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Angelo King Institute
for Economic and Business Studies

Monitoring the Philippine Economy Fourth Quarter Report for 2019

Project of Angelo King Institute

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Fourth quarter 2019 growth performance increased to 6.4 percent from 6.3 percent the previous year.

The Philippine economy remains robust amid global uncertainties. Fourth quarter growth was recorded at 6.4 percent, realizing a full-year economic growth of 5.9 percent. Increased household consumption, accelerated government spending, narrowed trade deficit, and improved performance of the service sector contributed to the Q4 2019 growth increase in spite of a plunge in capital formation, lackluster performance of the industry sector, and lethargic growth of the agriculture sector. With favorable domestic economic conditions, business sentiment strengthened. Meanwhile, lingering US-China trade tensions, negative overseas sentiments, presence of the African swine fever, and policy uncertainties arising from internal and external economic factors remain as challenges the government has to proactively address.

- **Major components of aggregate demand**
 - **Private consumption expanded with favorable domestic economic conditions.**

Growth of Household Final Consumption Expenditure (HFCE) in the fourth quarter was 5.6 percent year-on-year (y-o-y), which was a bit faster than 5.3 percent the previous year. The overall uptick in HFCE may be attributable to sustained average price levels, creation of more jobs, and exuberant holiday spending. According to the Philippine Statistics Authority (PSA)², Food and Non-alcoholic Beverages, the component with the largest share of 44.5 percent in consumption, posted a slightly decelerated growth (4.7 percent from 4.8 percent, y-o-y). Nonetheless, the slight decline was overshadowed by increases in various HFCE components: Transport (4.9 percent from 0.5 percent, y-o-y), Clothing and Footwear (3.5 percent from 0.2 percent, y-o-y), Health (6.8 percent from 4.4 percent, y-o-y), Recreation and culture (6.4 percent from 4.1 percent, y-o-y), Alcoholic beverages and Tobacco (-4.0 percent from 05.9 percent, y-o-y), Communication (6.0 percent from 4.5 percent, y-o-y), Miscellaneous goods and services (8.8 percent from 7.6 percent, y-o-y), and Restaurants and hotels (8.0 percent from 7.4 percent, y-o-y). Moreover, Education (4.1 percent from 19.4 percent, y-o-y), Housing, water, electricity, gas and other fuels (5.3 percent from 5.5 percent, y-o-y), and Furnishings, household equipment and routine household maintenance (4.8 percent from 5.0 percent, y-o-y) registered slower growth rates.

¹ Report is based on latest available data as of February 12, 2020. For comments and questions, please email mitzie.conchada@dlsu.edu.ph

² <http://psa.gov.ph/nap-press-release/sector/Household%20Final%20Consumption>

- Domestic investment growth turned positive after two consecutive quarters of registering negative growth rates.** Gross domestic capital formation grew 0.4 percent, a significant reversal from -2.6 percent and -8.5 percent registered in Q3 2019 and Q2 2019, respectively, but lower than 4.9 percent the previous year. According to PSA³, the slowdown was largely caused by the continuous contraction in Fixed Capital Investments in Durable Equipment (-5.9 percent from 3.1 percent, y-o-y). Eleven out of twenty types of fixed asset investments experienced decelerated growths. Q4 2019 is the third consecutive quarter wherein investments in durable equipment showed slower growth in 2019 like Construction (11.8 percent from 19.3 percent, y-o-y), Breeding Stocks and Orchard Development (3.6 percent from 5.2 percent, y-o-y), and Intellectual Property Products (23.5 percent from 32.2 percent, y-o-y).
- Government spending bolstered demand-side growth.** Government final consumption expenditure surged 18.7 percent, significantly higher than 9.6 percent and 12.6 percent the previous quarter and previous year, respectively. According to National Economic Development Authority (NEDA)⁴, the impactful growth in government expenditure for Q4 2019 was ascribable to the ramping up of government spending to compensate for the budget delay in the first half of the year. Also, the increase in public construction, completion of Department of Public Works and Highways (DPWH) projects, payment for the right-of-way acquisition, and construction of government buildings positively contributed to the growth in government consumption.
- Trade deficit in goods narrowed due to increased exports and decreased imports.** At the end of December⁵, exports and imports were recorded at 5.74 billion USD (21.4 percent growth y-o-y) and 8.22 billion USD (-7.6 percent growth y-o-y), respectively. Fourth quarter exhibited a trade deficit of 2.48 billion USD, narrower than the 4.17 billion USD deficit in December 2018. The surge in export sales was due to increases in 9 out of the 10 major export commodities: cathodes and sections of cathodes, of refined copper (471.2 percent), fresh bananas (34.9 percent), gold (30.2 percent), electronic products (24.9 percent), chemicals (18.2 percent), machinery and transport equipment (12.6 percent), other manufactured goods (10.4 percent), ignition wiring set and other wiring sets used in vehicles, aircrafts and ships (3.5 percent), and coconut oil (1.1 percent). The slowdowns in imports were due to decreases in 7 out of the 10 major import commodities: iron and steel (-38.0 percent), cereals and cereal preparations (-30.8 percent), industrial machinery and equipment (-21.9 percent), plastics in primary and non-primary forms (-21.5 percent), other food and live animals (-11.5 percent), electronic products (-7.1 percent), and transport equipment (-1.2 percent).

