



Angelo King Institute  
for Economic and Business Studies

## Monitoring the Philippine Economy Third Quarter Report for 2019

### Project of Angelo King Institute

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*Third quarter 2019 growth performance increased to 6.2 percent from 6.0 percent the previous year.*

**The Philippine economy achieves improved growth after two quarters of deceleration.** Subsequent to two consecutive quarters of slowdown in economic growth, third quarter growth was recorded at 6.2 percent, realizing a year-to-date economic growth of 5.8 percent. Accelerated household consumption, narrowed trade deficit, improvement in the agriculture sector, and robust performance of the service sector contributed to the Q3 2019 growth increase amid plunge in capital formation, slower government spending, and lethargic growth of the industry sector. With favorable inflation outlook, consumer sentiment rebounded to optimism. Stronger consumption is expected in anticipation of the holiday season. Meanwhile, lingering US-China trade tensions and policy uncertainties arising from internal and external economic factors remain as challenges the government has to proactively combat.

- **Major components of aggregate demand**
  - **Private consumption contributed as the major driver of growth in the demand-side.** Growth of Household Final Consumption Expenditure (HFCE) in the third quarter accelerated to 5.9 percent year-on-year (y-o-y) from 5.5 percent and 5.3 percent the previous quarter and year, respectively. The higher growth can be attributable to the continuous downtrend in inflation rates, which improved consumers' purchasing power. According to the Philippine Statistics Authority (PSA)<sup>2</sup>, Food and Non-alcoholic Beverages, the component with the largest share of 39.5 percent in consumption, registered an increased growth (4.3 percent from 3.1 percent, y-o-y). Improved domestic supply conditions remarkably pushed down food prices to 0.2 percent from 8.2 percent the previous year<sup>3</sup>. Most key food components posted lower or negative inflation during Q3 2019. Moreover, Communication (7.9 percent from 2.3 percent, y-o-y), Transport (5.5 percent from 1.3 percent, y-o-y), Clothing and Footwear (3.3 percent from -0.8 percent, y-o-y), Alcoholic beverages and tobacco (-1.9 percent from -5.2 percent, y-o-y), Recreation and culture (7.7 percent from 4.5 percent, y-o-y), and Restaurants and hotels (8.0 percent from 5.7 percent, y-o-y) contributed to the acceleration of HFCE growth. Meanwhile, Education (5.1 percent from 20.0 percent, y-o-y), Furnishings, household equipment and routine household maintenance (5.5 percent from 6.9 percent, y-o-y), Miscellaneous goods and services (9.1 percent from 10.4 percent, y-o-y), and

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

<sup>3</sup> [http://www.bsp.gov.ph/downloads/Publications/2019/IR3qtr\\_2019.pdf](http://www.bsp.gov.ph/downloads/Publications/2019/IR3qtr_2019.pdf)

Housing, water, electricity, gas and other fuels (7.5 percent from 8.8 percent, y-o-y) experienced declining growth rates.

