

BSP-PIDS Research Forum:
*Resilient Legs for Economic Recovery
in the Post-Pandemic Era*

Labor Productivity, Real Wages in Services and the Growth in IT-BPMs in the Philippines

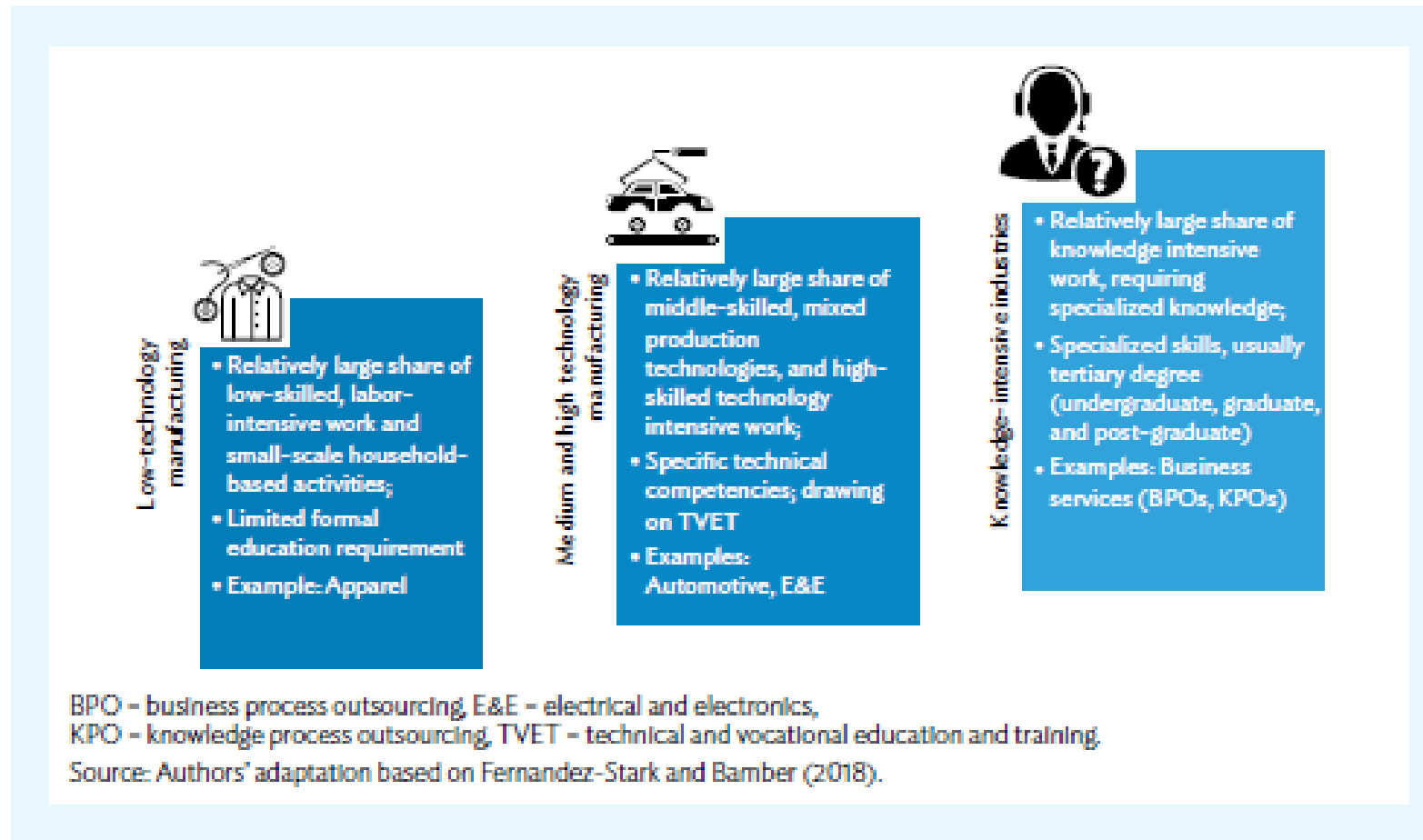
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27 October 2021

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Introduction: IT-BPMs and the GVC in Services

Workforce Composition Across Global Value Chains , or “trade-in-tasks”

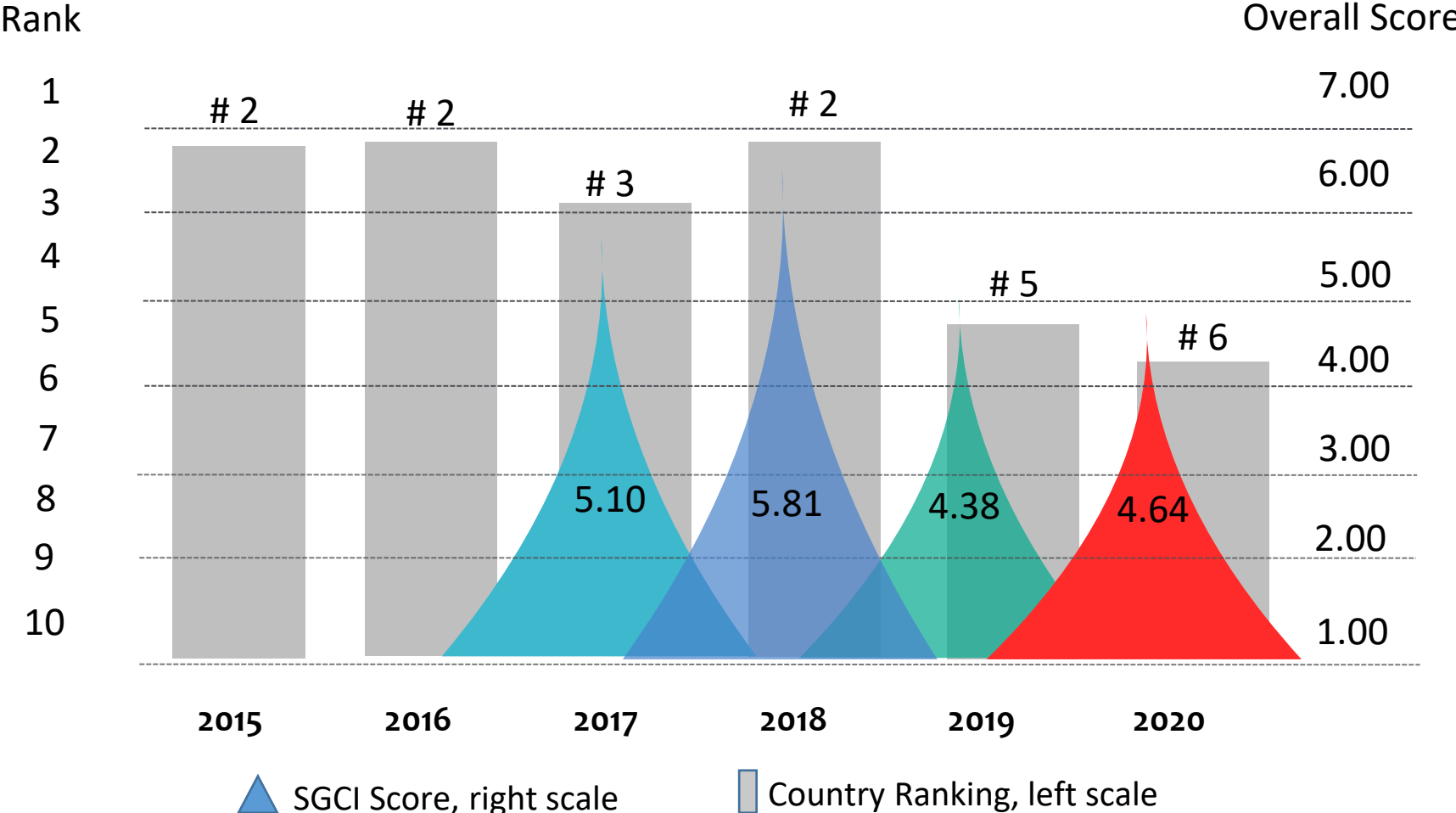


Source: TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING IN THE PHILIPPINES IN THE AGE OF INDUSTRY 4.0, March 2021, ADB

The Philippine's comparative advantages in human capital made it a best fit for BPOs



Tholons Service Globalization Country Index (SGCI) Scores and Ranking for the Philippines, 2015 to 2020



The Philippines has been faring well in global rankings:

- 2nd in Top 50 Digital Nations in the World (Tholons Services GCI, 2018)
- Top 7 (A.T. Kearney GSLI, 2014 to 2017)
- Industry leader (2017)

In 2020, four developed economies overtook developing countries like the Philippines in rankings

The 2020 index has a higher emphasis on digital innovation attributes and measures of progress against COVID-19

The Philippine IT-BPM industry has begun to move from BPOs and into higher value-added services or KPOs in response to global trends and automation.