³ <http://psa.gov.ph/nap-press-release/sector/Capital%20Formation>

⁴ <http://www.neda.gov.ph/statement-of-socioeconomic-planning-secretary-ernesto-m-permia-at-the-press-conference-on-the-philippine-economic-performance-for-the-fourth-quarter-and-full-year-of-2019/>

⁵ <https://psa.gov.ph/statistics/foreign-trade/fts-release-id/160003>

- **Major components of aggregate supply**

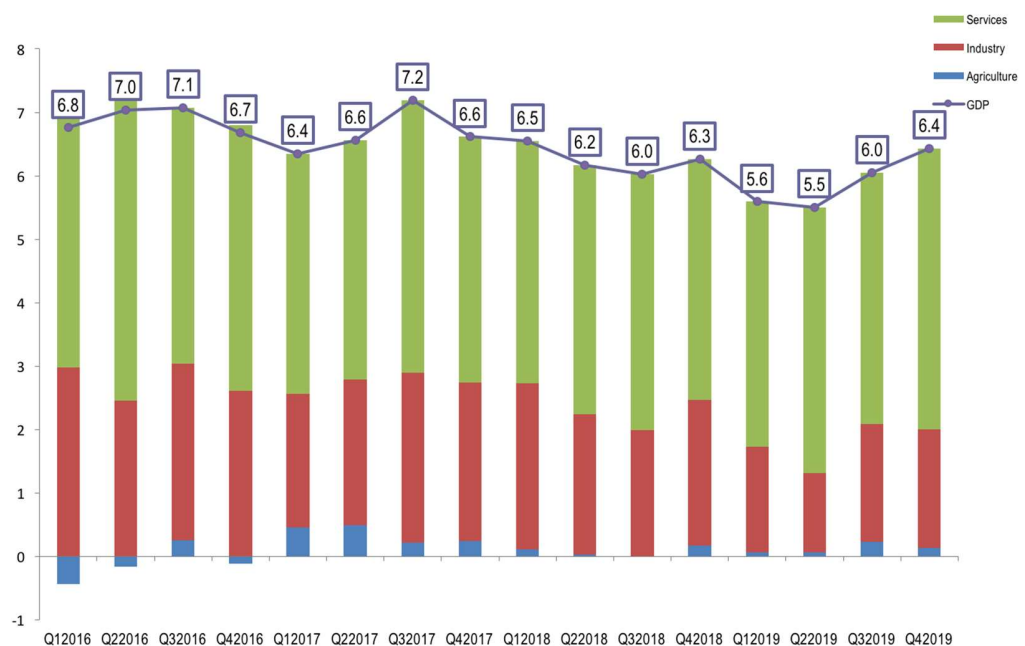
In this report, we present results from an alternative to the “traditional” (TRAD) method of decomposing growth of GDP in constant prices into sector contributions. This alternative method is a “generalized” (GEN) growth decomposition that applies to GDP in constant prices (e.g., in the Philippines) and to GDP in chained prices (e.g., in Canada and the US). While TRAD recognizes only “quantity” growth as the source of a sector’s contribution to GDP growth, GEN posits that a sector’s contribution comes from “quantity” growth and from “real price” growth where this price is, by definition, the ratio of a sector’s deflator to the overall GDP deflator. The GDP deflator as the common denominator of the above ratio makes real GDP the numeraire and, thus, this ratio is the relative price or exchange value of the GDP of a sector in “GDP units,” i.e., the “real price” of a sector’s GDP. Therefore, a sector’s positive “quantity” growth contribution will be diminished if accompanied by a negative “real price” growth of the same sector that may even result in a negative net contribution by the sector to GDP growth. On the other hand, a sector’s positive “quantity” growth contribution will be enhanced if accompanied by a positive “real price” growth (see Table 3).⁶

