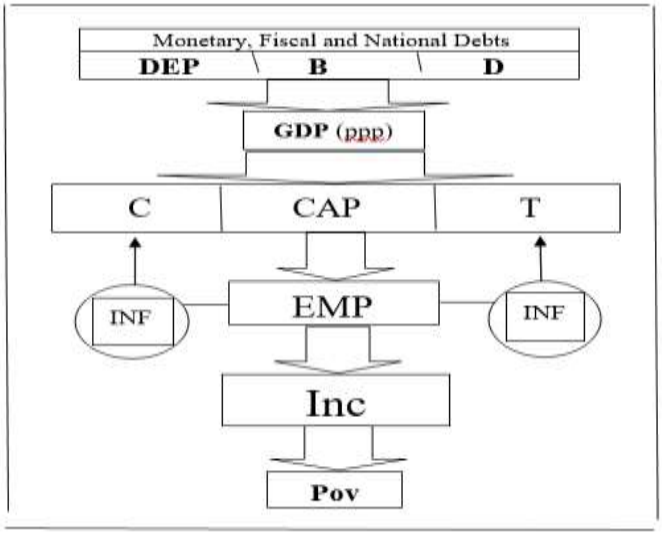

Figure 1. Conceptual Framework of the Marcos-Other Administrations' Comparative Economics

Legend: DEP (banking deposits-lag***). B (budgetary plans-lead*). D (national/external debt-lead*). GDP (GDP in ppp-coin**). C (consumption-lead*). CAP (capital formation/investment-lag***). T (net trade balance-lead*). INF (inflation levels***). EMP (employment-coin**).

Inc (income inequality-coin**). Pov (poverty-lag***)

*Lead (lead) indicators. **Coincident (coin) indicators. ***Lagging (lag) indicators.

They were gathered from the Philippine National Economic Development Authority (NEDA) and Bangko Sentral ng Pilipinas (BSP), in addition to the Knoema and Index Mundhi statistical panel data. In spite of the twenty-one-year panel data under the Marcos administration (1965-1986), Stock, J.H. and Watson, M.W. (2017) had clearly concluded that these number of years adequately improved the cohesiveness of the time series co-integration. Elsayir, H.A. (2018) and Demir, A. et. al. (2015) reaffirmed that the most important step is to construct the data model of the series, and then the future equilibrium values from the hypothesized co-integration could come to prove economic stability. Gujarati, D. and Porter, D. (2009) proposed that the co-integration analysis must be accompanied with the Granger-causality analysis to further see the two-way vector relationship of the indicators.

III. RESEARCH METHOD AND DATA ANALYSIS

First Research Question. The *first research question* was answered using the co-integration of the time series of the Philippine GDP (ppp) generation. It sought to ensure that there were no unit roots and variances in the series. Using the

e-view software the co-integration test generally sought to arrive at a good order of integration, which confirmed that a single set of differences could be at a stationarity level. Hence, this co-integration technique ultimately determined the stability by means of the hypothesized co-integration, which applied the unrestricted vector autoregression (VAR) method. The following is the brief equation of the hypothesized co-integration model:

$\ln y_t = \alpha + b1x1 + b2x2 + b3x3 + b4x4 + error$

where,

α = Intercept

$\ln y_t$ = Natural logarithm of the Philippine annual GDP (ppp)

b1x1 = Beta of the GDP growth (%) or GR

b2x2 = Beta of the inflation level (%) or INF

b3x3 = Beta of the capital formation as a % of GDP (ppp) or CAP

b4x4 = Beta of the industry contribution of the Philippine economy (%) as IND

Error = Uncertainty in the model.

The model assumes that the variables are stationary (mean, variance and covariance are time invariant) or order of integration I (d), where d is the differencing component to make it so to avoid generating spurious regression of the time series. The Augmented Dickey-Fuller (ADF) procedure is then used to find the trace and maximum eigenvalue statistics at the level significance of 0.05. The two-way vector causality is also used by employing the Granger-causality method.

Second Research Question. The *second research question* used the Granger-causality technique to test the two-way vector causality of the Philippine economic indicators' time series. Like the co-integration it was also capitalized on the stationarity of the series. It examined the bivariate relationship between all economic variables as those shown in Figure 1 and the Philippine GDP (ppp) during the Marcos administration.