Business Process Outsourcing

Information Technology Outsourcing

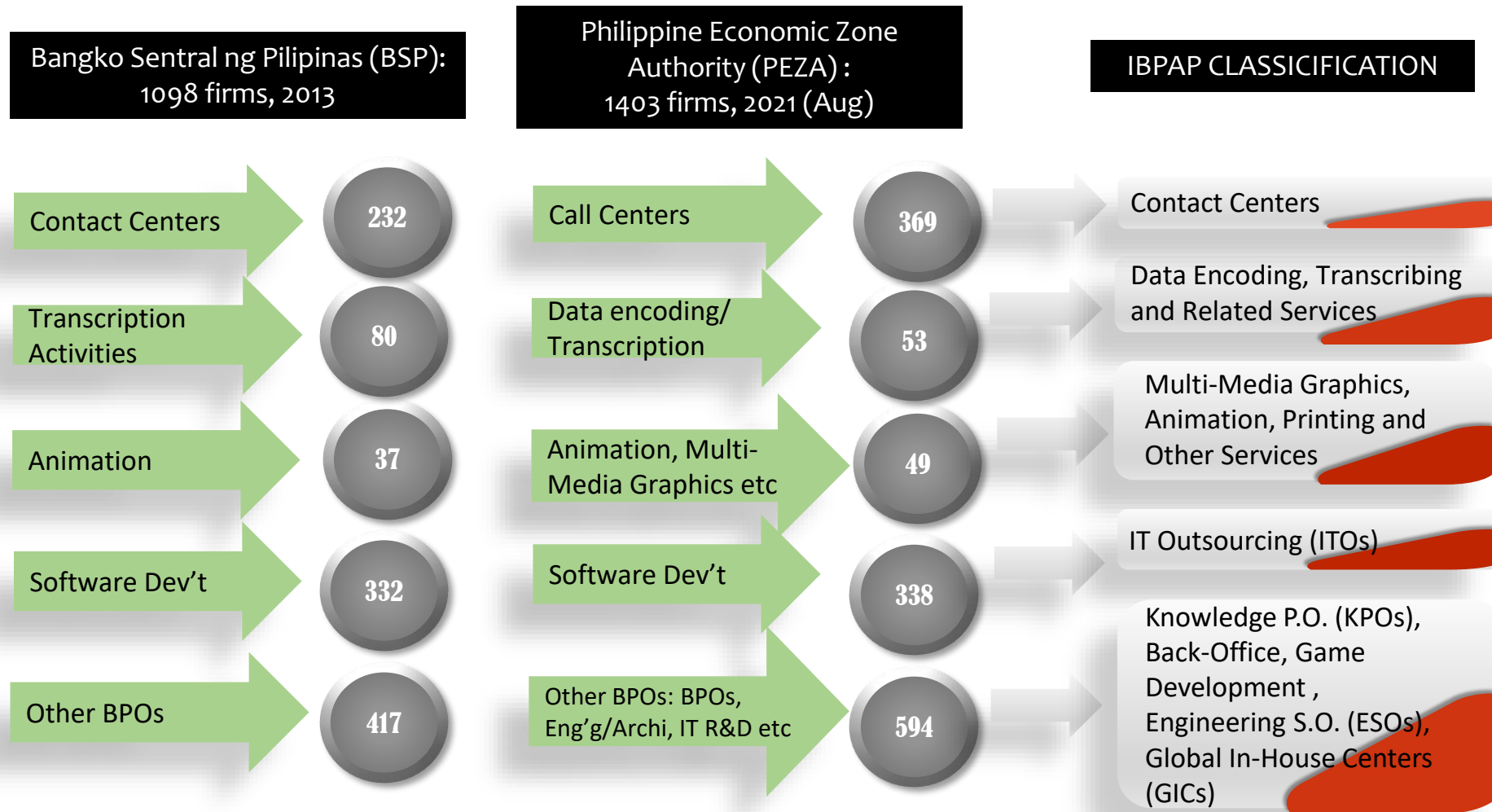
Knowledge Process Outsourcing

Involves	Back office or front office operations - data entry, customer care, finance and accounting, transcription, website services, HR support and payroll processing	IT outsourcing is the use of external service providers to effectively deliver IT-enabled business process, application service and infrastructure solutions for business outcomes.	Knowledge based - market research, equity research, legal process management, medical content & services and education and publishing
About	Size and volume and efficiency	Efficiency and depth of knowledge	Depth of knowledge, experience and judgment
Services	Low-end	Mid- to High-End	High-end
Employee qualification	Basic qualification with expertise in process	Skilled employees with technical knowledge	Skilled employees with expert knowledge
Based on	Rules	Efficiency and some judgement	Judgment
Driven by	Volume	Speed and functionality	Insights
Relies on	Cost arbitrage	Both cost and knowledge arbitrage	Knowledge arbitrage

Adapted from: <https://www.managedoutsource.com/what-is-kpo-how-is-it-different-from-bpo.htm>

Scope of the Philippine IT-BPM Industry: Number of Firms

Three Data Sources and Three Classifications



Motivation and Research Question



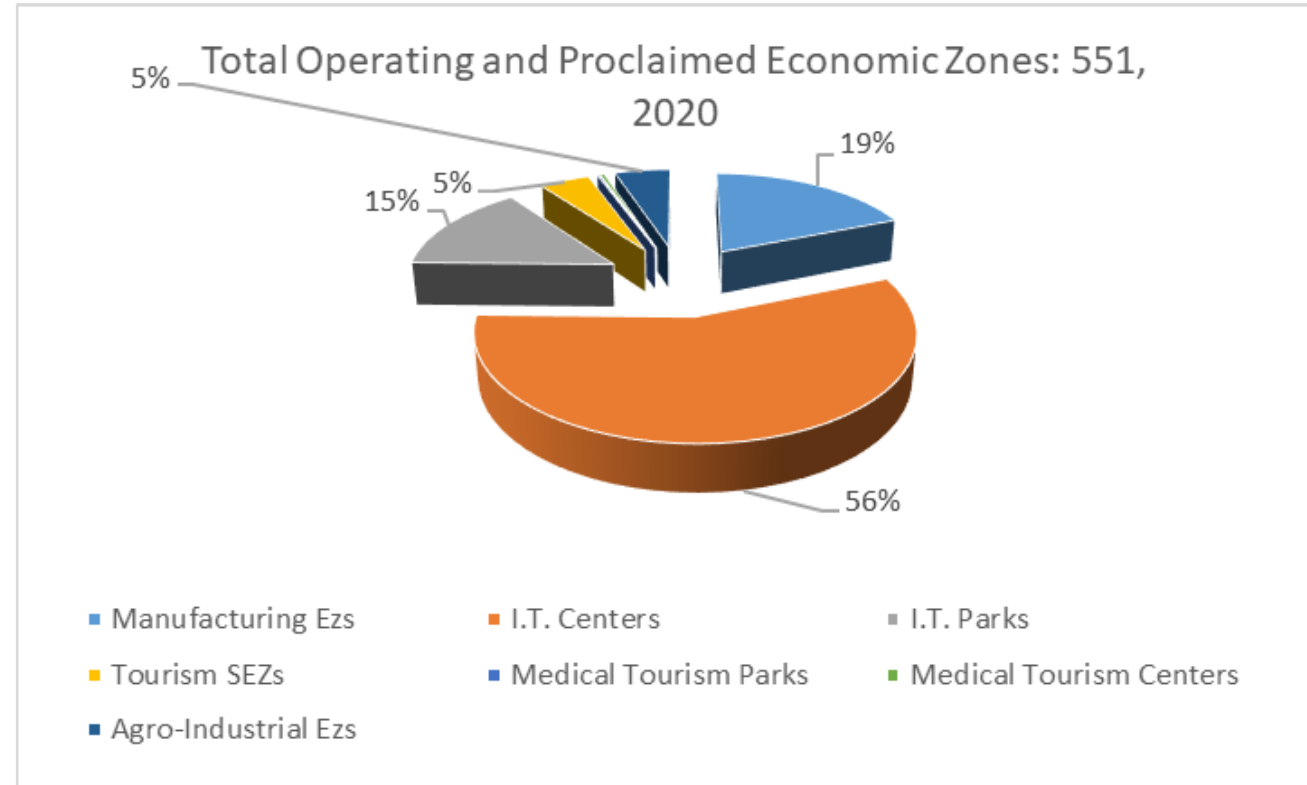
The Philippine IT-BPMs Moving from BPO to ITO to KPO, has been associated with growth in value added, higher employment, upskilling and growth in exports from 2007 to 2020

