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WHAT IS BEHIND LABOR MOBILITY COSTS? EVIDENCE FROM INDONESIA

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What is behind labor mobility costs? Evidence from Indonesia

Massimiliano Cali, Taufik Hidayat, and Claire H. Hollweg¹

Abstract

The ability of workers to transition to a new job is crucial to determine the resilience of an economy to (positive or negative) shocks. This paper provides new evidence on the factors that affect labor mobility by using labor data on Indonesia, one of countries with the higher estimated labor mobility costs. To do so it investigates correlates of the probability of an individual finding a job after a negative labor market shock, as well as of the duration of job search. The results show that higher housing prices are associated with higher mobility costs, suggesting that housing benefits or policies that increase the supply of housing may help reduce mobility costs in Indonesia. More generally, public expenditure on infrastructure seems to reduce labor mobility costs, particularly in urban areas, consistently with a reduction in transaction costs – such as urban transport. The results also highlight that formal institutional mechanisms such as job advertisements do not appear to work effectively to help labor mobility in Indonesia, suggesting the need to re-think active labor market policies. On the other hand, minimum wage level – a key outcome of labor market policy - does not appear to affect labor mobility. Labor mobility costs seem higher in urban areas, which could indicate a lower opportunity cost of joblessness than in rural area, employment composition skewed towards sectors with higher mobility costs and/or large congestion costs that negatively affect labor mobility. On the other hand, the general female penalty in labor mobility is less accentuated in urban areas, which may be the result of sectoral composition and/or less discriminatory cultural norms than in rural areas.

Keywords: Labor mobility, Layoffs, Job search, Trade and labor markets

JEL classification codes: J6, J62, J63, J64, F16

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1. Introduction

One of the key features of a well-functioning economy is its ability to reallocate factors smoothly following shocks. Labor is typically a factor slower to be reallocated than capital. Local labor market adjustment to trade shocks for instance can be remarkably slow even in a country like the US, where wages and labor-force participation rates have remained depressed for a long period of time in the areas subject to more import competition from China (Autor et al. 2016). Barriers both on the demand and supply sides make labor mobility costly. The literature suggests that these ‘labor mobility costs’ can be high, particularly in developing countries, and result in substantial costs for the economy, such as in the case of forgone gains from trade (Artuc et al. 2013).²

Our limited understanding of the factors that constrain labor mobility reduces policymakers’ ability to respond with policies that can lower these costs and facilitate labor market adjustment, thereby enhancing the gains from trade integration and other external shocks. This paper aims to help shed light on the determinants of such labor mobility costs. To do so it employs several waves of a detailed labor survey dataset on Indonesia, one of the countries with the highest labor mobility costs among those for which estimates exist (World Bank, 2016). The focus is on capturing the combined effect of different types of barriers that workers face when hit by a negative shock. These may include factors as the direct costs of switching sectors (e.g. firing costs, the costs of moving to a new geographical area, the cost of searching and matching for new employment), the fact that worker characteristics differ across sectors (as workers sort themselves across sectors based on their characteristics), and the sector specificity of skills (Dix-Carneiro, 2014).

This paper tries to isolate factors correlated to labor mobility costs in Indonesia by focusing on individuals who have been affected by a negative labor-market shock, identified as having recently experienced a plausibly exogenous firing. We rely on several waves of one of the largest labor force surveys in the developing world – Sakernas. This allows us to study thousands of individuals who experienced a negative labor shock during the period of analysis. Given the large size of the dataset the number of individuals is still substantial for statistical inference even when we apply the most stringent

² Studies show that restricted labor mobility also imposes negative effects in terms of welfare, productivity, and short- and long-term growth (Haltiwanger et al. 2014, Gross and Schmitt 2012, Gilbert and Oladi 2009, Mitra and Ranjan 2010, Cali and Miaari, 2018).

definition of exogenous job loss, i.e. the unexpected closure of business. For these individuals we investigate different individual as well policy-related correlates of the probability of finding a job after the negative shock, as well as the duration of job search. The types of policies explored include type of job search effort, access to finance and other types of support, regulations in labor markets, among others.

The paper contributes to the economic literature identifying factors behind individual's labor market transitions more broadly. Individual characteristics are shown empirically to be important determinants of labor mobility, including gender differences and other demographics.³ For example, men are shown to be more mobile across jobs, while women exhibit higher exit to non-employment across six European countries (Theodossiou and Zangelidis 2009). In Turkey, men also more often make job-to-job transitions than women (Eryar and Tekguc 2014). Age demographics are another important aspect of labor mobility. For example, Lalé (2012) shows the importance of demographic composition effects in occupational mobility, with a higher probability of mobility as age increases. Bergin et al. (2015) show that younger groups are less likely to exit unemployment, but are also at a lower risk of becoming unemployed if already having a job.

Education and skills are also important factors of labor market transitions, though do not play an equal role across different segments of the labor market. In the UK, for example, the type of educational qualification helps explain the probability and direction of job transitions out of unemployment or for lower segments of labor markets, but not higher segments (Ashton and Sung 1992). Theodossiou and Zangelidis (2009) show that women with lower education have lower job-to-job transitions in six European countries. Education, however, is not found to impact the transition from casual to permanent positions (Corsini and Guerrazzi 2007, Watson 2013).