- **Gross domestic capital formation posted negative growth rates for two consecutive quarters.** Domestic investment plunged to -2.1 percent from a buoyant double-digit growth of 19.6 percent the previous year. Q3 2019 continued the downtrend, following a negative growth rate of -8.5 percent the previous quarter. According to PSA<sup>4</sup>, the slowdown was largely caused by the contraction in Fixed Capital Investments in Durable Equipment (9.1 percent from 17.5 percent, y-o-y), particularly road vehicles, the component with the highest share of 52.4 percent in total durable equipment, which posted a declined growth of 12.5 percent from 16.5 percent the previous year. Moreover, Breeding Stocks and Orchard Development (3.4 percent from 6.2 percent, y-o-y) contributed in the deceleration of domestic investment. On the other hand, Construction (17.3 percent from 13.3 percent, y-o-y) and Intellectual Property Products (30.5 percent from 24.0 percent, y-o-y) exhibited accelerated growths.
- **Government spending recovered after the delayed budget passage and the election ban.** Government final consumption expenditure grew by 9.6 percent, significantly lower than 14.3 percent the previous year but higher than 6.9 percent the previous quarter. According to National Economic Development Authority (NEDA)<sup>5</sup>, the growth in government expenditure for Q3 2019 was ascribable to unleashing of project and program implementation that were affected by the budget impasse earlier this year. The validity extension of the 2019 fiscal program and the passage of the 2020 proposed national budget were approved at the House of Representatives.
- **Trade deficit in goods narrowed at the expense of decreased exports and imports.** At the end of September<sup>6</sup>, exports and imports were recorded at 5.90 billion USD (-2.6 percent growth y-o-y) and 9.02 billion USD (-10.5 percent growth y-o-y), respectively. Third quarter exhibited a trade deficit of 3.12 billion USD, narrower than the 4.02 billion USD deficit in September 2018. The decreases in export sales of the seven of the top ten major export commodities, namely metal components (-25.8 percent), articles of apparel and clothing accessories (-20.7 percent), machinery and transport equipment (-20.0 percent), miscellaneous manufactured articles (-8.1 percent), ignition wiring set and other wiring sets used in vehicles, aircrafts and ships (-7.0 percent), other manufactured goods (-6.3 percent), and gold (-1.8 percent) significantly contributed to the contraction of exports. Likewise, the decreases in import sales of the seven of the top ten major import commodities, namely iron and steel (-46.8 percent), cereals and cereal preparations (-22.0 percent), mineral fuels, lubricants and related materials (-14.5 percent), plastics in primary and non-primary forms (-9.4 percent), transport equipment (-7.8 percent), electronic products (-7.1 percent), and industrial machinery and equipment (-1.2 percent) notably contributed to the decline in imports.

<sup>4</sup> <http://psa.gov.ph/nap-press-release/sector/Capital%20Formation>

<sup>5</sup> <http://www.neda.gov.ph/statement-of-socioeconomic-planning-secretary-on-the-performance-of-the-philippine-economy-for-the-third-quarter-of-2019/>

<sup>6</sup> <https://psa.gov.ph/content/highlights-philippine-export-and-import-statistics-september-2019>

- **Major components of aggregate supply**

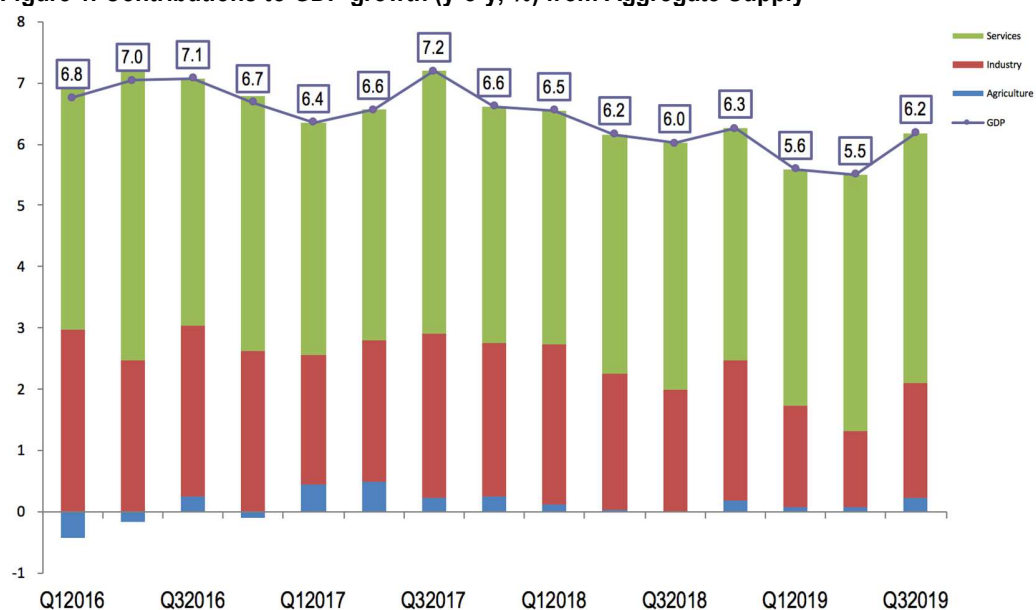
*In this report, we present results from an alternative to the “traditional” (TRAD) method of decomposing growth of GDP in constant prices into sector contributions. This alternative method is a “generalized” (GEN) growth decomposition that applies to GDP in constant prices (e.g., in the Philippines) 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).<sup>7</sup>*

