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Reducing Unemployment in Indonesia: Results from a Growth-Employment Elasticity Model

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ABSTRACT

Most of the unemployed in Indonesia are young and inexperienced, still live with their parents, and have at least 12 years of education. Starting with the premise that efforts to reduce unemployment should take into account the characteristics of the unemployed, we develop a model to look at the impact of different sectors and locations of economic growth on urban, rural, and national employment using a provincial level panel dataset. We find that increasing employment in rural and urban areas indeed requires different strategies. Services growth has the highest elasticity of employment in urban areas, while agriculture growth is still the best avenue to increase rural employment.

Keywords: unemployment; growth elasticity; profile; Indonesia.
JEL Classification: J21, J23.

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I. INTRODUCTION

Open unemployment is a problematic issue to deal with in developing countries. Given the unavailability of a comprehensive and reliable social security system, theoretically there is a very high incentive to stay employed, especially among the poor. Meanwhile, the poor who are not working, and to a certain extent the non-poor who are low educated and unemployed, tend to become discouraged workers. These are the people who are out of work but are not looking for work because they believe that they cannot find one (Kingdon & Knight 2006; Suryadarma, Suryahadi, & Sumarto 2005).

At the outset, the condition above implies that those who fall into the traditional definition of openly unemployed—people who have no work and are actively looking for one—in developing countries do not necessarily come from poor families since they can afford to wait for a job that fulfills their expectations. Furthermore, it is also possible that they are relatively highly educated, thus have high wage reservations and prefer to wait for the high paying job.

In the effort to reduce unemployment, it is important to ensure that the types of jobs created in an economy match the skills and expectations of the unemployed. As an example, an employment creation program that provides below market wages would not be successful in reducing unemployment in a country whose unemployed exhibit the characteristics described in the preceding paragraph. In contrast, the program would attract those who are already working in the informal sector to switch jobs or the discouraged workers to enter the labor market. Hence, while it may be successful in increasing general welfare, the program would not reduce the unemployment rate.

At the macro level, robust economic growth is considered the best way to create employment opportunities. Therefore, it is important to assess the growth elasticity of employment, which measures the ability of each percent of economic growth, to increase employment. The model to calculate the elasticity is quite standard and has been widely used and adopted around the world, for example, in ILO (2004). Related to the need for matching job offers

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with the skills and other characteristics of the unemployed, however, it is very plausible that growth in different sectors has different elasticities of employment.

In this paper, we investigate whether growth in different sectors in an economy indeed has different elasticities of employment. We develop a model that improves the widely used one and apply it by using survey datasets from Indonesia. We divide Indonesia's economy into three sectors: agriculture, industry, and services; and two locations: urban and rural. Therefore, we have a total of six sectoral growth numbers. Furthermore, we divide the employment figures into total, urban, and rural because there may be differential sectoral-location impacts in the two areas.

The rest of the paper is organized as follows. Section II describes the data used in the analysis. Section III sketches the overall open unemployment trend in Indonesia from 1994 to 2004. Section IV looks at the characteristics of the openly unemployed in Indonesia for the same period. Section V looks at the sectoral distribution of employment in Indonesia. Section VI describes the model used to calculate the growth elasticity of employment. Section VII estimates the growth elasticity of employment. Finally, section VIII concludes the paper.

II. DATA

We mainly use the data from *Survei Angkatan Kerja Nasional* (Sakernas), the National Labor Force Survey, and one module of *Survei Penduduk Antarsensus* (Supas), the Intercensal Population Survey. Both are published by BPS (Statistics Indonesia). Sakernas is an annual, nationally representative, and repeated cross-section labor force survey that collects activity data of individuals in the sampled households. On average, every round of Sakernas has around 200,000 observations on individuals at or above 15 years of age, the labor force age threshold used in Indonesia.

Meanwhile, Supas is a survey that is conducted in the mid-period between two population censuses. Since it is intended as a midterm check of trends data based on census, Supas has a much larger sample than Sakernas. In 1995, it has more than 600,000 observations on individuals that are suitable for our purposes. Therefore, due to this different sampling nature, the unemployment rate obtained from Supas is significantly higher than that obtained from Sakernas. We take this difference into account in this paper.

In looking at unemployment figures and the characteristics of the unemployed, we use Sakernas for every year between 1994 and 2004, except for the year 1995 when Sakernas was not conducted. We use the labor force module of Supas as a replacement. For the model estimation, meanwhile, we use Sakernas data aggregated at provincial level in six survey years: 1987, 1990, 1993, 1996, 1999, and 2002.

Finally, we use provincial level Regional Gross Domestic Product (RGDP) published by BPS. In line with the Sakernas data, the RGDP data covers the period from 1987 to 2002, with the value fixed at the 1993 rupiah worth. Since we only use provinces that have data for every year, in effect we have a complete provincial level panel dataset.