Physical distances of residential place and work place are also identified as one of the significant factors influencing individuals in their labor mobility decisions. Jolly (2015) shows that displaced workers who are more geographically mobile within the first two years following job losses experienced lower earnings losses, lower decreases in working hours, and smaller increases in unemployment periods. Similarly, Caliendo (2017) shows the positive impact on wages and job stability of the German Active

³ Labor mobility is defined broadly to include: (i) mobility in terms of different states of employment (e.g. unemployment vs. employment, casual vs. permanent, part time vs. full time); (ii) mobility within firms, between firms of the same sector, and between sectors; and (iii) physical mobility in terms of geographical relocation or residential and workplace distances.

Labor Market Policy through increasing geographic mobility among the unemployed job seekers (with incentives that covered moving costs to search and to accept jobs in distant regions).

Stringent hiring and firing regulations can limit labor mobility, and have a stronger effect in the labor reallocation than that which is generated by the entry and exit of firms (Haltiwanger et al. 2014). However, Fabrizi and Mussida (2009) do not find that the introduction of more flexible labor market reforms impacted labor mobility.

The paper contributes to the literature: (i) by focusing on workers negatively affected by a shock, we are better able to isolate determinants of labor mobility costs (rather than labor market transitions more broadly); and (ii) by exploring a larger set of policy-relevant determinants of labor mobility costs.

Our results show that higher housing prices are associated with lower probability for individuals who experienced a negative labor-market shock of finding a job. These results hold when controlling for the general consumer price index, which is not significant. We also find mixed evidence that minimum wage affects labor market reintegration in Indonesia, both in terms of lower probability of finding a job and higher time spent looking for a job. Labor markets with higher shares of job search through the application for an advertised job are associated with lower probability of finding a job. This finding may reflect that formal institutional mechanisms to find a job such as job fairs, which are intended to produce better matching in labor markets, are not working properly in Indonesia. Individuals negatively affected vis-a-vis a firing or company closure that have achieved a bachelor or higher degree are less likely to find a job than those negatively affected without a high school diploma.

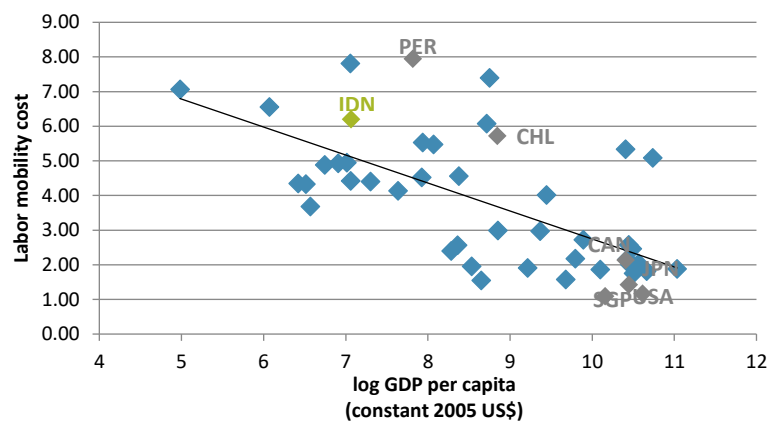
The remainder of the paper proceeds as follows. Section 2 reviews stylized facts about labor mobility costs in Indonesia, by sector, by type of worker and by geographical region. Section 3 presents the empirical methods and data sources used to investigate more formally the determinants of labor mobility costs in Indonesia, vis-a-vis the probability of finding a job after a negative shock and the duration of job search. The results for Indonesia are discussed in Section 4 and the policy implications along with the conclusions in Section 5.

2. Labor Mobility Costs in Indonesia

In Indonesia, the problem of labor reallocation following a shock may be particularly serious. Recent work shows that Indonesia is among the countries with the highest costs to labor mobility, which are high even among other countries at a similar level of economic development (World Bank 2016). Artuc et al. (2013) measure the average labor mobility cost for workers to transition across 8 broad manufacturing sectors for 47 countries worldwide over the period 1995-2007 (see Box 1 for an explanation).⁴

Labor mobility costs in Indonesia's manufacturing sector are among the highest in the sample. Richer countries tend to have lower mobility costs in manufacturing, and the cross-country correlation with GDP per capita is negative and robust (figure 1). Yet costs in Indonesia continue to be high relative to other countries, even after accounting for Indonesia's GDP per capita level. While Chile also departs from expected levels given the country's GDP per capita, other countries such as Japan, the United States and Singapore have among the lowest labor mobility costs in the sample, significantly below other developed countries.

Figure 1. Labor mobility costs vs. GDP per capita in Indonesia and other TPP countries



Source: World Bank (2016). Calculated using data from Artuc et al. (2013) and World Bank World Development Indicators.

⁴ Artuc et al. (2013) use employment and wage data across 8 aggregated manufacturing sectors for the period 1995-2007 from UNIDO Industrial Statistics Database. Although transitions across manufacturing sectors exclude transitions between services sectors, for example, Artuc et al. (2013) is the only source of internationally comparable labor mobility cost estimates across a wide range of countries. This international comparison still provides useful insights for Indonesia, despite it being a specific case for manufacturing.

Note: This figure plots the correlation between the estimated aggregate labor mobility cost for each country's manufacturing sector expressed as a ratio of the annual average manufacturing wage (vertical axis) and economic development (horizontal axis). Level of economic development is measured as the average log of GDP per capita (constant 2005 US\$) for 1995-2007.

Box 1: Defining labor mobility costs

It is not possible to measure labor mobility costs directly, because they are not readily observable. Instead, we use an indirect method that combines the observed worker transitions between sectors with the inter-sectoral wage gaps to estimate the “labor mobility cost” to explain why workers do not transition into higher wage sectors to the extent that wage gaps are eliminated. There may be multiple reasons why wage gaps persist, e.g., on the labor supply side (when it is physically or technically difficult due to skills mismatch to obtain a job in a certain sector), or on the labor demand side (such as a lack of new public-sector job openings). Both are obstacles to matching labor supply with labor demand at a market clearing wage, and both therefore imply a high cost of transitioning to said job.

