

Bayudan-Dacuycuy, Connie; Vargas, Anna Rita P.; Luzon, Paola Ellaine D.

Working Paper

Returns to professional licenses and education-occupation (mis)matching

PIDS Discussion Paper Series, No. 2025-32

Provided in Cooperation with:

Philippine Institute for Development Studies (PIDS), Philippines

Suggested Citation: Bayudan-Dacuycuy, Connie; Vargas, Anna Rita P.; Luzon, Paola Ellaine D. (2025) : Returns to professional licenses and education-occupation (mis)matching, PIDS Discussion Paper Series, No. 2025-32, Philippine Institute for Development Studies (PIDS), Quezon City, <https://doi.org/10.62986/dp2025.32>

This Version is available at:

<https://hdl.handle.net/10419/339142>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.



Photo from the Professional Regulation Commission (<https://www.prc.gov.ph>)



Philippine
Institute for
Development
Studies



EDCOM2
The Second Congressional
Commission on Education

Returns to Professional Licenses and Education–Occupation (Mis)matching

*Connie G. Bayudan–Dacuycuy, Anna Rita P. Vargas,
and Paola Ellaine D. Luzon*

The PIDS Discussion Paper Series constitutes studies that are preliminary and subject to further revisions. They are being circulated in a limited number of copies only for purposes of soliciting comments and suggestions for further refinements. The studies under the Series are unedited and unreviewed. The views and opinions expressed are those of the author(s) and do not necessarily reflect those of the Institute. The Institute allows citation and quotation of the paper as long as proper attribution is made.

This study is carried out with support from the Second Congressional Commission on Education (EDCOM II).

CONTACT US:

RESEARCH INFORMATION DEPARTMENT
Philippine Institute for Development Studies

18th Floor, Three Cyberpod Centris – North Tower
EDSA corner Quezón Avenue, Quezon City, Philippines



<https://www.pids.gov.ph>



publications@pids.gov.ph



(+632) 8877-4000

Returns to Professional Licenses and Education-Occupation (Mis)matching

Connie G. Bayudan-Dacuycuy, Anna Rita P. Vargas, and
Paola Ellaine D. Luzon

Philippine Institute for Development Studies

November 2025

Abstract

Cognizant of the persistent concerns about the lack of alignment of skills and education with industry and occupation needs, this paper investigates returns to professional licenses alongside education-occupation matching. It also analyzes the effects of individual and higher education attributes on basic pay. Results indicate that individual and school characteristics matter, but *labor market experiences and structural mismatches play greater roles* in determining pay premiums. *There are observed payoffs in possessing a license when education and occupation credentials align.* Beyond reforms in the education sector, policies are needed to ensure that education and learning translate to desirable labor market outcomes.

Keywords: labor market outcomes, returns to professional licenses, higher education institutions, education-occupation match, skill mismatch, overeducation, work experience

Table of Contents

1. Introduction	1
2. Review of Literature, Methodology, Data, and Variables	3
3. Findings	8
4. Ways Forward	10
5. References.....	12
Appendices.....	15

List of Tables

Table 1: Takers and passers of licensure examinations.....	1
Table 2: Programs, enrollment, and graduation.....	2
Table 3: Licensed and unlicensed workers, by employment status and occupation type	2
Table 4: Estimates of overeducated 22-60-year-old degree holders, by 1-digit PSOC.....	5
Table 5: Occupational distribution of educational courses, %	5
Table 6: Share of licensed workers (%), by education-occupation matching among graduates of courses requiring licensure examinations	6
Table 7: Difference of daily basic pay (php), by 1-digit PSCED	7
Table 8: Difference of daily basic pay based on PSCED-PSOC matching, in PhP	7
Table 9: Difference of daily basic pay based on worker and occupation type, in PhP	8
Table 10: Marginal effects of licenses and occupation type.....	9
Table 11: Marginal effects of licenses and education-occupation match	10

Returns to professional licenses and education-occupation (mis)matching

Connie G. Bayudan-Dacuycuy, Anna Rita P. Vargas, and Paola Ellaine D. Luzon¹

1. Introduction

The importance of credentials in labor market outcomes has been a decades-long research subject, and the literature is replete with studies estimating returns (e.g., Mincer, 1958), analyzing wage determinants (e.g., Willis, 1986), and computing wage differentials (e.g., Katz and Autor, 1999). Among the credentials, educational attainment consistently exhibited importance in these outcomes (see Heckman et al 2003). Regulations like licensing also occupied an important space in the wage determination literature due to the high percentage of regulated occupations, which is approximately 31% in Japan (Morikawa, 2018), 29% in the US (Kleiner and Krueger, 2013), and 28% in New Zealand (Greenwood and Menclov 2018). Meanwhile, estimates for developing economies are scant.

In the Philippines, professional regulations are thriving. As of October 2022, the Professional Regulation Commission (PRC), the country's licensing and regulatory agency for the practice of regulated professions, currently has 45 professional regulatory boards (PRB) spanning fields such as business, education, health, and engineering, among others. The PRB oversees the practice and ethical standards of its respective professions and also has the authority to grant accreditation to its professional organizations (PRC, n.d.-a).