III. OPEN UNEMPLOYMENT IN INDONESIA

Indonesia's open unemployment rate is high compared to the other developing Southeast Asian countries. In 2003, the official rate of 9.5% was astronomically higher than those of its neighbors, Malaysia and Thailand, which were just 3.6% and 1.5% respectively. It is only lower than that of the Philippines, which was 10.2%. Taking the comparison a bit further, Korea's unemployment rate in the same year was only 3.6%.[1]

In this paper, we use different unemployment figures from the official ones because we focus on the narrow measure of unemployment—those classified as traditionally unemployed. The official unemployment figures in Indonesia conform to the broad measure of unemployment—the traditionally unemployed plus the discouraged workers—starting in 2001.[2] Figure 1 shows the open unemployment rates in Indonesia between 1994 and 2004 based on the narrow definition.

Figure 1. Open Unemployment in Indonesia, 1994-2004 (%)
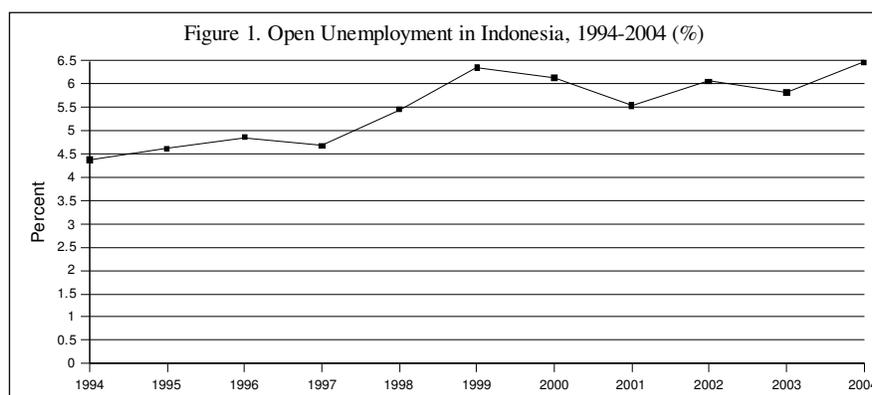
Open unemployment rate jumped from 4.4% in 1994 to 6.5% in 2004, or there was a 47-percent proportional increase. If one looks between 1994 and 1997, just prior to the economic crisis, unemployment rate was relatively stable. During the crisis, it skyrocketed to almost 6.5% in 1999 before starting to descend in the following year and reaching 5.5% in 2001. Afterwards, the rate went on a generally upward trend up until 2004.

[1]Figure for Indonesia is taken from BPS (2004), while figures for other countries are taken from ILO LABORSTA Internet website. These rates are generally comparable (Brooks 2002).

[2]The narrow-broad terms are introduced by Kingdon & Knight (2006).

Making a comparison between the rate during the peak of the crisis in 1999 and the rate in 2004, the unemployment rate was basically stable; however, the new equilibrium is almost two percentage points higher than the pre-crisis equilibrium. Hence, it is possible that the crisis has altered Indonesia's natural rate of unemployment, an issue we leave for future studies.

Meanwhile, Figure 2 shows open unemployment rates disaggregated by urban and rural areas. The unemployment rates in urban areas are always higher than those in rural areas, around four times higher in 1994 and twice in 2004. At the outset, this indicates that rural unemployment has steadily been creeping up higher than urban unemployment during the decade.

Figure 2. Urban-Rural Open Unemployment in Indonesia, 1994-2004 (%)
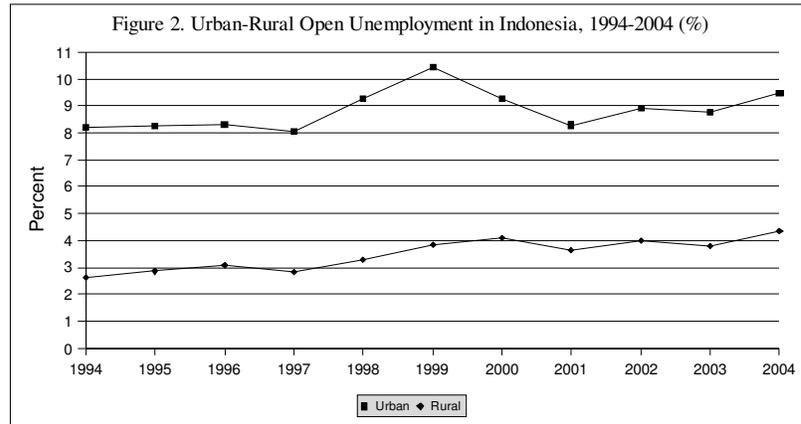
As we look from 1994 to 1997, urban unemployment exhibited a generally stable but slightly decreasing trend, while the rural unemployment rate increased between 1994 and 1996, and decreased in 1997; an overall relatively stable trend. Unemployment, then, soared as the crisis hit. In 1998, urban open unemployment rate increased to 9.3%, a 15.6% proportional increase in just one year, while rural open unemployment rate increased to 3.3%, a 16.6% proportional increase. At the height of the crisis in 1999, open unemployment rate in urban areas stood at a record 10.5%, while rural open unemployment rate increased to 3.8%.