When there are low transition rates across sectors of the economy despite high wage gaps, we interpret this to mean that it is costly for workers to move. Artuc et al (2013) estimate the welfare costs for a worker to switch industries/jobs using a dynamic rational-expectations model of costly labor adjustment. In each period, a worker can choose to move from her current industry to another one, but must pay a cost in doing so. The decision for a worker to move depends on her expected welfare gain, net of the welfare cost of moving. So for a sector that is difficult to access, we would assign a high labor mobility cost for entering that type of job. Combining the transition data with the observed wage gaps between sectors leads to estimates of labor mobility costs for entering each sector, expressed as a ratio of the annual average wage.

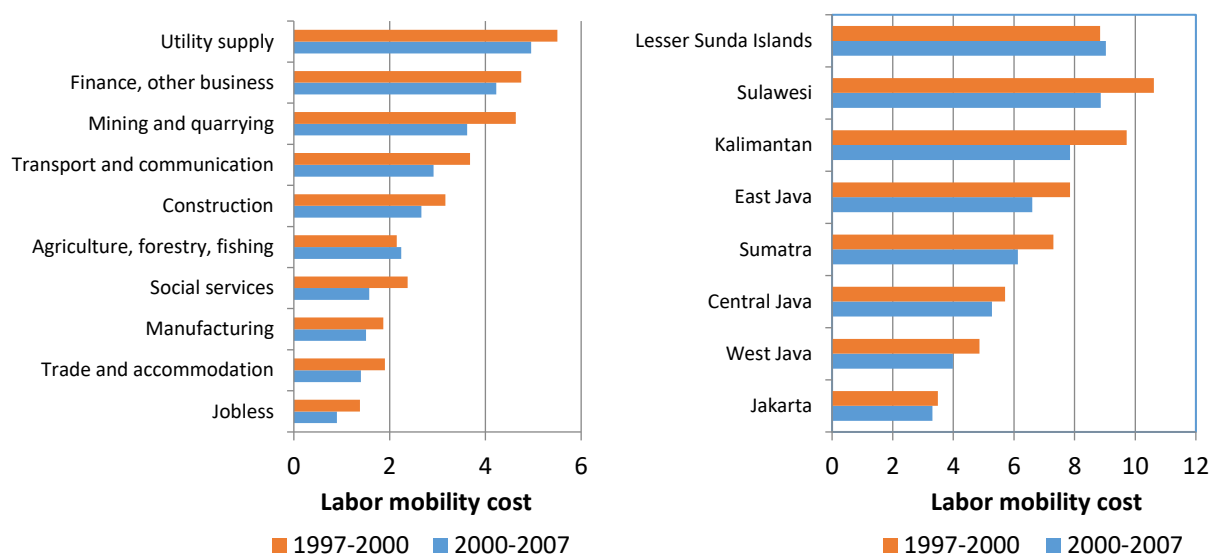
Source: Hollweg et al. (2014).

World Bank (2016) measure labor mobility costs to enter different sectors and regions within Indonesia to better understand why labor mobility costs appear to be higher than in other countries in the world. There is wide dispersion in costs that workers face to enter different sectors in Indonesia (Figure 2). Labor mobility costs in Indonesia in 2007 ranged from about 5 times the average annual wage to enter the utility sectors (electricity, water, and gas) to about 1.5 times the average annual wage to enter social services. Manufacturing is also one of the lowest cost sectors for workers to enter – even lower than

agriculture, forestry and fishing and not very different from low-end services of trade and social services, even though wages continue to be lower in agriculture than manufacturing. Low productivity services sectors, such as trade and social services, also have lower costs to entry than agriculture, forestry and fishing.

The work also suggests that workers in more remote regions (especially in Eastern Indonesia) face particularly high costs to mobility. Java – in particular Jakarta, West Java and Central Java – are the least costly for workers to enter. Sumatra – a region like Java where manufacturing is concentrated – is also among the least costly regions for individual mobility. Instead, moving to peripheral regions, such as the Lesser Sunda Islands and Sulawesi, are associated with significantly higher costs – three times that of Jakarta. Between 1997-2000 and 2000-2007, the costs to enter all regions declined, except in the Lesser Sunda Islands, where the cost workers face to enter the sector and region increased. Regional differences may be driven by geographic accessibility and connectivity, as well as (perception of) better job opportunities (World Bank 2016). Relocation across geographic areas appears in Indonesia to be an important aspect of labor mobility (box 2).

Figure 2. Labor mobility costs across sectors and across regions, 1997-2007



Source: World Bank (2016).

Box 2: Internal migration and labor market re-entry

The Indonesia Family Life Survey (IFLS) is a set of detailed household and community surveys on Indonesia conducted by RAND. It collects information about past employment history as well as past migration history, as well as the reason for migrating. We use this database to explore migration decisions in Indonesia for work-related reasons, and whether household migration is positively with the probability of re-employment following a shock.

Why do individuals migrate internally in Indonesia? In 2007 and 2014 (pooling the IFLS data), one third of individuals that migrated reported having done so for work-related reasons (restricting the sample to the individual's last migration). Fifteen percent reported migrating for marriage, 10 percent for education / training, and 9 percent to be closer to family.

Are individuals more likely to migrate if they receive a negative labor-market shock? Individuals that experienced a firing by the company because business was closed down/relocated/restructured or for other reason have a higher probability of migrating. Regressing a dummy variable for an individual that has migrated on a dummy variable for an individual that receives a negative labor market shock, the coefficient is positive and highly statistically significant.