Given that the main comparative advantages of IT-BPM is in terms of human capital (low labor cost, highly skilled workforce, English proficiency and culture compatibility and adaptability), does the sector's growth have any impact on labor productivity and real wages?

Some Stylized Facts

From only 16 public and private economic zones between 1969 to 1994, there are currently 551 operational and proclaimed Export Processing Zones (EPZs) in the country as of Dec 2020.

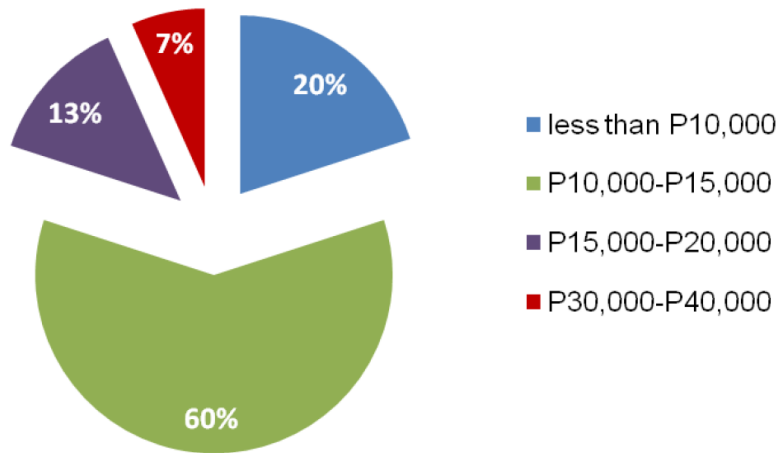
Out of that number, 311 or 56% are I.T. centers, and 15% are I.T. parks.



Some Stylized Facts

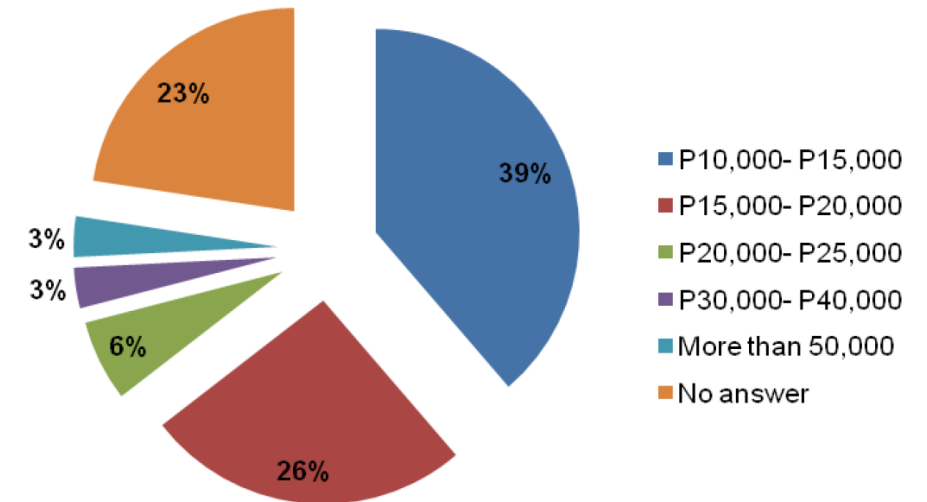
Based on a case study by EILER in 2009, 60% of respondents reported monthly salary in BPOs was between P10,000 to P15,000.

Monthly salary of BPO Workers in Damosa IT Park, Davao City



Majority of the respondents worked five days a week. Most are also working flexible shifts. But all of them worked 9 hour shifts, which included 1 hour and 30 minutes of break time. Almost half (46 percent) worked compulsory overtime.

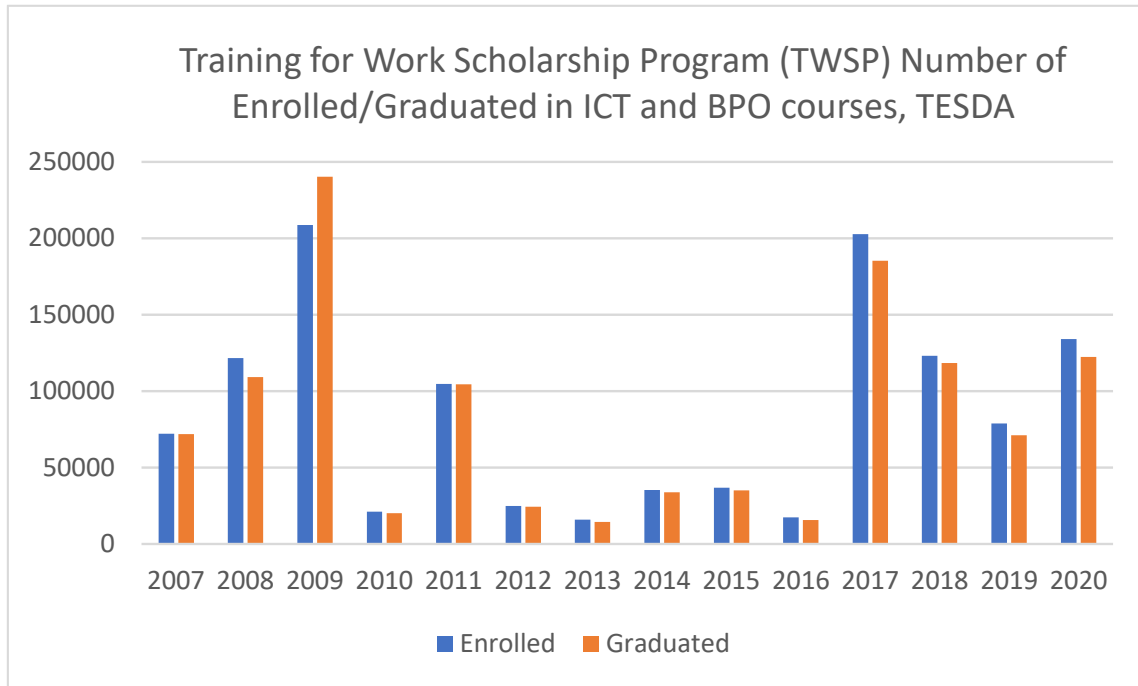
Monthly salary of BPO Workers in UP Ayala Technohub in Metro Manila