In 2000, open unemployment had reversed its trend in urban areas but was still increasing in rural areas, resulting in a decrease in the national open unemployment rate. Between 2000 and 2004, open unemployment rate slightly increased in both areas. In urban areas, although the downward trend persisted until 2001, open unemployment rate increased in the

following years and stood at 9.5% in 2004. Meanwhile, rural open unemployment rate was at 4.4% in 2004, a record high and still exhibiting no signs of leveling off.

Making a comparison between the unemployment figures during and after the crisis, there has been an alteration in trends between the two areas. Urban areas experienced a similar magnitude decrease in 1999–2001 as the increase in 1997–1999, and, although on an upward trend, the 2004 rates were still lower than those in 1999. In contrast, the unemployment rates in rural areas never returned to the pre-crisis levels and the increasing trend that began in 1998 was still going on in 2004. In the next section, we look at the characteristics of the unemployed.

IV. CHARACTERISTICS OF THE UNEMPLOYED

A. Education Level

The first characteristic is the make up of educational attainment of the unemployed. For simplicity, in Table 1, we differentiate the education level into six years or less (primary or less), nine years (junior secondary), 12 years (senior secondary), and tertiary. The table shows that more than half of the unemployed are highly educated, with at least 12 years of education, and a further quarter having nine years of education. This is in accordance with the higher open unemployment rate among the highly educated found in other studies (BPS, 2003; Irawan, Ahmed, & Islam, 2000).

Examining the trends, meanwhile, the shares of the tertiary and senior secondary educated are relatively constant, although the unemployed with a senior secondary school certificate makes up almost half of total unemployment. In contrast, the share of those with nine years of education has been constantly increasing, from 17% in 1994 to almost 26% in 2004. This phenomenon is related to the increasing average education attainment of the Indonesian working age population in the past decade from merely graduating from primary school to graduating from junior secondary school.

Table 2 disaggregates the unemployed into urban and rural areas. It is indeed clear that there is a difference in the education level of the unemployed between the two areas. The majority in urban areas are highly educated, with more than 60% having at least senior secondary school certificates. In contrast, the average share of the lowest educated for the whole period is 14%. In terms of trend, there is not much change in the share of those with 12 years or more of education. On the contrary, starting in 2000 there has been a decrease in the share of those with only six years of education or less, while the opposite trend happens to those with junior secondary certificates.

Table 1. Proportion of Education Level of the Unemployed, 1994–2004 (%)

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Primary or less	24.8	24.62	24.43	23.27	23.09	23.71	24.71	21.79	22.63	20.74	18.58
Junior secondary	17.13	17.64	18.14	17.54	19.44	19.23	23.37	22.07	23.54	24.27	25.87
Senior secondary	49.62	48.89	48.15	50.18	48.98	47.86	43.98	46.93	45.95	47.96	47.46
Tertiary	8.46	8.87	9.28	9.01	8.48	9.2	7.94	9.21	7.88	7.03	8.09

Table 2. Proportion of Education Level of the Unemployed by Area, 1994–2004 (%)

Urban											
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Primary or less	14.58	23.72	14.99	14.34	15.98	16.5	15.51	15.09	14.82	12.89	12.5
Junior secondary	15.58	16.64	15.33	14.12	15.67	16.61	20.67	16.27	19.48	20.44	21.2
Senior secondary	58.69	49.5	57.15	58.9	56.85	54.22	52.97	56.13	55.08	56.86	55.42
Tertiary	11.15	10.14	12.53	12.63	11.5	12.67	10.85	12.51	10.62	9.8	10.88
Rural											
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Primary or less	39.34	52.94	37.43	37.33	34.36	35.77	38.18	32.34	35.12	33.25	27.83
Junior secondary	19.32	17.84	22.02	22.93	25.4	23.61	27.33	31.21	30.01	30.37	32.98
Senior secondary	36.72	26.15	35.76	36.44	36.53	37.22	30.81	32.43	31.37	33.77	35.35
Tertiary	4.63	3.07	4.79	3.3	3.71	3.4	3.68	4.01	3.5	2.61	3.84

In rural areas, meanwhile, the share of the unemployed is more evenly distributed, with around 30% each for the six years or less, nine years, and 12 years or above. Looking at the trends, meanwhile, the share of the lowest educated is decreasing while the share of those with higher education is slightly increasing. While this also proves the fact that education attainment among Indonesians are increasing, there is still a sizable share of the low educated who are unemployed in rural areas.

B. Work Experience

The second characteristic that we look at is experience, shown in Table 3 by the proportion of those who have previous work experience among the unemployed. We only have data from 1998 to 2004 because of problems we encounter with this variable in earlier Sakernas years. To show the consistency of the proportion, we also include the share of experienced workers among the unemployed in urban and rural areas in Table 3.