Are individuals more likely to migrate for work reasons if they receive a negative labor-market shock? Restricting the sample to individuals that experienced a firing by the company because business was closed down/relocated/restructured or for other reason, the reason for migration for work-related reasons of households that migrate increases to 49 percent (compared to 32 percent).

Is there a higher incidence of labor-market re-entry after a negative shock for individual who migrate? We do not find evidence that migrating (for work-related reasons or for any reason) increase the probability of having found a job for individuals that received a negative labor-market shock.

Workers with less skills also face particularly high costs to mobility. Given that both manufacturing and low-productivity services sectors have low entry costs, the ability for workers to enter these sectors may come down to other worker-specific factors such as skills. Comparing the costs for labor mobility by skill level, the right skills mix is shown to be important for labor mobility in Indonesia. Skilled workers face lower costs to transition across sectors compared to unskilled workers, although the results vary by sector. Vocational workers often face higher costs to transition across sectors than unskilled workers.

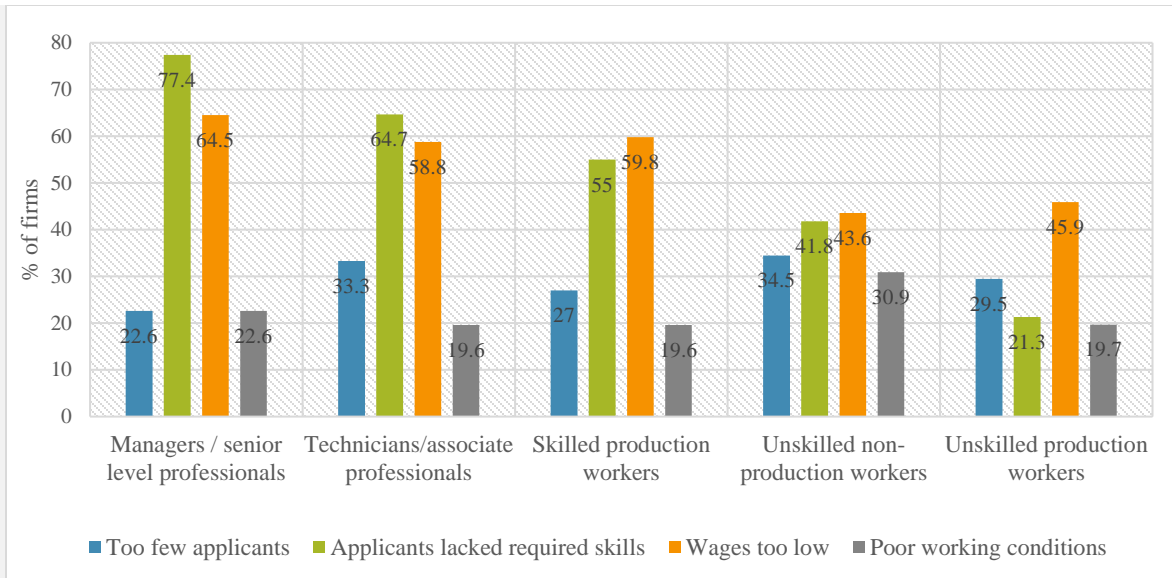
This is the case in the primary sector, as well as many services sectors. This may reflect a mismatch between the skills vocational workers are taught, and those that are demanded by the private sector, for example (box 2).

Box 3: Firms report skills gaps for hiring in Indonesia

A skills module for the Indonesia World Bank Enterprise Survey asked firms in 2015 to list the main problems they encountered when trying to hire both skilled and unskilled positions. On average, 40% of Indonesian firms cited lack of required skills as the main problem when trying to fill a position. Almost 55% of firms said the main difficulty was that applicants expected higher wages than they could pay.

Inadequate skills appear to be a greater obstacle to filling managers and higher-level non-production positions, such as technicians, sales associates and other professionals, than for unskilled production and non-production workers. When asked about the main problem faced when trying to hire unskilled non-production workers, 41% cited lack of required skills as a problem, while 44% of firms said applicants expected wages that were higher than what they could offer them. Lack of required skills was identified as a problem by only 20% of firms trying to hire unskilled production workers. Yet, as Figure B1 illustrates, lack of adequate skills was cited as the top constraint by 77% of firms when trying to hire senior managers, and by 65% of firms trying to hire technicians or associate professionals. By comparison, only 30% of firms in Malaysia and 34% of firms in Philippines identified lack of skills as the main problem when trying to hire managers and senior professionals (Table B1).

Figure B.1. Main obstacles in hiring by type of employee



Note: Data for Indonesia corresponds to average across firms surveyed in 2015. Data for Thailand, Malaysia, and Philippines is the average across firms from each country, interviewed in 2015 and 2016.

Table B.1. Percentage of firms citing inadequate skills in hiring each type of worker

Type of worker	Indonesia	Malaysia	Thailand	Philippines
Managers	76.7	30.2	75	34.2
Non-production technicians, associate professionals, and sales workers	67.3	50	86.7	55.6
Skilled production workers	55.1	39.5	46	69.3
Unskilled non-production workers	43.4	25.6	57.1	38.9
Unskilled production workers	21.8	38.5	25	48.1

Note: Data for Indonesia corresponds to average across firms surveyed in 2009 and 2015. Data for Thailand, Malaysia, and Philippines is the average across firms from each country, interviewed in 2015 and 2016.

Source: Gomez-Mera and Hollweg (2018).

