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Why do Filipinos desire to work more hours?

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In 2018, 16.4% of Filipino workers stated that they wanted to have more work hours in their present jobs, to have an additional job, or to have a new job with longer work hours, that is, they declared themselves under-employed. Analysis of the 2015 Labor Force Survey data shows that relative to being full-time employed and not under-employed, the major determinant of being under-employed is the basic pay. Region, educational attainment, sector, and primary occupation are much less important determinants.

Introduction

A well-known feature of the Philippine labour market is its high under-employment rate. 6.7 million workers, 16.4% of all employed Filipino workers, declared themselves to be under-employed in 2018. The Philippine Statistics Authority (PSA) defines a worker as under-employed if, during the past week, the employed person declares that he/she desires to have more work hours in his/her present job, or to have additional job, or to have a new job with longer work hours (PSA 2017a).

Although the country's under-employment rate has declined from a peak of 32.9% in 1984, it still affects a high share of those employed (Figure 1).[1]

What compels a Filipino worker to declare himself/herself to be under-employed? This paper seeks to establish the determinants of the likelihood of a Filipino worker desiring to work more hours. We focus on two major determinants of being under-employed—personal and job-related characteristics.

There are three reasons it is important to analyse under-employment in the Philippines. First, we need to know why the under-employment

[1] According to the International Labour Organization (ILO) (2015), visible under-employment 'occurs when a person is in employment of less than normal duration and is seeking, or would accept, additional work'. The normal duration of work may be the duration set by the country's law or the duration of work determined by the country concerned as representing normal employment.

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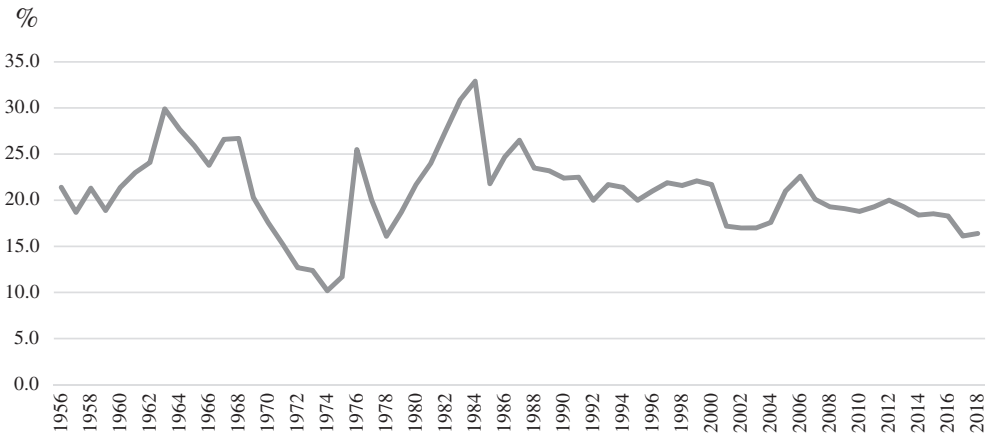
Figure 1
Under-employment rate in the Philippines, 1956–2018.



Sources: Notes: In 1957–75, data on the under-employment rate covered those aged 10 and above. From 1976 onwards, data included those aged 15 and above. Data for 1970 and 1979 were interpolated. Philippine Statistics Authority (2015a), (2017a), and 2018

rate is so high. Second, under-employment tends to be associated with the idea of under-utilised human resources; hence it should be examined closely. Third, under-employment has important welfare implications. Given the large differences in incomes between fully employed workers and under-employed workers, the welfare losses of being under-employed rather than fully employed are significant. Further, while unemployment clearly has greater adverse effects, the negative consequences of being under-employed are not far from those experienced by the unemployed (Wilkins 2007). The findings from this study can be used to design and implement better evidence-based policies that will help target the Filipino workers who are more likely to be at risk of being under-employed.

Under-employment is believed to be a significant phenomenon in many countries, yet the literature on the subject is not large. Most of the existing studies analyse the determinants of under-employment in advanced countries. Due to limited data, much less has been done to investigate under-employment in developing countries.

Studies of advanced countries examining the factors behind rising or persistent under-employment look at how this phenomenon may be associated with workers' attributes, as well as with job characteristics. Barret and Doiron (2001), for example, using data for Canada, found that under-employment was more closely tied to job characteristics such as type of industry, occupation, and region than to personal or human capital characteristics. Similarly, Doiron (2003) used data for Australia and found that demand-side variables (state of product demand, occupation, industry) were much more important in explaining under-employment than supply-side characteristics such as household composition and education. Their findings do not support the view that under-employment is caused mainly by labour hoarding by firms experiencing negative demand shocks; instead, they found that firms with contracting demand are less likely to have under-employed workers than expanding firms. They also found that junior workers are more likely to be under-employed, especially in expanding firms.

The interest in analysing under-employment in advanced countries gained traction during the post 2007–09 recession years. The reason was that the under-employment rate became a key indicator of labour market slack in advanced countries: under-employment

pushed down wages while unemployment did not (Bell and Blanchflower 2018). Another study by Bell and Blanchflower (2013) developed an under-employment index that included the extensive (jobs) and intensive (hours) margins of the labour market in the UK. They found that the index rose between the start of the recession and 2012. Analysing the determinants of being under-employed, they found that the young (aged 16–24) and with no qualifications were more likely to be under-employed than older workers. Valletta et al. (2018) studied US determinants of under-employment for the years 2003–16, distinguishing between variations associated with the business cycle and variation attributable to more persistent structural features of the labour market. They found that persistently high under-employment rates in the USA following the 2007–09 recession until 2016 were due to structural changes in the labour market, with workers shifting away from manufacturing toward service industries that rely heavily on part-time labour. A study by Green and Henseke (2016) analysed the effects of cognitive and non-cognitive skills on the individual probability of under-employment in a sample of employed graduates in OECD countries. They found that skill differences fail to account for a substantial proportion of graduate under-employment within countries and explain little about the variation across countries. The prevalence of under-employment was found to be associated mainly with the imbalance between jobs for graduates and the supply of graduates.

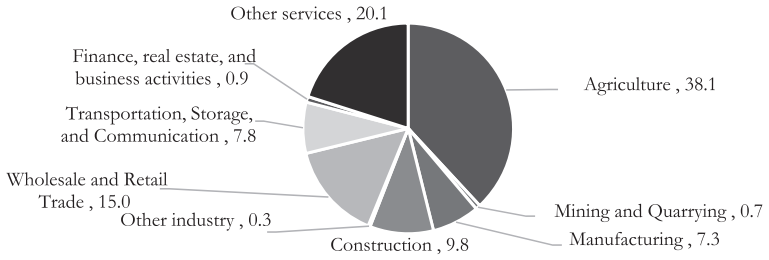
Clearly, there are far more studies on under-employment in advanced countries than for developing countries.[2] It is largely a question of data availability and quality. For the Philippines, the only paper on under-employment is that of Alba and Esguerra (1999). They used the Family Income and Expenditure Survey (FIES) and the Labor Force Survey (LFS) to determine the likelihood of a person being in one of the following labour-participation modes: unemployed (base category), visibly under-employed, fully employed, and invisibly under-employed, given his/her socioeconomic characteristics and the wage offer in each of the four participation modes. The authors found that marital status, years of completed secondary education, years of completed tertiary education, and the number of elderly members in a household are significant determinants of an individual's employment status, that is, if visibly under-employed, invisibly under-employed, or fully employed.

Indonesia's Central Bureau of Statistics defines under-employment as a state where a person works less than 35 hours per week and is willing to work more. Pratomo (2015) used the 2011 National Socio-Economic Survey of Indonesia to determine the marginal effects of under-employment, part-time employment, and full-time employment. He concluded that males, young workers, workers with higher education, and workers in the agriculture sector, are all associated with an increased probability of being under-employed. He also found that on the demand side, a higher provincial unemployment rate and a higher minimum wage increase the probability of being under-employed. On the other hand, a higher gross regional domestic product (GRDP) reduces the probability of being under-employed.

To explain the Philippines' high under-employment rate, we focus on the personal and job-related characteristics of workers. Unlike in the literature for the advanced economies, there is no employer or firm data. We differentiate between two types of under-employed workers: (1) visibly under-employed; and (2) invisibly under-employed. The former category refers to workers who work less than 40 hours in a week and desire to work more, while the latter refers to those who work at least 40 hours in a week but desire to work more. The concept of visible under-employment is similar to that of time-related under-employment, or to what is commonly referred to as involuntary part-time

[2] See Wilkins and Wooden (2011) for a discussion on earlier studies on under-employment.

Figure 2
Per cent distribution of under-employment by sector, 2016.



Source: Authors' calculations based on Philippine Statistics Authority (2017b)

employment. Invisible under-employment is less common in the literature. It is described by the ILO (1982) as a misallocation of labour resources or a fundamental imbalance between labour and other factors of production; the characteristic symptoms include low income, under-utilisation of skills, and low productivity. Throughout this paper, the terms 'visible' and 'invisible' under-employment are used, which is consistent with how these categories are referred to by the Philippine Statistics Authority.

