Unlucky and scarred: long-term consequences of labor market entry condition in Indonesia

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Abstract

This paper provides empirical evidence of the long-term consequences of labor market entrance conditions using Indonesian data. I exploit the fact that since the Asian Financial Crisis hit in 1997/1998, Indonesia suffered a spike in the unemployment rate that prolonged for almost a decade. I collect and harmonize a long series of Indonesian labor market surveys (SAKERNAS) spanning over 30 years to construct a pseudo-panel cohort of new labor market entrants from 1990 to 2019. Following Kahn (2010) and Oreopoulos et al. (2012), I exploit exogenous temporal variation of the unemployment rate at the national level and province level to test the existence of scarring effects. To deal with endogenous migration issues for the province-level specification, I constructed a migration-weighted unemployment rate (Schwandt and von Wachter, 2019) based on historical inter-province migration patterns from the Population Census. I find evidence of a scarring effect where a 1 percentage point increase in the unemployment rate at the year of labor market entrance causes about 15% loss in probability to be employed full-time and about 26% potential monthly income loss. The negative effects of the unemployment rate in the initial year on employment and income linger up to 11 years after entering the labor market. I find women and men share similar burdens in terms of negative employment effects, but larger negative income effects for women.

Keywords: labor market entrants, unemployment rate, scarring, Asian Financial Crisis, gender economics.

JEL Classification: J16, J24, J64, O17

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1 Introduction

The new entrant to the labor market, in comparison to the more experienced workers, is arguably one of the most affected groups during a labor market contraction. Reflecting on the recent pandemic-induced recession between 2019-2021, shreds of global evidence show that the young adult cohorts, compared to their older counterparts, suffer disproportionately in terms of increased mental health problems (Kwong et al., 2021), learning loss (Azevedo et al., 2021) and worsened quality of life (Favara et al., 2022). Not only short-run consequences but there are also rising concerns on long-term consequences such as future earnings and mental health according to the OECD report (2021)[1]. Yet, as argued by the report, these particular cohorts rarely become the center of recovery policies. The lack of youth-specific support is even more evident in developing countries due to limited resources (World Bank, 2021[2]).

In the last decade, there has been growing evidence of lasting negative effects of these unlucky cohorts, as documented by Von Wachter (2020). Unfortunately, most studies focus on developed countries such as the United States (Kahn, 2010; Schwandt and Von Wachter, 2019) and Canada (Oreopoulos et al., 2012). To my knowledge, very limited studies have been done in developing countries. I argue that understanding developing countries provides important insight into the literature. Two unique features of developing countries' economies to such scarring effects are their large share of informal sectors in the economy and low-income households. The informality of the labor market may provide a thicker job market compared to developed countries for new entrants during the recession. Next, as many of the new entrants are members of low-income households, they could not afford to be unemployed or delay their participation, to sustain their household livelihood. The interaction of such features could potentially provide new perspectives on scarring effect literature.

This paper uses Indonesia as a country of focus to study the existence of such scarring effects for those unlucky cohorts. In the last three decades, the Indonesian economy has been steadily growing, except when the Asian Financial Crisis hit between 1997 to 1999. Since then, only when the global pandemic hits in the last couple of years, has the Indonesian economy experienced a recession. The country shares one of the largest economies with the largest share of people working as unpaid workers and self-employed. About 60% of the labor force work in informal sectors. At the same time, before the crisis, Indonesia was transforming from

[1]See https://www.oecd.org/coronavirus/policyresponses/deliveringforyouthhowgovernmentscanputyoung-peopleatthecentreoftherecovery92c9d060/

[2]https://blogs.worldbank.org/voices/developingcountriescovid19crisishasnotaffectedeveryoneequally

a traditional to a modern economic sector. Leaving agriculture sectors to manufacturing, before it prematurely deindustrialized as service sectors started to take over the bigger portions of the economy (Suryahadi et al., 2012). The interaction between the aforementioned facts motivates this paper to investigate the long-term consequences of labor market entrance conditions using I argue that Indonesia is an ideal study case to investigate such lasting negative effects of new entrants in a developing country context.

This paper lies within a growing bed of literature about the scarring effect of entering the labor market during bad times. Empirical evidence of negative employment and income effects has been established in developed countries such as the United States (Kahn, 2010; Schwandt and Von Wachter, 2019), Canada (Oreopoulos et al., 2012), following the 1980's recession. Growing pieces of evidence emerge from another half of developed countries such as Japan (Genda et al., 2010), Australia (Andrews et al., 2020) and Korea (Choi et al., 2020). As to such scarring effects that are directly linked to the AFC, Choi et al. (2020) provide evidence from Korea that entering the labor market during a recession could lead to long-term negative income trajectories that last for about 10 years since first working. Surprisingly, the effect is far less pronounced for the women group.

Previous literature provides several possible explanations on how one could expect a lasting effect of a bad economic situation on the new entrants' future income trajectories. A relatively thin labor market during a recession would match many new entrants to lower-skilled jobs where these unlucky cohorts stay in this sector as job searching becomes costly over time (Topel and Ward, 1992). The longer these new entrants stay in the labor market potentially leads to job skill loss (Pissarides, 1992; Arulampalam et al., 2001). Related to this, being matched to lower-skilled jobs affects low human capital accumulation and investment of these new graduates (Gibbons and Waldman, 2004; Kahn, 2010).

My study contributes to the literature in several ways. First, as mentioned earlier, knowledge of how the scarring effect would operate in a large share of the informal economy is limited. Except for several studies such as Tansel and Taşçı (2010) in Turkey, Martinoty (2016) in Argentine and Kuchibhotla et al. (2020) in Sri Lanka, systematic studies on the effect of bad economic conditions on the labor market new entrants are lacking. Most scarring literature relies on searching theory and matching which in the labor market with a large informal sector component has lesser relevance. Secondly, in regards to the role of informal sectors, unlike previous studies on the scarring (Von Wachter, 2020), I do not focus only to college

graduates. Third, from the country-specific perspective, despite the significant event of AFC in Indonesia, evaluation of long-term consequences in the labor market is lacking. Data availability is partly responsible for this as it requires a long series of observations to examine the long-run consequences of the Financial Crisis in 1997/1998. To my knowledge, there is only one existing study that shares the closest similarities to my study. Pritadrajati et al. (2021) using a longitudinal household survey, namely, the IFLS, finds that there is a strong positive correlation between current unemployment probability and past unemployment status. In her heterogeneity results, the study shows similar negative scarring effects for those who were unemployed as caused by the Asian Financial Crisis. Compared to this paper, Pritadrajati et al. (2021) does not cover the entirety of cohort experience since the limitation of the longitudinal household survey. This paper also differs since it allows the scarring effect to vary across time after entering the labor market instead of a cross-sectional correlation. This result provides more insight into the dynamics of scarring effects over time.

I follow previous literature to construct my estimation strategy for either national-level specification (Choi et al., 2020) and province-level specification (Oreopoulos et al., 2012). The unit of observation is an aggregate cell of a cohort of labor market entrance, province, gender and time of the survey. Using a series of repeated cross-sections of the Indonesia labor market survey from 1990 to 2019, known as SAKERNAS, I can construct a pseudo-panel of cell level that spans over 30 years of observation. I match each cell observation to the corresponding unemployment rate based on the year of labor market entrance for national specification and province-year for the province-level specification. The estimated unemployment rate at labor market entry coefficients varies across years of experience after the year of entering the labor market. The estimated coefficients capture the effect of the economic situation when entering the labor market under province-cohort-specific variation in unemployment rates. This interpretation is preserved as the model controls for year province and calendar year-fixed effect.

I document significant negative employment and income effects of a high unemployment rate when entering the labor market. An Increase of 1 percentage point in the unemployment rate when entering the labor market leads to a drop in full-time employment probability by 3% for the first two years after entering the labor market. The negative effect was nullified after 9 to 11 years after entering the labor market. Overall, an increase of 1 percentage point in the unemployment rate is associated with a 15% loss in the probability of full-time employment

over 25 years of their working lifetime. Meanwhile, from income effects, I find that an increase of 1 percentage point in the unemployment rate translates to a 3% drop in monthly income for the first 2 years after entering the labor market. Similar to the employment effect, the negative effects start to disappear after 9 to 11 years.

The results from the province-level specification confirm my findings from the national-level specification. However, the estimated effects are less precise. On one hand, the similar results between the province and national specification suggest that temporal variation of the unemployment rate is unrelated to the change in cohort characteristics (Oreopoulos et al., 2012). On the other hand, this raises concern over the role of local labor market shocks that might be more relevant compared to the national level. However, as discussed as threats to identification earlier, this disparity between the province and national specification may also point to endogenous migration issues.

I find that men and women share similar negative employment and income effects except for the following aspects. First, compared to women, men are more likely to be employed as unpaid workers. Second, women experienced higher income penalties despite small differences in comparison to their men counterparts. Third, more men switched to agriculture within the male group, compared to the women group.

My findings are robust over several sensitivity checks. To partially address the endogeneity of graduation years, I use the 3-year moving average of unemployment rates of labor market entrance. I find that for both national and province specifications the results are robust. Next, my results are also robust when I use youth-specific unemployment rates, e.g unemployment rates for 25 years old, which may capture more relevant unemployment rates faced by the new entrants. I also find that the results are robust when using the official unemployment rate produced by BPS although estimated less precisely. My results are also robust over alternative age restriction for sample selection for each cohort cell. Finally, I find external validity to my results from the IFLS dataset in which I find a larger effect in the same direction as my preferred results.

The rest of the paper is organized as follows. Section 2 provides a brief overview of the Indonesian economy pre-AFC, AFC and post-AFC. In section 3, I provide the collected data. Section 4 discusses the estimation strategy and threats to the identification. I present the results in Section 5. I further discuss the gendered aspect of the results in section 6. Section 7 provides several sensitivity tests to the results. Lastly, I conclude and suggest the direction of

further research in Section 8.

2 Context

2.1 Indonesian economy and the Asian Financial Crisis

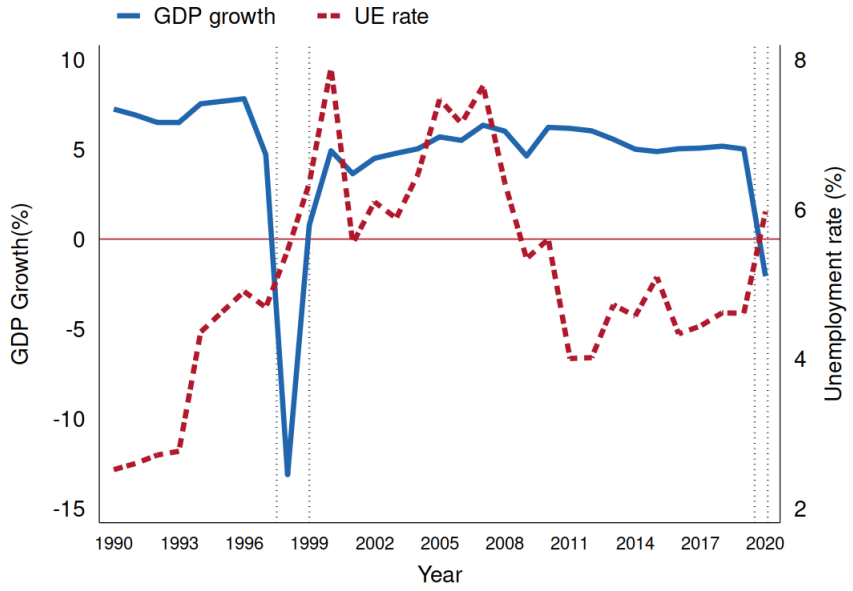
The Asian Financial Crisis (AFC) marked by a 15% drop in economic growth between 1997-1998, was taunted as the worst recession since the 1960s. As summarized in Figure 1, the crisis contributes to the large upswing of the unemployment rate that follows in the next couple of years Suryadarma et al. (2007); Nagib and Ngadi (2008). In terms of employment, the recession pushed people away from the urban sector, where the crisis hit the most, to find employment in the agriculture sector as documented by Manning and Junankar (1998). Falling real wages in the paid job also pushed people to be employed in self-employment and unpaid job (Manning, 2000). Strauss et al. (2004) find that a relatively large drop in household incomes was responded to by increasing the labor supply of female household members. Not only in urban areas, poor women in rural areas noticeably joined the labor force. Rural areas during the period provide job availability to keep the unemployment rate increase in check. Interestingly, the increase in the unemployment rate was accounted for by a huge increase in unemployment among youth by 4.4 percentage points, from 15.5 percent to 19.8 percent (Bank, 2010).