- **Services sector continued to lead supply-side growth performance, serving as the key driver of Q4 2019 economic growth.** Services sector posted the highest contribution to growth, with 4.43 percentage points from positive quantity and real price growth (see Table 3). The sector grew by 7.9 percent from 6.8 the previous year, with a major share of 57.1 percent in GDP. For 4Q 2019, Trade and Repair of Motor Vehicles Motorcycles Personal (8.6 percent from 6.7 percent, y-o-y) was the main driver of growth in the sector with a percentage point contribution of 1.52. Moreover, Transport Communication and Storage (5.6 percent from 3.7 percent, y-o-y), Financial Intermediation (10.9 percent from 6.3 percent, y-o-y), and Public Administration and Defense (17.1 percent from 14.7 percent, y-o-y) displayed accelerated growth in the sector. Meanwhile, Real Estate Renting and Business Activities (3.3 percent from 4.1 percent, y-o-y), and Other Services (7.0 percent from 9.4 percent, y-o-y) displayed decelerated growth in the sector.
- **Industry sector displayed lackluster growth performance.** The industry sector registered a growth of 5.4 percent, significantly slower than the 5.6 percent and 6.6 percent the previous quarter and year, respectively. The sector contributed 1.87 percentage points to GDP growth (see Table 3) while maintaining a 34.4 percent share in GDP. The overall deceleration of the industry sector was due to slower performances in manufacturing sub-sector growth, namely Mining and Quarrying (2.1 percent from 8.1 percent, y-o-y) and Construction (10.7 percent from 20.0 percent, y-o-y). Meanwhile, the sub-components that contributed to the offsetting of the industry growth were Manufacturing (3.7 percent from 3.2 percent, y-o-y) and Electricity Gas and Water Supply (7.3 percent from 6.7 percent, y-o-y).

⁶ The results in Table 3 are AKI-DLSU *Philippine Economic Monitor* calculations by applying the data in Table 1 to a “generalized” (GEN) exactly additive decomposition of GDP growth into *pure growth effect* (PGE) and *price change effect* (PCE) as an alternative to the “traditional” (TRAD) GDP growth decomposition. Analytically, PGE is the result of real GDP or “quantity” growth holding real price constant and PCE is the result of relative price or “real price” growth holding quantity constant. The GEN formulas for PGE and PCE and the TRAD formula are given, respectively, by equations (12), (13), and (17) in Dumagan, Jesus C. (2016), “Effects of Relative Prices on Contributions to the Level and Growth of Real GDP,” Working Paper Series No. 2016-036, Angelo King Institute for Economic and Business Studies, De La Salle University, Manila. This alternative framework follows from the decomposition of “aggregate labor productivity” (ALP) growth in Dumagan, Jesus C. (2013), “A Generalized Exactly Additive Decomposition of Aggregate Labor Productivity Growth,” *Review of Income and Wealth*, 59 (Issue 1): 157-168, where ALP is the ratio of GDP to total labor employment. Thus, by removing the labor variable, the decomposition of ALP growth in the latter paper yields the decomposition of GDP growth into PGE and PCE in the former paper which is implemented in Table 2.

- Agriculture sector experienced curtailed growth.** The agriculture sector posted a sluggish growth of 1.5 percent, lower than the 3.1 percent and 1.8 percent the previous quarter and year, respectively. The sector contributed 0.13 percentage points to GDP growth (see Table 3), remaining as the lowest contributor with only 8.5 percent share in GDP. Agriculture and Forestry registered a decreased growth of 1.0 percent, from 1.7 percent the previous year. The slowdown can be attributed to production declines in corn, sugar, and banana due to delayed planting and harvesting caused by the El Niño phenomenon during the first half of 2019. Furthermore, the spread of the African Swine Fever moderated livestock growth.⁷ On the other hand, Fishing (3.9 percent from 2.5 percent, y-o-y) registered an improved growth, as increased demand in some regions encouraged some ponds to resume operations. Also, favorable weather conditions allowed more fishing trips and better fish catch.⁸ However, the improvement in Fishing was insufficient to offset the contraction of Agriculture and Forestry.