Visible under-employment accounted for 53.9% of total under-employment in 2018. In 2016, most of these under-employed were in agriculture and services (Figure 2). Further, a large share of the under-employed were wage and salary workers in private establishments, and self-employed without any paid employee (Figure 3).

The remainder of the paper is organised as follows. Section II discusses the data sources. Section III reviews the econometric models and estimation techniques of the determinants of under-employment. Section IV discusses the results. Section V concludes.

Data sources and description

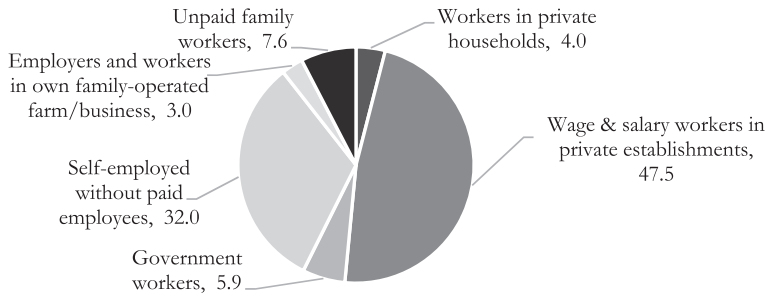
We use data from the LFS of the Philippines to determine the personal and job-related characteristics associated with being under-employed. The PSA conducts the LFS, a household survey that excludes the institutional population (national prisons and penal colonies, provincial and large city jails, tuberculosis sanitaria, mental hospitals, leprosaria, military, mining and logging camps, etc.) and gathers information on demographic, socio-economic, and employment characteristics every quarter—January, April, July, and October. We combine LFS data with data from the FIES, which collects information on consumption expenditure and income. The PSA administers the FIES twice every three years—January and July. The reason we use the FIES is that we need data on basic pay (BP), and this is not provided by the LFS for a large proportion of the employed.[3]

Since the timing of the two household surveys is different, we match the July-round of the 2015 FIES and the January-round of the 2016 LFS (PSA 2015b, 2016a).[4] Appendix

[3] 'The basic pay, also called basic wage, is the pay for normal time, prior to deductions of social security contributions, withholding taxes, and others. It excludes allowances, bonuses, commissions, overtime pay, and benefits in kind' (PSA 2016b). The LFS provides data on basic pay per day and total hours in the past week only. We compute the basic pay per month equal to $\left(\frac{\text{Basic pay per day}}{8\,\text{hours}}\right) \times \text{Total hours in the past week} \times 4\,\text{weeks}$.

[4] The FIES and LFS provide a unique ID for each household, and the LFS tags a unique line number for each household member in the same household. We merged the FIES and LFS using the unique household ID. This means that the household characteristics in the FIES will be the characteristics of all the members of the same households found in the LFS; and the individual characteristics in the LFS will be distinctive to his/her-self only.

Figure 3
Per cent distribution of under-employment by class of workers, 2016.



Source: Authors' calculations based on Philippine Statistics Authority (2017b)

1 provides details on how we cleaned the two survey data sets and how we categorised the survey questions and responses that served as criteria for the different employment statuses.[5] In addition, we use the 2006 FIES-LFS (PSA 2007) in our analysis to compare it with 2015.[6]

In this study, we focus on employed persons. Full-time employed are those who work at least 40 hours in a week, while part-time employed are those who work less than 40 hours. The LFS asks those employed whether they want to work more hours or not. The survey asks, 'Did you want more hours of work during the past week?' Therefore, we further disaggregate full-time into not under-employed and invisibly under-employed. Similarly, part-time employment is subdivided into not under-employed and visibly under-employed. Disaggregation details using the LFS questionnaire are in Appendix 1.

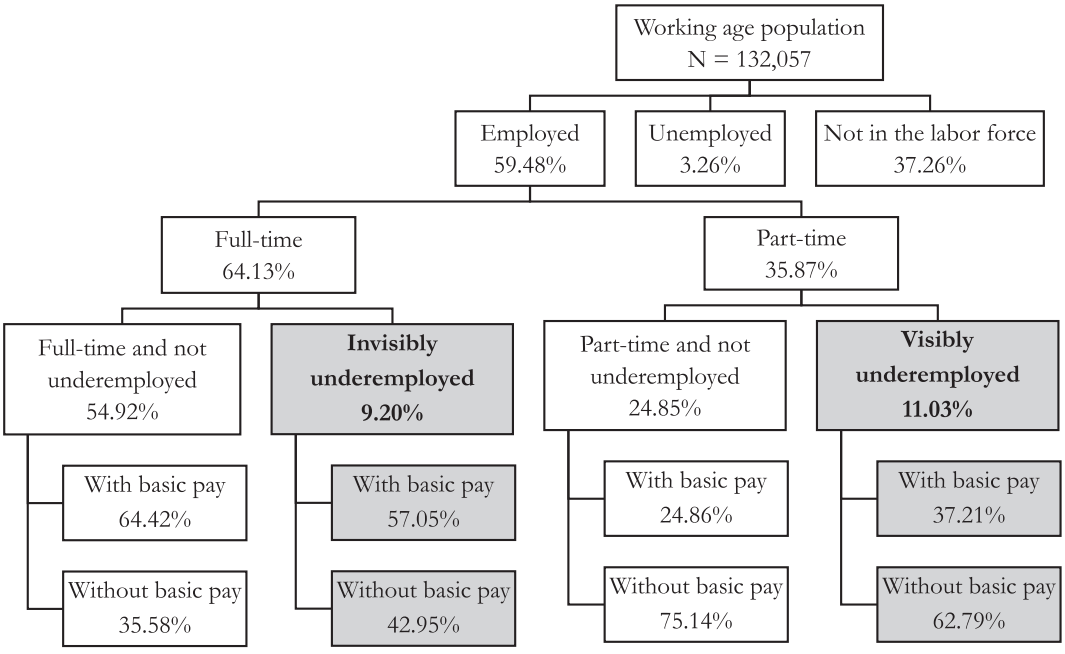
Figure 4 shows the number and distribution of employed persons with and without data on BP for each of the four employment statuses. In 2015, 59.5% of the working-age population, that is, at least 15 years old, are employed. 64.1% of employed workers are employed full time and the remainder are part-time workers. There is data on BP for the majority of the full-time workers, whether full-time not under-employed or invisibly under-employed. However, there is no pay data for the majority of the part-time workers.

Analysis of the 2015 FIES-LFS data reveals that 53% of those under-employed were visibly under-employed, while the other 47% were invisibly under-employed. 82% of the under-employed were in agriculture and services. By sector, under-employment in agriculture represented 27% of total employment in agriculture. The corresponding shares for industry and services were 21% and 16%, respectively. In addition, 54% of the under-employed admitted that they had not looked for additional jobs during the past week. Finally, 78% of the under-employed stated that they worked additional hours outside their primary occupation.

Table 1 indicates that the visibly under-employed group represents one-third of the workers who worked additional hours outside their primary occupation; the large majority (61%) of full-time and not under-employed did not work additional hours. Full-time workers and those not under-employed and the invisibly under-employed worked around 50 hours per week on their primary occupation, whether they worked additional hours or not. Both worked ten

[5] Details of the replication process of the rates of full-time and part-time employment, visible and invisible under-employment, unemployment, and workers not in the labour force, are available upon request.
[6] The comparable LFS data sets start from 2006. Changes in the reference period, definition of unemployment, etc. are some of the changes done by the PSA (DOLE-BLES and NSO 2011).

Figure 4
Distribution of employed persons with and without data on basic pay, 2015.



Source: Authors' calculations based on Philippine Statistics Authority (2015b), (2016a)

additional hours in a week on other jobs. Likewise, the part-time and not under-employed and the visibly under-employed worked 21 hours per week on their primary occupation, whether they worked additional hours or not. Both groups worked 15 hours in a week on other jobs. Clearly, there are visibly under-employed workers, as well as part-time workers and not under-employed, who worked less than 40 hours in a week even if they had other jobs outside their primary occupation.

Eighty five per cent of employed Filipino workers who looked for additional jobs outside their primary occupation were under-employed. Moreover, 58% of the employed workers who had two to five other jobs and looked for additional jobs were visibly under-employed. As noted earlier, close to two-thirds of those employed who did not look for additional jobs were full-time and not under-employed.

The average BP per month of the full-time and not under-employed and of the invisibly under-employed is almost five times that of the part-time and not under-employed and of the visibly under-employed.

Another observation worth mentioning refers to the difference between the BP of those who worked and those who did not work additional hours outside their primary occupation.[7] Workers in all employment statuses who did not work additional hours, except those visibly under-employed, received a higher BP than those who worked. Likewise, all those who did not look for additional jobs, except those who are visibly under-employed, received a higher BP than those who looked for work.