This crisis also temporarily reverses the structural transformation trend as many formal workers who lost their jobs return to farm activities as well as informal sectors. Sakernas data recorded the share of workers in formal sectors fell at a rate of 3.2 percentage points per year between 1998 to 1999. This decline was almost similarly shared among serviced and manufacturing sectors. However, manufacturing sectors recovered to the pre-crisis employment rate earlier than the service sectors. Declining formal sectors are also reflected by real wage drop, around 31 percent between 1997 and 1999 (Bank, 2010). Regarding poverty, this crisis end positive trends of poverty reduction, as the poverty rate increased by 12% during the 1997-1999 period. It is also worth noting that Indonesia also suffers from drought.[3] which worsens the situation as the food supply chain was disrupted.

From a female employment perspective, the increase in labor force participation among

[3]El Nina brings a lengthy period of rain-less which significantly affects agricultural production. As a consequence, food crop retail prices increase which slightly benefits farmers, but overall there are no winners in this period given the share of net producers of rice in rural areas was smaller than net consumers

Figure 1: Unemployment rate in Indonesia



Notes: Author's calculation. GDP growth retrieved from the World Development Index, The World Bank. The unemployment rate is calculated using SAKERNAS 1990-2020 following Suryadarma et al. (2007) approach to adjust for changes in labor market force definition and questionnaire. More details on the unemployment rate used in this graph are available in Section 4.2. The dotted black vertical line indicates the start and end of each recession event in Indonesia.

women, especially from low-income families, was motivated by sustaining a household level of income. This 'added worker effect' is a common coping mechanism, especially in low-income households (Attanasio et al., 2005). Female labor force participation who live in poor families increased by 7 percent between 1997 to 1999 In both urban and rural areas, most of these women worked as unpaid family workers and were mostly driven by low-educated women (Smith et al., 2002). They also pointed out the significant impact of AFC on wage cuts and employment rates for the younger female group, especially in urban areas with low education. Added worker effect, as more women join the labor force, may also partly explain that declines in real family incomes are about half of the individual hourly earnings (Smith et al., 2002).

The crisis was immediately followed by a significant increase in the poverty rate, especially in urban areas (Suryahadi et al., 2012). The poverty reduction trend slows down after the AFC. To sustain their livelihood, many children-aged household members became active in the labor market. This hardship also put more strain on younger members of the household. From Manning (2000) study, it emerges that to obtain additional money, children-aged

household members opt to work in informal sectors.

Several works of literature connect the negative effect of the recession to other socioeconomic outcomes. First, as a response to the recession, many students dropped out of school in the short-term (Cameron, 2001). This phenomenon, however, did not last for a long time as students started to attend schooling not long after the recession ended. From a health perspective, Waters et al. (2003) suggests lower utilization of healthcare following the recession in Indonesia. A significant drop in income translates to lower expenditure including on food. Giles and Satriawan (2015) argue, the social benefit has helped households to reduce child nutrition deprivation. Consistent with increased labor participation for women, Dong (2018) find that the financial crisis has improved the bargaining power of women within a household.

Indonesian economic recovery was marked by positive economic growth in 2000. This is also followed by democratic elections and big-bang decentralization. Despite positive and steady economic growth, Indonesia records a rather disappointing employment growth. Economists coined the term "jobless growth" to label the Indonesian economy between 2001 to 2004. The unemployment rate is remarkably high. However, as discussed by Suryadarma et al. (2007), changes in labor for participation definition are responsible for this fact. In section 4, I detail the unemployment rate definition issue. As depicted in Figure 1, economic growth is relatively stable at 5%. In 2007-08, the Global Financial Crisis hit

2.2 Labor market entrants

In the last decades, the education profile of the labor force in Indonesia has improved significantly. Labor market profiles predominantly attend primary school for those who were born in the 60s, whereas the 90s cohort predominantly attends secondary school (Allen, 2016). Consequently, this implies delayed age of labor market entrance. The IFLS survey reveals that younger cohorts (born in the 90s) have full-time jobs between 16 to 18 years old. This is also followed by the fact that the role of vocational secondary school also becomes more important over time Newhouse and Suryadarma (2011).

Before the AFC, as mentioned in the previous section, industrialization-led economic growth also benefits younger cohorts of new entrants to the labor market. Growing formal sectors drive upward income mobility in terms of the real wage for both male and female new entrants as discussed by Skoufias and Suryahadi (2002). Using SAKERNAS from the early 1990s to 2019, I construct a pseudo-panel of labor market entrants to track their correspond-

ing employment and income over time. Figure 2 Panel A and B illustrate how the condition of labor market entry could affect new entrants' employment and income trajectory in the future. Notice that each of the plotted lines in Figure 2 represents employment (Panel A) and log of monthly income(Panel B) of each year of entering the labor market entrance. The starting point of each plotted line represents the probability of full-time employment (monthly income).

From Figure 2 Panel A, we could observe that there is relatively stable full-time employability across years of entrance cohorts. However, those who entered the labor market between 1997 to 1999, printed as a solid line, were experiencing drops in full-time employability as represented by lower starting points compared to other lines. A more striking contrast is evident in terms of monthly income. Supporting Skoufias and Suryahadi (2002) findings, Figures 2 Panel B illustrates starting monthly income of new entrants during a recession is lower than their counterparts. Over time, however, new entrants receive better inflation-adjusted monthly income that shows the effect of growing wage jobs.

3 Estimation strategy

3.1 Threats to indetification

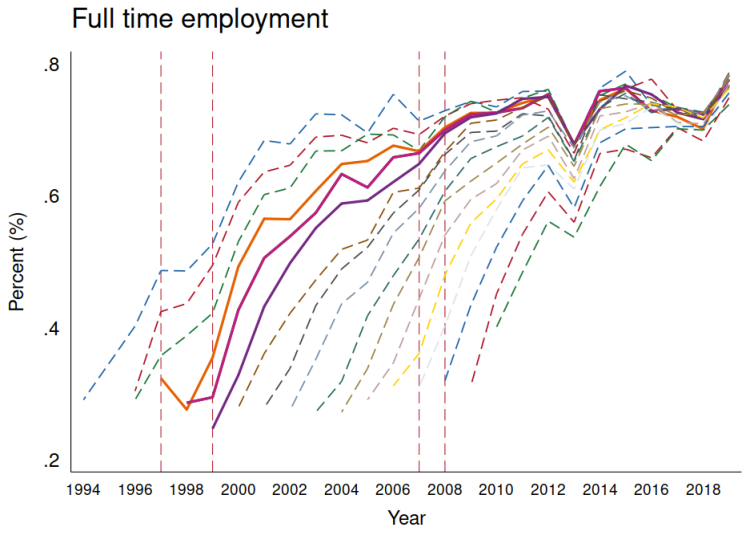
My estimation strategy relies on the assumption that temporal variation of the unemployment rate, as a product of the unexpected economic recession, could have a lasting effect on those entering the labor market. To draw this inference, each new entrant will be matched with the corresponding unemployment rate, to begin with, I discuss several potential issues that could threaten the identification of scarring effect estimates.

(i) Endogenous temporal variation of the unemployment rate.– The identification strategy relies on the assumption that temporal variation in unemployment caused by the unexpected recession should not correlate with the change in cohort-specific characteristics. From what we know, the 1997/1999 recession was caused by a regional-wide currency crisis that started in Thailand and quickly spread across the Southeast Asian region. This unexpected crisis should not correlate with the characteristics of the cohort during the time.

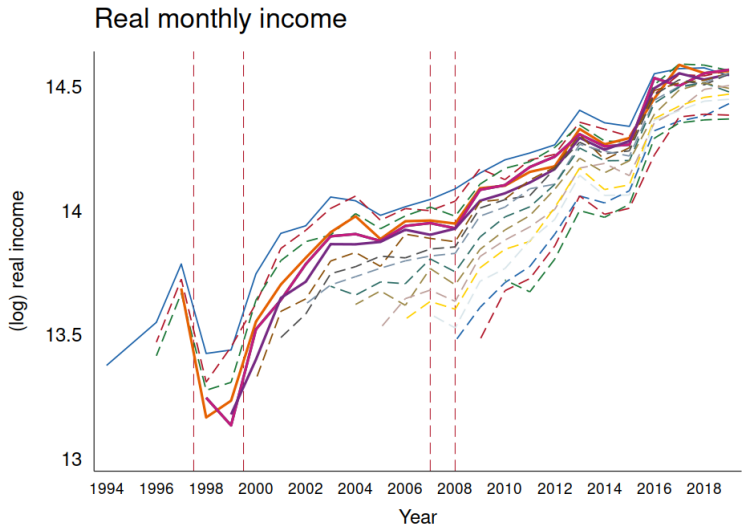
To test whether there are no such changes in characteristics, I follow Schwandt and Von Wachter (2019) to estimate balancing regression. This procedure simply tests if the variation of the unemployment rate would change the composition of fixed factors of the cohort such as gender

Figure 2: Trends in employment and worker's income by entrance to labor market timing, SAKERNAS 1990-2019, Author's calculation

Panel A



Panel B



Notes: Own calculation using SAKERNAS 1994-2019. The employment rate in Panel A is restricted to those participating in the labor market. The income variable used in Panel B includes wages, salaries and profits. Each pseudo-panel observation is weighted with individual weight provided by the survey.

composition. In the balancing regression, I estimate 1, using the indicator variable of being a female as a dependent variable. Figure A1 reports the result. It emerges that there is not enough evidence to show the effect of unemployment on sex composition is different from zero over time. The exogeneity also could be confirmed if the national level specification share similarity in results with the provincial level specification (Oreopoulos et al., 2012).

(ii) Endogeneous migration timing.– Individuals could decide to migrate to another place

with a better economic situation before entering the labor market. This positive sorting would create an attenuation bias of the estimated effect towards zero. For the national specification, this should not be a concern as Indonesia has relatively low inter-national mobility (Bazzi et al., 2016). On the other hand, interregional mobility predominantly happens within the province border (Pardede et al., 2020). However, as raised by Hugo (2000), the increased inter-province migration as a response to the crisis is not trivial. He argues that post-AFC, the inter-regional mobility of Indonesia has significantly increased. On this background, in the province specification, I would adjust the unemployment rate matching using inter-province migration patterns drawing from the historical Population Census from 1990 to 2010.

(iii) Endogeneous education timing.– To avoid bad labor market prospects, a person may stay longer in school to delay their labor market participation. Thus, the scarring effect estimates would bias toward zero. To my knowledge, there is no evidence of such behavior in the existing literature. Cameron (2001) find a temporary increase in school drop-out in a short time, but within months education participation bounced back to the pre-crisis trend.

3.2 National exposure specification

The main identification strategy relies on an unexpected increase of unemployment rates between 1997-2001 following the Asian Financial Crisis in 1997-1998. The AFC hit the Southeast Asian region the hardest compared to other Asian countries. As for Indonesia, the GDP growth shrank by 15%. This is the worst recession since the 1960s. While GDP started to recover and grew, the level of unemployment experienced a longer persistent effect. Notably, the unemployment rate has been increasing for two years before the AFC. Between 1997 and 2004, unemployment is recorded to increase by 6%. From 2006, the unemployment rate started to improve. The Global Financial Crisis (GFC) has had minimal impact on Indonesian economic performance and the labor market. Indonesia grows rather strongly at the 5-6% level during the GFC.

My baseline specification follows closely previous literature (Oreopoulos et al., 2012) which uses aggregate average outcomes at a cohort of graduation (c), gender (g), education group (d), province (p), calendar year (t). In comparison to previous literature, our estimate features disaggregation of gender to suit the purpose of this study. I estimate the following.

$$\bar{Y}_{c,g,d,p,t} = \alpha + \beta_e UR_0 + Exp_e + \pi_p + \theta_c + \gamma_g + \delta_d + \tau_t + \epsilon_{c,g,d,p,t} \tag{1}$$

The set of outcome variables $\bar{y}$ includes the log of annual earning, employment, and labor force participation is measured as the average of cell-level. The main independent variable is the corresponding unemployment rate (UR) at the provincial level (p) of graduation year c. The model also includes provincial fixed effect p, a cohort of a graduate group c, gender fixed effect g and education group fixed effect d, and lastly, calendar year fixed effect t. The error term ϵ is a zero-mean at cell level. To account for province variation, I cluster the standard error at the graduate cohort-provincial level.

Following Schwandt and Von Wachter (2019), we use "Mincerian" year of graduation as the SAKERNAS do not provide the exact year of graduation. The year of graduation is proxied by years of schooling derived from the highest education attained plus 6 years.[4]. To avoid cohort-specific labor market changes, I use the unemployment rate at the province level for the working-age population rather than the cohort-specific unemployment rate. In the robustness section, I discuss the result of using the youth unemployment rate.