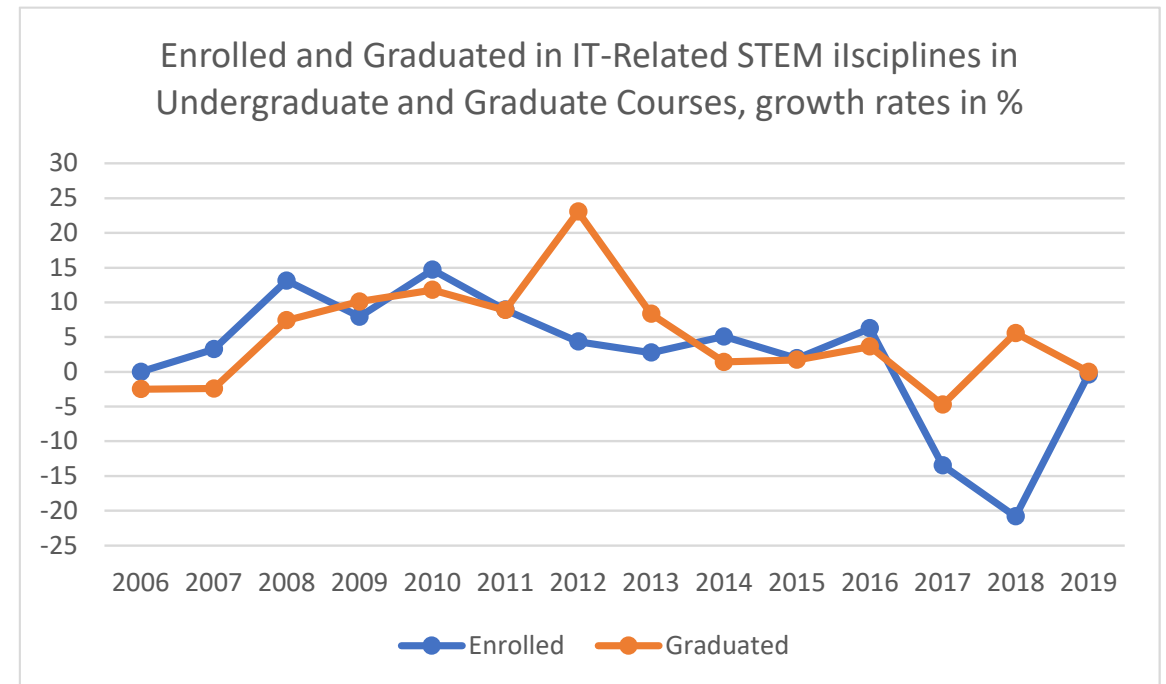
Source: (EILER), 2009. Modern Day Sweatshops in the Service Sector: Business Process Outsourcing (BPO) in the Philippines, Ecumenical Institute for Labor Education and Research, Inc. Manila

Some Stylized Facts

Education in STEM, CHED and Skills Training in ICT and BPOs, TESDA



Source: TVET Statistics, TESDA website



Source: PIDS, CHED

Some Stylized Facts

ICT-BPM Related courses and certification in TESDA Centers

Technical Education and Skills Development Authority (TESDA) courses on Information Technology (IT) and Communication Technology for 2020

ICT Courses

- Web Development using CSS3 and HTML5
- Animation (3D Digital)
- SMART Android Mobile Apps Development (for beginners)
- SMART Technopreneurship 101
- Basic Computer Operation

Microsoft Online Courses

- Android 4.0 for Programming in Java
- Android Development (for beginners)
- C# Fundamentals (for beginners)
- Developing 2D and 3D games with *Unity*
- Developing 2D Games with HTML5
- Game Development
- Game Production Basics
- Software Development Fundamentals
- Udacity – Google Courses
- Udemy Courses
- UX Design for Mobile Developers

Source: <https://announcement.ph/free-tesda-courses/>

Qualification Title	Date Promulgated
Contact Center Services NC II	10/01/14
Medical Transcription NC II	10/26/06
2D Animation NC II	07/27/07
3D Animation NC III	
Animation NC II	11/22/07
Cable TV Installation NC II	
Cable TV Operation and Maintenance NC III	12/19/07
Visual Graphic Design NC III	12/19/07
Broadband Installation (Fixed Wireless Systems) NC II	08/29/08
Telecom OSP and Subscriber Line Installation (Copper Cable/POTS and DSL) NC II	10/07/11
Telecom OSP Installation (Fiber Optic Cable) NC II	
2D Game Art Development NC III	05/09/12
3D Game Art Development NC III	09/17/12
Game Programming NC III	
Programming (.Net Technology) NC III	12/17/13
Programming (Java) NC III	
Programming (Oracle Database) NC III	
Medical Coding and Claims Processing NC III	06/16/15

Source: TESDA (2017). Dimming or Brightening: Current Views on Effects of Automation and the US Anti-Outsourcing Bill to the Philippine IT-BPM Industry. Labor Market Intelligence Report, TESDA. 2017.

Theoretical Framework

- The literature provides several mechanisms to explain the linkages between real wages, productivity and output of industries linked to GVCs (Eryilmaz and Bakir, 2018; Yildirim, 2015; Kumar, 2012).
 - Positive link between real wages and labor productivity
 - Traditional theory suggests that productivity determines real wages. Evolution of wages is not only influenced by labor productivity but also by other factors, for instance, unemployment and worker's reservation wage. Blanchard and Katz (1999) proposed the following specification:

$$(w_t - p_t^e) = \beta y_t + r_t + u_t + \varepsilon_t$$

where w_t is the nominal wage rate, p_t^e is the expected price level at time t , y is labor productivity, r is the reservation wage, u is the unemployment rate. The coefficient on the productivity term is expected to be positive, as suggested by the marginal productivity theory. The coefficient of the unemployment term is expected to be negative.

- Other theories argue that the causality goes from real wages to productivity (Shapiro and Stiglitz, 1984; Akerlof, 1982; Dal Bó et al., 2012)
 - **Efficiency wage theory** - a firm that pays wages above market-clearing levels could induce workers to increase their efficiency or productivity

Theoretical Framework

- Positive link between output/exports and productivity
 - Export-led growth models stress that exports are a key factor in promoting productivity (Kunst and Marin, 1989; Wagner, 2005;)
 - Specialization in sectors with comparative advantage increases productivity
 - Exports lead to economies of scale
 - Exposure to international competition prompts innovation and technological change
 - Exports stimulates productivity via externalities on other sectors
 - Other theories suggest that more productive firms self-select into export markets (Wagner, 2005; Bernard and Jensen 1995; Hallward-Driemeier, et al., 2002)

Empirical Literature

- On Sectors in GVCs and productivity
 - **Pattnayak and Chadha (2019)** – used a fixed effect model using data for the period 2001 to 2016 to show, among other things, that the age of an Indian IT firm is positively and significantly related to GVC participation, invoking the claim of Balik and Gort (1993) that experience gained over time may lead to increased productive efficiency
 - **Urata and Baek (2019)** – employed ordinary least squares and two-stage least squares on manufacturing sector data of 47 countries for the period 1995 to 2011 to establish the benefits of GVC participation to total factor productivity growth
 - **Kummritz (2016)** – demonstrated that a 1% increase in GVC participation (from forward linkages) led to 0.33% higher labor productivity
 - **Asada (2020)** – showed that for Vietnam, FDI, capital goods imports, and exports are positively related in the long-run to labor productivity growth, by using ARDL bounds testing on data from 1990 to 2017.
- On Sectors in GVCs and wages
 - **Paweenawat (2019)** – analyzed 32 industries in Thailand to show those that “had higher engagement in GVCs have higher wages for workers”
 - **Parteka and Wolszczak-Derlacz (2019)** – among other things, found an inverse though weak relationship between GVC participation of an industry and corresponding wage levels
 - **Baldwin and Yan (2014)** – showed for 2002 to 2006, Canadian manufacturing firms with significant GVC participation “paid higher wages”

Empirical Approach

- The autoregressive distributed lag (ARDL) model is used to estimate relationships between (economic) variables in a single-equation time series setup.
- The ARDL / EC model is useful for forecasting and disentangling long-run relationships from short-run dynamics, and is best for relatively short time series data.
- Cointegration of nonstationary variables is equivalent to an error correction (EC) process; the ARDL model has a reparameterization in EC form (Engle and Granger, 1987; Hassler and Wolters, 2006).

ARDL(p, q, \dots, q) model:

$$y_t = c_0 + c_1 t + \sum_{i=1}^p \phi_i y_{t-i} + \sum_{i=0}^q \beta'_i \mathbf{x}_{t-i} + u_t,$$

$p \geq 1$, $q \geq 0$, for simplicity assuming that the lag order q is the same for all variables in the $K \times 1$ vector \mathbf{x}_t .