Female workers face greater costs to transition across sectors compared to male workers. This is consistent with the observed low number of worker transitions by women. In general, labor mobility costs are higher for female than male workers in most sectors, except agriculture. Young workers tend to have lower labor mobility costs to enter sectors than other age cohorts. For example, young workers (age 15-24) have the lowest entry costs in finance, trade and accommodation, transport and communication, construction, and social services.

Understanding what is driving Indonesia's relatively high labor mobility cost can help identify policy responses to address these costs. The abovementioned stylized facts suggest that different factors may be behind high labor mobility costs in Indonesia, including individual-specific as well as region-specific factors, such as skills mismatches, sectoral characteristics, or geographic dispersion. Could Indonesia's

relatively high costs to labor mobility internationally also be the result of policy-relevant factors? These determinates are explored in more detail in the proceeding section.

3. Methodology

We more formally investigate determinants of labor mobility costs in Indonesia by estimating an empirical model to explore correlates of labor-market outcomes of individuals. To attempt to identify determinants of labor mobility costs, rather than labor mobility more broadly, we restrict the sample to individuals that experienced a negative labor-market shock in the past, and look at factors that are correlated with labor-market reintegration (or lack thereof).

3.1 Empirical approach

The estimation model is:

$$y_{ipdt} = \tau_t + \rho_p + X_{it} + Z_{pt} + W_{dt} + \varepsilon_{it}$$

where $y_{i,t}$ is the labor-market outcome of individual i in year t in province p , X is a vector of individual-level control variables, Z is a vector of policy-relevant variables of interest at the province level (i.e. potential determinants), and W is a vector of policy-relevant variables of interest at the district level. τ and ρ are year-round and province fixed effects, respectively, and ε is an idiosyncratic error term.

The model is estimated for individuals aged 15+ who experienced a negative shock in the labor market in period $t - 1$, and identifies two outcome variables of interest. The first is a binary variable equal to 1 if the individual is working in period t , and equal to 0 otherwise. The objective of using those individuals who have experienced a negative shock is to more accurately capture labor mobility costs associated with finding alternative employment. To the extent that the shock is exogenous to the individual, this also allows us to reduce endogeneity associated with individual-level decisions to change labor market status that may also be correlated with the policy-relevant variables of interest, and come closer to capturing causality (rather than correlation). For robustness, however, we include a broader group of individuals in the estimates who have stopped working in the past for other reasons.

We identify individuals who experienced a negative labor-market shock as those who have experienced a job separation due to a plausibly exogenous shock, i.e.: no demand/closed business, or expired work period/contract (*movers1*). For robustness we also use progressively less stringent definitions of exogenous shocks to construct the first independent variable of interest: adding those individuals that stopped work due to job termination (*movers2*); again adding those that stopped work due to unsatisfactory income (*movers3*); as well as adding all other individuals without any specific reason of stop working/moving job in the past (*movers4*).

The second outcome variable of interest is the duration that an individual spent to search for a new job post negative shock (but excludes individuals that are preparing to start a business). The outcome variable has a positive value if respondents of the survey spent time searching for a job, and a 0 value if respondents did not search for a job.

The analytical model includes individual- and household-specific variables as controls. Control variables include the individual's education level, dummy variables if the individual is female, married, or the household head, the individual's age and age-squared, and a dummy variable if the household is in an urban area. These are consistent with the literature of individual-level characteristics that correlate with labor mobility.

The analytical model also involves some policy variables of interest at both the individual-, household- and province-levels that we explore as potential determinants of labor mobility costs. These are discussed in detail below.

To further address the issues of endogeneity of the policy variables of interest stemming from unobservable characteristics of the individual that may correlate with the policy variables and also determine the labor market outcome, these policy variables of interest at the individual level are instrumented using a two-step approach. The first-stage estimation model is:

$$z_{i,t} = x_{i,t} + w + \tau_p + \rho_t + \varepsilon_{i,t}$$

where $z_{i,t}$ is the policy variable of interest of individual i in time t , x is a vector of control variables, τ and ρ are time and province fixed effects, respectively, and ε is an idiosyncratic error term w is the

interaction dummy variable between the time and the province effects. The control variables are the same as above, plus the individual's income and a dummy variable equal to one if the individual has an additional job, but do not include the squared age term.

The estimated parameters of w provide the time-varying probability difference of the individual-level policy variable of each province (relative to the base province-time reference). We then define a new variable that is the probability average of the policy variable, which comprises the constant or intercept of the base reference, the parameters w , the location effects ρ , and the period effects τ . The probability average at the province level of these variables are subsequently imposed as a regressor in the second-stage estimation of the analytical model. This is done for each of the policy variables of interest that are measured at the individual level. The first stage is estimated using OLS fixed effects, and the second stage is estimated using probit fixed effects for the first dependent variables of interest (along with OLS fixed effects for robustness).

Another source of endogeneity arises in the estimation of the second outcome variable of interest due to sample selection. The decision-making process of the respondent to seek a job or not may mean that the length of job search (i.e. observing a positive outcome for the dependent variable) is not independent from the probability of the respondent to seek a job (i.e. observing a zero outcome for the dependent variable).

Our strategy to correct for the sample selection bias is to apply the two-step model as suggested by Heckman (1976).⁵ The idea is to first model the job search choice as a non-exogenous event and then study the correlates of the length of job search only for the job seekers. To employ the estimation, ideally one would need a variable predicting job search status but not the length of job search. Unfortunately, none such variable is available to us, which makes the use of this estimation procedure less robust, although still feasible (Bazen, 2011). Given this limitation, we place less emphasis on the results of this estimation relative to the previous one.