3.3 Province exposure specification

Previous literature on the scarring effect, such as Oreopoulos et al. (2012) and Schwandt and Von Wachter (2019), commonly use provincial exposure, except for Kahn (2010) and Choi et al. (2020), arguing the local labor market conditions are more relevant to the new entrants. They argue that internal migration in US or Canada was relatively low, such that the endogenous migration threat, as discussed previously in Section 3.1, becomes less significant. In Indonesia, internal migrations predominantly occur within the province border (Pardede et al., 2020). However, there has been increasing mobility in the last decades. The migration pattern is dominated by outside Java to Java island,[5] mostly for employment and education-related purposes. Related to the AFC, existing literature records a noticeable increase in rural-to-urban migration as people looked for employment in agricultural jobs when jobs were scarce in urban areas (Hugo, 2000). Based on the 2010 Population Census, for non-Java provinces, more than 90% of the population were born within the province border, whereas for Java provinces, the average of native-born residents was about 70%. Hence, one could argue that internal mobility in Indonesia is relatively higher than in the US and Canada. Estimation at the province level,

[4]legal age to enter primary school

[5]Java island is the fourth largest island in Indonesia, yet has inhabited more than 60% of the population since the 90s. Historically, it became the center of the economy and the administration of the colonial government, since the Dutch's occupation. It is also the location of Jakarta, the nation's capital city since 1945

despite its advantages in capturing local labor dynamics, potentially suffers from endogeneity issues.

In regards to the endogeneity migration issue, Schwandt and Von Wachter (2019) offers insightful and practical bias correction procedure to the regional level rate exposure by weight in the initial unemployment rate with migration probability and education level. In principle, they calculate the probability of working-aged individuals with a certain education level to migrate from their birth region to the residence's region, then aggregate up across provinces and education profiles using the Population Census. This probability then to be assigned as a weight to the unemployment rate of each labor market entrants cohorts from the labor market survey observations. This double-weighted unemployment rate, they argue, is a biased-corrected unemployment rate exposure.

To apply such weight, the two key variables, the birth and residential province, must be available in both the population census and labor market survey. Unfortunately, the SAKERNAS does not provide the birth of province information. However, the Population Census provides the provinces where the respondent resided in the last five years. Hence, I can calculate an average migration pattern across provinces using a series of population censuses. Thus, in the similar spirit of Schwandt and Von Wachter (2019), I construct a migration-weighted (MW) average graduation year unemployment rate as summarized below.

$$UR^{MW} = \sum_{p=1}^{27} MIG_{p_{-5},p} UR_{p,A} \tag{2}$$

The migration-weight term, $\sum_{p=1}^{27} MIG_{p_{-5},p}$, it simply aggregates the share of migrants in each province concerning other provinces in the last five years, for respondents aged 22 years old. I use the 27 provinces definition to preserve consistency across years as the number of provinces grows during the decentralization process. As an illustration, suppose there are only two provinces, A and B. The historical migration rates of residence from Province A to Province B were 25%, meaning a quarter of people living in province A today originated from province B. Suppose in 1990, the unemployment rate in Province A was 5%, whereas in Province B was 2%. For those entering the labor market in 1990 and living in Province A, the migration-weighted unemployment rate was 4.5% ($2\% \times 0.25 + 5\% \times 0.75$), instead of 5%. Finally, I use the double-weighted unemployment rate (UR^{MW}) to estimate equation 1, as summarized as follows.

$$\bar{Y}_{c,g,d,p,t} = \alpha + \beta_e UR^M W_{p,0} + Exp_e + \pi_p + \theta_c + \gamma_g + \delta_d + \tau_t + \epsilon_{c,g,d,p,t} \quad (3)$$

From Equation 3, we now estimate labor market outcomes ($\bar{Y}_{c,g,p,t}$) at provincial, labor entrants, gender group and survey year cohort cells. The rest of the specification is similar to the equation 1, except for the unemployment rate terms (UR^{MW}) as well as additional provincial fixed effects. The standard errors are clustered at the cohort-provincial level.

In regards to the double-weighted specification by Schwandt and Von Wachter (2019), my provincial specification has some obvious limitations. First, I only rely on historical inter-province migration by assuming migration patterns are similar across birth cohorts. Despite using 20 years of average migration pattern, this measure could not capture a specific birth cohort confounding factors to mobility decisions, if any. As discussed earlier, there has been a significant improvement in terms of inter-province mobility in the last decades. Second, my migration-weighted approach ignores the specific education level factors that might also relate to the migration status. Pardede et al. (2020), in particular, points to the important role of education level in increasing the likelihood of migration decisions. Given these caveats, I use the provincial specification as part of supporting results and sensitivity checks for the national specification. As additional rationale to use national specification, in Figure A2 in Appendix A, I show evidence of a strong correlation between the national level and the province level unemployment rate. From Figure A2, the variation of unemployment at the province level follows closely the variation at the national level. The correlation coefficient of national and provincial unemployment rates also suggests a strong positive correlation between the two. Thus, I prefer national specification results as my main results.

4 Data

4.1 SAKERNAS

The National Labor Force Survey, also known as SAKERNAS, is the official household survey purposely designed to produce labor force statistics in Indonesia. The timing, frequency, and sampling procedures of the survey have been changing over time since its first implementation in 1976. Prior to 1986, The Indonesia statistical office, known as BPS, collected SAKERNAS as a thematic module of the National Household Socioeconomic Survey (SUSENAS) which is the

main nationally representative household socioeconomic survey.[6] Since 1986 the BPS started to regularly survey except in 1995.[7] Initially, the data collection was implemented once a year but later on conducted bi-annually as well as quarterly. The BPS surveys larger respondents in August, and smaller samples in February, when bi-annually, or May, if quarterly.[8] Designed to be nationally representative as it follows the SUSENAS sample frame, from 1986 to 2004,[9] the sampling frame preserve representativeness up to provincial level. Since 2005, the SAKERNAS has been represented at the district level, except in 2014. For this paper, I use SAKERNAS August and provincial level to preserve the consistency and representativeness of the dataset.

The survey collects labor market information on the working-age members of sampled households. SAKERNAS becomes the main dataset to produce official labor market statistics including unemployment rate, labor force participation and wages. The SAKERNAS collects a rich array of information on individual engagement in the labor market. This includes several key variables in the labor market which are not available in the SUSENAS such as wages, income and working hours. However, compared to the SUSENAS, the survey provides limited non-labor market information on individuals as well as households. Survey limitation includes unavailability of household expenditure, assets, fertility, and complete household member roster information which arguably are potentially important factors for employment outcomes and decisions (Dong, 2016). Despite the survey's limitations, the SAKERNAS remains the only long-series and consistently collected dataset to proxy key labor market outcomes which suit the purpose of this paper.[10]

4.2 Unemployment rate

The BPS releases the annual unemployment rate following the collection of SAKERNAS. Hence, the statistics have become available regularly every year since 1990, except for 1995. In 1995, due to budget problems, the BPS did not conduct the SAKERNAS survey. Labor market statistics in 1995 were inferred from the intercensal population survey in that year. BPS has

[6]SUSENAS has been the main resource to estimate welfare indicator, including poverty, collected since 1963

[7]The BPS uses a 5-yearly intercensal population survey, SUPAS, to estimate labor market indicators in the absence of SAKERNAS

[8]In case of bi-annual data collection, from 2006-2011 the BPS collected smaller samples in February with a lower level of representativeness. After 2012, when the survey implementation was done quarterly, the BPS collected mid-quarter data in May

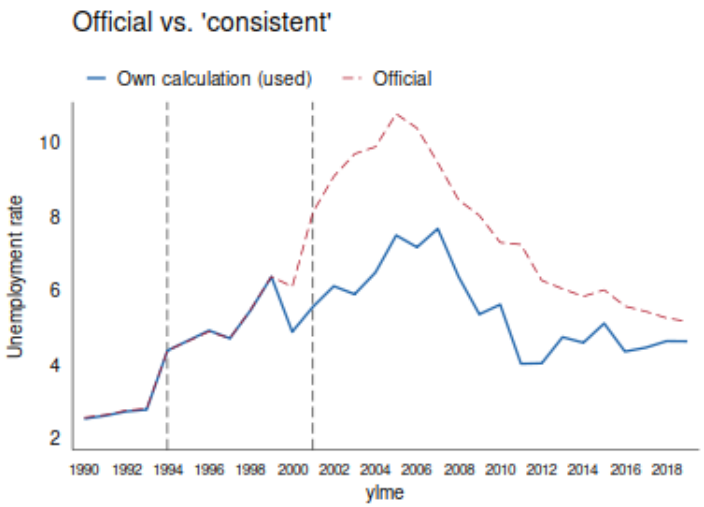
[9]except for 2000-2001, as the sampling was representative at regional level due to big-bang decentralization following the reformation era

[10]The possible alternative to SAKERNAS is the Indonesia Family Life Survey (IFLS) a privately collected longitudinal dataset that was collected five times between 1993 to 2014 using SUSENAS 1993 as a sample frame.

changed the definition of the unemployment rate at least three times, between 1980 to 2003, to accommodate the ILO definition of labor market participation. Two major changes occurred in 1994 and 2003. The first major adjustment to the unemployment rate is the changes in the working age definition. From 1980 to 1990, the official unemployment rate includes individuals aged 10 to 14 years old in the labor market survey. Since 1991, the survey follows the ILO to only include those who are at least 15 years old in the survey sample. The second major change happened in 2001.

Figure 3 illustrates the unemployment rate trends. The solid line represents the official unemployment statistics from the BPS as recorded in their annual releases. The dash-line represents the unemployment rate using the year 1990 as a point of reference for the definition of the unemployment rate. From the figure, noticeSuryadarma et al. (2007) argues this leads to a persistent increase in the unemployment rates since the financial crisis in 2004. In particular, they find that the new statistics inflate the number of discouraged workers. Unfortunately, there is no way to precisely recalculate the unemployment rate to a definition before and after 1994, as the structure of the questionnaire has changed. Hence, in this paper, I prefer to use the 'consistent' unemployment rate definition, following the pre-2001 definition

Figure 3: Unemployment rate in Indonesia



Notes: Own calculation using SAKERNAS 1990-2019. I exclude the unemployment rate in 1995.

4.3 Population Census

This paper uses a sample of population census data available from IPUMS to calculate the proportional migration across cohorts and education levels over time. The IPUMS population census represents 5% of the total population in 1990, and 10% of the total population in the 2000 and 2010 waves. The population census provides key information on where people live five years before the Census year. Using this information, I construct a matrix of migration patterns by pooling three Population Census as one. With this matrix, I obtain, on average, the share of individuals living in current residential provinces that lived in other 26 provinces five years ago.

5 Results

5.1 National estimates

I start with presenting the lifetime results as summarized in Table 1. From column (1), it emerges that a one percentage point increase in the unemployment rate at the time of labor market entry would decrease the probability to be employed by 15% over a working lifetime. Respectively, as shown in columns (2)-(5), we learn that an increased unemployment rate causes a lower probability to have a full-time job, increases the probability to have an unpaid job, lowers the probability to be in a self-employed job and increases the probability to be in an informal job.