Table 3. Share of Experienced Workers among the Unemployed, 1998–2004 (%)

	1998	1999	2000	2001	2002	2003	2004
National	38.69	34.01	28.89	32.18	37.12	32.06	34.30
Urban	39.52	37.40	32.92	35.30	39.77	35.11	38.47
Rural	37.38	28.35	22.99	27.26	32.89	27.20	27.96

Experienced workers were the minority among the unemployed in all areas. Making a comparison between urban and rural areas, shares of the experienced in urban areas were always higher, averaging 37%, than those in rural areas, which were 29% on average. This makes sense because work in rural areas normally evolves around the informal type of work, where experienced workers can easily find jobs. On the other hand, there may be higher job switching in urban areas, thus at any one time there is a higher share of experienced workers being unemployed.

In terms of trend, at the national level, the share stayed at around one-third, with four to five percentage point increase or decrease each year. The lowest was in 2000, where only 29% of the unemployed had prior working experience. Looking at urban and rural areas, meanwhile, the shares in rural areas are somewhat more volatile than those in urban areas. Comparing 1998 with 2004, nationally there was a five-percentage-point decrease. In the meantime, the

shares were relatively constant in urban areas but had diminished by around ten percentage points in rural areas.

C. Gender

In this section, we focus on the share of females among the unemployed, shown in Table 4. Interestingly, urban areas had a smaller ratio than rural areas, which might indicate the higher level of difficulty of securing work for females in rural areas. This could be related to the fact that many types of work in rural areas include physical labor, and that males are usually thought to have more of those in stock than females.

Meanwhile, between 1994 and 2004 the ratio showed a decreasing trend, which bottomed out during the peak of the crisis in 1999, where 42% of the unemployed were females, before increasing again, reaching 45% in 2004. The trend was also the same in both urban and rural areas. Considering that females only made up, on average, 37% of the labor force, a 45% share of females among the unemployed indicates that it was more difficult for female workers to find employment compared to their male counterpart.

D. Age

We now look at the age groups of the unemployed. For simplicity, we divide the age groups into four: 15-24, which represents young workers; 25-34, which represents early career workers; 35-44, which represents mid-career workers; and 45+, which represents mature workers. Figure 3 shows the profile for the national level. As we can see, nationally young workers made up, on average, 70% of the unemployed, although early career and mid career workers' shares increased by 9.1% and 52% respectively during the crisis compared to those in 1997. The trend, meanwhile, stayed relatively constant during the period.

Figure 3. Age Groups of the Unemployed, 1994-2004 (%)
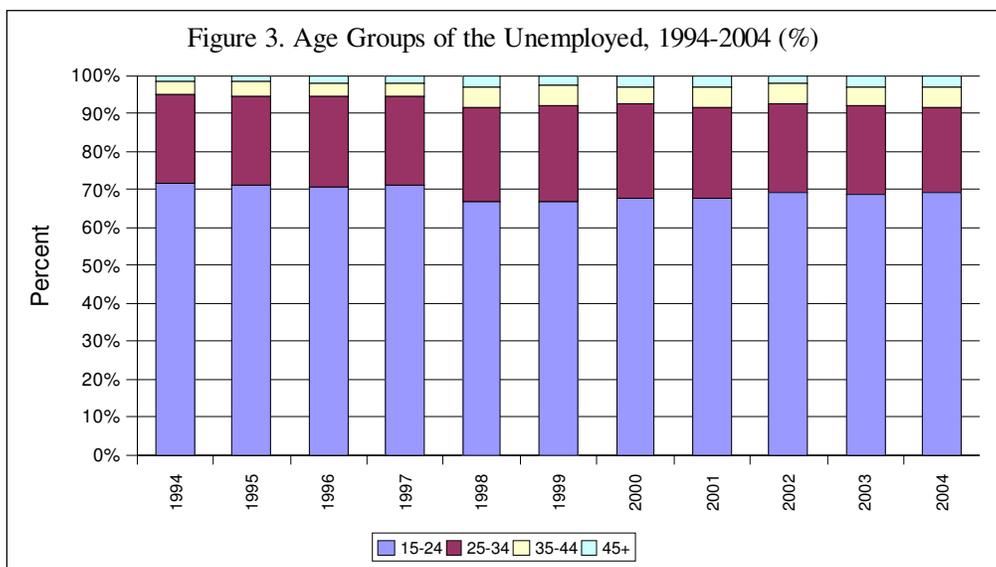
To see whether the high share of young workers is different between urban and rural areas, Table 5 shows the share of young workers in the two areas. It is clear that young workers dominate the unemployed in both areas, hovering between 62% and 68% in urban areas and between 71% and 79% in rural areas. This shows that it was more difficult for new entrants, who were generally better educated, to get into the labor market to find jobs in rural areas. Hence, it is of little surprise that many of the young and the educated leave rural areas and flock to urban areas.

In terms of trend, between 1994 and 1999, the significant decrease in share in both areas was in 1998. In 1999 the share continued to decrease—albeit slightly—in urban areas, while it increased slightly in rural areas because more older workers became unemployed due to the crisis. Between 2000 and 2004, the share in urban areas increased, while it remained constant in rural areas. Hence, between 1994 and 2004, there was a four-percentage-point decrease in the share in urban areas, although the share in 2004, when economic performance had recovered, was higher than that in the crisis era. On the other hand, in rural areas, the share in 2004 was similar to that in 1994 and higher than the 1999 share.