⁵ We also consider the robustness check of the time length for seeking a job model. The OLS regression for overall observation (including the zero value) and the OLS regression without considering the inverse Mills ratio are also conducted.

To implement the Heckman procedure, we first replace the dependent variable of the length of job search to equal 1 if the value of the variable is positive, and retain the value if it is 0. If there is a dependency between the probability to seek and the length of time spent seeking a job – commonly known as an inverse mills ratio – we need to capture this dependency in the second stage. This is done by using a first-stage probability model to construct a measure of the inverse mills ratio. We prefer the probit model to obtain the inverse mills ratio. However, we also estimate a linear probability model (LPM) and a binary dependent variable model with OLS for robustness. As the second step, we estimate a model for the length of time seeking a job conditional only for those respondents who are seeking a job, and include the inverse mills ratio that is generated using the probit model in the first stage as a variable in the second stage model. The observations in the second-step estimation is limited only for those who answer one in the binary variable at the first step. This model is estimated using OLS with province fixed effects.

3.2 Data

This paper relies on data sources that contain individual-level information in Indonesia of past employment shocks, current working status, and worker characteristics to estimate the empirical model. The primary data source is the Indonesia labor force survey (Survei Tenaga Kerja Nasional-Sakernas), which is published by the Statistic Indonesia-BPS. The Sakernas is a cross-sectional dataset with wide national representation and is undertaken twice a year. The Sakernas dataset is available bi-annually over an extended period of time. For the purposes of this study, we built a pooled dataset from 2000 to 2016. However, it has limited information on policy-relevant variables.

The Sakernas questionnaire collects information on whether the individual stopped/moved work in the past one year and the main reason for having stopped/moved work.⁶ It also collects information on the individual's current working status, which we define as active if the individual has a working activity in the past week or has a job or business even though he/she temporarily did not work in the past week. We combine this information to construct the first dependent variable. The Sakernas also asks a

⁶ The question asks, "main reason for stop working / moved job in the past one year". Options are: job termination; no demand / closed business; unsatisfactory income; mismatch work environment; expired work period contract; and other.

question on the time spent searching for a job, which is used to construct the second dependent variable.⁷

Policy-relevant variables that are available from the Sakernas relate to individual's effort in seeking a job. There are three types of efforts that we are interested in, including (i) registering for a job fair, (ii) applying for the advertised job, and (iii) contacting friends or family. We construct separate binary variables equal to 1 if the individual exerted this effort in seeking a job, and 0 otherwise. To obtain the role of those efforts, we use the probability average of each of the efforts at the province level, as described in the first-stage estimations above. The base reference of the dummy regression estimation is Aceh (province, location) and the year of 2010 (year round).

We also consider the effects of minimum wages, the consumer price index (CPI), and the housing price index.⁸ These variables are available at the province-year level and are publicly-available Indonesian statistics collected by BPS. For robustness, we run separate regressions with each of these control variables in the second stage lagged by one year (with the exception of the share of severance payments), both with and without the current year values. The results are generally robust to using a different lag structure for the provincial variables, and are available from the authors upon request.

Additional policy-relevant variables at the district-year level are included in the regressions. These include: dummy variables identifying the type of urban area of the district (core, non-metro rural, non-metro urban, periphery rural, periphery urban, single district urban)⁹; a dummy variable if the district is within a multi-district metro of Jakarta; the district's urbanization share; the district's share of Raskin household beneficiaries; the district's monthly public transport costs per capita; total government expenditure; the share of expenditure categories in GDP (housing and public facilities, health sector, education sector, social protection, infrastructure); share of villages in the district using different modes of transport as the main mode (land, sea, river); the share of villages where different land transport types are the main mode (asphalt, hardened, sand soil, other); and the share of BLT household

⁷ The question asks, "How much time have you spend looking for a job in the past year?".

⁸ We also explored the share of severance payments as an independent variable in the analytical model but there was not enough variation observed over province or time.

⁹ The dummy variable for 'urban' is based on the BPS (national statistics office) definition. It has a different definition than the World Bank database for type of urban area. As such, both definitions are included in the model simultaneously.

beneficiaries. The definition, data source and time coverage of the variables are included in Table A1 in the Annex.

We build other fixed effects to control for unobservable factors. Time effects are included using round/year dummy variables, since the Sakernas is asked two times per year. Province (location) effects are included using the province dummy variable. Due to a “split-merge” issue with the Sakernas, we keep the 2000 province definition consistently up to 2016.

Table 1 presents the summary statistics of the main variables. It is instructive to briefly inspect the dependent variables to have a sense of the distribution of labor market outcomes. On average 73% of workers who have lost their job in the previous due to business closure or contract expiration (*movers1*) have not yet transitioned to a new job. This share moves to 30% adding those that ended the previous job due to termination (*movers2*), a share that goes up to 33% when including any reasons for job loss (*movers4*). This suggests more exogenous shocks tend to be associated with more difficulty in transitioning to a new job, consistent with the idea that more exogenous shocks are more difficult to predict and act upon. The summary statistics for the other main dependent variable suggest that on average a job seeker has been looking for a job for a bit over 7 months. This average masks a substantial heterogeneity, with a non-negligible portion of long-term job seekers.