[7] The calculated basic pay excludes the additional earnings from the additional hours worked outside the primary occupation.

Table 1
Descriptive statistics of employed persons, 2015

	Full-time and not under-employed	Invisibly under-employed	Part-time and not under-employed	Visibly under-employed	Total
Worked additional hours[a] (%)	**20.15**	**16.87**	**29.12**	**33.86**	**100.00**
Hours worked on primary occupation (hours/week)	49.92	47.65	20.89	20.98	31.29
Hours worked on other jobs (hours/week)	10.87	10.34	15.01	15.69	13.62
Did not work additional hours[a] (%)	**61.11**	**8.57**	**22.05**	**8.28**	**100.00**
Hours worked on primary occupation (hours/week)	52.81	50.70	21.75	20.12	43.08
Hours worked on other jobs (hours/week)	0.00	0.00	0.00	0.00	0.00
Looked for additional jobs[a] (%)	**8.20**	**33.96**	**7.36**	**50.48**	**100.00**
Had one other job (%)	5.73	30.09	8.78	55.4	100.00
Had two to five other jobs (%)	4.13	29.85	8.31	57.72	100.00
Did not look for additional jobs[a] (%)	**63.59**	**6.29**	**24.5**	**5.62**	**100.00**
Had one other job (%)	33.78	8.91	40.66	16.66	100.00
Had two to five other jobs (%)	27.59	7.52	46.33	18.57	100.00
Basic pay per month at current prices (PHP)[b]	**10,025.92**	**8234.82**	**2788.34**	**2556.49**	**8483.48**
Worked additional hours[a] (PHP)	9644.18	7627.04	2772.57	2601.03	5931.23
Did not work additional hours[a] (PHP)	10,034.09	8319.67	2789.64	2545.16	8621.02
Looked for additional jobs[a] (PHP)	7308.75	7362.60	2366.92	2563.39	4970.28
Did not look for additional jobs[a] (PHP)	10,061.49	8777.70	2809.12	2547.07	8861.71
Sex (%)					
Female	55.66	6.66	27.55	10.13	100.00
Male	54.44	10.87	23.08	11.61	100.00
Region (%)					
Region I – Ilocos	54.90	7.58	27.57	9.96	100.00
Region II – Cagayan Valley	52.09	8.08	30.73	9.10	100.00
Region III – Central Luzon	67.05	7.71	18.81	6.43	100.00
Region IVA – CALABARZON	62.69	10.33	17.33	9.64	100.00
Region V – Bicol	39.28	12.63	28.09	20.00	100.00
Region VI – Western Visayas	53.08	8.41	28.13	10.38	100.00
Region VII – Central Visayas	54.33	7.95	28.80	8.92	100.00
Region VIII – Eastern Visayas	45.07	9.63	27.70	17.60	100.00
Region IX – Zamboanga Peninsula	47.76	9.37	30.17	12.70	100.00
Region X – Northern Mindanao	48.78	11.51	25.42	14.29	100.00

(Continues)

Table 1
Continued

	Full-time and not under-employed	Invisibly under-employed	Part-time and not under-employed	Visibly under-employed	Total
Region XI – Davao	54.75	9.61	25.42	10.23	100.00
Region XII – SOCCSKSARGEN	43.25	9.20	32.33	15.22	100.00
National Capital Region	79.38	5.49	11.41	3.72	100.00
Cordillera Administrative Region	53.81	14.22	20.37	11.60	100.00
Autonomous Region in Muslim Mindanao	48.13	8.19	36.42	7.26	100.00
Region XIII – Caraga	45.85	13.52	23.65	16.98	100.00
Region IVB – MIMAROPA	40.98	7.25	33.56	18.21	100.00
Age group (%)					
15–30	61.38	9.41	20.11	9.10	100.00
31–45	57.05	10.56	20.42	11.97	100.00
46–60	51.34	8.95	27.18	12.52	100.00
At least 61	39.07	5.02	46.31	9.61	100.00
Highest educational attainment (%)					
No grade completed	33.35	6.37	47.09	13.18	100.00
Elementary (incomplete)	39.54	9.71	34.92	15.82	100.00
Elementary graduate	44.51	9.16	31.65	14.67	100.00
High school (incomplete)	47.81	10.02	27.80	14.37	100.00
High school graduate	58.82	9.76	21.16	10.26	100.00
Post-secondary (incomplete)	59.63	9.36	22.75	8.26	100.00
Post-secondary graduate	66.52	9.74	16.81	6.93	100.00
College (incomplete)	60.45	9.05	22.60	7.90	100.00
College graduate and post-baccalaureate	78.06	7.40	11.29	3.26	100.00
Marital status (%)					
Single	60.81	8.50	21.69	8.99	100.00
Married	53.37	9.72	25.18	11.74	100.00
Widowed	43.01	6.24	38.71	12.03	100.00
Divorced/Separated/ Annulled	56.97	9.71	20.80	12.52	100.00
Basic pay per month (%)					
First quintile: at most PHP2,206	4.66	0.78	64.53	30.03	100.00
Second quintile: PHP2,207–PHP3,846	32.20	6.22	43.48	18.11	100.00
Third quintile: PHP3,847–PHP6,000	69.54	15.73	10.10	4.63	100.00
Fourth quintile: PHP6,001–PHP9,600	81.22	14.61	3.13	1.04	100.00
Fifth quintile: at least PHP9,601	89.72	8.67	1.26	0.35	100.00
Major economic sector (%)					
Agriculture	30.40	8.47	42.87	18.26	100.00
Industry	65.85	13.66	12.52	7.98	100.00
Services	66.79	8.38	17.35	7.48	100.00
Primary occupation (%)					
Managers	61.44	9.24	21.30	8.03	100.00
Professionals	87.04	6.05	5.24	1.67	100.00

(Continues)

Table 1
Continued

	Full-time and not under-employed	Invisibly under-employed	Part-time and not under-employed	Visibly under-employed	Total
Technicians and associate professionals	62.98	8.48	18.67	9.87	100.00
Clerical support workers	83.53	8.55	5.95	1.97	100.00
Service and sales workers	65.52	7.87	18.95	7.65	100.00
Skilled agricultural, forestry, and fishery workers	27.32	8.06	46.84	17.77	100.00
Craft and related trades workers	64.83	15.24	12.07	7.86	100.00
Plant and machine operators	72.01	11.89	10.09	6.01	100.00
Elementary occupations	45.51	9.23	30.11	15.15	100.00
Armed forces occupations and non-gainful activities, and special occupations	64.83	11.44	14.83	8.90	100.00

[a]Outside primary occupation.

[b]Only of those with data on basic pay.

Source: Authors' calculations based on Philippine Statistics Authority (2015b), (2016a).

Finally, Figure 5 shows the 2015 cumulative distribution of BP per month of employed Filipinos and the poverty line for a family of five (PHP9,064).[8] Panel 5(a) shows that even though the average BP per month of full-time and not under-employed is PHP10,025.92, 58% of them were below the poverty line for a family of five.

Panel 5(b) reveals that around 70% of the invisibly under-employed had earnings below the poverty line for a family of five. The average BP per month of the invisibly under-employed was 82% of the full-time and not under-employed. Also, his/her earnings were more than enough to meet the per capita poverty threshold. If he/she was the only employed person in a family of five, his/her earnings were 91% of the poverty threshold. Panel 5(c) indicates that 97% of the part-time and not under-employed lived below the poverty line for a family of five.