Figure 1. Contributions to GDP growth (y-o-y, %) from Aggregate Supply



Source: Author's calculations based on data in Table 3 below.

⁷ <http://www.neda.gov.ph/statement-of-socioeconomic-planning-secretary-ernesto-m-pemias-at-the-press-conference-on-the-philippine-economic-performance-for-the-fourth-quarter-and-full-year-of-2019/>

⁸ <http://www.neda.gov.ph/statement-of-socioeconomic-planning-secretary-ernesto-m-pemias-at-the-press-conference-on-the-philippine-economic-performance-for-the-fourth-quarter-and-full-year-of-2019/>

Challenges facing the economy

- **Peso-dollar exchange rate continues to appreciate⁹.** The peso strengthened by 1.39 percent to average ₱51.03/US\$1, on a quarter-on-quarter basis, from the previous average of ₱51.74/US\$1. Likewise, on a year-on-year basis, peso appreciated by 4.38 percent, from the previous year's ₱53.26/US\$1 average. The appreciation can be attributable to favorable domestic inflation environment, stable inflows from overseas Filipino remittances, foreign direct investments, and business process outsourcing receipts. Moreover, the market's expectation of interest rate cut by the US Federal Reserve further supported the peso. Nonetheless, lingering trade conflict between US and China poses as a threat to the peso-dollar exchange rate.
- **Stock market decreases in PSEi¹⁰.** At the close of the fourth quarter, PSEi reported a quarter-on-quarter decline of 1.7 percent with an average index points of 7,853.90. The downward movement in the main index was mainly caused by negative overseas sentiments, such as pro-democracy unrest in Hong Kong, contradicting signals about the US-China trade talks, apprehension on spillover effects of China's economic slowdown to its neighboring countries, and impeachment case of US President Donald Trump.
- **Unfavorable economic conditions may adversely affect the Philippine economy^{11 12}.** External factors such as (a) forecasts of weaker global growth, (b) persisting US-China trade tensions, and (c) geopolitical tensions serve as impending risks for the Philippine economy. Additionally, internal factors such as (a) sluggish output in agriculture, (b) presence of African swine fever, (c) natural disasters, (d) capacity of the government to adapt technological advancements, (e) lack of competition in key sectors, and (f) issues relating to water concession contract negotiations challenge the resiliency of the domestic financial system.

Other economic news

- **Headline inflation rate is within national government's target¹³.** Fourth quarter inflation reported an eased headline value of 1.6 percent, which was lower than the quarter- and year-ago rates of 1.7 percent and 5.9 percent, respectively. This brought the Philippines' full year average inflation to 2.5 percent, which is within the government's target range of 3.0 percent \pm 1.0 percentage point. During the quarter, food and non-food inflation accounted for the majority of the decrease: (a) decline in rice prices caused by ongoing main harvest season and continued rice imports, (b) slowed inflation for sugar, jam, honey, chocolate, and confectionery, (c) downward pressure in utility prices such as housing, electricity, gas, and other fuels, and (d) lower transport inflation due to decreased domestic airfare prices. Average inflation for 2020 and 2021 are forecasted to be at 2.9 percent and 3.1 percent, respectively.