4. Results

The results of the regressions of the probability of finding a job, for the four groups of individuals, are presented in Table 2 and Table 3. The latter replicates the main specification in Table 2 for each *movers* but controlling for an urban residence dummy as opposed to the urban definition of the district of residence (core, non-metro rural, periphery urban, etc.). Results using other permutations of the policy-relevant variables that are included in the regressions are presented in the Appendix. Results using fixed-effects are Probit similar to those using OLS estimation, and are available from the authors upon request. The probit results of the first-stage and second-stage regressions of the length of job search using the Heckman selection method are presented in Tables 4a and 4b.¹⁰ Results using other

¹⁰ Probit results using the Heckman selection method are reported only at the province level. We also attempted to include a ‘stop work’ variable in the probit model, but the results did not converge using the Heckman selection method.

permutations of the policy-relevant variables that are included in the regressions are presented in the Appendix.¹¹

The results are generally robust to the inclusion of an additional set of district- and province-level control variables including the GDP composition, transport infrastructure, public transport cost per capita, share of raskin beneficiaries, and government spending variables (see Table A2 in the appendix for the complete list). As the inclusion of these variables considerably reduces the number of observations, we use these only to test the robustness of the main results. To do that we compare the coefficients of the main variables with and without these additional controls using the same samples. This test is illustrated in the comparison between columns 1 vs. 2; 3 vs. 4 and 5 vs. 6 (with and without additional controls respectively) in Table A2 in the Appendix. We carry out this test for all of the specifications, confirming the robustness of the main results, but to save clutter we do not report them (results are available from the authors upon request).

4.1 Results of the individual level variables:

Individuals from urban areas have a 11-13% lower probability of finding a job following a negative labor-market shock (see table 2). While urban individuals have a higher probability of searching for a job, they spend more time searching for a job than individuals from rural households. This result may be consistent with the fact that individuals in urban areas can afford to remain without a job for a longer time to ensure a better matching. It could also be due to the fact that employment in urban areas is concentrated in services sectors, which appear to have some of the highest labor mobility costs, such as finance, utilities and transport and communications (see figure 2 above). A further explanation for the result could be that large congestion costs in urban areas negatively affect labor mobility. Among the types of urban areas, individuals in the urban periphery as well as in single district metros have the lowest probabilities of finding a job and the longest time spent looking for a job. The opposite is true for individuals in the greater Jakarta area. This result is in line with the low labor mobility costs in figure 2

¹¹ These second-stage regressions are conditional on seeking a job, but unconditional regressions for all specifications are available from the authors upon request. Also available from the authors upon request for the length of job search are: results with an additional control variable for 'working'; OLS results for both the province-level and household-level of the first-stage and second-stage regressions; results with lagged values of the policy-relevant variables; results with both current and lagged values of the policy-relevant variables.

above and also with the idea that in dense urban agglomerations the labor matching process is particularly efficient.

Women have on average around 5% lower probability of finding a job after a negative shock, but spend less time searching for a job than males. Together, these results may imply that females are more likely to exit the labor force than re-enter employment following a shock. These effects hold for individuals that were fired or quit for other reasons, though the magnitude of the probability of finding a job become more negative.

The gender-based penalty of finding a job after a negative shock disappears among urban residents when using our cleanest measure of labor mobility costs (those affected by a company closure, i.e. *movers1* – column 2).¹² The female penalty is also reduced when using less stringent measures of mobility costs (see columns 5, 7 and 9). This result could be consistent with various mechanisms. First it could be due to different composition of employment across sectors. In particular, urban areas have a high concentration of services jobs which tend to have lower biases towards female workers. Second it could also be consistent with lower discrimination in the labor market in urban setting due to less pronounced cultural norms. This is in line with some earlier evidence on Indonesian labor markets. Feridhanusetyawan et al. (2001) find that the proportion of the wage gender gap due to discrimination was lower in urban than in rural areas; AIPEG et al. (2017) show that while youth unemployment is slightly higher among women in rural areas, no gender difference apparent in urban areas.

Household heads and married individuals have a higher probability of finding a job than other family members after being hit by a negative labor market shock, even when controlling for individuals' age and gender as well as for a fuller set of controls (Table A2). They also spend less time searching for a job. These effects hold for individuals that were fired or quit for other reasons (though the magnitude of the probability of finding a job becomes more negative for household heads). These findings also hold when restricting the sample to individuals in urban areas and to residents of Java (column 7, Table A2). They point to some unobserved characteristics of household heads and married individuals that may make more effective at addressing labor mobility costs. At the same time, it is also plausible that part of these

¹² When we restrict the sample to those residing in majority urban districts – according to the World Bank definition – the negative female penalty holds (column 3). This may indicate that the effect is driven by urban areas proper not urbanized districts, which may still host a conspicuous share of rural dwellers.

results may be due to the higher opportunity costs for these individuals of staying without a job, similarly to what we hypothesized above for the urban penalty.

Older individuals have a higher propensity to find employment following a company closure, but they spend longer searching for a job than younger individuals, perhaps a reflection of the higher. However, these effects diminish slightly with age. These effects also hold for individuals that were fired or quit for other reasons.

Individuals in Indonesia that experienced a labor market shock (company closure) with vocational training are no more likely to find a job than those with only a high school diploma or lower – in the full sample as well as the urban sample. For the full sample (but not the urban sample), there is some evidence that once including individuals who separated from their job because of firing or for any other reason, the probability of finding a job for those with vocational training is actually lower than those with only a high school diploma or lower. This result may reflect skills learned during vocational training not being valued by employers.

Individuals with bachelor degree and higher who lost their job due to a company closure are less likely to become re-employed than those negatively affected without a degree; a result that applies also to those who lost the job due to firing (*movers2*), or quit their job due to unsatisfactory income (*movers3*), or for any other reasons (*movers4*). In addition, they spend more time looking for a job than the other individuals. This may be explained by higher reservation wages, where those individuals that are more skilled are willing to hold out for the right type of employment. It may be also consistent with the limited value of the bachelor qualification, as mentioned in section 2 above. However, this effect disappears when using the urban sample, which may reflect more employment opportunities that value skilled workers in urban settings.