Third Research Question. The *third research question* simply used averages, and compounded growth rates to compare the economic performance between the Marcos administration and the other administrations. The classification of the economic indicators used to compare the performance of the Marcos administration (1965-1986) versus the other administrations (1987-2010), adopts the one formulated by the US National Bureau of Economic Research or NBER, which are comprised of the leading (changes before the economics'), coincident (changes simultaneously with the economics'), and lagging (changes after the economics') indicators as presented by Klein, P.A. and Moore, G.H. (1982).

IV. RESULTS AND DISCUSSION

The co-integration analysis sought to prove how cohesively co-integrated the time series of the Philippine GDP (ppp) and its related functional indicators, were. It particularly proved how the long-term equilibrium of the hypothesized cointegrating equation model developed the stability of the Philippine GDP (ppp). It dealt with unit roots, optimal lag selection, Johansen co-integration and Granger-causality relationship.

RESEARCH QUESTION 1 – COINTEGRATION ANALYSIS

The Augmented Dickey-Fuller or ADF test examined the stationarity of the GDP (ppp) and all its functional indicators. The unit root test indicated that all indicators must reject the H0 that there was a unit root in the time series indicators at a 0.05 level of significance. The series of unit root proved that there was a strong co-integration in the Philippine economic indicators with an integrated of order 1 or I (1).

Trends of Philippine GDP (In Billion ppp) and Its Functions.

The mean (**x̄**), maximum, minimum and standard deviation (s) statistics, are supposed to indicate the descriptive size of the variables. While the Jarque-Bera test, computes the coefficient using the formula: $JB = n[(\sqrt{b1})^2/6 + (b2-3)^2/24]$, where: n = sample size, $\sqrt{b1}$ = sample skewness coefficient, b2 = the kurtosis coefficient. First, the descriptive statistics of the Philipine GDP (ppp) and its functions present a statistic of trends of the two indicators only, the GR (p = 0.008) and INF (p = 0.033). Second, the no-trend of the GDP, CAP and IND seemed to reflect an erratically irregular pattern, in spite of showing a normal distribution pattern. The Ho (that "*the time series data are normally distributed*") for GR and INF with the above probabilities, must be rejected at p = 0.05. They were not normally distributed. Third, the JB of all indicators were larger than 0.05. They didn't seem to follow the normality pattern. From this point on, any inferential testing must use the non-parametric statistics. Refer to Table 3.

Table 3. Descriptive Statistics of the Philippine GDP (ppp) and Its Functions

VARIABLE	x̄	Max	Min	s	Jarque-Bera	(JB) p (0.05)	Formation
GDP	0.207	674.6	25.1	205.7	4.702*	0.095	No trend
GR	0.168	0.421	0.065	0.091	9.650*	0.008	Trend
INF	0.999	0.304	0.024	0.086	6.836*	0.033	Trend
CAP	0.278	0.363	0.165	0.055	0.821*	0.663	No trend
IND	0.398	0.467	0.344	0.038	1.256*	0.533	No trend

*A JB statistic of > 0.05 indicates that the distribution is not normal leading to a non-parametric forecast.

Co-integration of Marcos Administration's Economic Performance

The co-integration sought to test the intactness of how GDP (ppp) was generated with the intensity of capital formation and industrialization in the economy. It specifically tested the stationarity of the economic variables during the Marcos administration to achieve the stability and good order of integration or I (d). The rejection of all H0s proved that there were no unit roots (p = < 0.05). The optimal lag selection and Johansen cointegration were evaluated.

Table 4. Unit Root Test of the Philippine GDP (ppp) and Its Functions

INDICATORS	Lag*	difference	ADF	critical	p**	
GDP (ppp)	GDP	2 over 3	2nd	-5.575	-3.040	0.002
GDP growth	GR	0 over 3	Level	-3.677	-3.012	0.013
Inflation level	INF	2 over 3	2nd	-5.372	-3.040	0.000
Capital formation/GDP	CAP	1 over 3	1st	-3.136	-3.030	0.041
Industry share	IND	1 over 3	1st	-4.271	-3.021	0.004

*****Based on Akaike Information Criterion (AIC)

******At levels with a significance of 0.05, McKinnon one-sided p value, and belong to I (1).

Optimal Lag Selection. *A lag is a fixed amount of passing time among the time series data*. The appropriate lag selection used the Akaike information criterion (AIC) from the four criteria presented here, which apparently determined an optimal lag of 1. It is generally an estimate of the lag length for the vector auto regression or VAR models at first difference. The information criterion for the lag optimality is presented as -12.202, -10.709, -11.878, and 148.768, for AIC, Schwarz, Hannan and LR, respectively. The co-integration pattern of all variables of the Philippine GDP (ppp) and its functions under study has presented a convincing fact that there are less unit roots at the integrated order of level or I (0) to (2). Refer to Table 4.