- **Services sector led supply-side growth performance, contributing more than half of total growth.** Services sector posted the highest contribution to growth, with 4.08 percentage points from positive quantity and real price growth (see Table 3). The sector maintained its growth of 6.9 percent from the previous year, with a major share of 59.7 percent in GDP. For 3Q 2019, Trade and Repair of Motor Vehicles Motorcycles Personal (8.1 percent from 5.1 percent, y-o-y) was the main driver of growth in the sector with a percentage point contribution of 1.47. Additionally, Transport Communication and Storage (9.1 percent from 5.4 percent, y-o-y) and Financial Intermediation (10.0 percent from 7.2 percent, y-o-y) displayed faster growth in the sector. While Public Administration and Defense (5.3 percent from 17.8 percent, y-o-y), Real Estate Renting and Business Activities (4.2 percent from 5.7 percent, y-o-y), and Other Services (5.1 percent from 7.9 percent, y-o-y) displayed slower growth in the sector.
- **Industry sector showed decreased growth performance.** The industry sector registered a growth of 5.6 percent, slower than the 6.2 percent the previous year. The sector contributed 1.87 percentage points to GDP growth (see Table 3) while maintaining a 33.1 percent share in GDP. The overall slowdown of the industry sector was due to the lackluster performances in manufacturing sub-sector growth, namely Mining and Quarrying (-4.9 percent from -1.3 percent, y-o-y) and Manufacturing (2.4 percent from 3.8 percent, y-o-y). Meanwhile, the sub-components that contributed to the offsetting of the industry growth were Construction (16.3 percent from 15.2 percent, y-o-y) and Electricity Gas and Water Supply (7.2 percent from 5.0 percent, y-o-y).

<sup>7</sup> 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 improved, registering the fastest growth in two years.** The agriculture sector posted a growth of 3.1 percent, significantly faster than the 0.6 percent and 0.4 percent the previous quarter and year, respectively. The registered growth rate is the fastest since the 2.6 percent expansion displayed in Q3 2017. Both sub-components of Agriculture and Forestry (3.5 percent from 0.2 percent, y-o-y) and Fishing (1.0 percent from -0.9 percent, y-o-y) showed strengthened growths. The upbeat performance was driven by increased production of corn, coconut, and pineapple<sup>8</sup>. However, despite the improvements, the agriculture sector remains as the lowest contributor to GDP with only 7.2 percent share. The sector contributed 0.23 percentage points to GDP growth (see Table 3).

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



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

<sup>8</sup> <http://www.neda.gov.ph/statement-of-socioeconomic-planning-secretary-on-the-performance-of-the-philippine-economy-for-the-third-quarter-of-2019/>

### ***Challenges facing the economy***

- **Peso-dollar exchange rate continues to appreciate<sup>9</sup>.** The peso strengthened by 0.64 percent to average ₱51.74/US\$1, on a quarter-on-quarter basis, from the previous average of ₱52.07/US\$1. Likewise, on a year-on-year basis, peso appreciated by 3.48 percent, from the previous year's ₱53.54/US\$1 average. The appreciation was mainly because market anticipation of interest rate reduction by the US Federal Reserve. The sustained inflows of foreign exchange from overseas Filipino remittances, foreign direct investments, business process outsourcing receipts, adequate level of country's Gross International Reserves, and the Philippines' robust economic growth served as support to the peso. Nevertheless, there remains challenges that cause volatility to the peso-dollar exchange rate, such as lingering trade conflict between US and China, attack in Saudi Arabia's oil facilities, as well as weak business activity data from large European economies.
- **Unfavorable economic conditions may adversely affect the Philippine economy<sup>10</sup>.** External factors such as (a) forecasts of slower global growth, (b) lingering US-China trade tensions, (c) geopolitical tensions, and (d) volatilities in global oil market serve as impending risks the Philippine economy. Moreover, internal factors such as (a) sluggish output in agriculture, (b) expectations of elevated pork prices caused by the African swine fever, and (c) proposed adjustments in excise taxes on oil, tobacco, and alcoholic beverages challenge the resiliency of the domestic financial system.