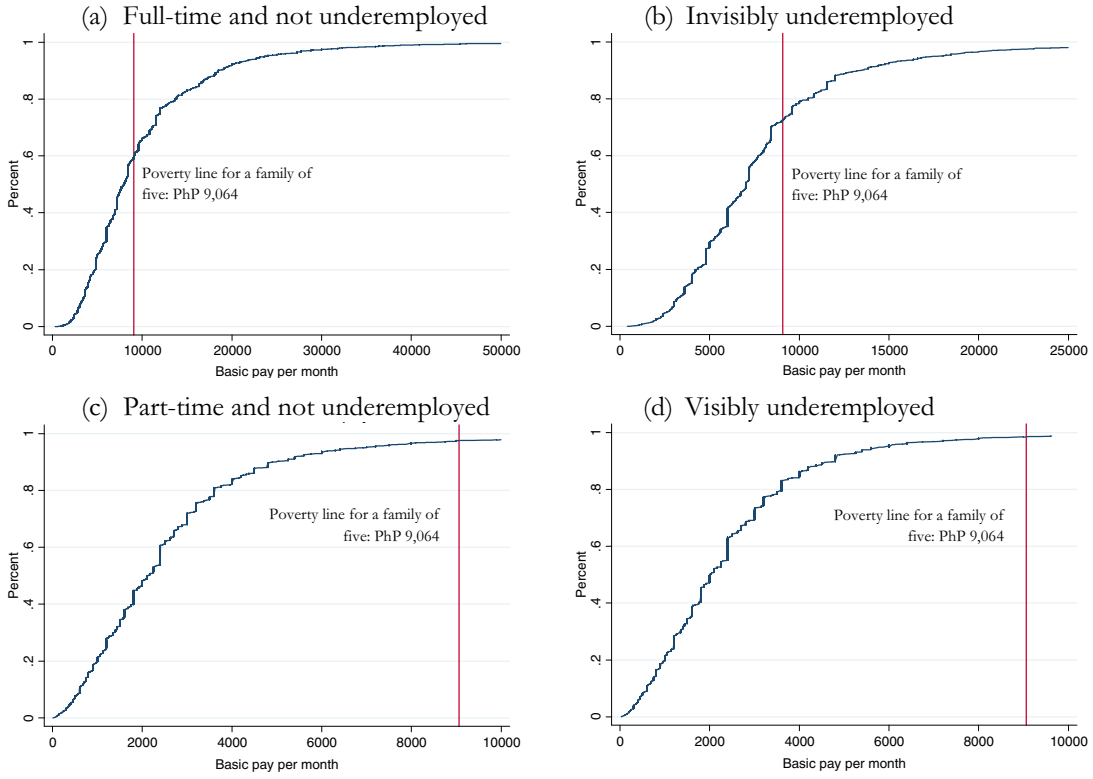
Panel 5(d) shows that almost 99% of the visibly under-employed were below the poverty line. The poverty threshold per capita is PHP1,813. The average BP per month of the visibly under-employed (PHP2,556.49) is PHP744 higher than the per capita poverty threshold (PHP1,813). This means that his/her earnings per month were enough to meet his/her basic food and non-food necessities. If he/she was the only employed person in a family of five, his/her earnings would be only 28% of the poverty threshold.

The determinants of under-employment

The LFS inquires whether employed workers desire to work more hours or not. This means that these workers make only one

[8] In December 2019, the PSA revised the 2015 poverty threshold per month for a family of five from PHP9,064 to PHP9,452.

Figure 5
Cumulative distribution of basic pay per month by employment status, 2015.



Source: Authors' calculations based on Philippine Statistics Authority (2015b), (2016a)

decision. In other words, it is not a nested decision to the extent that the LFS asks only those already employed. Therefore, to model this decision we use a multinomial logit model.[9] Note that under-employment is measured through the desire to work more hours, that is, a subjective statement. Such perception cannot affect one's BP, hence, there is no reverse causality.

In the estimation of the multinomial logit model, the probability of an individual to be in employment status m for a given **x**, p^m, is represented as follows[10]:

$$p^m = \Pr[y = m|\mathbf{x}] = \frac{\exp(\beta^m \mathbf{x})}{\sum_{k=1}^{J} \exp(\beta^k \mathbf{x})} \quad \text{for } k = 1, \ldots, m, \ldots, J \qquad (1)$$

[9] Suppose that an individual i maximises his/her latent variable of indirect utility given by $V_i(y) = \mathbf{x}_i\beta_y + \epsilon_{iy}$, by choosing the best employment status (y_i^*): $V_i(y_i^*) = \max_y \{\mathbf{x}_i\beta_y + \epsilon_{iy}\}$, where y is the dependent variable with k employment statuses, and **x** is the vector of independent variables, including personal characteristics such as sex, region, age group, highest educational attainment, and marital status; and job-related characteristics like basic pay per month, major economic sector, and primary occupation.

[10] It is assumed that the error term independently and identically follows the extreme value distribution $F(\epsilon) = \exp(-(\exp(-\epsilon)))$.

and we need to assume that β^m is equal to zero to identify the model. The employment status is a discrete qualitative variable that is represented by mutually exclusive categories. We have four employment statuses: (1) be full-time and not under-employed; (2) be invisibly under-employed; (3) be part-time and not under-employed; and (4) be visibly under-employed. The default employment status in our multinomial logit model is full-time and not under-employed. We estimate the probabilities of the employment statuses (2)-(3)-(4), relative to (1) using Equation (1). This is commonly referred to as the relative risk ratio, calculated as:

$$\frac{\Pr(y=2|\mathbf{x})}{\Pr(y=1|\mathbf{x})} = \exp(\beta^2 \mathbf{x}) \quad (2)$$

Consistent with Figure 4, there are four employment statuses. Furthermore, Table 1 shows that each of them can be further subdivided into two, giving a total of eight statuses. Therefore, we estimated three versions of the multinomial model: one with the four employment statuses for the dependent variable; and two versions with eight employment statuses (for the dependent variable): one corresponding to those who worked additional hours outside the primary occupation, and those who did not; and another one corresponding to those who looked for additional jobs and those who did not.

Imputation of basic pay per month

As noted earlier, the LFS does not have complete BP data for all employed persons. Those whose data are missing are the nonwage and salary workers, that is, self-employed without any paid employee, employer in own-family operated farm or business, and workers without pay in own family-operated farm or business. They represented 49% of the total number of employed workers in 2015, and 56% in 2006. Our strategy is to compare the regression results obtained using the sample of employed persons with actual data on BP, with the full sample, that is, adding to the previous one those with the imputed data on BP.[11] We use a standard Mincer earnings function and use age as the proxy for years of potential experience. We impute data by two different methods: (1) by estimating the BP equations using ordinary least squares (OLS); and (2) by applying the Heckman correction.

OLS regression

We use the LFS data to estimate the logarithmic transformation of BP and the following determinants: age (AG), age squared, total hours worked in the past week (TH), highest education level (HE), and region (RG):

$$\ln(\mathrm{BP}) = \alpha_0 + \alpha_1 \ln(\mathrm{AG}) + \alpha_2 [\ln(\mathrm{AG})]^2 + \alpha_3 \ln(\mathrm{TH}) + \alpha_4 (\mathrm{HE}) + \alpha_5 (\mathrm{RG}) + u \quad (3)$$

We use OLS to estimate Equation (3) for nine economic sectors. The sectors in the 2015 FIES-LFS were grouped according to the 2009 Philippine Standard Industrial Classification (PSIC) (National Statistical Coordination Board [NSCB] 2010). These are: (1) agriculture, forestry, and fishing; (2) manufacturing; (3) other industries; (4) wholesale and retail; (5) transportation, accommodation, information, and communications; (6) finance and real estate; (7) professional, public administration, education, health, and arts; (8) administration and support services; and (9) other services. The eight sectors in the 2006 FIES-LFS were classified based on the 1994 PSIC (Appendix 1) (NSCB 2002). The predicted BP from this model using the 2015 FIES-LFS data set is in Table A1. Results for 2006 are available upon request.

[11] In the 2015 (2006) FIES-LFS data set, the sample of employed persons with data on basic pay is 39,989 (33,693). The full sample of employed persons with and without data on basic pay is equal to 78,548 (76,606).

Heckman correction

FIES and LFS are sample surveys, that is, the collected data are representative of the national and regional population (PSA 2012, DOLE-BLES and NSO 2011). Using the sample of employed persons with data on BP is a form of non-random sampling (Wooldridge 2001). We employ the Heckman correction method to impute the BP on those observations with missing data (Cameron and Trivedi 2009).[12] The first step consists in determining the probability of an employed person being in the selection sample. This involves estimating the selection equation using the probit regression $SL^* = w\delta + v$, where SL^* is the latent variable for the selection sample, which equals 1 if the employed person has data on BP; and 0 otherwise; w includes the number of dependents, household type, housing tenure status, access to electricity, type of housing toilet and house building; and v is the error term.[13] We use the FIES data for all the variables in w.

Next, we get the transformed predicted individual probabilities of being in the selection ($\hat{SL}^*$) and use them as one of the covariates in our structural equation. Then, we apply the OLS regression in the structural equation

$$\ln(BP) = \beta_0 + \beta_1 \ln(AG) + \beta_2 [\ln(AG)]^2 + \beta_3 \ln(TH) + \beta_4 (HE) + \beta_5 (RG) + \beta_6 \left(\hat{SL}^*\right) + \varepsilon.$$

The predicted BP results for 2006 and 2015 are available upon request.

Results and discussion

In this section, we present the multinomial logit regression results for the models with four and eight employment statuses, using the full sample of employed persons, that is, including actual and imputed BP data, in the 2015 FIES-LFS data set. This full sample uses the imputed BP data derived from the OLS regression. Results using the full sample derived from the actual and imputed BP data from the Heckman correction are available upon request. Also available upon request are the estimation results for 2006 using OLS and Heckman regressions.