Table 1: Takers and passers of licensure examinations

	Takers			Passers			Passing rate, %	
	2013	2023	10-year CAGR, %	2013	2023	10-year CAGR, %	2013	2023
Total	407084	589926	3.8	160472	298959	6.4	39.4	50.7
<i>Start of regulation</i>								
On or before 1969	148758	210109	3.5	64575	116904	6.1	43.4	55.6
1970s	241806	343401	3.6	87991	162131	6.3	36.4	47.2
1980s	292	1292	16.0	202	798	14.7	69.2	61.8
1990s	8130	18507	8.6	3283	7337	8.4	40.4	39.6
2000s	442	4756	26.8	189	3366	33.4	42.8	70.8
2010s	790	11861	31.1	326	8423	38.4	41.3	71.0

Source: Takers and passers data: Professional Regulation Commission, as published in Philippine Statistical Yearbooks (2015, 2018, 2020-2024). Accessed on September 11, 2025 from <https://psa.gov.ph/philippine-statistical-yearbook>. Year of regulation: Authors' compilation

Out of the 57 PRC-monitored licensure examinations, 58% have been regulated on or before 1969, 11% in the 1970s and 1990s, and 5%, 7%, and 9% in the 1980s, 2000s, and 2010s, respectively. Moreover, the number of licensure examination takers has increased by around 4%, with examinees in more recently regulated professions growing at a rate higher than the national average (Table 1). Specifically, the number of examinees in professions regulated in the 2000s and 2010s has increased approximately eight times the national average. These trends are also observed for successful examinees in more recently regulated professions, which have

¹ Senior Research Fellow, Research Specialist, and Research Analyst at the Philippine Institute for Development Studies, respectively. The authors would like to thank Lucita M. Melendez for her valuable assistance.

grown approximately 5-6 times more than the national average. Moreover, the passing rates of these cohorts are higher than the national rate and are the highest among the decadal cohorts.

In addition, from 2005 to 2021, the number of programs with licensure examinations increased by approximately 19%, which is nearly twice the growth rate of non-board programs (Table 2). Enrollment in board programs also increased by around 61%, although graduation rates decreased by around 27%.

Table 2: Programs, enrollment, and graduation

	2005	2021	Growth rate, 2005-2021 %	Share, 2005 %	Share, 2021 %
<i>Programs</i>					
Without a licensure exam	11294	12410	9.9	55.4	57.1
With a licensure exam	9085	10777	18.6	44.6	44.8
<i>Enrollment in programs</i>					
Without a licensure exam	1120462	1961503	75.0	45.0	47.3
With a licensure exam	1368823	2203306	60.9	55.0	56.5
<i>Graduation in programs</i>					
Without a licensure exam	193509	159177	-17.7	46.0	48.8
With a licensure exam	227369	167215	-26.5	54.0	51.2

Source: Programs, enrollment, and graduation: CHED administrative data shared by the EDCOM2 Secretariat to PIDS.

Licensure examination: Authors' identification of PSCEDs with licensure examinations.

In the labor market front, 47 occupations, approximately 11% of those listed in the 2024 LFS, are licensed² (see Appendix 1 for the list). Among the employed 22–60-year-old degree holders in 2024, around 29% are licensed (Table 3). However, there are also license holders among the unemployed (20%) and among those not in the labor force (18%). Disaggregated by occupations requiring or not requiring a license (hereafter referred to as occupation type), approximately 78% of those in licensed occupations are license holders. Despite this high match, there are license holders who work in occupations that do not require license credentials (around 18%).

Table 3: Licensed and unlicensed workers, by employment status and occupation type

Employment status	Workers who are:	Total	%	Working in Occupations:	Workers who are:	Total	%
Employed	Unlicensed	6077534	70.8	Requiring a license	Unlicensed	389062.2	21.6
	Licensed	2512181	29.2		Licensed	1411703	78.4
Unemployed	Unlicensed	617551.8	80.1	Not requiring a license	Unlicensed	8277437	82.4
	Licensed	153557.2	19.9		Licensed	1769266	17.6
Not in the labor force	Unlicensed	1385316	82.3				
	Licensed	297718.6	17.7				

Source: Authors' compilation of licensed occupation merged with the 2024 LFS July round.

Notes: Samples are limited to workers aged 22 to 60 degree holders (highest grade completed codes from 60111 to 61099). Armed personnel (1-digit PSOC of 0) are excluded.

The preceding discussion highlights the critical connection between education and the labor market sector within the broader context of professional regulation. Despite the growing importance of licensing, there are few empirical studies available on professional licenses and their impact on labor market outcomes in the Philippines, largely due to a lack of data. Some

² Samples limited to workers aged 22-60 degree holders (highest grade completed code from 60111 to 61099). Armed personnel are removed.

studies analyzing the determinants of passing rates among nurses include Bautista (2019) and Amanonce and Maramag (2020). The former highlights the importance of class size and student-to-faculty ratio, while the latter underscores the role of academic achievement in passing the nurse licensure examination. Relative to the domestic market, accountancy, nursing, education, and engineering have higher returns overseas (Lupdag-Padama (2014).

Thus, this research aims to provide an updated analysis of the license pay premium by accounting for mismatches in the labor market. Vertical mismatch, or overeducation, is a significant concern, with one in five workers with tertiary education credentials engaged in occupations that primarily require basic skills (Bayudan-Dacuycuy and Dacuycuy 2021). Horizontal mismatch is also an issue, with around seven in 10 graduates not employable in their chosen occupation due to inadequate skills (Aspiring Minds 2017). Thus, licensing, while theorized to increase wages by limiting the supply of practitioners (Kleiner and Krueger 2013; Kleiner 2000), may have heterogeneous effects on the pay premium depending on structural mismatches. While the focus centers on the license and education-occupation match, the paper also considers factors at the individual and higher education institutions (HEI) levels.

Using the Heckman estimator, results indicate that individual and HEI characteristics matter, but labor market experiences and structural mismatches play greater roles in shaping labor market outcomes. There are observed payoffs in possessing a license when education and occupation credentials align. Beyond reforms in the education sector, policies are provided to ensure that education and learning translate to desirable labor market outcomes.

2. Review of literature, methodology, data, and variables

Professional licensing, or the right to practice professions, dates to Adam Smith's articulation in *Wealth of Nations* that masters of their crafts can limit the intake of new apprentices to reduce the number of experts and increase wages (Kleiner 2000). Viewed through an administrative lens, licensing entails gatekeepers (i.e., licensing regulatory boards) who enforce entry requirements and ensure the quality of services provided by the profession (Gittleman, 2014). Viewed using an economic perspective, scholars noted that licensing can only be effective through the creation of monopoly rents. As a disciplining device, rents mean high opportunity costs when shifting careers. As a motivating device, rents incentivize higher human capital investments (Morikawa, 2018) and the provision of quality services (Gittleman 2014). Several studies indicate that licensed workers have wage premiums and a higher probability of employment relative to their unlicensed counterparts (Gittleman et al., 2014; Greenwood and Menclova, 2018; Kleiner and Wang, 2023; Kleiner and Krueger, 2013; Kleiner, 2000).