E. Status in the Household

Finally, we look at the make up of the unemployed based on family status from 1995 to 2004. Given that most of the unemployed are still young, we expect to find children to make up most of the unemployed. Table 6 provides the shares in Indonesia for national, urban, and rural areas. Children made up around 72% of the unemployed in urban areas and 79% in rural areas, and the share stayed relatively constant during the period.

In conclusion, our results show that the majority of the unemployed in Indonesia are inexperienced young individuals who are relatively highly educated and still live with their parents. Irawan, Ahmed, & Islam (2000) state that most of the highly educated come from better-off households, hence they can afford to stay unemployed while looking for better-paid modern sector jobs. Meanwhile, Dhanani (2004) suggests that this is mainly caused by the rapid expansion of tertiary education in the early 1990s, and although initially faced with higher open unemployment rate, tertiary graduates enjoy a much better labor market than the low educated.

However, this 'waste of talent' among the educated is worrying and should not be taken lightly (Rao 1992). Moreover, graduate unemployment also occurs among the poor, who cannot afford to spend one to two years searching for a job (Manning & Junankar 1998). Lastly, this phenomenon is more apparent in rural areas, which could indicate a systematic barrier faced by workers with these characteristics in rural areas, which likely explains the high urbanization rate in Indonesia.[3]

In general, Rao (1992) states three important issues in graduate unemployment: a great majority of graduates look for wage and salary employment, not self employment; there seems to be a problem of excess supply; and the services sector is the most closely tied with the absorption of tertiary educated workers.

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[3]In 1971, 17% of Indonesians live in urban areas. By 2002, the share was at 45%.

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Table 4. Share of Females among the Unemployed, 1994–2004 (%)

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
National	45.78	50.91	46.67	46.16	43.46	41.56	42.78	44.81	43.06	43.6	44.53
Urban	43.77	47.31	44.97	44.03	41.73	39.95	41.34	43.51	41.98	42.76	44.6
Rural	48.64	55.05	49.02	49.53	46.21	44.26	44.89	46.87	44.79	44.94	44.42

Table 5. Share of the Young (15-24 years old) among the Unemployed, 1994–2004 (%)

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Urban	68.31	65.98	66.15	66.26	62.78	61.54	62.18	62.74	64.97	64.44	64.33
Rural	76.29	70.77	77.16	78.83	73.12	74.71	76.2	74.81	76.34	74.88	76.19

Table 6. Share of Children among the Unemployed, 1995–2004 (%)

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Urban	67.30	72.57	73.97	70.75	72.92	72.61	72.07	75.68	73.28	72.32
Rural	67.49	79.20	80.11	77.58	77.44	78.99	77.10	80.60	78.34	80.02
National	67.39	75.36	76.36	73.39	74.61	75.20	74.02	77.58	75.23	75.37

In the next sections, we investigate the sectoral growth elasticity of employment. The elasticities would be a useful guide for policymakers in choosing the sector to focus on in trying to reduce unemployment. Furthermore, we can find out whether the services sector indeed has the highest elasticity compared to the other sectors, as suggested by Rao (1992).

V. SECTORAL PROFILE OF EMPLOYMENT

We first look at the distribution of employment by sector and location to gather initial information on the labor market. This is shown in Table 7. Throughout the period, rural agriculture is the largest employer, although its contribution has significantly declined during the period. This is followed by urban services and rural services respectively, except in 1987 when rural services employed more people than urban services. Among the other sectors, urban agriculture is always the smallest employer, while urban industry has taken over from rural industry as the fourth largest employer in 2002.

Table 7. Sectoral and Location Distributions of Employment, 1987–2002 (%)

Year	Urban			Rural		
	Agriculture	Industry	Services	Agriculture	Industry	Services
1987	2.05	3.24	15.59	55.74	5.56	17.83
1990	2.72	4.42	17.49	52.60	6.46	16.31
1993	2.95	5.15	20.58	47.13	6.80	17.39
1996	2.71	5.73	24.25	40.80	7.77	18.74
1999	3.96	6.63	25.80	39.25	7.15	17.21
2002	5.26	8.28	26.93	39.08	5.62	14.82

Looking at the trends, meanwhile, rural agriculture has experienced constant setback, decreasing from employing 56% of the total workers in 1987 to merely 39% as of 2002. In contrast, urban services experienced the highest percentage-point increase during the period, from absorbing 16% of the total workers in 1987 to around 27% by 2002. In terms of proportional expansion, however, urban industry is the runner-up, growing from 3% to 8%, or more than a 150% proportional increase, slightly below the expansion of 157% experienced by urban agriculture. Among the other rural sectors, meanwhile, rural industry stays relatively constant, while rural services had been stable up to 1999 before contracting in 2002.