Alternative EC parameterization (ardl option ec1):

$$\begin{aligned} \Delta y_t = & c_0 + c_1 t - \alpha(y_{t-1} - \boldsymbol{\theta}' \mathbf{x}_{t-1}) \\ & + \sum_{i=1}^{p-1} \psi_{yi} \Delta y_{t-i} + \boldsymbol{\omega}' \Delta \mathbf{x}_t + \sum_{i=1}^{q-1} \psi'_{xi} \Delta \mathbf{x}_{t-i} + u_t, \end{aligned}$$

Data and sources (Available Sample: Annual data from 2007-2020)

1. ADB's Multiregional Input-Output Tables for "corrected" Value Added Data

- ❖ ADB augmented the World Input-Output Tables (Timmer et al., 2015) in order to facilitate analysis related to the Asia and the Pacific Region
- ❖ 19 Asian economies were added into the WIOTs for the years 2000, 2007 to 2019
- ❖ This has facilitated the production and analysis of global value chain-related statistics for a total of 25 Asian economies
- ❖ GVC Analysis points to a case of double-counting in export earnings and hence underestimated bilateral trade deficit: top exports are also top "importers" being a participant in GVCs
- ❖ Calculated labor productivity in IT-BPMs using VA from ADB MRIOT divided by employment in IT-BPM related sectors from PSA

2. PSA Data on Labor Productivity (only for Services), Employment, Real Wages and the IT-BPM Sector (from ASPBI)

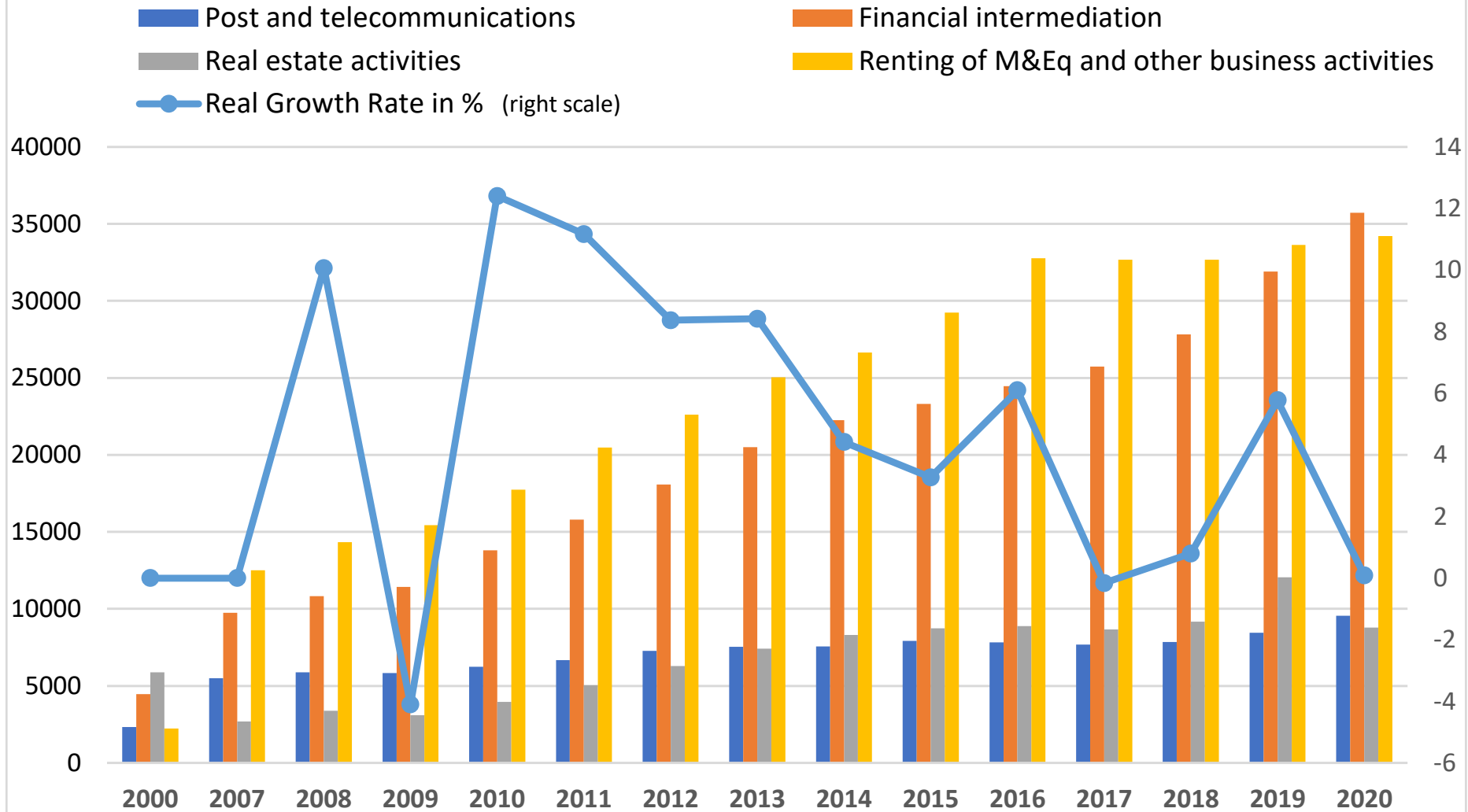
3. BSP (older) and IBPAP (newer) Data on FDI, Revenues, Employment, and Compensation

4. TESDA for data on enrollment/graduates in ICT/BPO courses; UNCTAD for LF_HCI data

Industry Classifications in ADB MRIOT

Code	35-sector aggregation	Code	15-sector aggregation	Code	5-sector aggregation
1	Agriculture, hunting, forestry, and fishing	1	Agriculture, hunting, forestry, and fishing	1	Primary
2	Mining and quarrying	2	Mining and quarrying	1	Primary
3	Food, beverages, and tobacco	3	Light manufacturing	2	Low-technology manufacturing
4	Textiles and textile products	3	Light manufacturing	2	Low-technology manufacturing
5	Leather, leather products, and footwear	3	Light manufacturing	2	Low-technology manufacturing
6	Wood and products of wood and cork	3	Light manufacturing	2	Low-technology manufacturing
7	Pulp, paper, paper products, printing, and publishing	3	Light manufacturing	2	Low-technology manufacturing
8	Coke, refined petroleum, and nuclear fuel	4	Heavy manufacturing	3	Medium- to high-technology manufacturing
9	Chemicals and chemical products	4	Heavy manufacturing	3	Medium- to high-technology manufacturing
10	Rubber and plastics	3	Light manufacturing	2	Low-technology manufacturing
11	Other nonmetallic minerals	3	Light manufacturing	3	Medium- to high-technology manufacturing
12	Basic metals and fabricated metal	4	Heavy manufacturing	3	Medium- to high-technology manufacturing
13	Machinery, nec	4	Heavy manufacturing	3	Medium- to high-technology manufacturing
14	Electrical and optical equipment	4	Heavy manufacturing	3	Medium- to high-technology manufacturing
15	Transport equipment	4	Heavy manufacturing	3	Medium- to high-technology manufacturing
16	Manufacturing, nec; recycling	3	Light manufacturing	2	Low-technology manufacturing
17	Electricity, gas, and water supply	5	Utilities	2	Low-technology manufacturing
18	Construction	6	Construction	2	Low-technology manufacturing
19	Sale, maintenance, and repair of motor vehicles and motorcycles; repair of motor vehicles and motorcycles	7	Trade services	4	Business services
20	Wholesale trade and commission trade, except of motor vehicles and motorcycles	7	Trade services	4	Business services
21	Retail trade, except of motor vehicles and motorcycles; repair of household appliances	7	Trade services	4	Business services
22	Hotels and restaurants	8	Hotels and restaurants	4	Business services
23	Inland transport	9	Transport services	4	Business services
24	Water transport	9	Transport services	4	Business services
25	Air transport	9	Transport services	4	Business services
26	Other supporting and auxiliary transport activities; activities of travel agencies	9	Transport services	4	Business services
27	Post and telecommunications	10	Telecommunications	4	Business services
28	Financial intermediation	11	Financial intermediation	4	Business services
29	Real estate activities	12	Real estate, renting, and business activities	4	Business services
30	Renting of M&Eq and other business activities	12	Real estate, renting, and business activities	4	Business services
31	Public administration and defense; compulsory social security	13	Public administration and defense	5	Personal and public services
32	Education	14	Education, health, and social work	5	Personal and public services
33	Health and social work	14	Education, health, and social work	5	Personal and public services
34	Other community, social, and personal services	15	Other personal services	5	Personal and public services
35	Private households with employed persons	15	Other personal services	5	Personal and public services