Mismatches, such as the discrepancy in education and skill levels required by the job, can result in wage penalties. The impact of licenses on wages is heterogeneous depending on the alignment of the field of study with the occupation. Studies demonstrated this heterogeneity between low-education and high-education occupations (Kleiner 2000), standard and non-standard employments (Morikawa 2018), and among different fields of study (Lemieux 2014).

As an empirical strategy, the paper employs the Heckman selection estimator, which is typically used to account for sample selection bias in wage determination (Heckman 1979). Sample selection bias occurs when participation in the labor market is not random, typically due to unobservable attributes like motivation, aspiration, and ability that drive one to work and influence wage outcomes. Failure to account for this bias results in the overestimation or

underestimation of wage estimates. In the current research, the following set-up guides the estimation selection and outcome equations:

$$\text{Working} = f(\text{identification variables, individual attributes, HEI characteristics, labor market situation}) \quad (1)$$

$$\text{Daily pay} = f(\text{individual attributes, HEI characteristics, labor market situation}) \quad (2)$$

Using the 2024 LFS July round, *individual attributes* included only in the selection equation are the father's educational attainment when the sample was 15 years old and an indicator of poverty status. The latter is an index constructed by computing the tetrachoric correlation coefficients of the binary indicators of asset ownership including household appliances (washing machines, oven, induction stove, refrigerator, microwave oven), communication devices (basic cellphone, smart phone, landline/wireless telephone), entertainment paraphernalia (videoke, television, radio), vehicles (bicycle, pedicab, car/jeep/van), draft animals, house ownership, and an indicator for a one-to-one ratio of the number of bedrooms to family size. The overall Kaiser-Meyer-Olkin measure of sampling adequacy was around 0.94, indicating that the data contained similar information suitable for a factor analysis. Applying factor analysis to the correlation coefficients revealed four factors with loadings greater than one. For the research, only the first factor, typically containing the biggest variations, was predicted and normalized by its maximum value. The poor indicator takes the value of 1 if the predicted value is between the first and third quantiles, 0 otherwise.

Individual attributes included only in the outcome equation are work experience (measured in 5-year intervals) and indicators for horizontal matching. The first matching indicator is a binary variable equal to 1 if the occupation requires a license³, 0 otherwise (*lic_psoc*). The second matching indicator is a categorical variable (*match*) equal to 1 if the PSCED matches with the 4-digit PSOC⁴ and is considered matched. The rest are tagged as unmatched and are assigned a value of 2 if identified as workers in elementary occupations, 3 if AFR/craft/machine operators, 4 if Technicians/associate professionals, and 5 if Professionals/managers. Individual attributes commonly found in the selection and outcome equations include age, indicators for being female, on-time graduation, and license holding.

HEI characteristics comprise indicators for private schools and school quality. School quality is assigned a value of 1 if the school is an autonomous or deregulated private school (AY 1994-1995 to AY 2022-2023), a level III or IV SUC as of AY 2016, or if the school has a Center of Excellence/Center of Development; otherwise, it is assigned a value of 0.

Labor market situation is characterized by an indicator of overeducation in the 4-digit PSOC (*overeducation*). Following Verdugo and Verdugo (1989), the difference and sum of the mean and standard deviation of the schooling years are computed to create lower and upper bounds of schooling years, respectively, in each 4-digit PSOC. A worker is overeducated if their schooling years exceed the upper bound and is considered fit if they fall within the bounds. *Overeducation* is calculated as the ratio of the total number of overeducated workers to the total number of workers in each 4-digit occupation code.

Samples are limited to 22-60-year-old-degree holders (i.e., with highest grade completed codes

³ Identified by matching the information on professions with board exam with the 4-digit PSOC in the LFS data.

⁴ e.g., Building and civil engineering (PSCED) and Civil engineers (PSOC) are tagged as matched.

from 60111 to 61099). Armed personnel (1-digit PSOC of 0) are excluded. Using these samples, around 33% of the 8580738 with relevant data are overeducated (Table 4). Among the overeducated graduates, around 49% are service and sales workers, and 12% are workers in elementary occupations.

Table 4: Overeducated 22-60-year-old degree holders, by 1-digit PSOC

	Fit	Overeducated	Overeducated, % of the total overeducated samples
Managers	596774	183604	6.5
Professionals	2159540	10587	0.4
Technicians and Associate Professionals	811156	128207	4.6
Clerical Support Workers	1879568	175722	6.3
Service and Sales Workers	309263	1373129	48.9
Skilled Agricultural, Forestry, and Fishing Workers	2574	178960	6.4
Craft and Related Trade Workers	4609	196374	7.0
Plant and Machine Operators	11005	225003	8.0
Elementary Occupations		334666	11.9
Total	5774487	2806251	

Source: Authors' estimates using the 2024 LFS, July round.

Notes: Samples are limited to workers aged 22-60 degree holders (highest grade completed codes from 60111 to 61099). Armed personnel (1-digit PSOC of 0) are excluded.

The occupational distribution of courses indicates that a large percentage of graduates of education (62%), health and welfare (51%), and humanities/arts (46%) courses are managers and professionals (Table 5). Despite this, a notable percentage of graduates of these courses are either clerical support or service/sales workers (28%, 27%, and 33%, respectively). Moreover, a significantly larger percentage (ranging from 43% to 59%) of graduates in services, social sciences/journalism, information, business administration/law, ICT, and AFR/veterinary courses are employed as clerical support or service/sales workers. Mismatch can plausibly explain the skewed distribution of educational courses towards clerical and support occupations, although the increasing servicification in the country can also be dictating the labor market structure and its needs.