Table 2 shows the relative risk ratios of the multinomial logit model with the three employment statuses, with the reference category being full-time and not under-employed. Note that the interpretation of each right-hand side variable also refers to a base category (shown in the Table for each variable). The most salient results are as follows:

1. The differences in the relative risk ratios of the determinants of being visibly under-employed are negligible, except for BP. Filipino workers in the first, that is, lowest, BP quintile are 11,855 times more likely than those in the fifth quintile to be visibly under-employed. All relative risk ratios of the visibly under-employed are above 1. This means that Filipino workers in the four lowest quintiles, compared to those in the fifth, are more likely to be visibly under-employed than to be full-time and not under-employed.
2. As a consequence of the above, the main finding of this study is that being in the first BP quintile is the major predictor of being visibly under-employed. The probabilities associated with the other characteristics that determine whether or not an employed person is visibly under-employed, do not differ from those associated with being full-time and not under-employed (that is, a relative risk ratio about 1).
3. A male worker is more likely to be under-employed, either visibly or invisibly, than a female worker. The likelihood that a male worker is visibly under-employed is twice that of a female worker.
4. A worker in the National Capital Region is more likely to be visibly under-employed than a worker in any of the other regions. However, the opposite holds true for the invisibly under-employed—the likelihood

[12] We use the built-in Heckman command in Stata instead of doing the two steps manually.
[13] The proxy variable for the number of dependents is the number of household members who are less than 17 years old.

Table 2
Relative risk ratio of employed persons using actual and imputed basic pay data derived from the OLS regression, 2015

	Invisibly under-employed 1	Part-time, not under-employed 2	Visibly under-employed 3
Constant	0.0637	0.0958	0.0071
Sex (base = female)			
Male	1.3383	1.2288	1.9825
Region (base = National Capital Region)			
Region I – Ilocos	1.4447	0.3134	0.3311
Region II – Cagayan Valley	1.4510	0.2844	0.2380
Region III – Central Luzon	1.3253	0.4163	0.4028
Region IVA – CALABARZON	1.9754	0.7398	1.1969*
Region V – Bicol	3.3544	0.3654	0.7399
Region VI – Western Visayas	1.6686	0.1687	0.1861
Region VII – Central Visayas	1.6289	0.2233	0.2022
Region VIII – Eastern Visayas	2.1908	0.2537	0.4603
Region IX – Zamboanga Peninsula	2.0093	0.1627	0.1922
Region X – Northern Mindanao	2.4722	0.2106	0.3396
Region XI – Davao	1.8612	0.3967	0.4593
Region XII – SOCCSKSARGEN	2.1856	0.2404	0.3012
Cordillera Administrative Region	2.6804	0.2769	0.5169
Autonomous Region in Muslim Mindanao	1.3585	0.2130	0.1175
Region XIII – Caraga	3.0575	0.4238	0.9018+
Region IVB – MIMAROPA	1.7920	0.3451	0.5704
Age group (base = 15–30 years old)			
31–45	1.0742*	1.5490	1.9124
46–60	0.9696+	1.7746	1.6273
At least 61	0.6579	1.8886	0.7429
Highest educational attainment (base = college graduate and post-baccalaureate)			
No grade completed	1.0042+	0.1189	0.1456
Elementary (incomplete)	1.2375	0.1197	0.1855
Elementary graduate	1.1518**	0.1349	0.2105
High school (incomplete)	1.2261	0.1660	0.2549
High school graduate	1.1505	0.1964	0.2930
Post-secondary (incomplete)	1.0648+	0.2860	0.2896
Post-secondary graduate	1.2042**	0.4160	0.5245
College (incomplete)	1.1629**	0.4183	0.4580
Marital status (base = single)			
Married	1.2312	1.3271	1.9289
Widowed	1.2634	1.2444	2.0087
Divorced/Separated/Annulled	1.2991	1.2058**	2.2736
Basic pay per month (base = fifth quintile: at least PHP9,601)			
First quintile: at most PHP2,206	1.2358*	7237.83	11,854.61
Second quintile: PHP2,207–PHP3,846	1.3603	560.03	783.37
Third quintile: PHP3,847–PHP6,000	1.4907	39.11	51.82
Fourth quintile: PHP6,001–PHP9,600	1.3352	6.7412	6.2478
Major economic sector (base = agriculture)			
Industry	0.7991	0.4344	0.6385
Services	0.6481	0.3474	0.4034
Primary occupation (base = managers)			
Professionals	0.6797	0.4378	0.6404
Technicians and associate professionals	1.0824+	0.7335	1.2085+
Clerical support workers	0.8847*	0.1965	0.2025
Service and sales workers	0.8298	0.2868	0.3099

(Continues)

Table 2
Continued

	Invisibly under-employed 1	Part-time, not under-employed 2	Visibly under-employed 3
Skilled agricultural, forestry, and fishery workers	0.9523+	0.4315	0.4609
Craft and related trades workers	1.1505**	0.6998	0.8860+
Plant and machine operators	0.9636+	0.9477+	1.1906*
Elementary occupations	0.9174*	0.3671	0.5014
Armed forces occupations and non-gainful activities, and special occupations	1.0853+	0.8567+	1.1654+

Reference category: Full time and not under-employed.

CALABARZON = Cavite, Laguna, Batangas, Rizal, and Quezon; MIMAROPA = Mindoro (Occidental and Oriental), Marinduque, Romblon, and Palawan; SOCCSKSARGEN = South Cotabato, Cotabato, Sultan Kudarat, Sarangani, and General Santos.

Notes: All estimates are significant at 1% except those with ** significant at 5%, * significant at 10%, and + not significant. Sample size is 78,002.

Source: Authors' estimates based on Philippine Statistics Authority (2015b), (2016a).

that a worker in the other regions desires more work hours, even if he or she already works full time, is higher (up to 3.35 times in Bicol) than for someone from the capital region. This outcome probably stems from the disparity in earnings from full-time jobs between the capital region and other regions.

5. Filipino workers aged 31–45 are more likely than those aged 15–30 years old to be under-employed. This finding contrasts with findings from advanced countries where younger workers have a greater tendency to be under-employed (Doiron 2003 Bell and Blanchflower 2013).
6. Workers who are not college or post-baccalaureate graduates are less likely to be visibly under-employed than to be full-time and not under-employed, compared to those who have completed at least a college degree.
7. Workers in industry and services are less likely to be invisibly under-employed or to be visibly under-employed than to be full-time and not under-employed, compared to workers in agriculture. Employment in agriculture, partly owing to the seasonality of production and low productivity, raises one's risk of being under-employed.

Our descriptive analysis shows that a large proportion of the under-employed (54%), despite saying that they desire to work more hours, in fact did not look for additional jobs. What are the key characteristics of this type of under-employed workers? To answer this, we ran a multinomial logit model with the 'basic' four employment statuses disaggregated into those who looked for additional jobs and those who did not, giving a total of eight employment statuses. Table 3 presents the relative risk ratios from this model. The reference category is full-time and not under-employed who did not look for additional jobs.

We highlight four results. First, as expected, we find that earnings remain the critical factor that distinguishes between a worker (1) who is visibly under-employed and who looked for additional jobs, and (2) one who is full-time and not under-employed and who did not look for additional jobs. Workers in the lowest quintile are

Table 3
Relative risk ratio of employed persons using actual and imputed basic pay data derived from the OLS regression: Looked for versus did not look for additional jobs, 2015

	Full-time and not under-employed and looked 1	Invisibly under-employed and did not look 2	Invisibly under-employed and looked 3	Part-time, not under-employed and did not look 4	Part-time, not under-employed and looked 5	Visibly under-employed and did not look 6	Visibly under-employed and looked 7
Constant	0.0049	0.0435	0.0097	0.0325	0.0002	0.0015	0.0017
Sex (base = female)							
Male	1.6212	1.2343	1.6747	1.3949	2.2963	1.9187	2.4983
Region (base = National Capital Region)							
Region I – Ilocos	1.1590+	1.2888	1.9267	0.3286	0.2110	0.3739	0.3076
Region II – Cagayan Valley	1.0862+	1.3526	1.8412	0.3114	0.0927	0.2286	0.2735
Region III – Central Luzon	0.7657+	1.2640	1.5367	0.4500	0.3146	0.4736	0.3841
Region IVA – CALABARZON	1.1684+	1.8014	2.5161	0.7844	0.8338+	1.3665	1.1183+
Region V – Bicol	4.3083	2.7353	5.4791	0.3990	0.8052+	0.7918*	0.8066*
Region VI – Western Visayas	2.4316	1.4187	2.5028	0.1910	0.3086	0.2319	0.1874
Region VII – Central Visayas	1.6052**	1.4570	2.2465	0.2439	0.4329	0.3023	0.1413
Region VIII – Eastern Visayas	2.6888	2.1658	2.6374	0.2802	0.4974**	0.5283	0.4688
Region IX – Zamboanga Peninsula	0.9960+	1.4064	3.6183	0.1890	0.2573	0.2228	0.2104
Region X – Northern Mindanao	1.7080**	2.2457	3.2698	0.2333	0.2399	0.3292	0.3965
Region XI – Davao	1.6612**	1.4263	3.0885	0.4205	0.6033*	0.4473	0.5076
Region XII – SOCCSKSARGEN	2.9324	1.7114	3.6601	0.2751	0.5900*	0.3094	0.3768
Cordillera Administrative Region	2.2790	2.8586	2.8134	0.3002	0.8506+	0.7860*	0.3935