### ***Other economic news***

- **Stock market increases in PSEi<sup>11</sup>.** At the close of the third quarter, PSEi reported a quarter-on-quarter uptick of 1.3 percent with an average index points of 7,988.57. The upward movement in the main index was mainly caused by the country's favorable inflation environment which led to the Central Bank easing its monetary policy stance.
- **Headline inflation rate edges lower but y-t-d inflation abide by government's targets<sup>12</sup>.** Third quarter inflation reported a further decreased headline value of 1.7 percent, which was lower than the quarter- and year-ago rates of 3.0 percent and 6.2 percent, respectively. While Q3 2019's headline inflation fell below National Government's target range of 3.0 percent  $\pm$  1.0 percentage point, the y-t-d average inflation registered at 2.8 percent, remaining within target. In September, inflation was recorded at 0.9 percent, lowest since May 2016. During the quarter, lower food inflation accounted for the majority of the decline. With (a) continued implementation of non-monetary policy actions to increase domestic food supply and stabilize prices, (b) base effects, (c) stable global crude oil prices, (d) lower electricity prices, (e) easing domestic rice and other food prices, and (f) weaker global economic prospects, mean inflation forecasts for 2019 and 2020 are expected to be lower at 2.7 percent and 3.1 percent, respectively.

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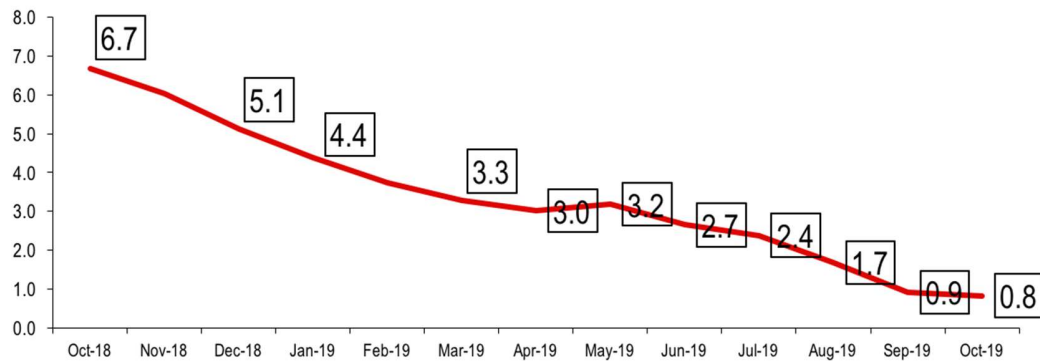
<sup>9</sup> [http://www.bsp.gov.ph/downloads/Publications/2019/IR3qtr\\_2019.pdf](http://www.bsp.gov.ph/downloads/Publications/2019/IR3qtr_2019.pdf)

<sup>10</sup> [http://www.bsp.gov.ph/downloads/Publications/2019/IR3qtr\\_2019.pdf](http://www.bsp.gov.ph/downloads/Publications/2019/IR3qtr_2019.pdf)

<sup>11</sup> [http://www.bsp.gov.ph/downloads/Publications/2019/IR3qtr\\_2019.pdf](http://www.bsp.gov.ph/downloads/Publications/2019/IR3qtr_2019.pdf)

<sup>12</sup> [http://www.bsp.gov.ph/downloads/Publications/2019/IR3qtr\\_2019.pdf](http://www.bsp.gov.ph/downloads/Publications/2019/IR3qtr_2019.pdf)