Table 5: Occupational distribution of educational courses, %

<i>1-digit PSCED / 1-digit PSOC</i>	Managers, professionals	Technicians, associate professionals	Clerical support workers	Service and sales workers	Skilled agricultural, forestry, and fishing workers	Craft and related trade workers	Plant and machine operators
Education	62	4	13	15	1	1	1
Humanities/arts	46	11	18	15	2	2	4
SocSci/journ/info	19	11	24	33	3	2	3
BA/law	24	12	38	19	1	1	2
NatSci/math/stat	42	20	18	13	0	4	2
ICT	23	13	34	18	1	3	3
Eng/mfg/const	40	15	12	11	2	8	6
AFR/veterinary	17	13	23	20	12	3	4
Health/welfare	51	17	11	16	2	1	1
Services	15	9	24	35	4	3	4

Source: Authors' estimates using the 2024 LFS, July round.

Notes: Samples are limited to workers aged 22-60 degree holders (highest grade completed codes from 60111 to 61099). Armed personnel (1-digit PSOC of 0) are excluded.

SocSci Social sciences; BA Business administration; NatSci Natural sciences; ICT Information and Communications Technology; Eng/mfg/const Engineering, manufacturing, and construction; SocSci/journ/info Social sciences, journalism, and information; AFR Agriculture, forestry, and resources.

Specific to samples with PSCEDs that have licensure examinations⁵, around 1786710 or 58% of the total sample are licensed (Table 6). Among the licensed, 65% are considered matched to their occupation, and 9% are not matched but are either professionals or managers. Approximately 25% of licensed holders are employed in non-professional/non-managerial positions. These observations underscore the heterogenous labor market outcomes among license holders.

Table 6: Share of licensed workers (%), by education-occupation matching among graduates of courses requiring licensure examinations

Horizontal matching indicator	Unlicensed	Licensed	Share of licensed to the total licensed (%)	Total per match category	Share of licensed to the total per match category (%)
<i>Unmatched</i>					
Workers in elementary Occupations	74826	15241	1	90067	17
Clerical/Service/Skilled AFR/Craft workers/Machine operators	750752	314826	18	1065578	30
Technicians/Associate Professionals	147597	124576	7	272173	46
Professionals/Managers	189445	169150	9	358594	47
<i>Matched</i>					
	150006	1162918	65	1312924	89
<i>Total</i>	<i>1312626</i>	<i>1786710</i>			

Source: Authors' estimates using the 2024 LFS, July round.

Notes: Samples are limited to workers aged 22-60, with PSCED codes identified as having licensure examinations. Armed personnel (1-digit PSOC of 0) are excluded.

To remove the outliers, the 1st and 100th percentiles of the daily basic pay⁶ are also dropped from the sample. By PSCED group, education graduates receive an average pay of PhP946 (Table 7). Except for graduates of natural sciences/mathematics/statistics and health/welfare courses, the average pay of education graduates is significantly higher than those of graduates of other courses, ranging from PhP52 to PhP235.

⁵ Architecture and town planning, Building and civil engineering, Accounting and taxation, Dental studies, Chemistry, Education Science, Training for pre-school teachers, Teacher training without subject specialization, Teacher training with subject specialization, Forestry, Medicine, Nursing and midwifery, Medical diagnostic and treatment technology, Therapy and rehabilitation, Pharmacy, Fashion, interior and industrial design, Library, information and archival studies, Law, Psychology, and Veterinary

⁶ Minimum and maximum daily basic pay before removing the outliers is PhP 76 and PhP 10666, respectively. Minimum and maximum daily basic pay after removing the outliers is PhP 201 and PhP 2583, respectively.

Table 7: Difference of daily basic pay (PhP), by 1-digit PSCED

	Humanities, arts	SocSci, journ, info	BA, law	NatSci, math, stat	ICT	Eng, mfg, const	AFR, veterinary	Health, welfare	Services
Average daily pay	815.715	875.919	793.647	915.64	784.275	893.807	715.644	951.134	711.223
Daily pay difference: Education (PhP 945.804) – Average daily pay	130.09*** [6.33]	69.89*** [17.96]	152.16*** [12.28]	30.16 [37.04]	161.53*** [15.25]	52.00** [16.29]	230.16*** [28.23]	-5.33 [17.62]	234.58*** [17.12]

Source: Authors' estimates using the 2024 LFS, July round.

Notes: */**/** Significant at the 1/5/10% level. Figures in [] are standard errors.

Samples are limited to workers aged 22-60 degree holders (highest grade completed codes from 60111 to 61099). Armed personnel (1-digit PSOC of 0) and the first and 100th percentiles.

SocSci Social sciences; BA Business administration; NatSci Natural sciences; ICT Information and Communications Technology; Eng/mfg/const Engineering, manufacturing, construction; SocSci/journ/info Social sciences, journalism, and information; AFR Agriculture, forestry, and resources

Among the graduates of courses that have licensure examinations, workers with matched education-occupation credentials enjoy higher pay than their unmatched counterparts (Table 8, unconditional test of difference). Despite this, the premium is minimal, at around PHP68 per day, when compared to professionals/managers with unmatched credentials. Expectedly, the pay of workers with matched credentials is substantially higher relative to that of unmatched workers in elementary occupations (PhP557 more). These are rough indications of penalties due to horizontal mismatch.

Table 8: Difference of daily basic pay based on PSCED-PSOC matching, in PhP

	Unmatched, Workers in Elementary Occupations	Unmatched, Clerical, Service, Skilled AFR, Craft Workers, Operators	Unmatched, Technicians, Associate Professionals	Unmatched, Professionals, Managers
Average daily pay	518.4776	723.577	859.41	1006.97
Daily pay difference: Matched PSOC-PSCED (PhP1075.428) – Average daily pay	556.95*** -47.83	351.85*** -14.5	216.02*** -23.86	68.45** -23.9

Source: Authors' estimates using the 2024 LFS, July round.