⁹ http://www.bsp.gov.ph/downloads/Publications/2019/IR4qtr_2019.pdf

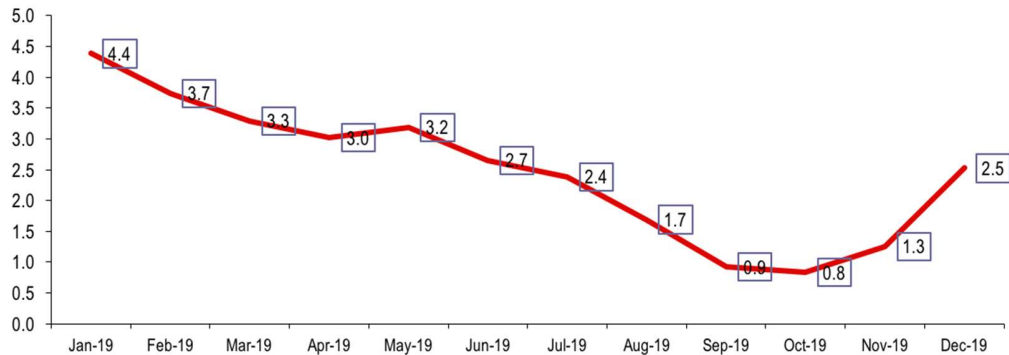
¹⁰ http://www.bsp.gov.ph/downloads/Publications/2019/IR4qtr_2019.pdf

¹¹ <http://www.neda.gov.ph/statement-of-socioeconomic-planning-secretary-ernesto-m-permiao-at-the-press-conference-on-the-philippine-economic-performance-for-the-fourth-quarter-and-full-year-of-2019/>

¹² <https://www.worldbank.org/en/country/philippines/publication/philippines-economic-update-october-2019-edition>

¹³ http://www.bsp.gov.ph/downloads/Publications/2019/IR4qtr_2019.pdf

Figure 2. Consumer price index (y-o-y, %)



Source: Graph prepared by author based on Philippine Statistics Authority data.

- Consumer outlook weakens but remains optimistic.¹⁴** Overall confidence index (CI) for Q4 2019 was recorded at 1.3 percent, lower than 4.6 percent the previous quarter, but remarkably higher than -22.5 percent the previous year. The less optimistic sentiment was due to expectations of (a) higher commodity prices, (b) minimal or no increase in salary, (c) increase in household expenses, and (d) high unemployment rate. The outlook a quarter ahead seems steady as the CI declined by 0.1 percentage point only from the previous quarter's survey. However, in the year ahead the outlook is less optimistic as the CI declined to 26.4 percent from 29.8 percent, quarter-on-quarter.
- Business outlook strengthens¹⁵.** Overall confidence index (CI) increased to 40.2 percent from 37.3 percent the previous quarter. The improved sentiment was due to (a) higher consumer demand during the holiday and harvest seasons, (b) increase in sales, orders, and projects, (c) better macroeconomic conditions, (d) accelerated government expenditure, and (e) business expansion. However, CI is expected to weaken in the next quarter due to expectations of (a) lower consumer demand after the holiday and harvest seasons, (b) deceleration in orders and sales, (c) stiffer competition, and (d) other factors such as rising prices, concerns over the African Swine Flu, and fishing ban period.
- Full-year economic growth is 5.9 percent, slightly below the lower-bound of the 2019 target¹⁶.** The Philippine economy attained the slowest full-year growth in eight years, falling below the government's target range of 6.0 percent to 6.5 percent. According to NEDA, the budget impasse, coupled with the election ban at the start of 2019 adversely impacted the national economy. Delayed implementation of government projects and programs hindered the economy from reaching its full potential. Nevertheless, the Congress and the Department of Budget and Management guaranteed the timely passage of the 2020 General Appropriations Act, and approved the validity extension of the 2019 fiscal program until the end of 2020.

¹⁴ http://www.bsp.gov.ph/downloads/Publications/2019/CES_4qtr2019.pdf

¹⁵ http://www.bsp.gov.ph/downloads/Publications/2019/BES_4qtr2019.pdf

¹⁶ <http://www.neda.gov.ph/statement-of-socioeconomic-planning-secretary-ernesto-m-pernia-at-the-press-conference-on-the-philippine-economic-performance-for-the-fourth-quarter-and-full-year-of-2019/>