While ascertaining the share of workers in each sector and location is useful, for our purpose it is more important to assess the sectoral and location distributions of workers by education level. Given the fact that most of the unemployed in Indonesia have at least 12 years of education, growth in the sector that absorbs the most of the highly educated may be able to

reduce unemployment more rapidly than that in the other sectors. Table 8 provides the distribution in the urban and rural areas in 1987, 1993, 1999, and 2002.[4]

In urban areas, services sector is where most workers engage in regardless of education levels; however, the higher the education level, the higher the proportion of those working in the services sector. In 1993, 17% of those with primary education or less were working in agriculture, 17% in industry, and 66% in services. In comparison, only slightly more than 1% of those with tertiary level education made their living in agriculture, while 10% were in industry and a whopping 89% were in the services sector. By 2002, however, more of the low educated were in agriculture, that is, 25%, while the share of those working in services decreased to 58%. In contrast, 86% of the highest educated were in services, while 12% and 2% were in industry and agriculture respectively, which means that more are engaged in industry relative to 1993.

Another interesting observation from Table 8 is that the highest increase in the share of workers in industry is among junior and senior secondary graduates. In 2002, a quarter of those with secondary level education were working in industry, compared to 17% and 12% among primary and tertiary level graduates respectively.

Meanwhile, sectoral absorption in rural areas is quite different. For the two lowest education levels, most are working in agriculture. In contrast, for those with senior secondary and tertiary level education, most are employed in services. In addition, for all the four education levels, industry is the sector with the least share of people working.

In terms of trend, meanwhile, there is not much change among the lowest educated. On average, 70% are working in agriculture, a further 20% in services, while the rest in industry. Similarly, the changes are rather negligible among the junior secondary educated. In contrast, there seems to be a shift among those with 12 years of education, with the share of services decreasing by ten percentage points between 1993 and 2002, while agriculture and industry increased by eight and three percentage points respectively. Meanwhile, among tertiary level graduates, the share of agriculture nosedived from 17% in 1993 to 6% in 2002,

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[4]The shares in 1987 do not add up to 100% because of problems in the sectoral definition during that period. This has been remedied by BPS in 1990; therefore, the shares in 1993 and beyond add up to 100%.

followed by industry, which decreased by three percentage points—or 50% proportionally—while services increased its dominance to 91%. In the next section, we introduce the model that we use to empirically find the answer on the best avenue to reduce unemployment in Indonesia.

Table 8. Distribution of Sectors of Employment by Education in Rural and Urban Areas, 1987–2002 (%)

	Urban				Rural			
	Primary or Less	Junior Secondary	Senior Secondary	Tertiary	Primary or Less	Junior Secondary	Senior Secondary	Tertiary
1987								
Agriculture	13.98	3.75	1.63	0.67	71.20	52.91	21.05	7.98
Industry	13.30	16.02	15.10	8.85	6.65	8.13	6.14	3.54
Services	64.03	69.56	69.66	73.06	18.25	31.53	61.63	78.94
1993								
Agriculture	16.91	6.56	2.53	1.20	70.27	57.03	30.16	16.55
Industry	16.76	22.54	19.32	9.73	9.37	11.58	9.16	5.54
Services	66.16	70.74	78.04	89.05	20.15	31.31	60.60	77.62
1999								
Agriculture	19.58	7.56	3.44	1.75	67.92	53.97	32.55	6.51
Industry	16.59	22.12	20.52	10.43	10.95	13.73	11.27	3.68
Services	63.83	70.32	76.04	87.82	21.13	32.3	56.18	89.81
2002								
Agriculture	24.56	8.83	3.50	1.79	71.93	57.28	37.67	6.44
Industry	17.37	25.02	24.39	11.90	8.87	11.54	11.95	2.76
Services	58.06	66.15	72.10	86.32	19.19	31.18	50.38	90.79

VI. THE MODEL

Several studies have calculated growth elasticity of employment for Indonesia, each arriving at very differing results albeit using similar methodologies. Islam & Nazara (2000) calculate that the average long-term elasticity for 1977-1996 was between 0.49 and 0.66 when calculated using simple statistics and OLS. They state that the elasticity is much different when calculated using methods other than OLS or data from other sources. Meanwhile, Islam (1998) comes up with an elasticity of 0.29 for the period of 1985-1995 with decreasing short-term elasticity each year.

In this paper, we introduce a new model. The main critique about the widely used model is the fact that it completely ignores labor supply shifters. As widely known, labor market equilibrium is influenced by labor demand shifters, for example, economic growth, and labor supply shifters, for example, population growth or changes in labor force participation rate. As a case in point, rapid population growth is one of the reasons why unemployment in the Philippines remains high despite robust economic performance (Brooks 2002). Hence, in calculating the elasticity, we need to take these variables into account. Solimano & Larrain (2002) use real wage as one of the control variables in estimating the output elasticity of employment demand in Chile. In this paper, we use the change in labor force participation rate.

The new model's second improvement over the widely used one is its ability to provide policy guidance. The widely used model, while informative, only indicates a condition without providing any guide on which measures to put in place to significantly increase employment. Since our model disaggregates the economy into sectors and locations, the result is useful for policymakers to focus growth on the sector and location that is found to be significantly employment-creating.