Notes: */**/** Significant at the 1/5/10% level. Figures in [] are standard errors.

Samples are limited to workers aged 22-60 degree holders (highest grade completed codes from 60111 to 61099). Armed personnel (1-digit PSOC of 0) and the first and 100th percentiles.

Specific to the issue of licensure examination and horizontal matching, the unconditional tests of pay difference indicate a premium on licenses, especially if license holders are engaged in occupations requiring such credentials (Table 9). This is evident in their average pay being higher than that of license holders working in non-license occupations and even higher than that of workers without a license.

Table 9: Difference of daily basic pay based on worker and occupation type, in PhP

	Without a license, working in a non- license occupation	With a license, working in a non- license occupation	Without a license, working in a license occupation
Average daily pay	722.5819	886.8102	782.5156
Daily pay difference: With a license in a licensed occupation (PhP 1099.216) – Average daily pay	376.63*** [14.68]	212.41*** [18.77]	316.70*** [26.51]

Source: Authors' estimates using the 2024 LFS, July round.

Notes: */**/** Significant at the 1/5/10% level. Figures in [] are standard errors.

Samples are limited to workers aged 22-60 degree holders (highest grade completed codes from 60111 to 61099). Armed personnel (1-digit PSOC of 0) and the first and 100th percentiles.

3. Findings

Estimation results using three samples are presented in Table 1A in the appendix. The first sample utilizes the full data (Specification 1), the second limits the sample to graduates of courses with licensure examinations and accounts for at least 1% of the said sample (Specification 2), and the third uses a more restrictive sample based on the 5-digit PSCED (Specifications 3 and 4)⁷. Recognizing the labor market participation dynamics of license holders, all estimating equations include the interactions of license with the horizontal matching indicators (*lic_psoc* and *match*). The test of no selection in each specification, found in the lower panel of Table 1A ($\text{Rho}=0$), indicates that the correlation of the selection and outcome equations is not zero and that the use of the Heckman estimator is warranted.

Given the considerations above, the following results are noted:

The effects of individual and HEI attributes are muted compared to factors related to the labor market, such as labor market experiences and overeducation at the occupation level. Based on Table 1A and focusing on specifications (3) and (4), which use more accurate samples of licensed PSCED):

- In terms of individual attributes, women are 28% less likely to participate in the labor market and earn PHP43 to PHP50 per day less than their male counterparts. Those who graduated on time are 13% more likely to work and earn around PhP32-39/day more than their delayed counterparts.
- On the HEI characteristics, graduates from private schools are 4%-5% more likely to work than their public-school graduate counterparts. Meanwhile, graduates of schools demonstrating quality are 11% more likely to work. Both attributes are positively correlated with the basic pay.

⁷ The samples are limited to observations with the following PSCED: Architecture and town planning, Building and civil engineering, Accounting and taxation, Dental studies, Chemistry, Education Science, Training for pre-school teachers, Teacher training without subject specialization, Teacher training with subject specialization, Forestry, Medicine, Nursing and midwifery, Medical diagnostic and treatment technology, Therapy and rehabilitation, Pharmacy, Fashion, interior and industrial design, Library, information and archival studies, Law, Psychology, and Veterinary.

- Returns to work experience range from PhP121 (for 1-5 years of work experience) to PhP233 (for 21 years and above). These are higher than the returns obtained by workers with less than a year of work experience.
- Overeducation adversely affects basic pay. Workers in occupations with a high ratio of overeducated workers earn PhP135 to PhP195 less, demonstrating penalties due to the mismatch between the schooling years workers possess and the average schooling years occupations require.

There are premiums on possessing licenses, especially when education and occupation credentials align.

- License holders earn more than those without license credentials. Among license holders, those working in occupations requiring licenses earn 32%-43% more than those working in occupations not requiring such credentials (Table 10, upper panel). These findings underscore the presence of incentives for possessing and maintaining licenses.
- Relative to workers in unlicensed occupations, those in licensed occupations earn more. Among those working in licensed occupations, license holders earn 47%-50% more than their unlicensed counterparts (Table 10, lower panel).

Table 10: Marginal effects of licenses and occupation type on daily pay

	Full sample (1)	Selected PSCEd (2)	Selected PSCEd (3)
<i>Marginal effects of licenses (Relative to unlicensed workers)</i>			
Licensed, working in a non-licensed occupation	150.87*** [0.76]	171.19*** [0.69]	158.64*** [0.89]
Licensed, working in a licensed occupation	205.45*** [1.04]	225.43*** [1.00]	227.57*** [1.12]
<i>Marginal effects of working in licensed occupations (Relative to not working in a licensed occupation)</i>			
Working in a licensed occupation, unlicensed	116.75*** [0.94]	110.83*** [0.96]	136.70*** [1.11]
Working in a licensed occupation, licensed	171.34*** [0.68]	165.06*** [0.69]	205.64*** [0.76]

Source: Authors' estimates using the 2024 LFS, July round.

Notes: */**/** Significant at the 1/5/10% level. Figures in [] are standard errors.

Computed based on the estimates shown in columns (1), (2), and (3) of Table 1A in the appendix.

- Relative to unlicensed workers, license holders with matched education-occupation credentials earn around PhP234 more. Comparing license holders with matched portfolios against their unmatched counterparts, the former earns more, ranging from as low as 60% (against professionals/managers and technicians/associate professionals with unmatched credentials) to as high as 450% (against workers in elementary occupations) (Table 11, first two columns).
- Relative to workers with unmatched education-occupation portfolios, license holders with matched credentials earn around PhP643 more (Table 11, next four columns).
 - Matched license holders earn approximately 86% more than their matched unlicensed counterparts.

- Among unmatched workers, licensed professionals/managers earn around 60% more than their unlicensed counterparts. Licensed technicians/associate professionals and skilled AFR/craft and trade workers/machine operators earn almost twice as much as their respective unlicensed counterparts.