- **Southeast Asian (SEA) Games bolsters Central Luzon's tourism and economy¹⁷.** Last November 30 to December 11, the Philippines hosted the 30th SEA Games at Pampanga, San Fernando City. With more than 12,000 athletes and other members of the SEA Games delegation arriving to the country via Clark International Airport, the region experienced an upsurge in tourist volume. Prior to the SEA Games, the government improved infrastructures in Central Luzon under the *Build Build Build* program. The modernization of the Clark International Airport is expected to attract businessmen and tourists. In fact, the Department of Tourism recorded 2.4 million tourist arrivals during the first seven months of 2019, and forecasted some 12 million passengers increase per year. Likewise, Clark Freeport and Subic Freeport, where some sporting events were held, experienced a boost in the tourism industry. In the first ten months, 15 cruise ship arrivals in Subic brought 38,985 visitors and generated expenditures of approximately P8.07 million. The Philippine Sports Tourism Awards (PSTA) recognized the Clark Freeport as "sports tourism destination of the year" for hosting more than 200 events that included fun runs, marathons, triathlons, duathlons, football, baseball, cycling, and other sports-related activities. In addition, Clark was selected as a preferred destination for Meetings, Incentives, Conferences, and Exhibits (MICE). With continuous implementation of massive infrastructure projects, the government foresees stimulated business activities in the region.

¹⁷ <https://www.pna.gov.ph/articles/1089538>



Table 1. Philippine Economic Indicators

Philippines Economic Data											
Monthly Leading Indicators	Mar-19	Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19	Jan-20
Industrial Production (y-o-y, %)	-8.8	-14.0	-7.8	-9.0	-8.7	-12.5	-6.4	-5.0	-7.9	-10.1	...
Consumer Price Index (y-o-y, %)	3.3	3.0	3.2	2.7	2.4	1.7	0.9	0.8	1.3	2.5	2.9
Retail Sales (y-o-y, %)	-1.8	-6.5	1.5	-1.4	-2.9	-5.6	-2.4	-0.8	-3.9	...	...
Exports (y-o-y, %)	-1.8	1.0	1.0	3.3	3.5	0.8	-1.2	0.3	-0.7	...	...
Imports (y-o-y, %)	7.8	-1.9	-5.2	-10.4	-4.2	-8.8	-10.5	-10.8	-8.0	...	...
Trade Balance, US\$ million	-3,100	-3,469	-3,298	-2,370	-3,393	-2,679	-3,035	-3,240	-3,342	...	...
Total Reserves (less gold), US\$ billion	75	76	77	77	77	78	78	78	78	80	...
Policy Rate	4.75	4.75	4.5	4.5	4.5	4.25	4	4	4	4	...
Fiscal Balance (million pesos)	-58,409	86,872	2,564	-41,838	-75,296	-2,488	-178,557	-49,262	-60,883	...	...
Quarterly/Annual Economic Indicators	2015	2016	2017	1Q2018	2Q2018	3Q2018	4Q2018	1Q2019	2Q2019	3Q2019	4Q2019
Real GDP (y-o-y, %)	6.1	6.9	6.7	6.5	6.2	6.0	6.3	5.6	5.5	6.0	6.4
- Private Consumption	6.3	7.0	5.9	5.6	6.0	5.3	5.3	6.1	5.5	5.9	5.6
- Government Consumption	7.6	8.4	6.2	13.6	11.9	14.3	12.6	7.4	7.3	9.6	18.7
- Gross Capital Fixed Formation	18.4	23.7	9.4	10.3	20.0	19.6	4.9	8.0	-8.5	-2.6	0.4
Current Account (% of GDP)	2.9	-0.4	-0.7	-0.4	-4	-2.1	-2.6	-2.1	-0.2	0.8	...
Financial Account (US\$ million)	2,523	175	-2,798	-816	-1,627	-1,793	-3,768	-3,279	-329	-848	...
- Net Direct Investments, US\$ million	-122	-5,883	-6,952	-1,025	-2,672	-1,374	-797	-1,075	-677	-748	...
- Net Portfolio Investments, US\$ million	4,757	1,480	2,454	1,612	1,021	-224	-1,275	-695	-1,176	895	...
Overall BOP position (US\$, million)	2,616	-1,038	-863	-1,227	-2,030	-1,879	2,830	3,797	991	778	...
Unemployment rate	6	5.1	5.7	5.3	5.4	5.1	5.1	5.2	5.1	5.1	5.1
Others	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19
Overseas Filipinos' Remittances (US\$, million)	2,484	2,301	2,514	2,441	2,609	2,290	2,581	2,589	2,379	2,671	2,372
... = not available											

Source: Bangko Sentral ng Pilipinas, Philippine Statistics Authority, Asian Development Bank.