Johansen's Cointegration. Co-integration of the GDP (ppp) and all its functions would include the Johansen co-integration test and hypothesized co-integrating VAR. First, the unit root tests mentioned earlier seemed to indicate that the variables belonged to integration of order 1 or I (1). It means that GDP (ppp) indicator, including all its functional indicators, show a strong co-integration at an integrated order of 1. Second, the trace statistics of Johansen co-integration test showed strong numbers of co-integration as the hypothesized numbers are all < than 0.05. None, at most 1 and 2, all derived significance values of 0.000, similar to that of the eigenvalue statistics. Third, in the long-run GDP (coefficient = 1.000) and all its functional indicators' t-values indicate a strong confidence of good predictor. Refer to Table 5.

Table 5. Johansen Co-integration and Normalized Co-integrating Coefficient (cc)

	NORMALIZED cc*			TRACE			EIGENVALUE		
DESCRIPTION	Code	Coeff.	t-value	statistic	critical	p	statistic	critical	p
None				69.8	69.8	0.000	112.9	33.9	0.000
At most 1				47.9	47.9	0.000	77.8	27.6	0.009
At most 2				70.6	29.8	0.000	51.0	21.1	0.034
GDP (ppp)	GDP	1							
GDP growth	GR	2634.1	2.049						
Inflation level	INF	23137.7	4.541						
Capital formation /GDP	CAP	1241.1	0.684						
Industry share	IND	-5884.4	0.751						

******Co-integrating coefficients or cc: GR (2634.1), INF (23137.7), CAP (1241.1), IND (-5884.4).*

The co-integrating equation of the GDP (ppp) seemed to indicate a stable equilibrium at: GDP (1.000) = *GR (2634.1), INF (23137.7), CAP (1241.1), IND (-5884.4)*, except for CAP (t-value = 0.684 < 1.96) and IND (t-value = 0.751 < 1.96) that were not significant. There seemed to be a relative confidence that the coefficient was a good predictor.

RESEARCH QUESTION 2 – GRANGER-CAUSALITY ANALYSIS

In order to create a VAR model with (p + 1) lags and test the Granger-causality, Figure 2 shows the evidence that CAP, IND and INF Granger-caused GDP (ppp) at p = 0.043, p = 0.033, and p = 0.001 for lag 1, respectively. The analysis, apparently giving rise to the fact that the IND (Philippine industry weight), CAP (national capital formation as a percentage of GDP) and INF (the inflation level), during the period 1965-1986, Granger-caused the Philippine GDP (ppp) under the Marcos administration. The connotation of this causality relationship seemed to be raising the point of the need of Philippine industrialization, when the administration began with the eleven MIPs with more industry weight in the economy. The evaluation dealt with the following at lag 1:

- The main Granger-causality pointed to CAP (p = 0.043), IND (p = 0.033) and INF (p = 0.001) as causing the generation of Philippine GDP (ppp).
- The supporting Granger-causality pointed to the fact that more capital formation or CAP (p = 0.012) increased the industry weight in the economy needed for an industrialization.

Refer to Figure 2.

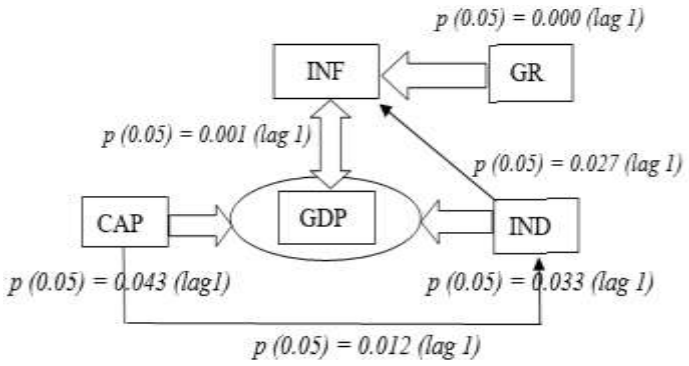

Figure 2. Granger-causality of All Variables to the Philippine GDP (ppp)

Of course, this finding on Granger-causality of the Philippine GDP (ppp) doesn't affect the structure of the hypothesized cointegrating equation of the future equilibrium.