Table 11: Marginal effects of licenses and education-occupation match on daily pay

Marginal effects of licenses (Relative to unlicensed workers)		Marginal effects of horizontal match (Relative to Elementary occupations)			
	Licensed		Licensed (1)	Unlicensed (2)	Difference: (1) – (2)
Licensed, working in elementary occupations	-63.77*** [7.88]				
Licensed, Skilled AFR/craft/machine operators	123.29*** [1.11]	Unmatched, Skilled AFR/craft/machine operators	382.53*** [7.41]	195.47*** [2.89]	187.06*** [7.95]
Licensed, Technicians and Associate Professionals	150.42*** [1.78]	Unmatched, Technicians and Associate Professionals	423.84*** [7.47]	209.64*** [3.10]	214.19*** [8.07]
Licensed, Professionals/Managers	149.09*** [1.64]	Unmatched, Professionals/Managers	569.54*** [7.44]	356.68*** [3.07]	212.87*** [8.04]
Licensed, Matched	234.44*** [1.24]	Matched	643.45*** [7.37]	345.24*** [3.05]	298.21*** [7.96]

Source: Authors' estimates using the 2024 LFS, July round.

Notes: */**/** Significant at the 1/5/10% level. Figures in [] are standard errors.

Computed based on the estimates shown in column (4) of Table 1A in the appendix.

4. Ways forward

Cognizant of the persistent concerns about the lack of alignment of skills and education with industry and occupation needs, this paper investigates returns to professional licenses alongside education-occupation matching. It also analyzes the effects of individual and HEI attributes on basic pay. Results indicate that individual and HEI characteristics matter, but labor market experiences and structural mismatches play greater roles in shaping labor market outcomes. There are observed payoffs in possessing a license when education and occupation credentials align. Beyond reforms in the education sector, policies must ensure that education and learning translate into desirable labor market outcomes, such as employability and productivity. To do this, the following suggestions can be considered:

TESDA, DOLE, DepDev, PSA, CHED, and other key agencies: Mitigate mismatches by establishing a solid foundation for skills data and improving the granularity of data.

- Develop a National Skills Taxonomy aligned with industry, occupation, and educational codes, and create an O*NET-like platform to compile detailed information on the skills, knowledge, and values required in education, training, occupations, and industries. Currently, the absence of a skills taxonomy poses challenges to the common understanding of national and/or industry/occupation/education-specific skills profiles (Bayudan-Dacuycuy et al 2025). Aligning PSCED, PSIC, and PSOC regarding human resource requirements and developing a taxonomy based on this alignment can enhance skills mapping and forecasting.

- Improve labor market intelligence by providing real-time data on skills demand and supply, the skills and education requirements of in-demand and hard-to-fill jobs, and labor market outcomes, including returns and sectoral and industrial employment. This information can guide students, HEIs, career counselors, and policymakers. This information can be integrated into the O*NET-like platform advocated above.
- Strengthen the collection of critical data.
 - *HEIs and other agencies*: Collect the PhilSys Number (national ID number) in all administrative data, as this can improve the monitoring of student mobility and attrition and reduce the need for graduate tracer data (Bayudan-Dacuycuy 2025; Bayudan-Dacuycuy et al 2024).
 - *PSA and other agencies*: Collect, when applicable, 4- or 5-digit standard occupational, industry, and education codes in government-funded surveys and information systems (e.g., PESO, PhilJobNet), as these can enhance the granularity of labor market intelligence (Bayudan-Dacuycuy et al., 2025).
 - *PSA*: Collect data on regulations, including licenses, certifications, and union memberships, in labor force surveys, as these can improve the assessment of their effectiveness.

CHED, HEIs, policymakers: Strengthen alignment with the industry through apprenticeship programs appropriately designed to prevent inequality among learners

Strengthen school-to-work transition and early labor market exposure through a National Apprenticeship Program embedded in degree programs. When designing the program, it is critical to ensure that apprenticeships do not deepen inequality, given that (1) firms may prefer students from reputable HEIs and (2) students from less-endowed origins may find participation in such programs challenging due to transportation, food, and other related costs. To address the latter, future amendments to the UAQTEA can make the tertiary education subsidy an effective instrument for supporting apprenticeships.

CHED: Strengthen curricula-industry alignment by addressing gaps in the agency's organizational capabilities

One key aspect to ensure alignment is the presence of outcome-based education (OBE) specialists, trained to translate agreements in technical panels into OBE language, within the agency (Largoza and Fernandez 2025). Complementing the technical panels' work with these personnel can mitigate the varying quality of policies, standards, and guidelines (PSGs) among disciplines.

CHED: Strengthen curricula-industry alignment by pursuing ISO certification for quality management system

Addressing concerns in critical areas can align education and learning with the needs of the industry and labor market. These concerns include the slow authorization and recognition of new academic programs, as well as the lack of consistent guidelines in processes related to technical panel engagement, among other issues (Aldaba et al. 2025). Pursuing ISO 9001 certification will ensure that processes for delivering and monitoring quality services are in

place. Thus, it may result in effective and efficient development and updating of PSGs (through clearly defined documentation, inputs, outputs, review cycles, and incentives), leading to relevant academic programs.

HEIs: Implement intervention programs to support timely graduation and facilitate the early accumulation of work experience

- Expand academic advising, tutoring, and mental health services to reduce delays in graduation. The cost of these services can be defrayed through the administrative support cost (ASC) of the tertiary education subsidy. Currently, expenditures on these services are not included in the ASC.
- Enhance career counseling services to help students choose education paths with clear occupational linkages. This initiative underscores the vital importance of real-time labor market intelligence.

Policymakers: Develop a national policy on the recognition of prior learning (RPL), Philippine Qualifications Framework (PQF)-National Coordinating Council: Integrate RPL into the PQF

Developing a system for RPL and integrating it into the PQF provides pathways for experts and practitioners who lack the necessary educational qualifications to become HEI faculty members. The PQF, currently focused on the linkages of qualifications obtained through formal learning, can be improved to integrate professional qualifications and those obtained through assessments, such as the RPL (Bayudan-Dacuycuy et al. 2024). This initiative has the potential to increase the pool of teachers and strengthen academe-industry linkages.