Table 1: Long-term consequences of unemployment rate at labor market entry

	(1) Employed	(2) Full-time Job	(3) Formal Job	(4) Unpaid Job	(5) Self-employed Job	(6) Informal Job
UR at entry	-0.153***	-0.109***	0.146***	0.064***	-0.210***	-0.146***
	(0.007)	(0.007)	(0.010)	(0.013)	(0.005)	(0.010)
Mean	0.877	0.551	0.431	0.325	0.244	0.569
adjr2	0.623	0.645	0.712	0.502	0.720	0.712

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

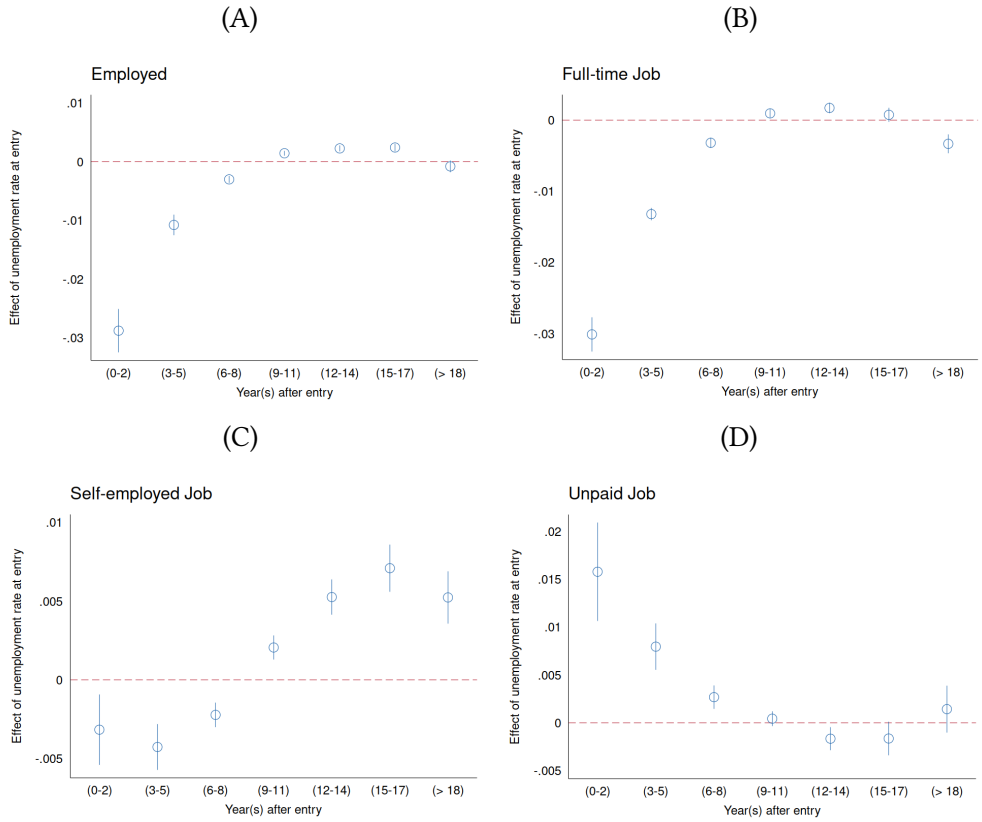
I present the main results by plotting the scarring effects across years of experience since entering the labor market, following Equation 1. Figure 4 depicts the persistence of scarring effects on employment outcomes. As depicted in Figure 4 Panel (A), in the first two years after entering the labor market, the probability to be employed drops by about 3%. The negative effect lingers up to 9 to 11 years after first entering the labor market. An almost identical

story emerges for the probability to get a full-time job, as illustrated in Panel B. This finding is comparable with previous studies in the United States (Schwandt and Von Wachter, 2019) and Canada (Oreopoulos et al., 2012).

From Figure 4 Panel C, interesting results emerge. The unlucky new entrants were unlikely to be employed in self-employed jobs. While this may contradict the fact that after the crisis many people became self-employed as the wage sector contracted, these results show that new entrants might find it difficult to begin their career in self-employed jobs. One possible explanation is the set-up cost of starting a self-employed job. Though for most workers, switching to self-employed occupations is an effective strategy Rothenberg et al. (2016), this might not be the most affordable strategy.

Finally, from Panel D, I find evidence that many new entrants are sorted into unpaid jobs. The probability to be employed in unpaid jobs is positively associated with the unemployment rate at entrants up to 9-11 years after graduation. This fact is consistent with previous findings (Manning and Junankar, 1998; Manning, 2000) that find many waged workers switch to unpaid jobs in rural areas. For the new entrants, this could be the type of job that they can get sorted too with minimum barriers to entry.

Figure 4: Scarring effects on employment

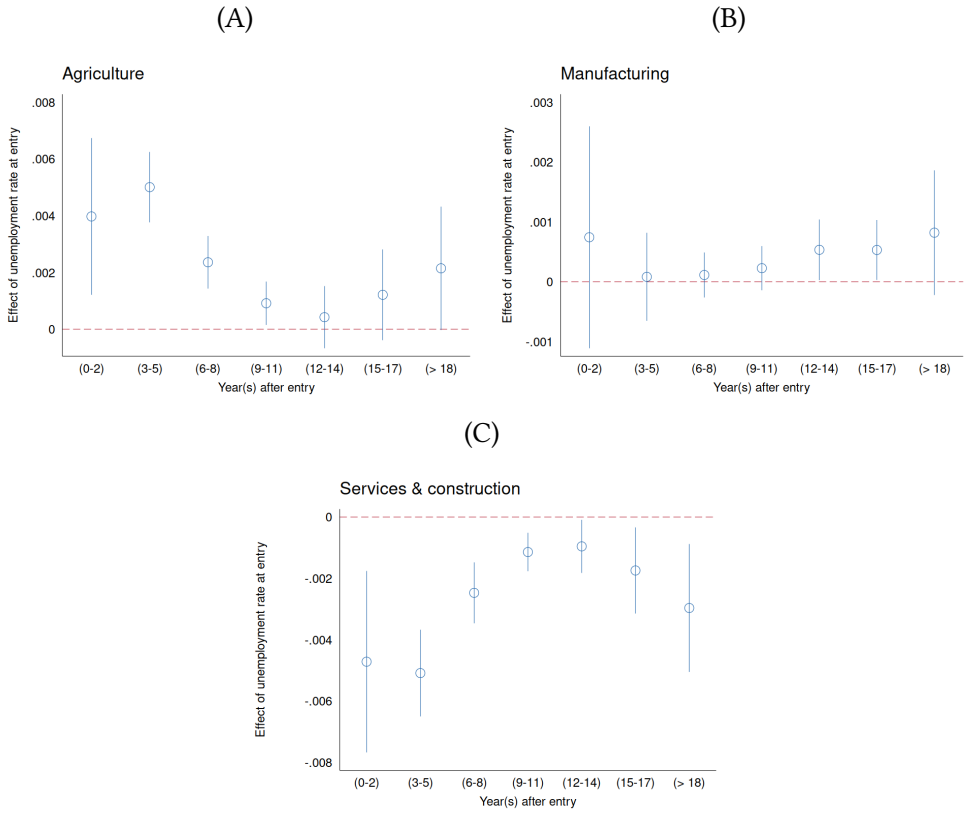


Notes: Results are based on national specification as summarized in Equation 1 using data from SAKERNAS 1990-2019. Plots represent coefficients on unemployment rate at the year and current province residence of labor market entrance. Specification controls for labor market entry fixed effects, gender fixed effects and survey year fixed effects. Standard errors are clustered at the provincial level.

It emerges that the new entrants are likely to be in the agriculture sector when the unemployment rate is high, as illustrated in Figure 5 Panel A. This is consistent with previous literature that finds agriculture as a safety net employment for those who were affected by the recession in 1997/1998 Manning and Junankar (1998). While most existing studies refer to already-in-labor market employer responses, my results confirm that the new entrants follow a similar path. Increased likelihood to work in agriculture is tightly correlated with the fact that reverse migration from urban and rural is a typical response of workers in Indonesia when the labor market contracted as experienced during the AFC (Hugo, 2000). However, in contrast to employed workers, I do not find a significant effect towards the probability to be employed in manufacturing, as shown in Figure 5 Panel B. Existing literature shows that manufacturing employment has shrunken, as the recession hit in 1997/1998. For the new entrants, the unemployment rate does not significantly affect the probability to find a job in manufacturing. I do find that bad economic conditions push out new entrants from the services and

construction sectors (see Figure 5 Panel C). The negative effect on services and construction sectors persists throughout their working lifetime. This persistent negative effect, in particular, is interesting as it suggests that the new entrants may fail to accumulate the necessary skills to be engaged in services and construction when they started in the non-services sectors. One possible interpretation is the service sector consists of high-skilled occupations such as education, finance, technology, etc. Human capital investment in an earlier stage of a career is even more important compared to other sectors such as agriculture and manufacturing. However, one should carefully interpret the results, as service sectors also include lower-skilled occupations such as retails and trade which do not require such accumulation of human capital.

Figure 5: Scarring effects on employment sector



Notes: Results are based on national specification as summarized in Equation 1 using data from SAKERNAS 1990-2019. Plots represent coefficients on unemployment rate at the year and current province residence of labor market entrance. Specification controls for labor market entry fixed effects, gender fixed effects and survey year fixed effects. Standard errors are clustered at the provincial level.

From the previous section, we observe evidence that bad economic conditions at labor market entry would affect new entrants' employability and job placement. As bad economic condition is associated with the likelihood to be in a lower-skilled job, we should expect it

would also be reflected in their income trajectories. From Table 2, it emerges that a percentage point increase in the unemployment rate in labor market entrance causes more than 26% loss of income or wage during the 25 years of working experience (see Columns 1 and 2). This loss of income is statistically significant and substantive. It also affects working hours as well as wage rate consequently (see column 3 and column 4).

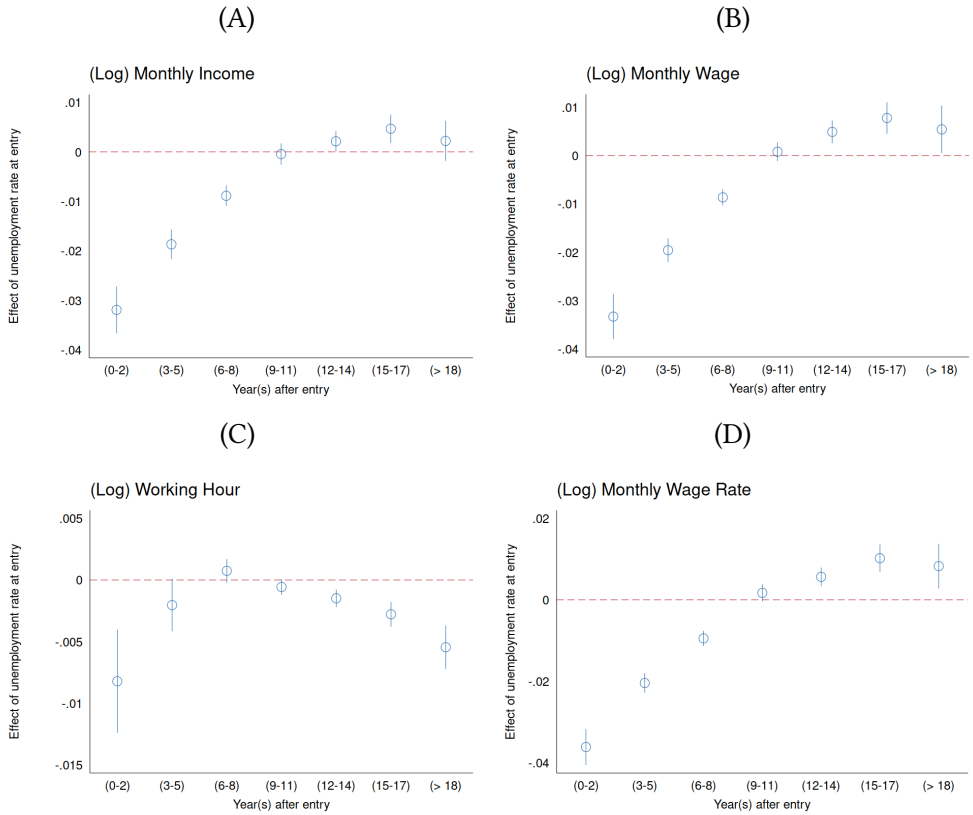
Table 2: Long-term consequences of unemployment rate at labor market entry

	(1) lnincmonth	(2) log total wage	(3) log working hours	(4) log wage/ hours
UR at entry	-0.262***	-0.279***	-0.132***	-0.350***
	(0.020)	(0.023)	(0.010)	(0.027)
Mean	13.769	13.935	5.075	8.772
adjr2	0.927	0.748	0.640	0.701

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Decomposing the effect to be varied across years after entering the labor market, for total income and wage, I find a similar pattern as the negative effect towards probability to be employed. A bad economic situation in the initial year correlates with more than 3% less income or wage in the first two years of their career. The effect starts to be nullified after 9 to 11 years after graduation. There is a significant drop in wage rate for the new entrants in the early years of their career as working hours also dropped along with their total monthly income. As the picture depicts both waged workers and informal jobs, it may mask a more pronounced effect for the waged worker group. The size of income loss is similar to developed countries' experience such as the US (Schwandt and Von Wachter, 2019; Kahn, 2010) and Canada (Oreopoulos et al., 2012).