Research Question Three – Comparative Economic Performance

On the basis of the conceptual framework in Figure 1, the study revealed that most economic indicators indicated a better performance under the Marcos administration, except for some under the other administrations. There were three leading indicators, two coincident indicators, and another three lagging indicators, the evaluation of which are presented below. In addition to the better performance, these NBER-formulated indicators also indicated the health level of the administration (Dhanorkar, S., 2019). Reinforcing this author was Sicat, G.P. (2011) reaffirmation that the Marcos administration successfully reformed government organizations, development of public infrastructure, and much better economic progresses, culminating in a positive balance sheet figure. Refer to Table 7.

Under Marcos Administration

Leading Indicators. The *first* advantageous leading indicator under the Marcos administration was the larger national budget/GDP of an average 0.8% compared to that of the other administrations of only 0.4%, which indicated more active effort of the government to develop the economy in spite of the difficult time because of the martial law. Even though increased from an average USD 230 million in the period 1965-1970 to an average USD 2,830 million in the period 1983-1986, the *second* more advantageous leading indicator was the country's debt/GDP ratio of an average 50.7%, which proved that it was still half of the other administrations' total debts/GDP (D = 108.5%). The public perfectly understood that the external debts were utilized to develop the eleven MIPs and other public infrastructures. The result so-to-speak was clear. The opposition has been using this increased debt as the culprit of the Marcos administration, which of course is not correct. The third more advantageous indicator was the net trade balance deficit (import is larger than export) of -29.5% compared to the -55.1% under the other administrations. These were all made possible with the diversified product composition in all economic sectors, growth in retail and agri-business, including that of high-yielding varieties in agricultural produces, which culminated in increased export earnings (Marcos, F.E., 1972).

Coincident Indicators. The first advantageous coincident indicator or GDP (ppp) seemed to be the best measure of productivity performance of the country. A GDP growth rate of 17.5% per annum was an amazing performance for a country that experienced a concern in security and order of a martial law, compared to the 11.4% per annum under the normal economic conditions. Business cycle normally continues to increase, whoever the administration is. Hence, the low GDP (ppp) of USD 237.5 billion during the Marcos administration can be of no comparison with the USD 3,339.3 billion during the other administrations under the four Presidents. Second, in line with the aggressive move to invest in capital expenditures, including those of the eleven MIPs, the larger IND (40.2%) weight of industrial contribution to the Philippine economy, was a proof of good economic decision, in comparison with the 32.0% under the normal economic conditions of the other administrations. It reflects that even though in the difficult situation of the martial law, the government had focused more on developing the industry, and not just on agriculture as well as services alone.

Table 6. Economic Indicators Under the Marcos and Other Administration

DESCRIPTION	MARCOS ADMINISTRATION				AVERAGES	
	1965-70	1971-76	1977-82	1983-86		
GDP (ppp-Bio. USD)	32.6	92.0	250.8	574.6	237.5	3339.3
GDP growth % (GR)	13.3 %	20.8 %	16.8 %	19.2 %	17.5 %	11.4%
Consumption/GDP % ©	76.5 %	70.5 %	69.5 %	75.1 %	72.9 %	82.4%
Capital Formation/GDP % (CAP)	25.5 %	28.8 %	32.8 %	22.5 %	27.4 %	22.5%
Trade Balance/GDP % (T)	-15.5 %	-25.6 %	-54.5 %	-22.3 %	-29.5 %	-55.1%
Inflation Level % (INF)	2.8%	5.7%	11.2 %	25.4 %	11.3 %	87.4%
Industry Contribution % (IND)	35.4 %	38.5 %	42.6 %	44.2 %	40.2 %	32.0%
Banks' Deposit/GDP % (DEP)	7.3%	10.9 %	11.4 %	3.0%	8.2%	2.5%
Government Budget/GDP (B)	1.3%	1.6%	1.6%	0.6%	0.8%	0.4%
External Debt (Mio. USD) (D)	230.0	680.0	2470.0	2830.0	1552.5	5265.0
- Debt/GDP %	9.2%	24.7 %	83.4 %	85.6 %	50.7 %	108.5 %
- Debt growth %	29.7 %	20.1 %	24.4 %	5.2%	19.9 %	7.4%
Employment % (EMP)	54.2 %	51.9 %	61.5 %	63.5 %	57.8 %	63.8%
Income Inequality-GINI % (Inc)	49.8 %	49.1 %	48.8 %	48.4 %	49.0 %	47.6%
Poverty Level % (Pov)	51.7 %	47.5 %	43.3 %	39.1 %	45.4 %	29.3%