We start from the basic relationship between employment growth, economic growth, and change in labor force participation rate shown in Equation (1).

$$\dot{E} = \beta \dot{Y} + \gamma \Delta PR + \varepsilon \qquad (1)$$

where $\dot{E}$ is growth in the number of employed working age people, $\dot{Y}$ is overall GDP growth in real terms, ΔPR is change in labor force participation rate, and ε is the residual. The growth elasticity of employment is represented by β. As we mention in the introduction, however, we want to see the relationship between growth in different economic sectors and locations to overall employment. Therefore, we disaggregate the GDP data into:

$$\dot{Y} = \frac{dY}{Y} = \frac{(dY_a^u + dY_1^u + dY_s^u + dY_a^r + dY_i^r + dY_s^r)}{Y} \tag{2}$$

where superscripts {u,r} represent urban and rural areas respectively and subscripts {a,i,s} represent agriculture, industry, and services. Hence, Equation (2) can also be rewritten as:

$$\dot{Y} = \frac{dY}{Y} = \frac{Y_a^u}{Y}\frac{dY_a^u}{Y_a^u} + \frac{Y_i^u}{Y}\frac{dY_i^u}{Y_i^u} + \frac{Y_s^u}{Y}\frac{dY_s^u}{Y_s^u} + \frac{Y_a^r}{Y}\frac{dY_a^r}{Y_a^r} + \frac{Y_i^r}{Y}\frac{dY_i^r}{Y_i^r} + \frac{Y_s^r}{Y}\frac{dY_s^r}{Y_s^r} \tag{3 or}$$

$$\dot{Y} = \frac{dY}{Y} = H_a^u\dot{Y}_a^u + H_i^u\dot{Y}_i^u + H_s^u\dot{Y}_s^u + H_a^r\dot{Y}_a^r + H_i^r\dot{Y}_i^r + H_s^r\dot{Y}_s^r \tag{4}$$

where H denotes the share of each sector to total output. Equation (4) can then be easily substituted into Equation (1) to form Equation (5):

$$\begin{aligned}\dot{E} &= \beta_a^u(H_a^u\dot{Y}_a^u) + \beta_i^u(H_i^u\dot{Y}_i^u) + \beta_s^u(H_s^u\dot{Y}_s^u) \\ &+ \beta_a^r(H_a^r\dot{Y}_a^r) + \beta_i^r(H_i^r\dot{Y}_i^r) + \beta_s^r(H_s^r\dot{Y}_s^r) + \gamma\Delta PR + \varepsilon\end{aligned} \tag{5]}$$

which will be the model that we estimate.

While estimating Equation (5) is straightforward, it requires time series data with sufficiently long period. Thus, it is not possible to estimate Equation (5) with the six national-level observations that we have from Sakernas. To overcome this problem, we use provincial level data, which is not problematic because Sakernas is representative at provincial urban-rural level.

Using provincial level data, however, requires us to deal with the inter-provincial migration issue. In theory, unemployed people from slow growing regions will move to fast growing ones in order to find better jobs. Therefore, not controlling for migration could underestimate the elasticities, or even result in the elasticities being negative. In other words, economic growth can be found to have very low impact or even reduce employment.

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To pass this obstacle, we add a variable that measures change in population share of a province. Therefore, the model that we estimate becomes:

$$
\begin{aligned}
\dot{E}j ={}& \beta_{aj}^{u}(H_a^u \dot{y}_{aj}^u) + \beta_{ij}^{u}(H_i^u \dot{y}_{ij}^u) + \beta_{sj}^{u}(H_s^u \dot{y}_{sj}^u) + \beta_{aj}^{r}(H_a^r \dot{y}_{aj}^r) \\
& + \beta_{ij}^{r}(H_i^r \dot{y}_{ij}^r) + \beta_{sj}^{r}(H_s^r \dot{y}_{sj}^r) + \phi dS_j + \gamma \Delta PR_j + \varepsilon
\end{aligned}
\tag{6}
$$

with the subscript *j* indicating the provinces.

We estimate the model using GLS for panel data that takes into account heteroskedasticity across provinces. Since the variables are already in growth and change units, we assume no autocorrelation across years.

A final note regarding our model relates to the coefficients after estimation. A large coefficient does not automatically mean that a sector has a high growth elasticity of employment. This is due to the nature of the variable, which is a sector's growth weighted by its share to the whole GDP pie. Therefore, the coefficient needs to be multiplied by the mean GDP share of the whole period to get the actual elasticity.

VII. ESTIMATION RESULTS

We estimate the elasticity for total, urban, and rural employment. The capital province, Jakarta, has no rural component; therefore, we merge it with its neighboring province, West Java. In total, we have data of 22 provinces, with the provinces of Aceh, Papua, and Maluku excluded because of incomplete data due to civil unrests there.[5] Multiplying the 22 provinces with six years yields a total of 132 observations; however, since our model employs growth figures, the total observation included in each estimate is 110.

We first look at the estimation result for total employment shown in Table 9. Only three out of the six growth variables are significant: urban services growth, rural agriculture growth, and rural industry growth. Overall, all growth variables are positive, including the three that are insignificant. This means that growth increases the number of people employed. Meanwhile, change in population share has an insignificant positive coefficient. Finally, change in participation rate is also positive and highly significant. Looking at more detailed figures, however, may yield results that are more relevant to policymakers.