Figure 6: Scarring effects on income



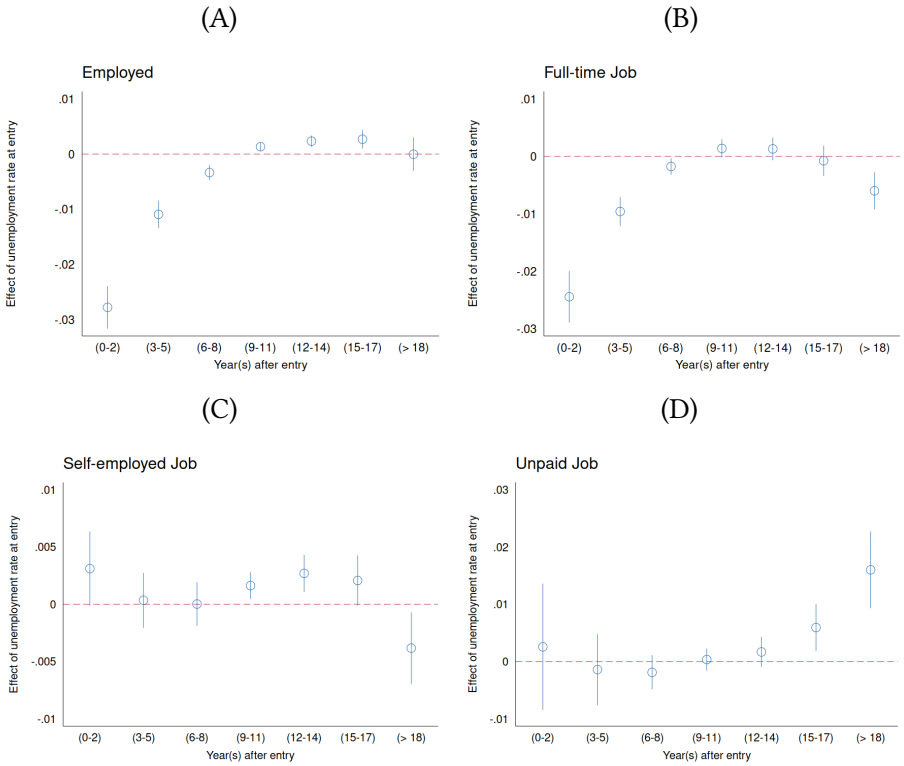
Notes: Results are based on national specification as summarized in Equation 1 using data from SAKERNAS 1990-2019. Plots represent coefficients on unemployment rate at the year and current province residence of labor market entrance. Specification controls for labor market entry fixed effects, gender fixed effects and survey year fixed effects. Standard errors are clustered at the provincial level.

5.2 Province estimate

Overall, the province estimates share similar insights to the national estimates as summarized in Figure 7. A higher unemployment rate at labor market entry leads to a drop in the probability of being employed and having a full-time job. The negative effect is found the largest in the first two years and starts to recover after 9 to 11 years. The magnitude of the negative effect of labor market entrance conditions is similar to the national estimates. However, interesting results emerge in the probability of being self-employed and working at unpaid jobs outcomes. In Figure 7 Panel C and D, respectively, the effect of bad economic conditions is less precisely estimated and not significant for the earlier career for both self-employed and unpaid job outcomes. For the self-employment outcomes, the estimate using provincial exposure provides the opposite effect compared to the national estimates. From the provincial specification, there is a positive effect of a bad economic situation for the new entrants, while

not statistically significant. As for the unpaid job, the increased likelihood of the unpaid job from national estimates in the earlier stage of new entrants' work life is less detectable.

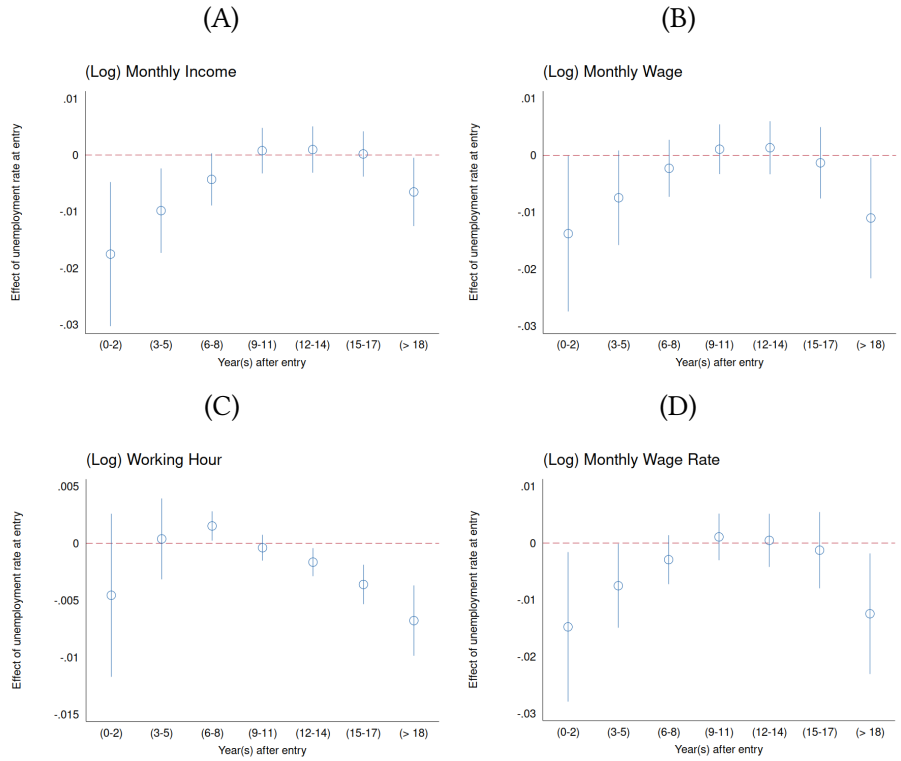
Figure 7: Province estimate: Scarring effects on employment



Notes: Results are based on national specification as summarized in Equation 1 using data from SAKERNAS 1990-2019. Plots represent coefficients on unemployment rate at the year and current province residence of labor market entrance. Specification controls for labor market entry fixed effects, gender fixed effects and survey year fixed effects. Standard errors are clustered at the provincial level.

Now, let's turn to the income effect point of view as depicted in Figure 8. I find that, overall, the negative income effect emerges but is smaller in magnitude and less precisely estimated. For the monthly income outcome, see Panel A of Figure 8, the negative effect trends throughout an individual's work life are similar to the national estimates. For the monthly wage, see Panel B, while sharing a similar trend and direction with the national estimates, the negative income effects are no longer statistically significant. Similar to national estimates, I also find that individuals take fewer working hours (see Panel C of Figure 6) but the negative effect estimates are also no longer statistically significant. Consequently, the estimated scarring effect on unpaid job likelihood follows a similar pattern.

Figure 8: Province estimate: Scarring effects on income



Notes: Results are based on national specification as summarized in Equation 1 using data from SAKERNAS 1990-2019. Plots represent coefficients on unemployment rate at the year and current province residence of labor market entrance. Specification controls for labor market entry fixed effects, gender fixed effects and survey year fixed effects. Standard errors are clustered at the provincial level.

These findings, I argue, lead to two possible explanations. First, the disparity between national and provincial estimates could reflect that the local labor market, as well-proxied by the provincial unemployment rate, is more relevant to the outcomes compared to the national level. Second, the less precision in province specification estimates may also indicate endogenous migration problems that have not been resolved fully. However, in general, national estimates and province estimates are consistent with each other except for the self-employment job likelihood. This gives us more confidence in the exogeneity of temporal variation of the unemployment rate. The change in the unemployment rate is less likely to be correlated with changes in cohort-specific characteristics.

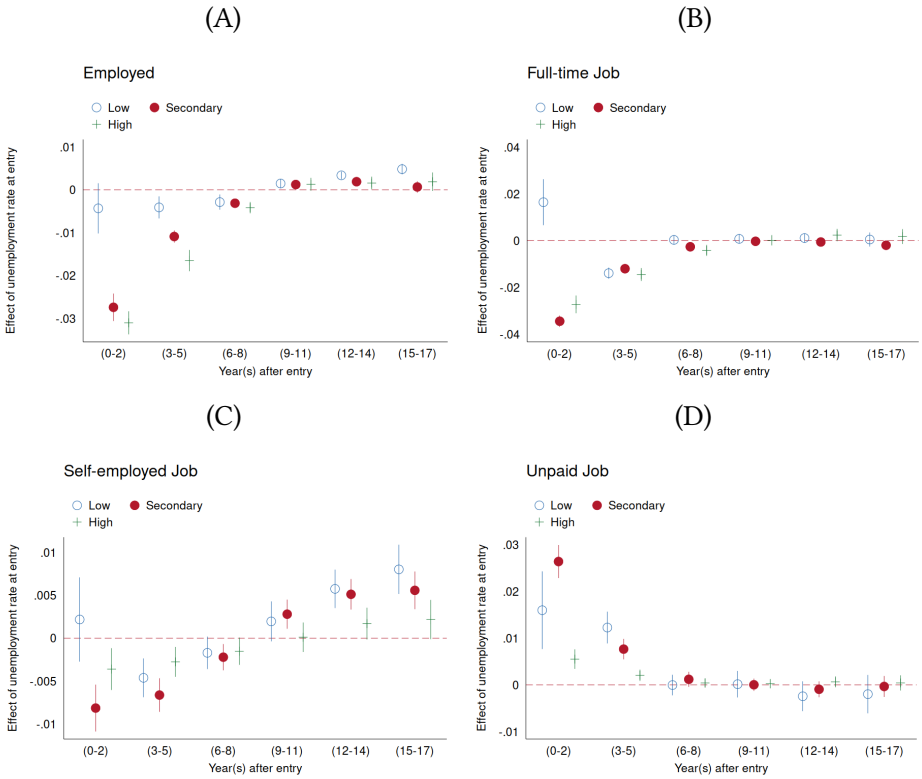
6 Heterogeneity results

6.1 Education

Education profiles of the new entrants matters in employment decisions and potential incomes, hence the scarring effect would vary across education level. As discussed in Section 2, the AFC hit the waged workers sector the most. Hence, one possible hypothesis would be more educated workers are more affected by the recession due to their job prospects, especially in an earlier stage of their careers. Furthermore, the more educated new entrants could recover better in the long run as they endowed human capital than the lower educated. On the contrary, it is also possible to hypothesize otherwise. The less educated might suffer more in terms of employment as they were to compete with more educated new entrants who were looking for low-level jobs.

Figure 9 summarizes the estimation of the scarring effect by education level. From 9 Panel A, confirmed our earlier hypothesis that more educated new entrants experience a larger drop in employment probability in the first 5 years of their career compared to their less educated counterparts. This suggests evidence that shrinking waged employment disadvantaged the more educated workers. Investigating the likelihood to have a full-time job, the striking gap between more and less educated becomes more evident. Surprisingly, the low-educated new entrants were more likely to have full-time jobs. I connect this evidence to the fact that low-educated individuals, largely come from lower-level income families who could not afford to be unemployed to sustain their livelihood. Finally, as shown in Panel C of Figure 9, both low-educated and high-educated new entrants matched to unpaid jobs in the first 5 years of their career and share similar recovery over time.

Figure 9: Scarring effects on employment by education

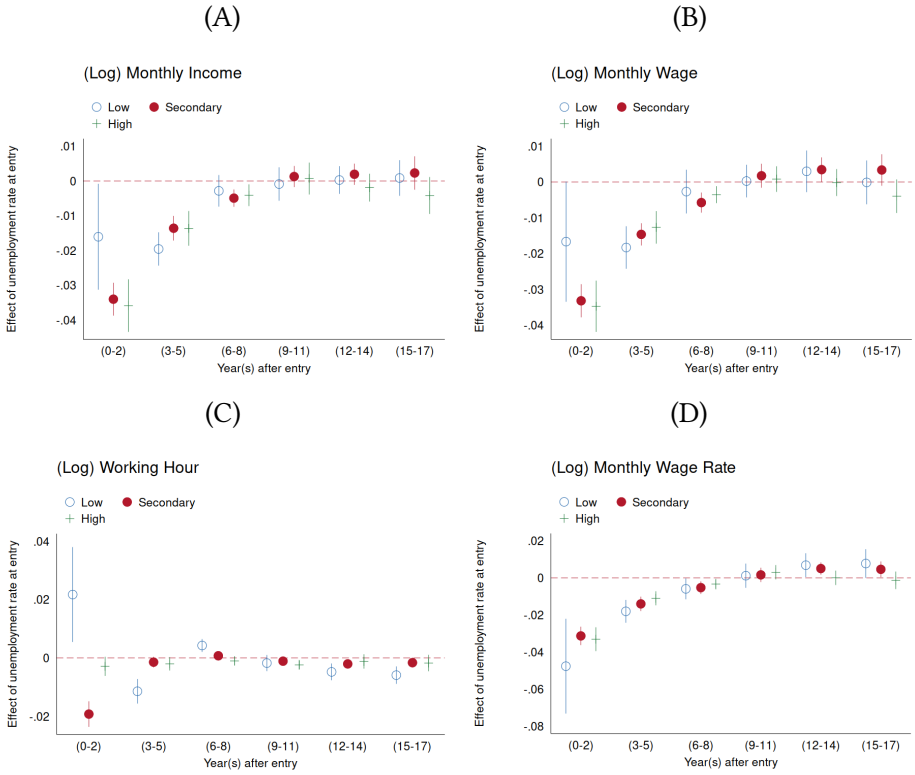


Notes: Results are based on national specification as summarized in Equation 1 using data from SAKERNAS 1990-2019. Each colored line represents separate regression by education level. Plots represent coefficients on unemployment rate at the year and current province residence of labor market entrance. Specification controls for labor market entry fixed effects, gender fixed effects and survey year fixed effects. Standard errors are clustered at the provincial level.