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



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

- Consumer outlook rebounded to optimism across all income groups<sup>13</sup>.** Overall confidence index (CI) changed to a positive territory at 4.6 percent from negative boundaries of -1.3 percent and -7.1 percent the previous quarter and previous year, respectively. The optimistic sentiment was due to expectations of (a) improvements in the peace and order situation, (b) availability of more jobs, (c) additional and high income, and (d) good governance. The quarter and year ahead seem more upbeat as the CIs soared to 15.9 percent and 29.8 percent, respectively.
- Business outlook reflected weaker sentiments<sup>14</sup>.** Overall confidence index (CI) decreased to 37.3 percent from 40.5 percent the previous quarter. The weaker sentiment was due to (a) seasonal factors such as slack in the demand and slowdown of business activities during the rainy season, (b) decline in orders leading to lower sales, (c) lack of supply of raw materials, (d) perceived unfavorable effects of various government policies, and (e) stiffer competition. However, CI is expected to improve in the next quarter due to expectations of (a) higher consumer demand during the holiday and harvest seasons, (b) continued increases in orders and projects, (c) more favorable macroeconomic conditions, (d) higher government spending, and (e) business expansion.
- Year-to-date economic growth is 5.8 percent, slightly below the lower-bound of the 2019 full-year growth target<sup>15</sup>.** After two consecutive quarters of slowdown in economic growth, the Philippine economy climbed to 6.2 percent in 3Q 2019, resulting to a y-t-d growth of 5.8 percent. Withstanding the fact that the y-t-d growth is below the national government's target growth range of 6.0 percent to 7.0 percent, the Philippine economy has to expand by at least 6.7 percent in the fourth quarter to achieve the low-end of the target for 2019. According to NEDA, the government is confidently embarking on the challenge to meet the target by the end of the year.

<sup>13</sup> [http://www.bsp.gov.ph/downloads/Publications/2019/CES\\_3qtr2019.pdf](http://www.bsp.gov.ph/downloads/Publications/2019/CES_3qtr2019.pdf)

<sup>14</sup> [http://www.bsp.gov.ph/downloads/Publications/2019/BES\\_3qtr2019.pdf](http://www.bsp.gov.ph/downloads/Publications/2019/BES_3qtr2019.pdf)

<sup>15</sup> <http://www.neda.gov.ph/statement-of-socioeconomic-planning-secretary-on-the-performance-of-the-philippine-economy-for-the-third-quarter-of-2019/>



**Table 1. Philippine Economic Indicators**

Philippines Economic Data											
Monthly Leading Indicators	Dec-18	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19
Consumer Price Index (y-o-y, %)	5.1	4.4	3.7	3.3	3.0	3.2	2.7	2.4	1.7	0.9	0.8
Exports (y-o-y, %)	-12.2	-6.7	-0.1	-1.8	1.0	3.3	3.5	0.8	-2.6	...	...
Imports (y-o-y, %)	-4.9	3.6	2.6	7.8	-1.9	-5.2	-10.4	-4.2	-8.8	-10.5	...
Trade Balance, US\$ million	-4,170	-3,920	-2,744	-3,100	-3,469	-3,298	-2,370	-3,393	-2,679	-3,119	...
Total Reserves (less gold), US\$ billion	71	74	74	75	76	77	77	77	78	78	78
Policy Rate	4.75	4.75	4.75	4.75	4.75	4.5	4.5	4.5	4.25	4	...
Fiscal Balance (million pesos)	-81,042	44,537	-76,373	-58,409	86,872	2,564	-41,838	-75,296	-2,488	-178,557	...
Quarterly/Annual Economic Indicators	2014	2015	2016	2017	1Q2018	2Q2018	3Q2018	4Q2018	1Q2019	2Q2019	3Q2019
Real GDP (y-o-y, %)	6.2	6.1	6.9	6.7	6.5	6.2	6.0	6.3	5.6	5.5	6.2
- Private Consumption	5.6	6.3	7.0	5.9	5.6	6.0	5.3	5.3	6.1	5.5	5.9
- Government Consumption	3.3	7.6	8.4	6.2	13.6	11.9	14.3	12.6	7.4	7.3	9.6
- Gross Capital Fixed Formation	4.4	18.4	23.7	9.4	10.3	20.0	19.6	4.9	8.0	-8.5	-2.1
Current Account (% of GDP)	4.4	2.9	-0.4	-0.7	-0.4	-4.0	-2.1	-2.6	-1.5	-0.2	...
Financial Account ( US\$ million)	10,084	2,523	175	-2,798	-816	-1,627	-1,621	-3,768	-4,711	-225	...
- Net Direct Investments, US\$ million	789	-122	-5,883	-6,952	-1,025	-2,672	-1,360	-797	-1,074	-666	...
- Net Portfolio Investments, US\$ million	2,460	4,757	1,480	2,454	1,612	1,021	-500	-1,275	-1,795	-1,343	...
Overall BOP position (US\$, million)	-2,858	2,616	-1,038	-863	-1,227	-2,030	-1,879	2,830	3,797	991	...
Unemployment rate	6.8	6	5.1	5.7	5.3	5.4	5.1	5.1	5.2	5.1	...
Others	Nov-18	Dec-18	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19
Overseas Filipinos' Remittances (US\$, million)	2,326	2,849	2,484	2,301	2,514	2,441	2,609	2,290	2,581	2,589	2,379
... = not available											