Business Services in IT-BPOs: Value-Added at Basic Prices from ADB-MRIOT (US\$ million, current prices)



Industry Classifications from the PSA:

1. PSA's Annual Survey of Philippine Business and Industry (ASPBI) of IT-BPMs

List of IT-BPM Industries in the Philippines

2009 PSIC	Industry Description
BPM under Information and Communication Sector	
J58190	Other publishing activities
J58200	Software Publishing
J59110	Motion picture, video and television programme activities*
J59120	Motion picture, video and television programme post-production activities*
J62010	Computer programming activities
J62020	Computer consultancy and computer facilities management activities
J62090	Other information technology and computer service activities
J63111	Data processing
J63112	Website hosting services
J63113	Application hosting services
J63120	Web portals
BPM under Administrative and Support Service Activities Sector	
N78103	On-line employment placement agencies
N82211	Customer relationship management activities
N82212	Sales and marketing (including telemarketing) activities
N82219	Other call centers activities (voice), n.e.c.
N82221	Finance and accounting activities
N82222	Human resources and training activities
N82223	Administrative support activities
N82224	Document processes activities
N82225	Payroll maintenance and other transaction processing activities
N82226	Medical Transcription activities
N82227	Legal services activities
N82228	Supply chain management activities
N82229	Other back office operations activities, n.e.c.
N82291	Engineering outsourcing activities
N82292	Product development activities
N82293	Publishing outsourcing activities
N82294	Research and analysis activities
N82295	Intellectual property research and documentation activities
N82296	Security outsourcing activities
N82299	Other non-voice related activities, n.e.c.

* - includes animation production and post-production activities only

2. IT-BPM related Subsectors under GVA in Services from the National Income Accounts and Employment by Industry Classification:

04. Information and communication

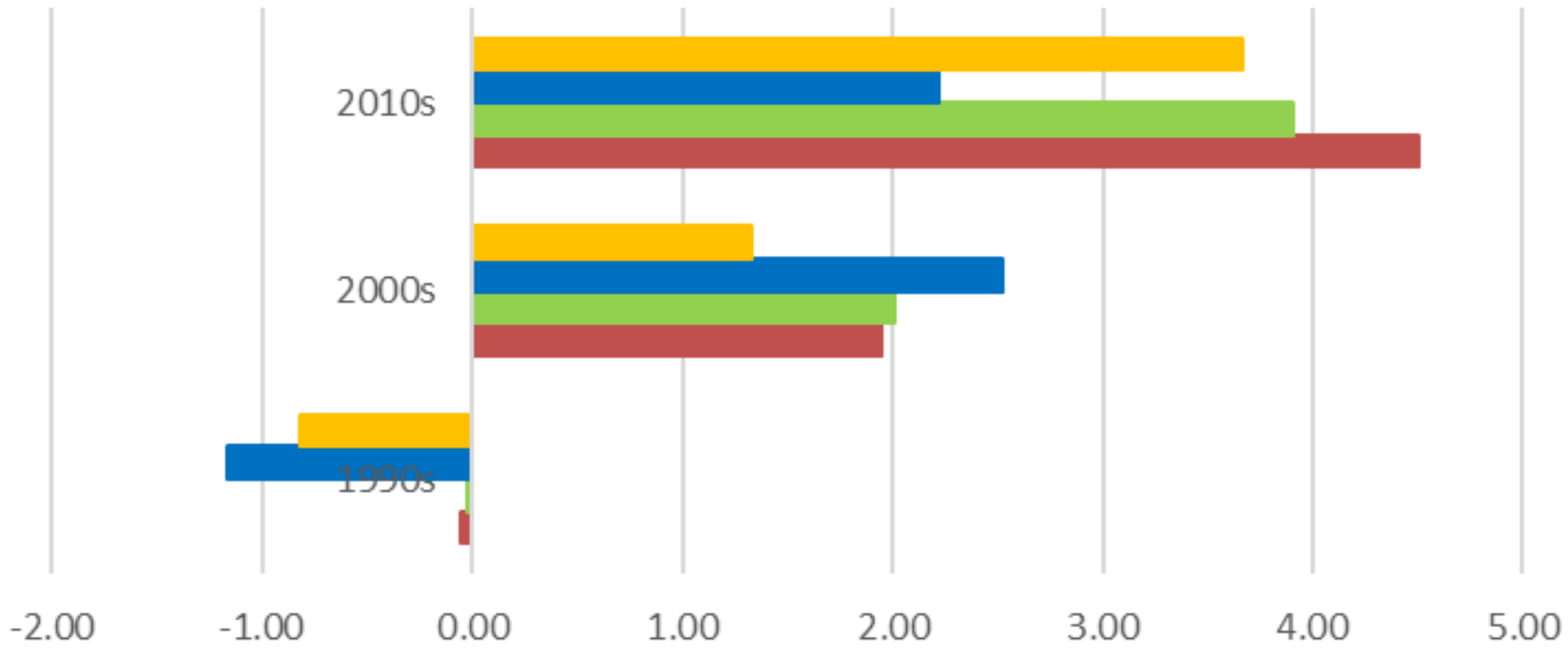
05. Financial and insurance activities

06. Real estate and ownership of dwellings

07. Professional and business services

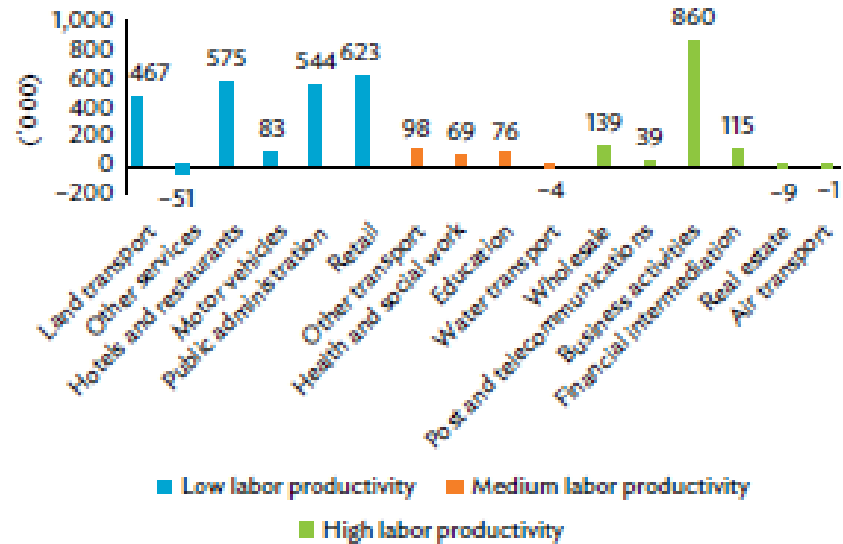
Average Labor Productivity, by Sector, 1990s-2010s (growth rate, %)

Services Industry Agriculture, Forestry and Fishing ALL SECTORS



Source: Philippine Statistics Authority

Net Employment Growth by Labor Productivity Group, 2010–2017



Sources: ADB estimates based on labor force survey; the ADB Multi-Regional Input-Output Database