Previous literature Topel and Ward (1992) suggests that as the cost of job searching increased over time, less educated young workers would search intensely after being allocated to lower-quality jobs. On the other hand, more educated individuals could afford longer job search costs for a longer time. From Figure 9, it emerges that the recovery trajectories do not vary much across education levels in terms of employment. There seems no strong evidence that the endowed with better human capital helped them to recover quicker than the less endowed. However, it is possible to have different trajectories in terms of income, as more educated individuals could be matched to much better jobs when the scarring effect starts to wear off. Figure 10 summarizes the results on income by education level. Several interesting results emerge. First, from Panel A, B and C of Figure 10, scarring effects were more pronounced for less educated individuals, though not statistically significant compared to the more educated. Second, there is no evidence of better recovery trajectories across levels of education. Thus, from our results, no evidence supports the idea that more educated new

entrants would recover better. This may point to an argument that the more educated young workers invested in the 'wrong' human capital due to bad initial job matching as discussed by Gibbons and Waldman (2004)

Figure 10: Scarring effects on income by education



Notes: Results are based on national specification as summarized in Equation 1 using data from SAKERNAS 1990-2019. Each colored line represents separate regression by education level. Plots represent coefficients on unemployment rate at the year and current province residence of labor market entrance. Specification controls for labor market entry fixed effects, gender fixed effects and survey year fixed effects. Standard errors are clustered at the provincial level.

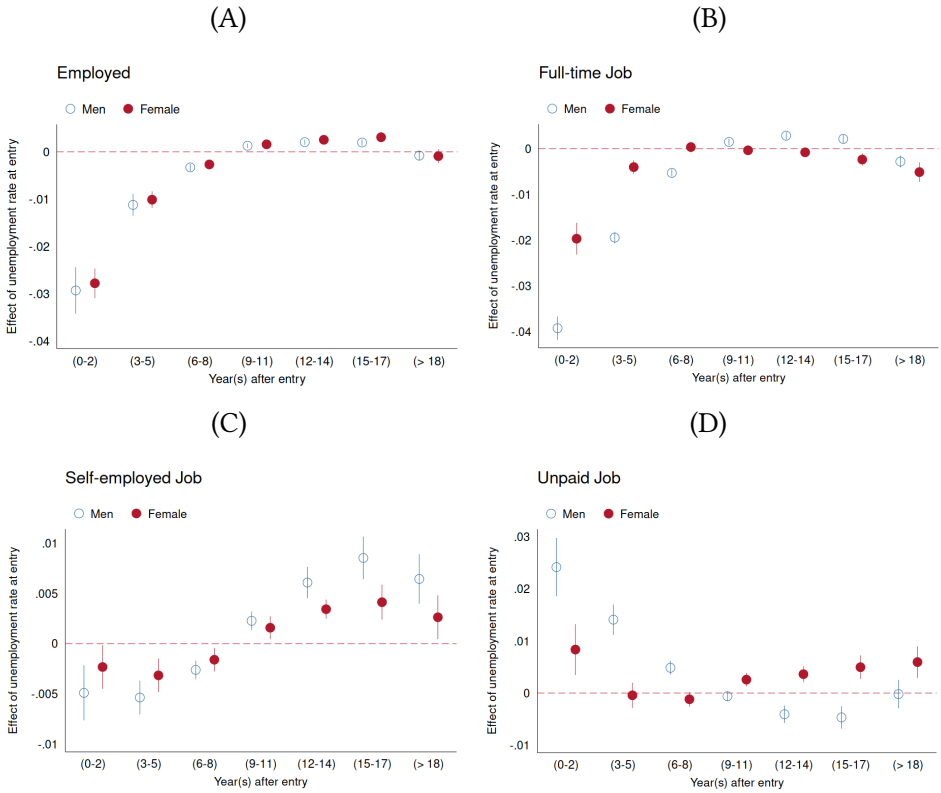
6.2 Gendered results

In this section, I focus on investigating if there are any differences in the bad economic situation when entering the labor market between men and women. As the gender gap, either in employment and income, in the labor market in Indonesia remains a big issue (Schaner and Das, 2016), the more relevant comparison would be within their gender group.

First, from an employment perspective, gender comparison reveals that the negative employment effect is shared similarly among men and women. Figure 11 captures this result. Both women and men experience about 3% less likely to be employed during the first 2 years of their careers. After 9 to 11 years, the negative employment effect starts to disappear. Among

women, however, they experience less likely to be employed in an unpaid job compared to the men group by about 1%.

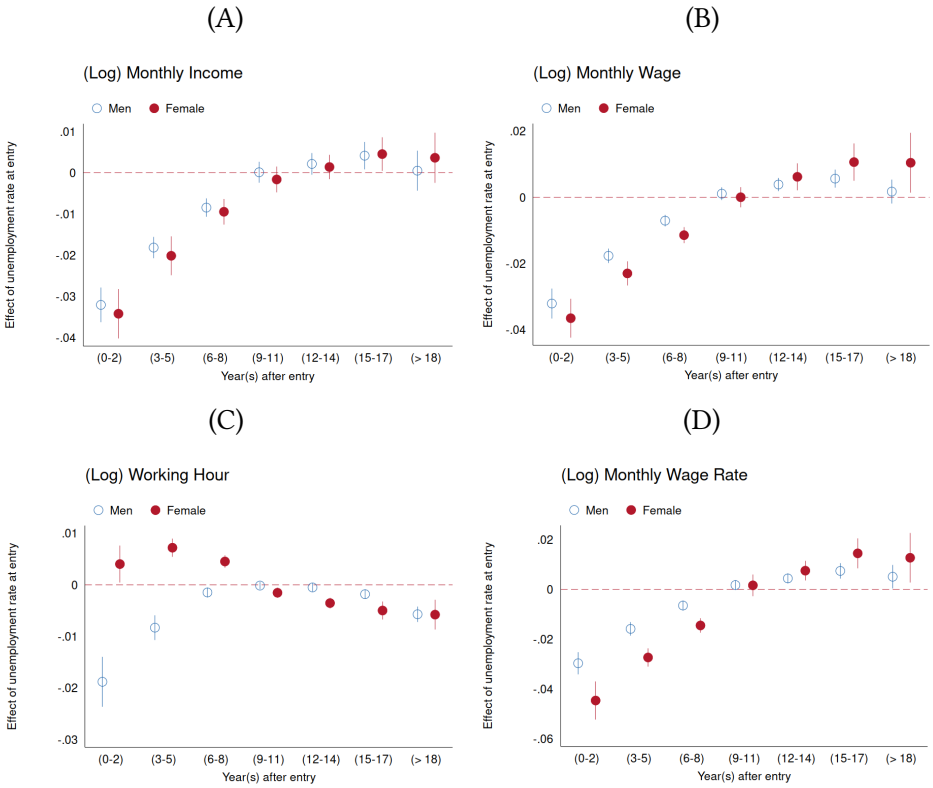
Figure 11: Scarring effects on employment by gender



Notes: Results are based on national specification as summarized in Equation 1 using data from SAKERNAS 1990-2019. Each colored line represents separate regression by gender. Plots represent coefficients on unemployment rate at the year and current province residence of labor market entrance. Specification controls for labor market entry fixed effects and survey year fixed effects. Standard errors are clustered at the provincial level.

Secondly, an almost mimicking story emerges from income perspectives. Both gender group experiences similar pattern in terms of negative income effect among themselves as illustrated in Figure 12. The only exception is the effect on working hours. The initial unemployment rate has the opposite effect across gender. Within the men group, the effect is positive such that an increase in the initial unemployment rate leads to increased working hours. On the other hand, the scarring effect leads to a drop in working hours among the women group.

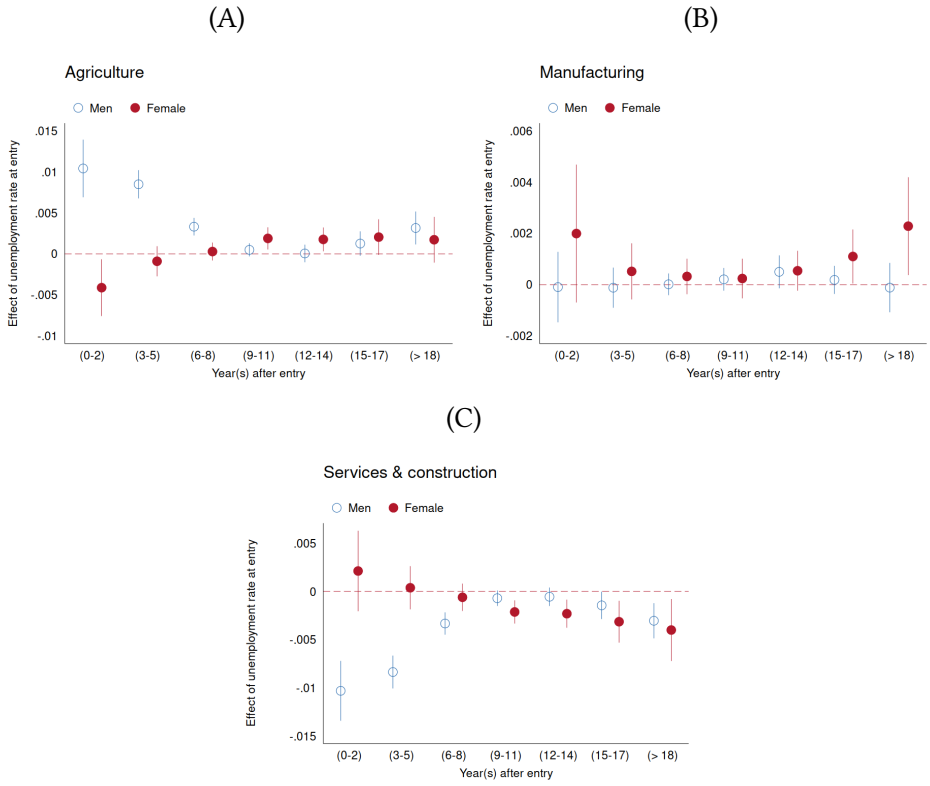
Figure 12: Scarring effects on income by gender



Notes: Results are based on national specification as summarized in Equation 1 using data from SAKERNAS 1990-2019. Each colored line represents separate regression by gender. Plots represent coefficients on unemployment rate at the year and current province residence of labor market entrance. Specification controls for labor market entry fixed effects and survey year fixed effects. Standard errors are clustered at the provincial level.

Lastly, some interesting results emerge from sectoral results. The labor market entry condition affects increased participation in agriculture largely among men. As for women, surprisingly within the first two years, the results are negative (see Figure 13 Panel A. This result could relate to the fact that at the initial stage, more women may already be absorbed in agriculture, compared to men. In terms of services, as expected, the men's group has been impacted more by the scarring effect as seen in Figure 13 Panel C. This strongly correlated with the fact that these sectors include construction which was a male-dominated job that happened to be hit the hardest during the AFC.

Figure 13: Scarring effect on income by gender



Notes: Results are based on national specification as summarized in Equation 1 using data from SAKERNAS 1990-2019. Each colored line represents separate regression by gender. Plots represent coefficients on unemployment rate at the year and current province residence of labor market entrance. Specification controls for labor market entry fixed effects and survey year fixed effects. Standard errors are clustered at the provincial level.

7 Sensitivity tests

7.1 Alternative unemployment rate

I first test the sensitivity of national estimate results using an alternative unemployment rate choice. First, I use the 3-year moving average of the unemployment rate. While endogenous migration is less likely in national estimates, endogenous graduation of timing might affect our estimates. Using a 3-year moving average, we averaged out the possibility of individuals delaying or starting their careers early in the labor market. In Figure A3 and Figure A4, my results are robust using a 3-year moving average of the unemployment rate. Second, one might expect that a cohort-specific unemployment rate would be more relevant to the new entrants. Thus, I use the unemployment rate for people aged 25 years old as a proxy for the youth-specific unemployment rate. I find that my results are robust using such a youth-specific unemployment rate for all outcomes as depicted in FigureA5 and Figure A6.