Turning to urban employment, the growth of all the three sectors in urban areas has positive and significant coefficients, with agriculture having the highest coefficient.[6] The result means that rural growth in any sector would not have any impact on employment in urban areas. Finally, both control variables are positive and have significant coefficients.

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[5] The three provinces have a total of 4% of the Indonesian population in 2002.

[6] None of the the coefficients of rural growth are significant.

Table 9. The Impact of Economic Growth on Employment Growth in Indonesia

	Total Employment Growth			Urban Employment Growth			Rural Employment Growth		
	Coefficient		Std. Error	Coefficient		Std. Error	Coefficient		Std. Error
Urban									
Agricultural GDP Growth	0.33		0.19	2.10	**	0.54	-0.20		0.19
Industrial GDP Growth	0.01		0.02	0.45	**	0.10	-0.11	**	0.03
Services GDP Growth	0.19	**	0.06	0.58	**	0.16	0.07		0.06
Rural									
Agricultural GDP Growth	0.64	**	0.17	0.29		0.51	0.48	*	0.19
Industrial GDP Growth	0.29	**	0.10	0.16		0.26	0.36	**	0.08
Services GDP Growth	0.15		0.08	0.35		0.21	0.19	*	0.07
Change in population share	1.67		2.59	11.38	**	3.85	5.30	**	1.26
Change in participation rate	0.97	**	0.26	4.19	**	0.48	0.88	**	0.21
Chi-squared	189.57**			393.48**			152.62**		
Log likelihood	155.43			47.13			150.60		

Note: ** significant 1%; * significant 5%.

Population share and participation rate variables depend on the dependent variables (total, urban, rural).

The final set of results pertains to rural employment. Again, all the three growth variables in rural areas have positive and significant coefficients; however, urban industrial growth also turns out to be significant, and, more importantly, negative. This means that growth in urban industry reduces the number of people working in rural areas, while at the same time increasing urban employment, as shown in the urban employment regression results. Finally, both control variables have positive and significant coefficients.

To be able to directly compare the influence of each sector on employment, we calculate the growth elasticities of employment in Table 10. From the total employment column, we find that 10% urban services growth would increase total employment by 0.7%, while a similar magnitude increase in rural agriculture would increase total employment by 1.5%. Finally, while also significant, rural industrial elasticity of total employment is small.

The next two columns disaggregate employment into urban and rural areas. For urban employment, urban services sector has the highest elasticity, almost 2, followed by industry and agriculture. This indicates that services sector is the sector that policymakers should focus on in order to increase employment in urban areas.

Table 10. The Impact of 10% Growth on Employment Growth (%)

Sectoral Growth	Mean GDP Share (%)	Total Employment		Urban Employment		Rural Employment	
Urban							
Agricultural	2.4	0.08		0.50	**	-0.05	
Industrial	13.7	0.01		0.61	**	-0.15	**
Services	33.9	0.66	**	1.97	**	0.24	
Rural							
Agricultural	23.9	1.52	**	0.69		1.14	*
Industrial	9.0	0.26	**	0.14		0.32	**
Services	17.1	0.25		0.59		0.32	*

Note: ** significant 1%; * significant 5%.

In comparison, increasing employment in rural areas could be faster achieved by focusing on agriculture growth, while industry and services have equal elasticities. In contrast, urban industrial growth would reduce rural employment.

VIII. CONCLUSION

This paper aims to contribute to macro-level discussion on open unemployment in Indonesia by providing several characteristics of the unemployed and looking at the growth elasticity of employment of different economic sectors in urban and rural areas. There are several conclusions from the findings of this study.

Firstly, we find that most of the unemployed are young, highly educated, and inexperienced, and still live with their parents. In trying to ascertain which path is the best way to reduce unemployment, we look at the sectoral distribution of workers by education levels. The results suggest that the services sector would be most suitable because it absorbs most of the highly educated workers.

Secondly, agriculture still dominates employment in rural areas, especially among the low educated. In contrast, 90% of the highly educated are working in the services sector. Industry, meanwhile, is the smallest employer.

Different from the condition above, in urban areas most workers from any education level are in the services sector, especially those with higher education, although there is still a sizable and expanding share of the low educated who are engaged in agriculture. Industry, meanwhile, is the second highest employer in urban areas among those with junior secondary education or higher.

Thirdly, using a new model, we find that not every sector has the same growth elasticity of employment. The best improvement of this model over the widely used one is its ability to guide policymakers in enacting policies that would increase employment. For urban areas, the highest employment-generating sector is services, while agriculture is still the champion to increase rural employment. In terms of rural-urban linkages, none of the rural sector growth has a significant impact on urban employment, while we find urban industrial growth reduces rural employment.

In its quest to reduce unemployment, therefore, the government should ensure that urban services and rural agriculture enjoy unfettered long-term growth. Providing any other types of job, especially those with below market wages, or focusing on the wrong sector in a location would not be effective in reducing unemployment.

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