(Continues)

Table 3
Continued

	Full-time and not under-employed and looked 1	Invisibly under-employed and did not look 2	Invisibly under-employed and looked 3	Part-time, not under-employed and did not look 4	Part-time, not under-employed and looked 5	Visibly under-employed and did not look 6	Visibly under-employed and looked 7
Autonomous Region in Muslim Mindanao	1.0452+	1.5429	1.3477**	0.2650	0.2484	0.1885	0.0959
Region XIII – Caraga	2.9621	2.0726	5.8161	0.4719	1.4194+	0.8733+	1.1183+
Region IVB – MIMAROPA	1.7723**	1.5574	2.5728	0.3780	0.7084+	0.6340	0.5913
Age group (base = 15–30 years old)							
31–45	0.8908+	1.0289+	1.2100	1.6740	1.9173	2.0203	2.0075
46–60	0.7515**	0.9692+	1.0408+	2.0449	1.5045	1.8379	1.6919
At least 61	0.4547	0.6967	0.6594	2.3814	0.9506+	1.0300+	0.6587
Highest educational attainment (base = college grad and post-baccalaureate)							
No grade completed	2.4549	0.9489+	1.2915+	0.1294	0.1408	0.1441	0.1783
Elementary (incomplete)	1.7827	1.3252	1.3715	0.1322	0.1475	0.2156	0.2046
Elementary graduate	1.4812**	1.3241	1.1693*	0.1484	0.1674	0.2452	0.2288
High school (incomplete)	1.3895*	1.4423	1.2013**	0.1838	0.1998	0.3020	0.2726
High school graduate	1.3976**	1.2791	1.2208	0.2177	0.2451	0.3375	0.3146
Post-secondary (incomplete)	2.7461	1.3069+	1.0150+	0.3275	0.3982*	0.3450	0.3067
Post-secondary graduate	1.7435	1.3306	1.2850**	0.4528	0.4094	0.6069	0.5159
College (incomplete)	1.3614*	1.3241	1.1676+	0.4602	0.4235	0.5651	0.4329
Marital status (base = single)							
Married	1.4540	1.1665	1.4481	1.4669	2.0135	2.0524	2.0773
Widowed	0.9569+	1.1198+	1.6517	1.4274	2.1824	2.1765	2.2556
Divorced/ separated/ annulled	1.5199*	1.0952+	1.7613	1.2630	2.2303	2.2897	2.4154
Basic pay per month (base = fifth quintile: at least PHP9,601)							
	1.3595+	0.9383+	1.8528	4905.90	16,410.87	8054.88	8304.31

First quintile: at most PHP2,206							
Second quintile: PHP2,207–PHP3,846	1.3735*	1.0809+	2.0080	402.56	1135.14	531.16	607.61
Third quintile: PHP3,847–PHP6,000	1.4998	1.2252	2.1860	31.15	83.98	37.22	45.17
Fourth quintile: PHP6,001–PHP9,600	1.2460*	1.1903	1.7884	6.1466	10.38	5.7245	5.5097
Major economic sector (base = agriculture)							
Industry	0.7207	0.9508+	0.7652	0.5945	0.9495+	0.9458+	0.8460
Services	0.6413	0.7199	0.5534	0.4292	0.4283	0.5283	0.4467

Reference category: Full-time and not under-employed, and did not look for additional jobs outside primary occupation.

CALABARZON = Cavite, Laguna, Batangas, Rizal, and Quezon; MIMAROPA = Mindoro (Occidental and Oriental), Marinduque, Romblon, and Palawan; SOCCSKSARGEN = South Cotabato, Cotabato, Sultan Kudarat, Sarangani, and General Santos.

Notes: All estimates are significant at 1% except those with ** significant at 5%, * significant at 10%, and + not significant. Sample size is 78,002.

Source: Authors' estimates based on Philippine Statistics Authority (2015b), (2016a).

Table 4
Relative risk ratio of employed persons using actual and imputed basic pay data derived from the OLS regression: Worked versus did not work additional hours, 2015

	Full-time and not under-employed with additional hours 1	Invisibly under-employed without additional hours 2	Invisibly under-employed with additional hours 3	Part-time and not under-employed without additional hours 4	Part-time and not under-employed with additional hours 5	Visibly under-employed without additional hours 6	Visibly under-employed with additional hours 7
Constant	0.0027	0.0664	0.0012	0.0974	0.0006	0.0072	0.0003
Sex (base = female)							
Male	1.6987	1.2926	1.8746	1.2088	2.0626	1.7772	3.1076
Region (base = National Capital Region)							
Region I – Ilocos	5.4642	1.2125**	5.9568	0.3184	1.1297+	0.2924	0.9345+
Region II – Cagayan Valley	3.9806	1.2388**	5.1696	0.2876	0.8701+	0.1929	0.7334+
Region III – Central Luzon	2.1646	1.3510	1.4822+	0.4099	1.0131+	0.4255	0.3863
Region IVA – CALABARZON	3.8068	1.9623	3.2694	0.7161	3.1175	1.0687+	2.9628
Region V – Bicol	4.9277	3.2009	8.6051	0.3537	1.8302**	0.6707	1.9193
Region VI – Western Visayas	5.0314	1.5276	5.0649	0.1634	0.8496+	0.1743	0.4511
Region VII – Central Visayas	4.0305	1.5572	3.8536	0.2111	1.1685+	0.1870	0.4834
Region VIII – Eastern Visayas	4.5725	2.0746	5.7183	0.2495	1.0817+	0.4035	1.2572+
Region IX – Zamboanga Peninsula	3.5998	1.3008	11.7919	0.1584	0.7582+	0.1284	0.7827+
Region X – Northern Mindanao	4.2695	2.4324	5.1794	0.2044	0.9526+	0.2908	0.9678+
Region XI – Davao	3.7768	1.7622	4.6094	0.3741	2.1198	0.4259	1.0743+
Region XII – SOCCSKSARGEN	3.0023	2.0142	5.7773	0.2317	1.0012+	0.2683	0.7395+
Cordillera Administrative Region	2.7058	2.6479	4.8946	0.2771	0.6730+	0.4651	1.2114+
Autonomous Region in Muslim Mindanao	1.9012	1.3360	2.4632	0.2154	0.4234	0.1252	0.1527
Region XIII – Caraga	3.2143	2.8155	8.3511	0.4055	1.9735	0.7816**	2.4110
Region IVB – MIMAROPA	6.6294	1.6955	5.2963	0.3082	2.9875	0.5069	1.7393**

Age group (base = 15–30 years old)							
31–45	2.6888	0.9817+	2.4239	1.5266	2.8610	1.8272	2.6929
46–60	2.9011	0.8717	2.3303	1.7925	2.8218	1.5404	2.3292
At least 61	2.3113	0.6032	1.3655**	1.9688	1.9674	0.7251	0.9056+
Highest educational attainment (base = college grad and post-baccalaureate)							
No grade completed	1.6262	1.0345+	0.9165+	0.1198	0.1612	0.1382	0.1806
Elementary (incomplete)	0.7419**	1.2837	0.9094+	0.1155	0.1396	0.1817	0.1841
Elementary graduate	0.7788**	1.2101	0.8224+	0.1320	0.1443	0.2077	0.2076
High school (incomplete)	0.8348+	1.2983	0.8543+	0.1630	0.1809	0.2457	0.2725
High school graduate	0.8671+	1.2024	0.8513+	0.1928	0.2177	0.2926	0.2852
Post-secondary (incomplete)	0.8760+	1.1749+	0.5167+	0.2823	0.2732	0.3158	0.2032
Post-secondary graduate	1.0725+	1.2147**	1.1321+	0.4132	0.4531	0.5550	0.4468
College (incomplete)	0.9974+	1.2114	0.8996+	0.4165	0.4204	0.4730	0.4058
Marital status (base = single)							
Married	1.8698	1.1637	2.0748	1.2976	2.5541	1.7394	3.1957
Widowed	1.8861	1.1948**	2.1406	1.2034	2.6304	1.8398	3.3119
Divorced/ Separated/ Annulled	1.7386	1.2975	1.5865**	1.1644+	2.4141	1.9712	4.0539
Basic pay per month (base = Fifth quintile: at least PHP9,601)							
First quintile: at most PHP2,206	1.4184+	1.1728+	2.0854	6984.04	12,179.08	11,231.11	15,607.20
Second quintile: PHP2,207–PHP3,846	1.7640	1.1742	3.3386	551.88	816.84	739.19	1038.08
Third quintile: PHP3,847–PHP6,000	1.7108	1.3773	2.8259	39.40	45.36	50.98	60.54
Fourth quintile: PHP6,001–PHP9,600	1.1375+	1.2755	1.9144	6.8059	6.1541	6.2385	6.3291
Major economic sector (base = agriculture)							
Industry	0.7674**	0.8099	0.6840	0.4310	0.4165	0.6918	0.4556
Services	0.7990**	0.6546	0.6045	0.3445	0.3510	0.4176	0.3429
Primary occupation (base = managers)							
Professionals	0.8820+	0.6581	0.8205+	0.4376	0.4076	0.7165**	0.3475
Technicians and associate professionals	0.8055+	1.0019+	1.5121**	0.7488	0.5534	1.2396+	1.0599+
Clerical support workers	0.6325	0.9140+	0.5827	0.1973	0.1546	0.2220	0.1224