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



Table 2. Level of Philippine GDP, 2018Q3 – 2019Q3

	<b>Nominal GDP</b>		<b>Real GDP</b>	
	(million current pesos)		(million constant pesos)	
	<b>2018Q3</b>	<b>2019Q3</b>	<b>2018Q3</b>	<b>2019Q3</b>
<b>Agriculture</b>	<b>366,229</b>	<b>352,973</b>	<b>164,445</b>	<b>169,506</b>
Agriculture and Forestry	306,049	292,826	135,181	139,956
Fishing	60,180	60,148	29,264	29,550
<b>Industry</b>	<b>1,217,361</b>	<b>1,275,892</b>	<b>739,410</b>	<b>781,022</b>
Mining and Quarrying	35,877	32,768	16,511	15,706
Manufacturing	728,578	717,421	488,464	500,264
Construction	332,571	399,087	151,661	176,350
Electricity Gas and Water Supply	120,334	126,616	82,774	88,701
<b>Services</b>	<b>2,641,892</b>	<b>2,874,768</b>	<b>1,316,231</b>	<b>1,406,839</b>
Transport Communication and Storage	238,099	256,331	146,829	160,175
Trade and Repair of Motor Vehicles Motorcycles Personal	859,298	937,075	405,776	438,449
Financial Intermediation	357,208	399,322	165,482	181,961
Real Estate Renting & Bus. Actvt	586,842	627,788	273,613	285,054
Public Administration & Defense: Compulsory Social Security	191,180	209,490	97,318	102,490
Other Services	409,265	444,764	227,214	238,711
<b>Sum = GDP</b>	<b>4,225,482</b>	<b>4,503,634</b>	<b>2,220,086</b>	<b>2,357,366</b>

Source: Philippine Statistics Authority





**Table 3. Industry Contributions to Philippine GDP Growth, 2018Q3 – 2019Q3**

	<b>TRAD</b>	<b>GEAD</b>		<b>GEAD</b>
	<b>GDP Growth</b>			<b>GDP Growth</b>
	<b>PGE*</b>	<b>PGE*</b>	<b>PCE*</b>	<b>PGE* + PCE*</b>
	(percent)	(percent)	(percent)	(percent)
		(1)	(2)	(1)+(2)
<b>GDP Growth</b>	<b>6.18</b>	<b>6.18</b>	<b>0.00</b>	<b>6.18</b>
<b>Industry Growth Contribution</b>				
<b>Agriculture</b>	<b>0.23</b>	<b>0.23</b>	<b>1.57</b>	<b>1.80</b>
Agriculture and Forestry	0.22	0.22	1.39	1.60
Fishing	0.01	0.01	0.18	0.19
<b>Industry</b>	<b>1.87</b>	<b>1.87</b>	<b>-4.59</b>	<b>-2.71</b>
Mining and Quarrying	-0.04	-0.04	0.19	0.16
Manufacturing	0.53	0.53	-4.22	-3.69
Construction	1.11	1.11	0.41	1.53
Electricity Gas and Water Supply	0.27	0.27	-0.97	-0.70
<b>Services</b>	<b>4.08</b>	<b>4.08</b>	<b>3.02</b>	<b>7.10</b>
Transport Communication and Storage	0.60	0.60	-1.23	-0.63
Trade and Repair of Motor Vehicles Motorcycles Personal	1.47	1.47	1.84	3.32
Financial Intermediation	0.74	0.74	0.78	1.52
Real Estate Renting & Bus. Actvt	0.52	0.52	1.91	2.42
Public Administration & Defense: Compulsory Social Security	0.23	0.23	0.19	0.42
Other Services	0.52	0.52	-0.47	0.05

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.