Lagging Indicators. The first advantageous lagging indicator was the 27.4% capital formation growth versus the 22.5% achieved by the other administrations, which resulted in the earlier mentioned 40.2% industrial contribution of the country. It was obvious from the build-and-build programs of the Marcos administration. This industrial development was of course supported by the Philippine banking system third party funding accumulation (DEP) for investment as the second advantageous lagging indicator. Under the Marcos administration the Bangko Sentral ng Pilipinas (BSP) was active in accumulating and mobilizing third party deposit funds for investments. It was indicated by the 8.2% compared to the much smaller ratio of 2.5% under the other administrations. Lamberte, M.B. (2002) presented the growth fact of the Philippine deposit liabilities or the third-party funding, which fueled the economy with investments, at the rate of 47.1% per annum (from P 25.5 billion in 1980 to P 258.2 billion in 1986) from the year 1980-1986, the terminal period of the Marcos administration. In President Corazon C. Aquino administration, the BSP was able to grow it at a meager 5.7% rate or much lower than the 47.1%. The third advantageous lagging indicator was the much smaller inflation rate of 11.3% per annum compared to the 82.4% per annum under the other administrations. It only told us that under the Marcos administration the BSP was effective in controlling prices in the midst of developing the country's industrialization (Chikiamco, C.V., 2020). The Marcos administration exerted stringent control over foreign exchange traffic, including that of goods importation into the Philippines since the year 1963. So, it was of no surprise, why prices fluctuated only at 11.3% per annum. Besides, when he was a senator, President Ferdinand E. Marcos authored a law for restricting importation of goods.

Under Other Administrations

In the Philippines, Estudillo, J.P. (1997) evaluated the composition of Filipino earnings among the rich and poor in terms of those income from wages, entrepreneurial, OFW remittances, and property rental, which the GINI index and poverty level indicated the ratios of 47.6% and 29.3%, respectively. The lesser the GINI index is, the lesser the income inequality is, e.g. the 47.6% under the other administrations is much better, even slightly, than the 49.0% under the Marcos administration, which is the first advantageous indicator. The related indicator was the employment participation from the total Filipino population of 63.8%, compared with the 57.8% under the Marcos administration, which was the second better indicator. Golay, F. (1955) commented that the abolishment of US-Philippine Bell Trade Act, where US involvement was lessened to the Philippine economy, had positively impacted on employment and labor productivity. The third better indicator was the consumption/GDP, which at 82.4% indicated a more active economy than the 72.9% under the Marcos administration. Among the four Presidents, the following were the better economic indicators they had been associated with:

- President Aquino: Better GDP growth of 14.3% per annum, the 43.2% per annum inflation rate, and a 38.7% industrial composition in the economy.
- President Ramos: Capital formation/GDP of 26.4%, and the highest banking deposit liabilities of 2.9%.
- President Estrada: More active consumption/GDP of 84.4%.
- President Arroyo: Lesser trade balance deficits/GDP of -38.7%.

V. SUMMARY OF INTERPRETATIVE FINDINGS and CONCLUSION

The study came up with the summary of interpretative findings of the Marcos administration economic analysis.

VI. INTERPRETATIVE FINDINGS

The study presents the findings and their interpretation below. First, the unit root tests seemed to indicate that the variables belonged to an integrated order 1 or I (1), reinforced by the trace statistics of Johansen cointegration test showing strong numbers of co-integration. Its hypothesized co-integration indicated stability (good predictor) of the Marcos administration's economic performance, in spite of a difficult situation under the martial law. Second, evidence that IND (industry weight in the economy), CAP (continuous capital formation), and INF (prices movement because of high national consumption), Granger-caused Philippine GDP (ppp) at $p = 0.033$, $p = 0.043$, and $p = 0.001$, respectively, all for lag 1, only proved that the industrialization process was already initiated in this administration. The opportunity was unfortunately not taken advantage to continually follow up or even step up the industrialization process by the other subsequent administrations. Third, the three leading (predicting future changes), two coincident (occurring simultaneously), and other three lagging (delayed reaction to a change) economic indicators, proved that the Marcos administration, in spite of the difficult situation under the martial law, economically performed relatively better than the other administrations.

VII. CONCLUSION

Based on the interpretative findings, the study concluded that the relatively good economic performance for taking off to be an industrialized country under the Marcos administration was absolutely taken for granted. The capable administration of President Corazon C. Aquino should have continued the Marcos administration's eleven MIPs, if the country wanted the Philippines to develop into stronger industrialized countries in Asia like China, India, Japan, Singapore, South Korea, and Indonesia, which had relatively similar blue print industrialization programs with the Philippine MIPs.

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