7.2 BPS official unemployment rate

In Section 4, I discuss the argument to use a consistent unemployment rate definition as opposed to using BPS official unemployment rate. Assigning BPS's official unemployment rate as the initial labor market condition for the new entrants would be an appropriate sensitivity check to my results. The results are presented in Figure A7 and A8.

From employment outcomes perspectives, in general, we find a similar effect to our preferred national specification in Section 5. Negative and persistent scarring-effect emerges for both employment probability and having a full-time job outcome. However, notice that the results are less precise and share more similarities to the province specification estimates. This resemblance could also be observed for unpaid jobs and self-employment as shown in Figure A7 Panel C and D, respectively. This could indicate that the province estimates might still suffer from the potential endogeneity.

7.3 External validity using IFLS dataset

As my last sensitivity check, I use the Indonesian Family Life Survey (IFLS)[11] to investigate the scarring effect. Since the IFLS is a longitudinal household survey, it allows me to conduct individual-panel estimates. The dataset covers the period of 1993 to 2014. There are at least three potential benefits of utilizing IFLS compared to official labor market survey data. First, the IFLS possesses a more detailed questionnaire on labor market history as they explicitly ask the year when the respondent starts their first full-time job. Second, the survey also provides more detailed education information as it records the highest grade of each education year such that it is possible to more accurately measure the years of schooling. Third, the survey provides information on the province of residence when individuals aged 12 years old.[12]

However, at least two major caveats are using the IFLS for my investigation. First, the IFLS may have not been able to cover the representation of each cohort that enters the labor market for this study. The sample of IFLS is designed to be representative of 83% of the Indonesian population in 1993. Then, the survey follows the household including the split-off household over time in the next four waves. One may argue that the limitation of tracking split-off households would fail to represent every cohort that enter the labor market between

[11] Collected by RAND Cooperation, available in 5 waves. The survey is regarded as high-quality household survey data with a very low attrition rate.

[12] The IFLS also provides information on migration history, however for simplicity, I argue that using residence at age 12 could be able to more precisely predict the

1993 to 2014. Second, as the survey was collected within about 5 years intervals, though it includes 1997 conveniently to our study design, the employment and income history solely relies on respondent recall. The collected information is easily prone to recall bias, especially for income information. While overall attrition is low, the working history module is higher than overall tracking attrition. The missing information on income in particular also higher than employment.

I follow a similar procedure in the spirit of my identification strategy except for the following. First, the IFLS allows me to estimate at the individual-panel level. Second, the timing of entering the labor market defines as the year of the first full-time job. Next, the province entering the labor market use the province when aged 15. Using this information I matched the unemployment rate used in my province's specifications. Instead, the IFLS results as summarized in Table A1, overall, agree with my preferred estimation results. The IFLS estimate captures a larger scarring effect compared to my preferred specification results. On one hand, this result gives external validity to my estimate. On other hand, these results also suggest that using more precise province information might improve the estimation using province specification, hence suggesting that province specification might remains suffer from endogenous migration issues.

8 Conclusion

In this study, I provide evidence of the scarring effect of bad economic conditions when entering the labor market. In particular, I use Indonesia, a country that was heavily affected by the AFC in 1997/1999, as a study context. The financial crisis triggered a massive economic contraction which I argue is significant enough to create a temporal variation of the unemployment rate during and years after the crisis. I follow scarring effect literature (Kahn, 2010; Oreopoulos et al., 2012; Schwandt and Von Wachter, 2019) to use exposure to the unemployment rate at the year of labor market entrance as a treatment variable for the corresponding cohort. In the preferred specification, I match the national-level unemployment rate to pseudo-panel observations aggregated at a cohort of graduation and province of residence by year of labor market entrance. Alternatively, I provide an estimation using province-level unemployment rate weighted by migration share across provinces. The latter specification is prone to endogenous migration issues and persistent unemployment at local labor markets

despite potentially picking up more relevant local labor market situations.

I find a significant and large negative scarring effect of the unemployment rate at labor market entrance on the cohort's employment and income outcomes. For the likelihood to be employed and having full-time job outcomes, the effect persists up to nine to eleven years after entering the labor market. An increase in the unemployment rate by 1 percentage point leads to a 3% drop in the likelihood of having a full-time job in the first 2 years since entering the labor market. The bad economic situation on the labor market entrance also matches this cohort o unpaid jobs. From the income perspective, a similar story emerges. The negative income effect is measured by about a 3% drop in total monthly income and monthly wage in the first 2 years after entering the labor market and starts to fade away after 9 to 11 years. I also find that individual work more hours which lead to a subsequent drop in the wage rate. That unlucky cohort is also more likely to find a job in agriculture and less likely to be involved in services and construction. This is consistent with findings from previous literature (Manning, 2000) that show the agriculture sector absorbs more workers from non-agriculture following the crisis as more people move temporarily from urban areas where most job opportunities contracted (Hugo, 2000).

From gender viewpoints, I find that, in general, the scarring effect is shared similarly among men and women groups. Women and men groups experience different labor market entrance consequences in two fashions. First, the matching to unpaid jobs is more apparent within the men group compared to within the women group. Second, within the women group, worsening labor market conditions at the entrance translate to more working hours while the opposite results emerge for men groups. Lastly, the allocation to the agricultural sector is more pronounced within the men's group.

Overall, comparing national and province specification results brings two important insights. First, the similarity in direction of the scarring effect between national and province specification encourages us to that exogenous temporal variation in the unemployment rate to cohort characteristic changes holds. Second, endogenous migration might remain an issue but also the local labor market shock may be more relevant compared to the national level. The effects on income become less precisely estimated.

Understanding the magnitude and mechanism of the scarring effect for new entrants becomes an even more important issue for policymakers than before given the latest pandemic-induced recession. Hence, this study offers at least two important insights to policymakers.

First, it raises the importance of providing economic support for young people to afford costly job-matching processes to avoid allocation to low-skilled jobs. Second, providing job training could help the new entrants to not lose important human capital accumulation. Finally, I acknowledge that this study has several caveats. First, the design of the study was unable to test the explicitly possible mechanism behind the scarring effect. Second, this paper has very limited insight into firm-side stories which interact with the labor supply side. Addressing the aforementioned caveats should motivate the direction of future research agendas.

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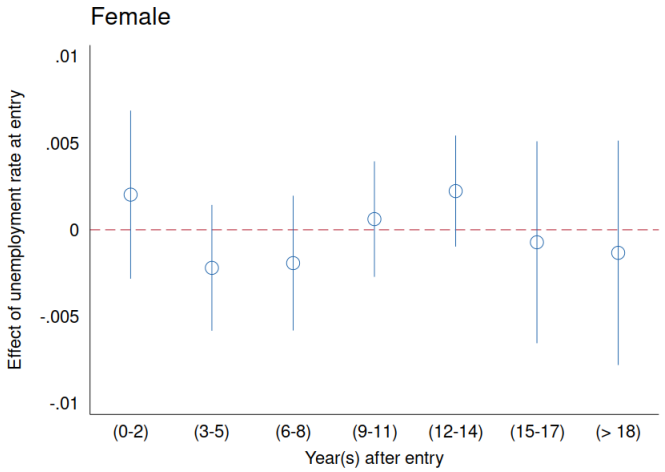
9 Appendix

Table A1: Long-term consequences of the unemployment rate at labor market entry using IFLS

	(1) All	(2) Urban	(3) Rural
UR at entry	-0.032***	0.029***	0.037***
	(0.0004)	(0.0006)	(0.0007)
Covariates	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes
Province Fixed Effects	Yes	Yes	Yes
Observation	13022	7236	5766

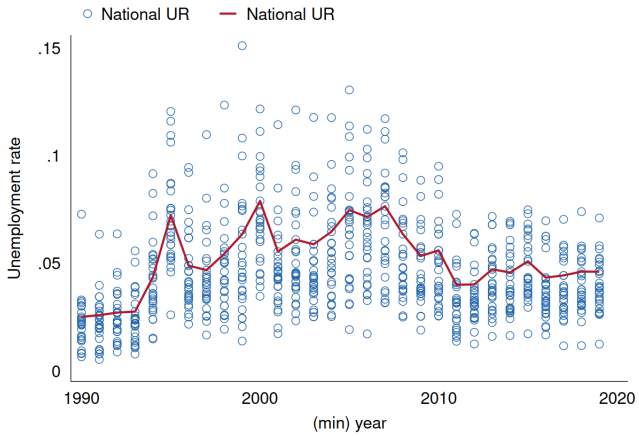
Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Figure A1: Balancing regression



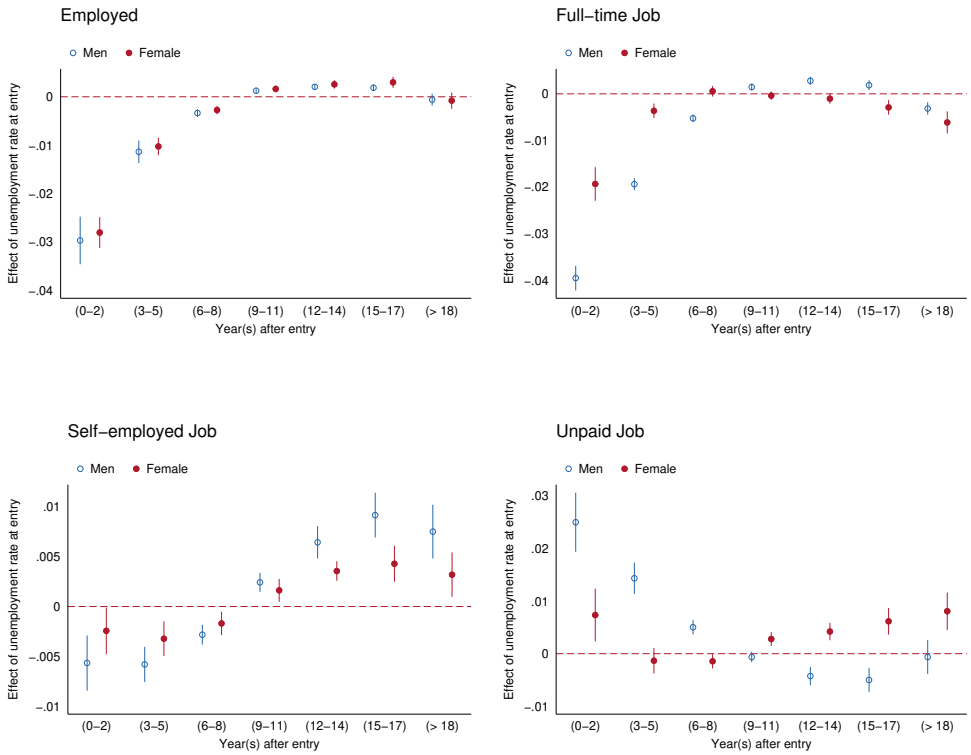
Notes: Results are based on national specification as summarized in Equation 1 using data from SAKERNAS 1990-2019. The dependent variable is the share of female individuals in each cell. Plots represent coefficients on unemployment rate at the year and current province residence of labor market entrance. Specification controls for labor market entry fixed effects and survey year fixed effects. Standard errors are clustered at the provincial level.

Figure A2: Unemployment rates at province level vs. national level



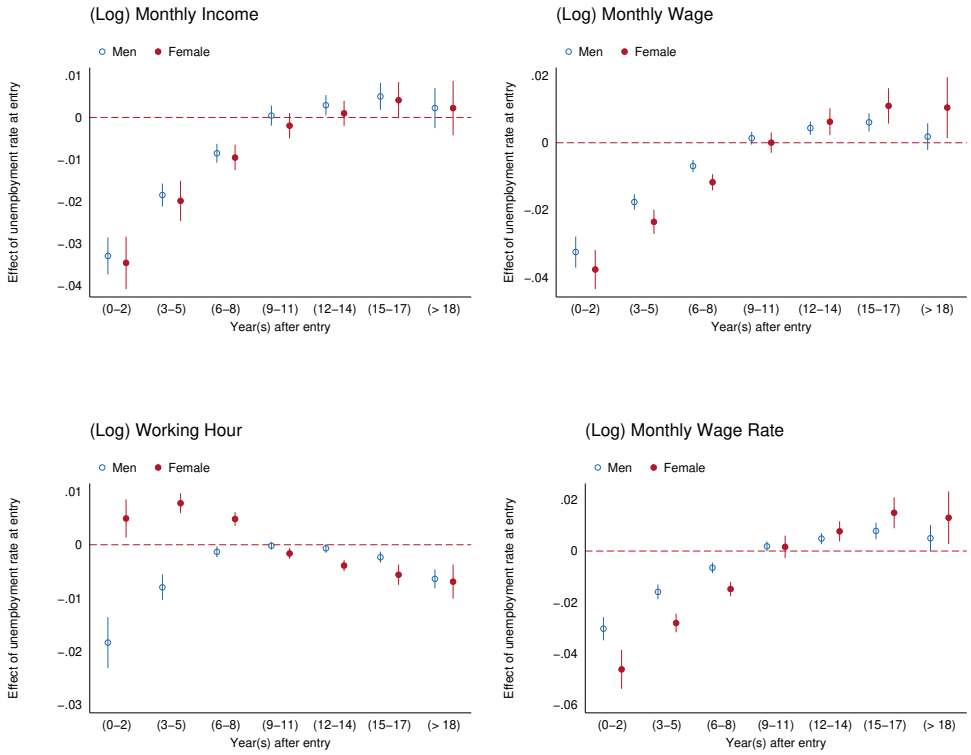
Notes: Own calculation using SAKERNAS data 1990-2019. The correlation coefficient is a linear square estimation of national unemployment rate to provincial unemployment rate at each survey year.