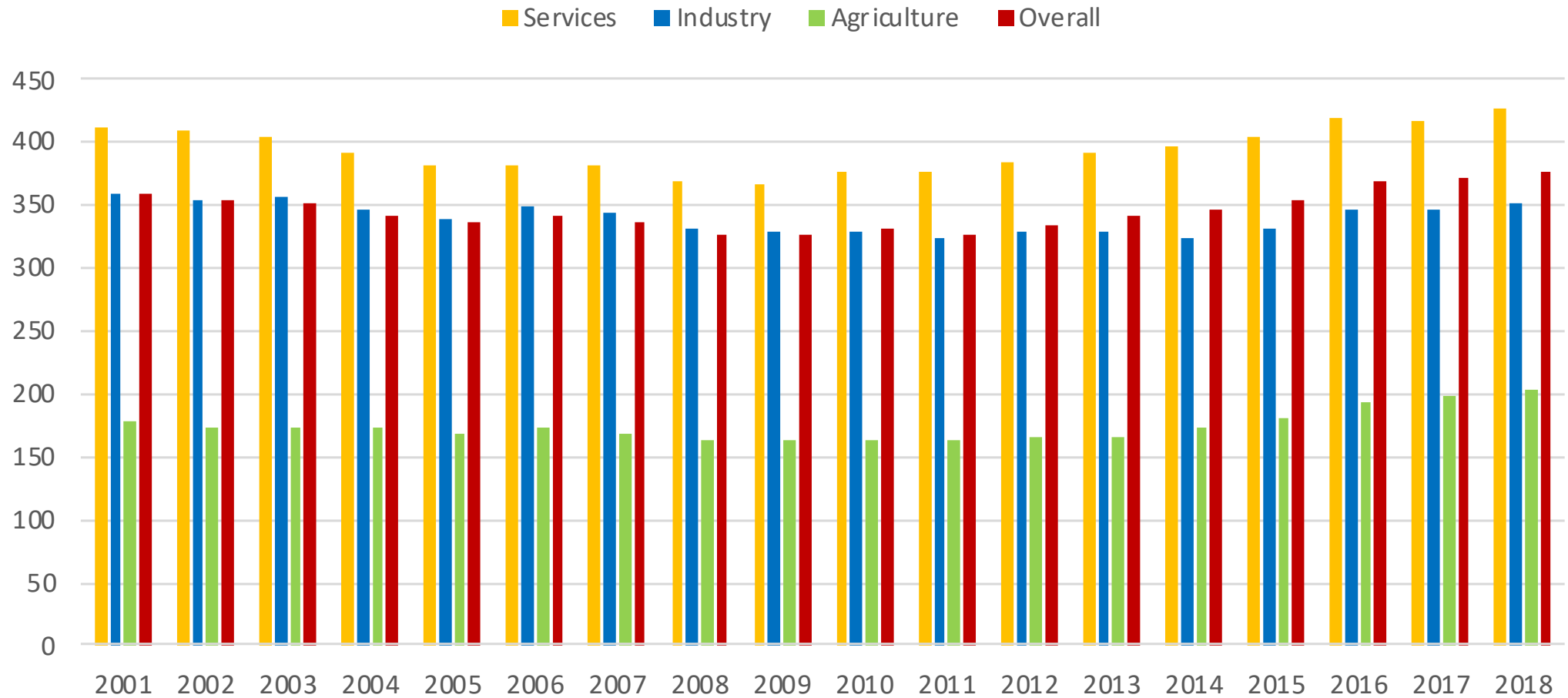
Average Annual Employment Growth Rate in Services by Labor Productivity Group, 2010–2017



Source: ADB estimates based on labor force survey, and ADB Multi-Regional Input-Output Database.

Source: TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING IN THE PHILIPPINES IN THE AGE OF INDUSTRY 4.0, March 2021, ADB

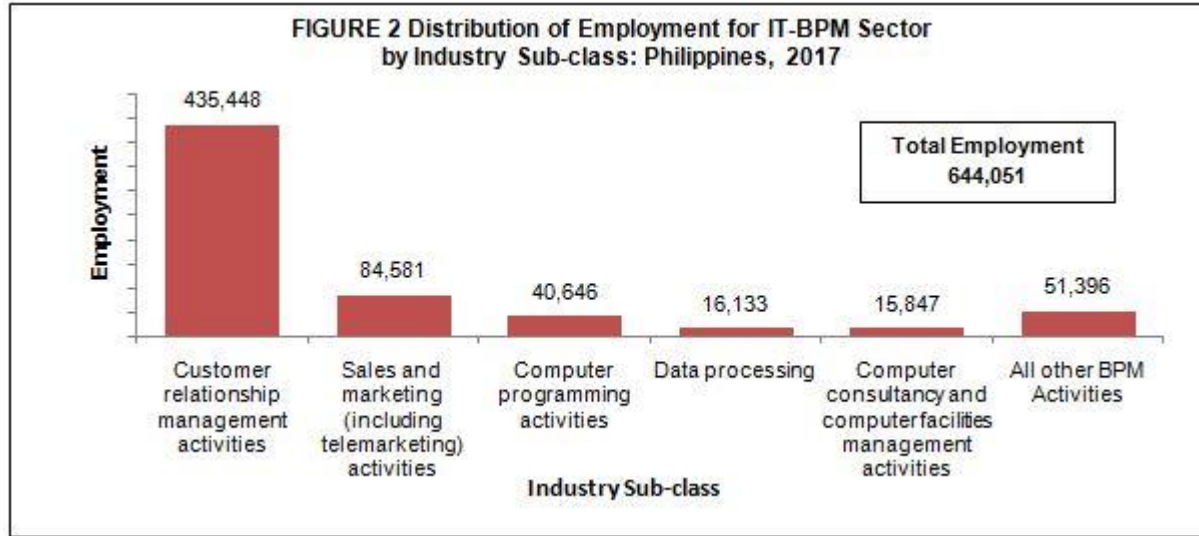
Average real daily basic pay 2001-2018 (2012 PHP)



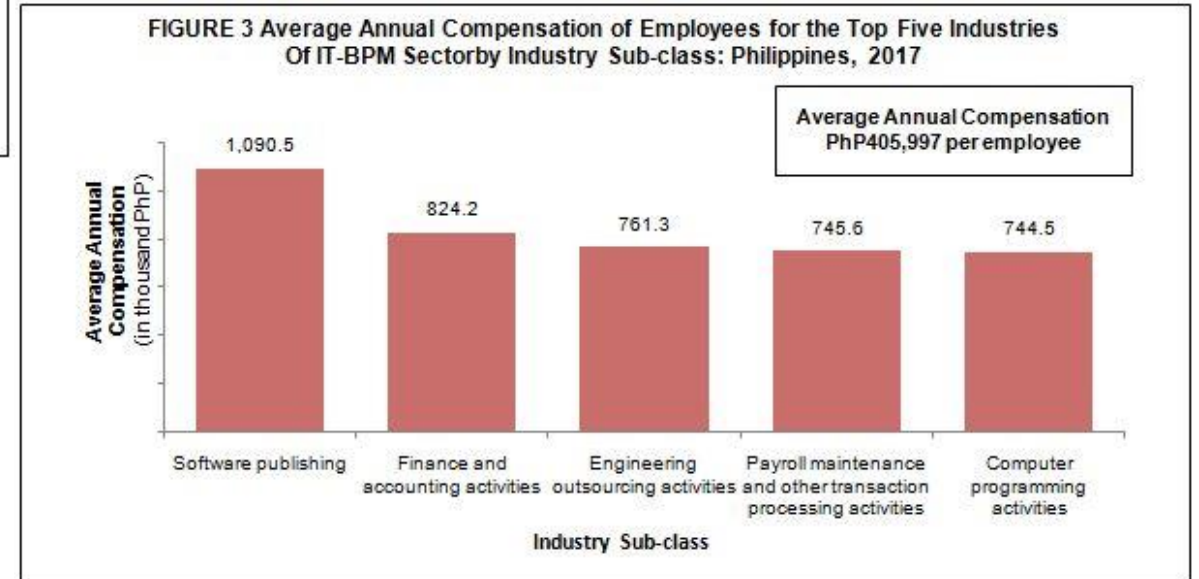
Source: Decent Work Statistics (DeWS)-Philippines Publication Tables 1995-2018, PSA

Distribution of Employment and Per Worker Compensation in IT-BPMs

Latest data from the Annual Survey of Philippine Business and Industry (ASPBI), released in January 2020



Source: Philippine Statistics Authority



Source: Philippine Statistics Authority

Preliminary Results - ARDL

- Evidence from preliminary ARDL estimation indicates that growth in the output of the IT-BPM sector is a **positive determinant** of IT-BPM labor productivity and of real wages (except in Model 2.2)
- Labor productivity of IT-BPM is also a **positive determinant** of real wages
- The exchange rate has a **positive contemporaneous effect** on IT BPM labor productivity in Model 1.1, but in lagged values the results can be positive or negative
- FDI in IT-BPM has a **small positive effect** on real wages, but a **small negative effect** on labor productivity
- TESDA enrollees/graduates of ICT/BPO courses has a **positive impact** on labor productivity and real wages