5. References

- Aldaba, F., Sescon, J., and Alconis, K.E. 2024. Strengthening CHED's developmental and regulatory capacity. PIDS Discussion Paper Series No. 2024-41. Quezon City, Philippines: Philippine Institute for Development Studies.
- Amanonce, J. T. and Maramag, A.M. 2020. Licensure examination performance and academic achievement of teacher education graduates. *International Journal of Evaluation and Research in Education (IJERE)* 9(3): 510–516. DOI: 10.11591/ijere.v9i3.20614
- Aspiring Minds. 2017. Philippines national employability report: Graduates. Annual report 2017. <https://www.shl.com/assets/premium-content/philippines-national-employability-report-2017-en.pdf> (accessed on March 1, 2023).
- Bautista, J.R., Ducanes, G., and David, C.C. 2019. Quality of nursing schools in the Philippines: Trends and evidence from the 2010-2016 Nurse Licensure Examination results. Quezon City, Philippines: University of the Philippines Center for Integrative Development Studies.
- Bayudan-Dacuycuy, C.G. 2025. Hazard and incidence of exits of ever-enrolled college-age students. PIDS Discussion Paper Series No. 2025-12. Quezon City, Philippines: Philippine Institute for Development Studies.

- Bayudan-Dacuycuy, C.G., C.J.R. Cabuay, and P.E.D. Luzon. 2024. Expansions, quality, and affirmative action in public higher education institutions. PIDS Discussion Paper Series No. 2024-16. Quezon City, Philippines: Philippine Institute for Development Studies.
- Bayudan-Dacuycuy, C.G. and Dacuycuy, L. 2021. Labor market structures, pay gap, and skills in the Philippines. PIDS Discussion Paper Series No. 2021-28. Quezon City, Philippines: Philippine Institute for Development Studies.
- Bayudan-Dacuycuy, C.G., Epetia, M.C.F., Vargas, A.R.P., and Ocbina, J.J.S. 2025. Enhancing the Philippine labor market information system and TESDA's skills anticipation and prioritization of skills requirements framework. PIDS Research Paper Series No. 2025-03. Quezon City, Philippines: Philippine Institute for Development Studies.
- Gittleman, M., Klee, M., and Kleiner, M. 2014. Analyzing the labor market outcomes of occupational licensing. Research Department Staff Report 504. Federal Reserve Bank of Minneapolis. DOI: <https://doi.org/10.21034/sr.504>
- Greenwood, S. and Menclova, A. 2018. Analysing the extent and effects of occupational regulation in New Zealand. *New Zealand Economic Papers* 52(1): 21–39.
- Heckman, J.J. 1979. Sample selection bias as a specification error. *Econometrica* 47(1): 153-161.
- Heckman, J. J., Lochner, L.J., and Todd, P.E. 2003. Fifty years of Mincer earnings regressions (NBER Working Paper No. 9732). National Bureau of Economic Research. <http://www.nber.org/papers/w9732>.
- Katz, L. F and Autor, D. H. 1999. Changes in the wage structure and earnings inequality. In *Handbook of Labor Economics* (vol. 3A, pp. 1463-1555), edited by O. Ashenfelter and D. Card. Amsterdam, New York, and Oxford: Elsevier Science, North-Holland.
- Kleiner, M. and Krueger, B. 2013. Analyzing the extent and influence of occupational licensing on the labor market. *Journal of Labor Economics*, 31(2):S173-S202.
- Kleiner, M. and Wang, W. 2023. The labor market effects of occupational licensing in the public sector. Staff Report No. 645. Federal Reserve Bank of Minneapolis. DOI: <https://doi.org/10.21034/sr.645>.
- Kleiner, M.M. 2000. Occupational licensing. *Journal of Economic Perspectives* 14(4): 189-202.
- Largoza, G.L. and Fernandez, C.G. 2025. Review of CHED policies, standards, and guidelines (PSGs) pre- and post-K to 12 reforms. PIDS Discussion Paper Series No. 2025-13. Quezon City, Philippines: Philippine Institute for Development Studies.
- Lemieux, T. 2014. Occupations, fields of study and returns to education. *The Canadian Journal of Economics / Revue canadienne d'Economique* 47(4): 1047-1077.

- Lupdag-Padama, E.A., Rivera, J.P.R., Fernandez-Go, R.C., Yu, K.D.S., Solis, F.D.B., and Sayoc, R.A. 2014. An approximation of the internal rate of return of investment in selected undergraduate degree programs. *DLSU Business & Economic Review* 23(2): 88-114.
- Mincer, J. 1958. Investment in human capital and personal income distribution. *Journal of Political Economy*. 66(4):281-302.
- Morikawa, M. 2018. Occupational licenses and labor market outcomes in Japan. *Japan and the World Economy* 48: 45-56.
- Professional Regulation Commission (PRC). n.d. History. <https://www.prc.gov.ph/history> (accessed on February 15, 2024).
- Verdugo, R.R. and Verdugo, N.T. 1989. The impact of surplus schooling on earnings: Some additional findings. *The Journal of Human Resources* 24:629-643.
- Willis, R. J. 1986. Wage determinants: A survey and reinterpretation of human capital earnings functions. In *Handbook of Labor Economics* (vol. 1, pp. 525-602), edited by O. Ashenfelter and R. Layard. Elsevier.