(Continues)

Table 4
Continued

	Full-time and not under-employed with additional hours 1	Invisibly under-employed without additional hours 2	Invisibly under-employed with additional hours 3	Part-time and not under-employed without additional hours 4	Part-time and not under-employed with additional hours 5	Visibly under-employed without additional hours 6	Visibly under-employed with additional hours 7
Service and sales workers	0.5269	0.8375	0.6862	0.2965	0.1569	0.3243	0.2316
Skilled agricultural, forestry, and fishery workers	0.9143+	0.9569+	0.8351+	0.4245	0.4516	0.4147	0.4745
Craft and related trades workers	0.5785	1.1931	0.8524+	0.7084	0.4881	0.9231+	0.7069**
Plant and machine operators	0.4530	1.0314+	0.4676	0.9588+	0.5707	1.3147	0.7207*
Elementary occupations	0.6278	0.9318+	0.7739**	0.3787	0.2212	0.5382	0.3572
Armed forces occupations and non-gainful activities, and special occupations	0.1387**	1.1634+	0.5653+	0.8236+	0.7336+	1.2099+	0.8600+

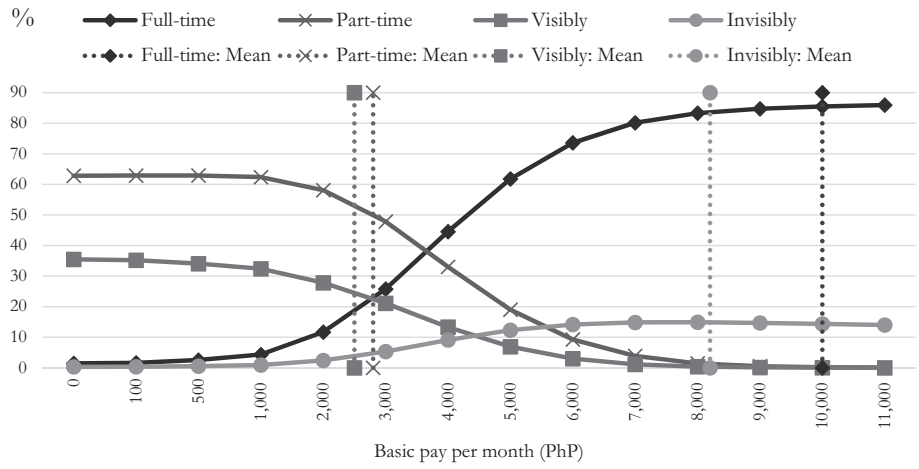
Reference category: Full-time and not under-employed, with additional hours outside primary occupation.

CALABARZON = Cavite, Laguna, Batangas, Rizal, and Quezon; MIMAROPA = Mindoro (Occidental and Oriental), Marinduque, Romblon, and Palawan; PU = part-time and not under-employed; SOCCSKSARGEN = South Cotabato, Cotabato, Sultan Kudarat, Sarangani, and General Santos.

Notes: All estimates are significant at 1% except those with ** significant at 5%, * significant at 10%, and + not significant. Sample size is 78,002.

Source: Authors' estimates based on Philippine Statistics Authority (2015b), (2016a).

Figure 6
Probability that a worker will be in any employment status given basic pay per month, 2015.



Source: Authors' calculations based on Philippine Statistics Authority (2015b), (2016a)

8304 times more likely to be visibly under-employed and searching for additional jobs than workers in the highest quintile. This means that BP is the major cause of a Filipino worker to be visibly under-employed, whether he/she looked for additional jobs. Second, the likelihood that a worker be visibly under-employed, either looking for a job or not, is higher among those in the National Capital Region than those in the other regions. Third, workers who have not completed a college degree are less likely to be visibly under-employed and not search for jobs than workers with a college degree and post-baccalaureate. Fourth, workers in agriculture are more likely to be visibly under-employed and not searching for additional jobs than workers in services. This may be the result of fewer available work opportunities, that is, an under-employed worker in agriculture may be less inclined to look for additional employment because there are fewer available jobs than in services.

Our descriptive analysis shows that 16.9% of employed workers (Table 1) who did not work additional hours outside their primary occupation, are under-employed. This corresponds to 78% of the total under-employed. Table 4 presents the relative risk ratios of the multinomial logit model with the four employment statuses disaggregated into those who worked additional hours outside the primary occupation and those who did not. The reference category is full-time and not under-employed who did not work additional hours. Our results show that, compared to the highest BP quintile, Filipino workers in the lowest quintile are 11,231 times more likely to be visibly under-employed and not working additional hours. Workers living outside the capital region are more likely to be invisibly under-employed and not working additional hours than workers in the capital region. The risk of being visibly under-employed and not having employment outside their main occupations is twice as high for workers in agriculture than for workers in services and industry.

Finally, Figure 6 shows the probability of a worker being in any of the four employment statuses, given his/her BP per month. To estimate these probabilities, we estimated a multinomial logit model with BP as a continuous variable. For each BP, the sum of the probabilities is 100%. The probabilities of being

(1) part-time and not under-employed and (2) visibly under-employed decrease with BP, while the probabilities of being (3) full-time and not under-employed, and (4) invisibly under-employed increase with BP. Visible under-employment tends to vanish beyond a BP of PHP8000 per month at 2015 prices. This amount is equivalent to about three times the average earnings of the under-employed working less than full time (that is, visibly under-employed) (Table 1), as well as twice the average earnings in the agriculture sector (Table A1).

Conclusions

This paper has analysed why 6.7 million Filipino workers (16.4% of all workers) declared themselves as under-employed in 2018. Using the 2015 FIES-LFS data set, our multinomial logit analysis indicates that being in the first BP quintile is the strongest predictor of an employed person being visibly under-employed in all models estimated for different employment statuses.

A Filipino worker in the first, that is, lowest, BP quintile is 11,854 times more likely to be visibly under-employed than those in the fifth quintile. Therefore, BP is the major predictor of being visibly under-employed. Aside from that, all Filipino workers in the four quintiles (compared to the fifth/highest quintile) are more likely to be visibly under-employed, or to be invisibly under-employed than to be full-time and not under-employed. The relative risk ratios of other attributes like sex, age group, highest educational attainment, marital status, type of sector, and primary occupation, are about 1.0.

Workers in the lowest BP quintile are 8055 times more likely to be visibly under-employed and not look for additional jobs than workers in the highest quintile. It is important to understand why such a high percentage of workers indicated that they wanted to work additional hours, and yet they did not look for another job given that their BP falls into the lowest quintile. This would require additional questions in the labour force surveys inquiring about the reasons for not looking for additional jobs.

Furthermore, 78% of the total under-employed, that is, 72% of those visibly under-employed and 84% of those invisibly under-employed, did not effectively work additional hours outside their primary occupation. BP is also the major determinant. Workers in the lowest BP quintile are 11,231 times more likely to be visibly under-employed and not look for additional jobs than workers in the highest quintile. In addition, we find that those in agriculture are much more likely to be visibly under-employed without work outside their main employment than those in industry or services. The question is whether the available jobs are suitable given constraints on time and skills of the visibly under-employed.

Our findings reinforce the view that under-employment, poverty, and inequality are intrinsically linked (Balisacan et al. 2004). It is much more prevalent among those in the lowest earnings quintiles than in the other quintiles. The risk of being visibly under-employed is also higher in the capital region than in the other regions, and yet the capital continues to draw an increasing number of migrants. The probability of being invisibly under-employed is higher in the other regions than in the capital, that is, having a full-time job and still wanting more work hours, which could of course be attributed to low earnings. Overall, the results imply that what matters most in addressing under-employment is providing decent employment opportunities, or employment that provides sufficient income. Further, given that the risk of under-employment is much higher in agriculture than in services and industry, it is important to induce and facilitate changes in the structure of the economy to enable the transfer of workers into sectors with higher productivity.

Conflict of Interest

There is no conflict of interest.

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APPENDIX 1: CLEANING OF FAMILY INCOME AND EXPENDITURE SURVEY-LABOUR FORCE SURVEY DATA SETS

Variables:

1. Sex – Retain male as '1' and recode female from '2' to '0'
2. Region – Recode CALABARZON from '41' into '4' and MIMAROPA from '42' into '17'
3. Highest educational attainment – Recode the following: (1) no grade and preschool into no grade completed; (2) grades 1–5 into elementary (incomplete); (3) first to third year high school into high school (incomplete); (4) first and second post-secondary into postsecondary (incomplete); (5) codes 501–589 into post-secondary graduate; (6) first to fourth year college into college (incomplete); and codes 601–689 and post-baccalaureate into college graduate
4. Marital status – Retain the tags of single, married, and widowed. Recode divorced/separated and annulled into one category.
5. Basic pay – Compute the BP per month equal to $\left(\frac{\text{Basic pay per day}}{8\text{ hours}}\right) \times \text{Total hours in the past week} \times 4\text{ weeks}$.
6. Major economic sector.