Figure A3: Scarring effects of 3-year moving average unemployment rate



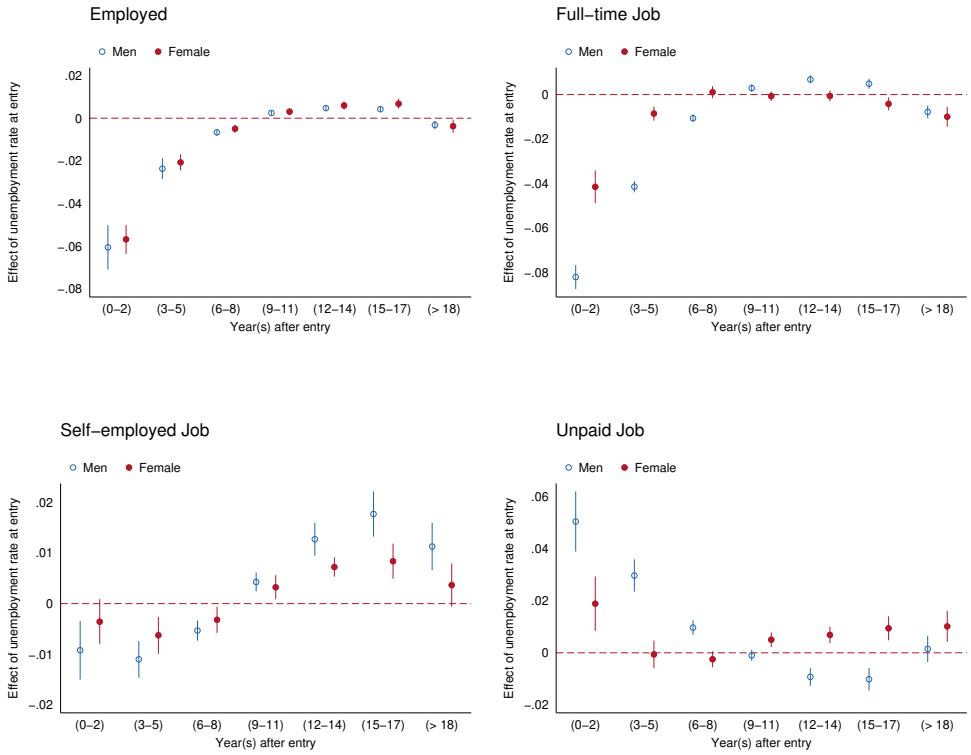
Notes: Results are based on national specification as summarized in Equation 1 using data from SAKERNAS 1990-2019. Each colored line is estimated separately by gender. Plots represent coefficients on the 3-year moving average unemployment rate at the year and current province residence of labor market entrance. Specification controls for labor market entry fixed effects and survey year fixed effects. Standard errors are clustered at the provincial level.

Figure A4: Scarring effects of 3-year moving average unemployment rate



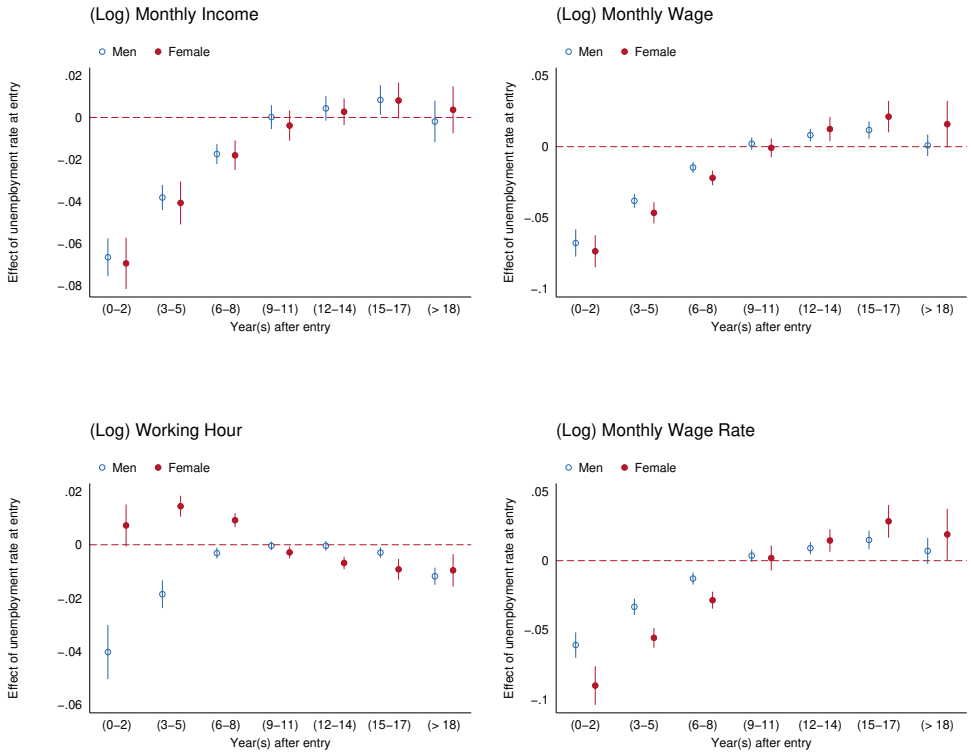
Notes: Results are based on national specification as summarized in Equation 1 using data from SAKERNAS 1990-2019. Each colored line is estimated separately by gender. Plots represent coefficients on the 3-year moving average unemployment rate at the year and current province residence of labor market entrance. Specification controls for labor market entry fixed effects and survey year fixed effects. Standard errors are clustered at the provincial level.

Figure A5: Scarring effects using unemployment rate of 25 years old



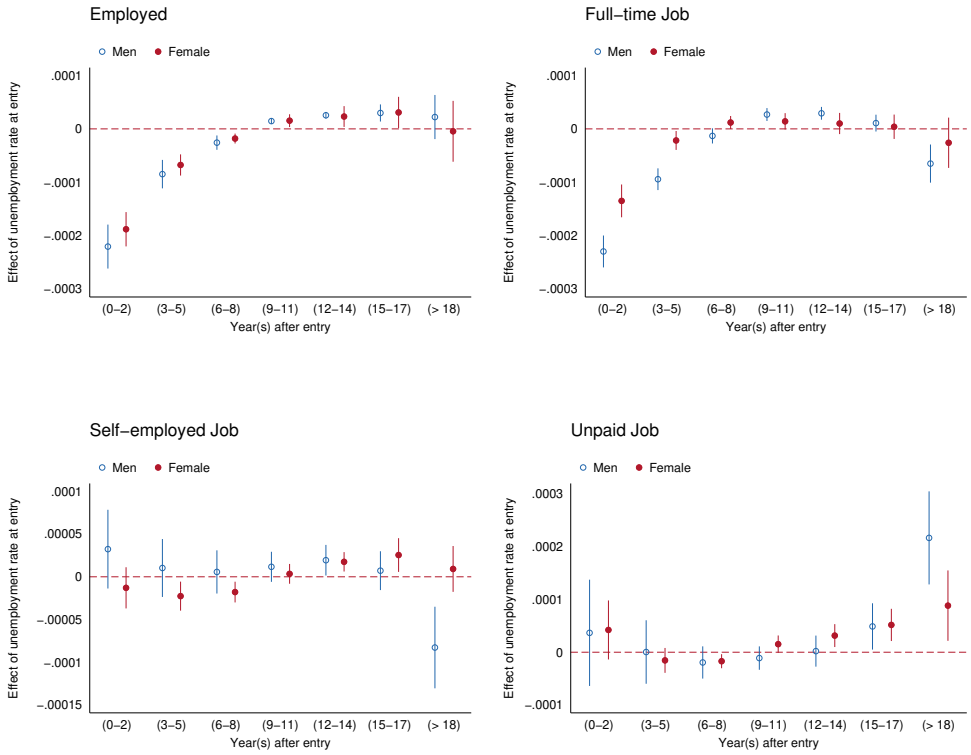
Notes: Results are based on national specification as summarized in Equation 1 using data from SAKERNAS 1990-2019. Each colored line is estimated separately by gender. Plots represent coefficients on youth-specific (aged 25 years old) unemployment rate at the year and current province residence of labor market entrance. Specification controls for labor market entry fixed effects and survey year fixed effects. Standard errors are clustered at the provincial level.

Figure A6: Scarring effects using unemployment rate of 25 years old



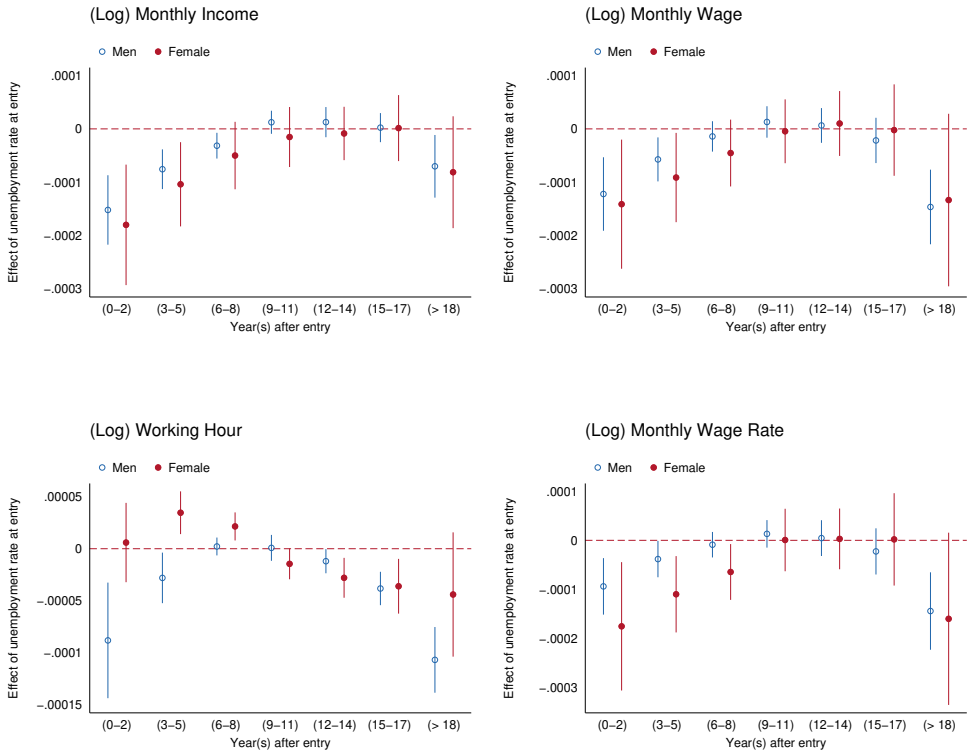
Notes: Results are based on national specification as summarized in Equation 1 using data from SAKERNAS 1990-2019. Each colored line is estimated separately by gender. Plots represent coefficients on youth-specific (aged 25 years old) unemployment rate at the year and current province residence of labor market entrance. Specification controls for labor market entry fixed effects and survey year fixed effects. Standard errors are clustered at the provincial level.

Figure A7: Scarring effects of official BPS unemployment rate



Notes: Results are based on national specification as summarized in Equation 1 using data from SAKERNAS 1990-2019. Each colored line is estimated separately by gender. Plots represent coefficients on the official unemployment rate produced by BPS at the year and current province residence of labor market entrance. Specification controls for labor market entry fixed effects and survey year fixed effects. Standard errors are clustered at the provincial level.

Figure A8: Scarring effects of official BPS unemployment rate



Notes: Results are based on national specification as summarized in Equation 1 using data from SAKERNAS 1990-2019. Each colored line is estimated separately by gender. Plots represent coefficients on the official unemployment rate produced by BPS at the year and current province residence of labor market entrance. Specification controls for labor market entry fixed effects and survey year fixed effects. Standard errors are clustered at the provincial level.