APPENDICES

1. List of PSOCs in the LFS 2024 July round tagged as license occupations

2113 Chemists, 2132 Farming, forestry and fisheries advisers, 2133 Environmental protection professionals, 2142 Civil engineers, 2144 Mechanical engineers, 2145 Chemical engineers, 2151 Electrical engineers, 2152 Electronics engineers, 2153 Telecommunications engineers, 2161 Building architects, 2162 Landscape architects, 2165 Cartographer and surveyors, 2211 Generalist medical practitioners, 2212 Specialist medical practitioners, 2221 Nursing professional, 2222 Midwifery professionals, 2250 Veterinarians, 2261 Dentists, 2262 Pharmacists, 2264 Physiotherapist, 2265 Dieticians and nutritionist, 2267 Optometrists and ophthalmic opticians, 2269 Health professionals not elsewhere classified, 2320 Vocational education teachers, 2330 Secondary education teachers, 2341 Primary school teachers, 2342 Early childhood educators, 2352 Special need teachers, 2411 Accountants, 2611 Lawyers, 2612 Judges, 2622 Librarians and related information professionals, 2634 Psychologists, 2635 Social work and counselling professionals, 3111 Chemical and physical science technicians, 3114 Electronics engineering technicians, 3211 Medical imaging and therapeutic equipment technicians, 3212 Medical and pathology laboratory technicians, 3214 Medical and dental prosthetic technicians, 3251 Dental assistants and therapists, 3315 Valuers and loss assessors, 3331 Clearing and forwarding agents, 3334 Real estate agents and property managers, 3432 Interior designers and decorators, 7126 Plumbers and pipe fitters, 7233 Agricultural and industrial machinery mechanics and repairers, 7411 Building and related electricians

2. Determinants of daily pay and participation in the labor market using the Heckman estimator

Table 1A: Daily pay and working using the Heckman estimator

	Daily pay (1)	Working (2)	Daily pay (3)	Working (4)
<i>Individual attributes</i>				
Age	3.15*** [0.04]	-0.00*** [0.00]	3.08*** [0.04]	-0.00*** [0.00]
Female	-24.36*** [0.48]	-0.04*** [0.00]	-23.84*** [0.49]	-0.10*** [0.00]
Graduated on time	17.56*** [0.47]	0.08*** [0.00]	17.91*** [0.48]	0.11*** [0.00]
Poor		-0.23*** [0.00]		-0.27*** [0.00]
<i>HEI characteristics</i>				
Graduated from a Private school	18.05*** [0.52]	-0.06*** [0.00]	22.21*** [0.53]	-0.06*** [0.00]
School quality	31.02*** [0.48]	0.12*** [0.00]	39.63*** [0.48]	0.07*** [0.00]
<i>Work experience (years)</i>				
1-5	125.06*** [0.98]		117.08*** [1.01]	121.09*** [1.18]
6-10	237.62*** [1.06]		225.61*** [1.08]	192.01*** [1.29]
11-15	224.61*** [1.21]		218.72*** [1.23]	206.67*** [1.49]
16-20	258.02***		248.34***	190.38***

	Daily pay (1)	Working	Daily pay (2)	Working	Daily pay (3)	Working	Daily pay (4)	Working
21 and above	[1.32] 297.77*** [1.43]		[1.34] 291.84*** [1.45]		[1.64] 235.45*** [1.75]		[1.62] 233.30*** [1.73]	
<i>Labor market situation</i>								
Overeducation	-495.14*** [2.38]		-489.64*** [2.40]		-195.19*** [3.28]		-134.86*** [3.27]	
<i>License and horizontal matching indicator</i>								
Licensed	150.87*** [0.76]	0.76*** [0.00]	171.19*** [0.69]	0.45*** [0.00]	158.64*** [0.89]	0.52*** [0.00]	-63.77*** [7.88]	0.53*** [0.00]
Working in an occupation requiring a license (<i>lic_psoc</i>)	116.75*** [0.94]		110.83*** [0.96]		136.70*** [1.11]			
Licensed# <i>lic_psoc</i>	54.59*** [1.12]		54.23*** [1.14]		68.94*** [1.33]			
Unmatched, in Skilled AFR/craft/machine operators (<i>2.match</i>)							195.47*** [2.89]	
Unmatched, Technicians and Associate Professionals (<i>3.match</i>)							209.64*** [3.10]	
Unmatched, Professionals/Managers (<i>4.match</i>)							356.68*** [3.07]	
Matched PSOC- PSCED (<i>5.match</i>)							345.24*** [3.05]	
<i>Interaction of license and horizontal matching indicator</i>								
Licensed# <i>2.match</i>							187.06*** [7.95]	
Licensed# <i>3.match</i>							214.19*** [8.07]	
Licensed# <i>4.match</i>							212.87*** [8.04]	
Licensed# <i>5.match</i>							298.21*** [7.96]	
Rho	-0.28*** [0.00]		-0.26*** [0.00]		-0.25*** [0.00]		-0.26*** [0.00]	
Observations	8189		6477		4111		4096	
Selected (Not selected)	4506 (3683)		4362 (2115)		2872 (1239)		2857 (1239)	
Wald Chi2	627897.3		685849.2		506508.3		548495.3	
p-value	0.00		0.00		0.00		0.00	
Wald test of indep. eqns.	7207.14		7055.7		2763.03		2580.77	
p-value	0.00		0.00		0.00		0.00	

Source: Authors' estimates using the 2024 LFS, July round.

Notes: */**/** Significant at the 1/5/10% level. Figures in [] are standard errors.

All outcome specifications include dummy variables for courses requiring licenses. All selection specifications include an indicator for belonging to a poor household and the father's educational attainment when the respondent was 15 years old.

Specification 1 uses the full sample.

Specification 2 utilizes samples of PSCED with licensure examinations that include at least 1% of their observations in the data.

Specification 3 uses a more restrictive sample based on the PSCED detailed description, limiting the samples to observations with the following PSCED: Architecture and town planning, Building and civil engineering, Accounting and taxation, Dental studies, Chemistry, Education Science, Training for pre-school teachers, Teacher training without subject specialization, Teacher training with subject specialization, Forestry, Medicine, Nursing and midwifery, Medical diagnostic and treatment technology, Therapy and rehabilitation, Pharmacy, Fashion, interior and industrial design, Library, information and archival studies, Law, Psychology, and Veterinary.

Specification 4 uses the sample in specification 3.