Table A1
Predicted basic pay per month derived from the OLS regression, by minor economic sector, 2015

	Actual basic pay per month	Predicted basic pay per month	Difference between actual and predicted	*R*-squared
Agriculture	**3784.32**	**2890.64**	**893.68**	**0.70**
Industry	**8235.35**	**5560.74**	**2674.61**	**0.61**
Manufacturing	8425.31	4391.90	4033.41	0.62
Other industries	8106.37	7225.21	881.16	0.68
Services	**9766.46**	**6691.33**	**3075.13**	**0.62**
Wholesale and retail	7476.11	6421.53	1054.58	0.53
Transportation, accommodation, information, and communications	9220.29	7144.13	2076.16	0.56
Finance and real estate	13,680.23	6474.29	7205.94	0.41
Professional, scientific, technical and public administration, education, health, and arts	14,027.41	5497.06	8530.35	0.56
Administration and support services	13,447.46	10,336.27	3111.19	0.51
Other services	3966.89	2471.49	1495.41	0.66

Source: Authors' estimates based on Philippine Statistics Authority (2015b), (2016a).

The 1994 Philippine Standard Industrial Classification (PSIC) is patterned after the International Standard Industrial Classification (ISIC) Revision 3 of the United Nations while the 2009 PSIC is after the ISIC Revision 4. One significant modification, for example, is the partition of real estate, renting, and business activities from being a division in 1994 PSIC into three stand-alone sections, that is, real estate activities; professional, scientific and technical activities; and administrative and support services, in 2009 PSIC.

We categorise the sectors in 2006 Family Income and Expenditure Survey-Labor Force Survey (FIES-LFS) according to the major groups in 1994 PSIC and the sectors in 2015 FIES-LFS based on 2009 PSIC. This means that even if the same three major sectors were created in 2006 FIES-LFS, the subsets of sectors are different in both data sets.

Agriculture sector
- Agriculture and forestry
- Fishing

Industry sector
- Mining and quarrying
- Manufacturing
- Utilities
- Construction

Service sector
- Wholesale and retail trade, and repair
- Transportation, accommodation, information and communication
- Finance and real estate
- Professional, scientific and technical; public administration and defence; education; health and social work; and arts and entertainment
- Administrative and support services
- Other service activities including residual activities.[14]
- Primary occupation.

The 1992 Philippine Standard Occupational Classification (PSOC) is patterned after the 1988 International Standard Classification Occupations (ISCO) of the International Labour Organization while the 2012 PSOC follows the 2008 ISCO (NSCB 2014; NSCB 2002). One crucial revision, for example, is the special occupations which include armed forces and occupations that are not identifiable in the 1992 PSOC. In the 2012 PSOC, the special occupations were changed to armed forces and

1992 PSOC	2012 PSOC
Officials of government and special-interest organisations, corporate executives, managers, managing proprietors, and supervisors	Managers
Professionals	Professionals
Technicians and associate professionals	Technicians and associate professionals
Clerks	Clerical support workers
Service workers and shop and market sales workers	Service and sales workers
Farmers, forestry workers and fishermen	Skilled agricultural, forestry, and fishery workers
Trades and related workers	Craft and related trades workers
Plant and machine operators and assemblers	Plant and machine operators and assemblers
Labourers and unskilled workers	Elementary occupations
Special occupations	Armed forces occupations

PSOC = Philippine Standard Occupational Classification.
Source: Authors.

[14] Residual activities are not elsewhere classified.

all major groups have subgroup 'Not elsewhere classified' to account for all other occupations that are not classifiable.

We classify the types of occupation in the 2006 FIES-LFS according to the major groups in 1992 PSOC and 2015 FIES-LFS in 2012 PSOC. This means that even if the same 10 major groups were created in 2006 FIES-LFS, the subsets of occupation are different in both data sets.

Definition	Questions on the Labor Force Survey
1. Employed persons are those who worked at least one hour in the past week or had a job/business but not at work.	'Did you do any work for at least one hour during the past week?' Answer: Yes. OR 'Although ___ did not work, did ___ have a job/business during the past week?' Answer: Yes. AND Age is at least 15 years old during the reference period.
1.1 Full-time employed are those who worked at least 40 hours in the past week.	The same questions and answers as in **(1)**. AND 'Total number of hours in the past week' The answer must be at least 40.
1.1.1 Full-time employed and not under-employed are those who worked at least 40 hours in the past week and did not desire to have additional work hours, or to have additional job(s), or to have new job with longer working hours.	The same questions and answers as in **(1.1)**. AND 'Did ___ want more hours of work during the past week?' Answer: No.
1.2 Part-time employed are those who worked less than 40 hours in the past week.	The same questions and answers as in **(1)**. AND 'Total number of hours in the past week' The answer must be less than 40.
1.1.2 Part-time employed and not under-employed are those who worked less than 40 hours in the past week and did not desire to have additional work hours, or to have additional job(s), or to have new job with longer working hours.	The same questions and answers as in **(1.2)**. AND 'Did ___ want more hours of work during the past week?' Answer: No.
2. Under-employed persons are all employed who desired to have additional work hours, or to have additional job(s), or to have new job with longer working hours.	The same questions and answers as in **(1)**. AND 'Did ___ want more hours of work during the past week?' Answer: Yes.
2.1 Invisibly under-employed are under-employed persons who worked at least 40 hours in the past week.	The same questions and answers as in **(2)**. AND 'Total number of hours in the past week' The answer must be at least 40.
2.2 Visibly under-employed persons are those who desired to have additional work hours, or to have additional job(s), or to have new job with longer working hours; and worked less than 40 hours in the past week.	The same questions and answers as in **(2)**. AND 'Total number of hours in the past week' The answer must be less than 40.
3. Unemployed persons are those who, in the past week, had no job/business and available for work and looking for work. Also, those who did not look for work because of the following reasons: i. tired or believe that no work is available; or ii. waiting for the results of previous job application; or iii. waiting for the job rehire; or iv. temporary illness/disability; or v. bad weather.	'Did ___ do any work for at least one hour during the past week?' Answer: No. AND 'Although ___ did not work, did ___ have a job/business during the past week?' Answer: No. AND 'Did ___ look for work or try to establish a business during the past week?' Answer: Yes. AND 'Had opportunity for work existed last week or within two weeks, would ___ have been available?' Answer: Yes. AND Age is at least 15 years old during the reference period.

(Continues)

Definition	Questions on the Labor Force Survey
	Also included: 'Did ___ do any work for at least one hour during the past week?' Answer: No. AND 'Although ___ did not work, did ___ have a job/business during the past week?' Answer: No. AND 'Did ___ look for work or try to establish a business during the past week?' Answer: No. AND 'Why did ___ not look for work?' Answer: Tired/ believe no work available; or awaiting results of previous job application; or temporary illness/ disability; or bad weather; or waiting for rehire/job recall. AND 'Had opportunity for work existed last week or within two weeks, would ___ have been available?' Answer: Yes. AND Age is at least 15 years old during the reference period.
4. Not in the labour force or economically inactive population are those who are neither employed or unemployed, including those who did not look for work because of the following: i. too young/old ii. permanent disability iii. household duties iv. schooling v. others	'Did ___ do any work for at least one hour during the past week?' Answer: No. AND 'Although ___ did not work, did ___ have a job/business during the past week?' Answer: No. AND 'Did ___ look for work or try to establish a business during the past week?' Answer: Yes. AND 'Had opportunity for work existed last week or within two weeks, would ___ have been available?' Answer: No. AND Age is at least 15 years old during the reference period. Also included: 'Did ___ do any work for at least one hour during the past week?' Answer: No. AND 'Although ___ did not work, did ___ have a job/business during the past week?' Answer: No. AND 'Did ___ look for work or try to establish a business during the past week?' Answer: No. AND 'Why did ___ not look for work?' Answer: Tired/ believe no work available; or awaiting results of previous job application; or temporary illness/ disability; or bad weather; or waiting for rehire/job recall. AND 'Had opportunity for work existed last week or within two weeks, would ___ have been available?' Answer: No. AND Age is at least 15 years old during the reference period. Also included: 'Did ___ do any work for at least one hour during the past week?' Answer: No. AND 'Although ___ did not work, did ___ have a job/business during the past week?' Answer: No. AND 'Did ___ look for work or try to establish a business during the past week?' Answer: No. AND 'Why did ___ not look for work?' Answer: Too young/old or retired/permanent disability; or household/family duties; or schooling; or others. AND Age is at least 15 years old during the reference period.