Table 2. Level of Philippine GDP, 2018Q4 – 2019Q4

	Nominal GDP (million current pesos)		Real GDP (million constant pesos)	
	2018Q4	2019Q4	2018Q4	2019Q4
Agriculture	485,682	462,787	222,608	225,962
Agriculture and Forestry	427,870	400,370	183,176	185,007
Fishing	57,812	62,417	39,431	40,955
Industry	1,603,097	1,693,037	866,797	913,425
Mining and Quarrying	34,575	32,806	19,324	19,734
Manufacturing	1,071,284	1,102,953	599,810	622,014
Construction	367,598	420,511	176,464	195,295
Electricity Gas and Water Supply	129,641	136,768	71,199	76,382
Services	2,855,839	3,127,013	1,404,628	1,515,057
Transport Communication and Storage	265,613	279,351	179,164	189,232
Trade and Repair of Motor Vehicles Motorcycles Personal	923,942	1,002,046	442,423	480,401
Financial Intermediation	368,048	414,532	167,961	186,320
Real Estate Renting & Bus. Actvt	584,177	616,779	265,437	274,142
Public Administration & Defense: Compulsory Social Security	247,784	302,185	107,130	125,406
Other Services	466,275	512,120	242,513	259,556
Sum = GDP	4,944,618	5,282,837	2,494,033	2,654,444

Source: Philippine Statistics Authority



Table 3. Industry Contributions to Philippine GDP Growth, 2018Q4 – 2019Q4

	TRAD	GEAD		GEAD
	GDP Growth			GDP Growth
	PGE*	PGE*	PCE*	PGE* + PCE*
	(percent)	(percent)	(percent)	(percent)
		(1)	(2)	(1)+(2)
GDP Growth	6.43	6.43	0.00	6.43
Industry Growth Contribution				
Agriculture	0.13	0.13	1.39	1.53
Agriculture and Forestry	0.07	0.07	1.79	1.87
Fishing	0.06	0.06	-0.40	-0.34
Industry	1.87	1.87	-2.12	-0.25
Mining and Quarrying	0.02	0.02	-0.05	-0.03
Manufacturing	0.89	0.89	-1.88	-0.99
Construction	0.76	0.76	0.08	0.84
Electricity Gas and Water Supply	0.21	0.21	-0.27	-0.06
Services	4.43	4.43	0.72	5.15
Transport Communication and Storage	0.40	0.40	-1.87	-1.47
Trade and Repair of Motor Vehicles Motorcycles Personal	1.52	1.52	0.63	2.15
Financial Intermediation	0.74	0.74	0.45	1.19
Real Estate Renting & Bus. Actvt	0.35	0.35	1.58	1.93
Public Administration & Defense: Compulsory Social Security	0.73	0.73	0.31	1.04
Other Services	0.68	0.68	-0.37	0.31

Source: DLSU-AKI Philippine Economic Monitor calculations by applying the data in Table 2 to a "generalized exactly additive decomposition" (GEAD) of GDP growth into pure growth effect (PGE*) and price change effect (PCE*) as an alternative to the "traditional" (TRAD) GDP growth decomposition that recognizes PGE* but not PCE*. PGE* is the result of real GDP or "quantity" growth holding relative price (real price) constant and PCE* is the result of "real price" growth holding quantity constant. PCE* measures the change in value of an industry's output when outputs of all industries are converted to the same unit of measure, in terms of the economy's "GDP basket." The GEAD formulas for PGE* and PCE* and the TRAD formula (which equals PGE*) are given, respectively, by equations (39), (40), and (46) in Dumagan, Jesus C. (2018), "Modifying the 'Generalized Exactly Additive Decomposition' of Growth of GDP and Aggregate Labor Productivity in Practice for Consistency with Theory," Working Paper Series No. 2018-07-053, Angelo King Institute for Economic and Business Studies, De La Salle University, Manila. The paper by Dumagan, Jesus C. (2013), "A Generalized Exactly Additive Decomposition of Aggregate Labor Productivity Growth," Review of Income and Wealth, 59 (Issue 1): 157-168 decomposed growth of aggregate labor productivity (ALP), which is the ratio of GDP to total labor employment. Thus, by removing the labor variable, the decomposition of ALP growth becomes a decomposition of GDP growth into the modified PGE* and PCE* formulas which were implemented in this Table 3.