ARDL (Short-run dynamics; bounds test results); All variables in log except ER				
	Model 1.1	Model 1.2	Model 2.1	Model 2.2
<i>Cointegration present for these Variables as Dependent</i>				
	Labor Productivity		Value Added from MRIOT	
<i>Dependent Variable</i>	Labor Productivity (LP) ¹	Labor Productivity (LP) ¹	Real Wages in NCR(RealW)	Real Wages in NCR(RealW)
<i>Dynamic Regressors</i>	LP (-1)***	LP (-1)***	RealW(-2)	RealW(-2)
Coeff	-1.35	-0.38	-0.32	-0.40
t-stats	-9.48***	-1.84	-4.73*	-5.44*
	GVC Value Added in IT BPM sectors (GVC VA)	GVC VA	GVC VA	GVC VA
Coeff	0.69	0.27	1.78	-0.005
t-stats	6.38**	1.46	6.29*	-0.010
	GVC VA (-1)	GVC VA (-1)	GVC VA (-1)	GVC VA (-1)
Coeff	0.36	-1.57	-2.54	-1.487
t-stats	3.75*	-3.78	-6.95*	-4.03*
	GVC VA (-2)	GVC VA (-2)	GVC VA (-2)	GVC VA (-2)
Coeff	0.39	2.13	2.78**	3.435
t-stats	3.83*	6.25*	11.34	10.20**
	Exchange Rate (ER)	ER	Labor Productivity (LP) ¹	Labor Productivity (LP) ²
Coeff	0.02	-0.018	2.05	2.478
t-stats	7.58***	-4.64*	6.24*	5.97*
	ER (-1)	ER (-1)	LP(-1)	LP(-1)
Coeff	-0.05	-0.041	0.60	-4.03
t-stats	-12.45***	-4.40	2.46	1.49
	ER (-2)	ER (-2)	LP (-2)	LP (-2)
Coeff	0.00	0.026	-3.66	-0.005
t-stats	2.59***	3.577	-13.34**	-12.64**
<i>Fixed Regressors</i>				
	FDI in Professional, Scientific and Technical	Enrolled in TWSP-ICT (ICT enrol)	Graduated in TWSP-ICT (ICT grad)	FDI in Information and Communication
Coeff	-0.00078	0.030	0.039432	0.000349
t-stats	-12.37***	5.60*	4.30*	3.62*
Adjusted Rsquared	1.000	0.999	0.99	0.99
Akaike Information Criterion	-9.485	-8.564	-6.50	-6.18

Granger Causality Tests

Granger Causality Tests: Productivity vs Output, Real Wages NCR and Out NCR

Pairwise Granger Causality Tests

Date: 10/25/21 Time: 17:05

Sample: 2007 2021

Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
GVCVALADD does not Granger Cause PRODYBPMCALGVC	11	5.42595	0.0451
PRODYBPMCALGVC does not Granger Cause GVCVALADD		0.59967	0.5789

Pairwise Granger Causality Tests

Date: 10/25/21 Time: 17:03

Sample: 2007 2021

Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
PRODYBPMCALGVC does not Granger Cause REALWAGNCR	11	0.56138	0.5977
REALWAGNCR does not Granger Cause PRODYBPMCALGVC		5.06150	0.0515

Pairwise Granger Causality Tests

Date: 10/25/21 Time: 17:08

Sample: 2007 2021

Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
REALWAGOUTNCR does not Granger Cause PRODYBPMCALGVC	11	4.99938	0.0527
PRODYBPMCALGVC does not Granger Cause REALWAGOUTNCR		0.34437	0.7218

Granger Causality Tests: Exports, Real wages and Productivity—[For Further Study](#)

Pairwise Granger Causality Tests

Date: 10/21/21 Time: 22:45

Sample: 2007 2021

Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
LPRODYBPMCALGVC does not Granger Cause LEXPBPMGVC	11	0.66734	0.5474
LEXPBPMGVC does not Granger Cause LPRODYBPMCALGVC		3.74330	0.0881

Pairwise Granger Causality Tests

Date: 10/21/21 Time: 22:48

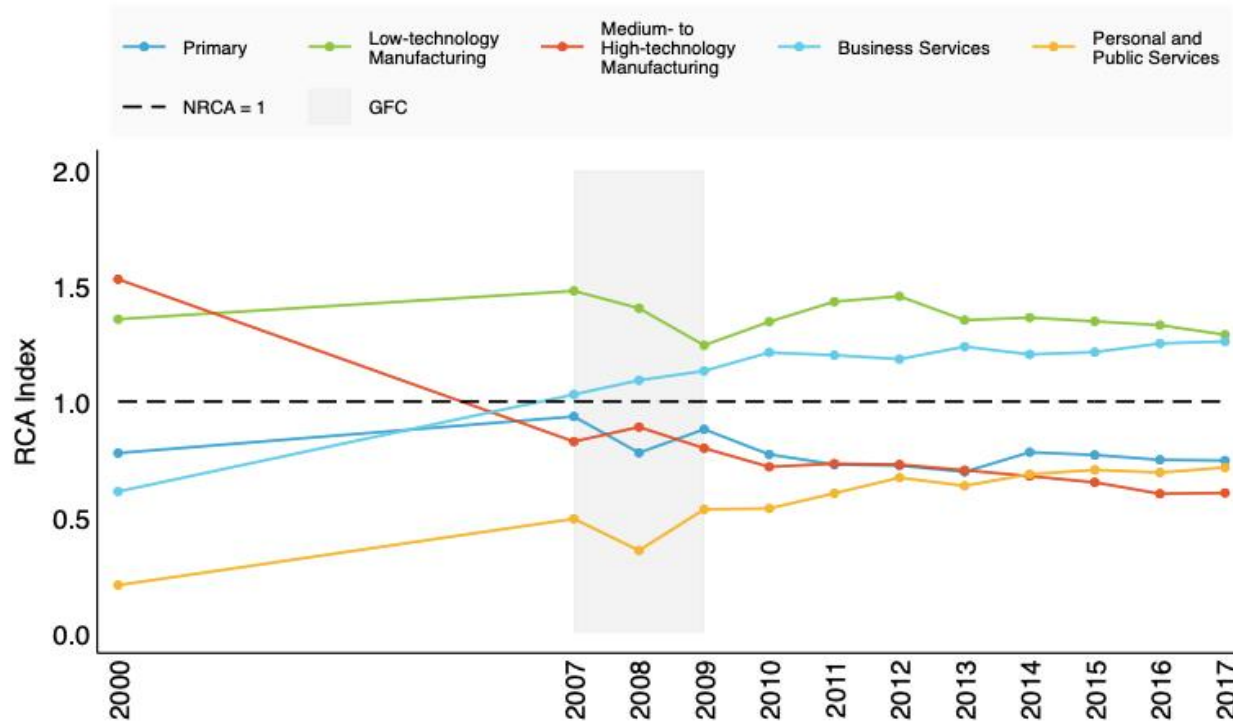
Sample: 2007 2021

Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
LEXPBPMGVC does not Granger Cause LREALWAGNCR	12	3.94445	0.0713
LREALWAGNCR does not Granger Cause LEXPBPMGVC		0.84940	0.4675

CONCLUSION

Revealed Comparative Advantage by Sector
Philippines, 2000, 2007-2017



Source: Authors' estimates based on WWZ (2018) using ADB-MRIO (2000, 2007-2017).

Extracted from the ADB-MRIOT

Source: Asian Development Bank

- Given the positive impact of IT-BPM output growth and ICT/BPO education and training on labor productivity, the PHI IT-BPM appear to have the opportunity to improve labor productivity further mainly via **upskilling and human capital investment within the short to medium-term**.
- Higher productivity could help move up the sector in the global value chain in business services—this, in turn, ensures the industry’s competitiveness in the post-pandemic era.
- Revealed comparative advantage (RCA) based on ADB-MRIOT portray how much RCA has been lost by the PHI electronics export sector (which falls under Medium to High-Technology Mfg; see slide 18). This was compensated for, in almost mirror-image, by RCA gains in PHI ICT/Business services where IT-BPMs belong.

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Thank You.

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