4.2 Policy variables

The type of instruments used to search for a job at the provincial level (whether resorting to family and friends, to job ads or to job fairs) does not seem to matter much in the probability of finding a job after a company closure. However, when extending the dependent variable to *movers2* and above we find that in provinces where individuals rely more on job advertisements workers are less likely to find a job after

having lost theirs. This applies to urban areas as well. In addition, higher prevalence to using family/friends to search for a job is positively associated to the probability of searching for a job as well as to the length of the job search.

In summary, standard modes of job search (contacting friends / family, registering for job fairs, or applying for job advertisements) do not appear to lower labor mobility costs by supporting labor market reintegration. If anything the more intense use of jobs advertisements seems to be associated with higher mobility costs. Collectively these results suggest that formal (and informal) institutions underpinning Indonesia's labor market may not be functioning as intended.

The evidence on the correlation between minimum wage (at the province level) and labor mobility costs is mixed. Minimum wage is negatively correlated with the probability of finding a job in the full sample, although it is not significant, except for the urban sample (column 3). At the same time higher minimum wage is associated with less time spent looking for a job level. This mixed evidence does not support the conclusion that minimum wage does in fact affect labor mobility costs in a significant way.

On the other hand, higher housing prices, but not the general consumer price index, is associated with lower probability of finding a job (except for those experiencing a company closure in the full sample, or also those experiencing a firing in the urban sample). The importance of housing for labor mobility is further supported by the positive – albeit not significant - coefficient of the district-level government expenditure on housing and public facility (columns 2 and 4 in table A2). Conversely, housing prices are negatively related to the time spent looking for a job, which we interpret as *prima facie* evidence that high costs of housing increases the opportunity cost of staying without a job, particularly in urban areas. The time spent looking for a job is positively correlated with the average province-time level of the general CPI, in both the full and urban samples.

Finally, public expenditure on infrastructure is positively related to the probability of transitioning to a new job after a negative shock in the urban sample (column 6, table A2).

5. Conclusions and Policy implications

What factors affect the transition of labor across sectors and jobs? This question is important to maximize the gains from positive and negative shocks such as trade integration and financial crises. However, the evidence on these factors is thin. This paper has sought to contribute to this knowledge by exploring this question for Indonesia, a large emerging economy with one of the highest estimated labor mobility costs.

It has first provided evidence that despite labor mobility costs are slowly decreasing over time in Indonesia, they remain high by international standards and are particularly high for certain services sectors and more peripheral regions. It has then investigated empirically different policy-relevant correlates of proxies of labor mobility costs, controlling for worker-specific characteristics such as gender, skill and age. The analysis has attempted to correct for endogeneity of the policy-relevant variable using different approaches, including probability average effects at the province-time level, as well as two-stage Heckman selection. In the absence of observed labor mobility costs, the paper has proposed two novel proxies for such costs: 1) the probability of finding a job after experiencing a negative labor-market shock; 2) the duration of job search for current job seekers.

Our results show that higher housing prices are associated with lower probability for individuals who experienced a negative labor-market shock of finding a job. The cost of housing may impede individuals' decision to move for new work opportunities. This suggests two possible policies to address the constraint. First, in line with the literature showing the effectiveness of directly subsidizing moving costs, policies such as housing benefits could be valuable tools in reducing labor mobility costs in Indonesia. In addition, housing prices may be lowered through increased supply, for example by reducing zoning restrictions and increase public expenditures on housing and public facilities, a policy which finds some mild support in our results.

More generally, public expenditure on infrastructure seems to have the potential of reducing labor mobility costs in Indonesia, particularly in urban areas. This could be consistent with a reduction in transaction costs – such as transport - that would increase the ability of workers to transition across jobs.

While there has been much debate in Indonesia about the minimum wage impact on labor market outcomes, our analysis is unable to find any conclusive evidence on its relation with labor mobility costs. In particular, there doesn't seem to be any relation between minimum wage and the probability of finding a job after a negative shock. If anything higher minimum wage seems associated with lower time spent looking for a job. This lack of strong evidence could be a by-product of low enforcement of the minimum wage policy or it could be the result of labor market adjustments not affected by the minimum wage level.

Job effort by way of applying for an advertised job is associated with lower probability of finding a job at the province-time level. Contacting friends/family or registering with a job fair do not correlate with the probability of finding a job. This finding may reflect that formal and informal institutional mechanisms of job search are not functioning properly in Indonesia. This is despite individuals affected by shocks using these types of job search efforts. Policies that strengthen these mechanisms and reduce information asymmetries could help produce faster matching in labor markets.

Skills levels appear to be a constraint for matching in the Indonesian labor market. Individuals negatively affected vis-a-vis a firing or company closure that have achieved a bachelor or higher degree are less likely to find a job than those negatively affected without a high school diploma. This result does not extend to individuals with a vocational diploma, who are just as likely to find a job than those with a high school diploma. Both groups, however, spend longer searching for a job than unskilled counterparts. This may be explained by higher reservation wages, where those individuals that are more skilled are willing to hold out for the right type of employment. This result may also reflect skills learned during vocational training not being valued by employers. This aligns with other evidence from the demand side of the labor market, where firms report significant constraints in finding workers with relevant skills, most notably at the managerial and skilled level, which impacts firm performance (Gomez-Mera and Hollweg, 2018).

Finally, it's worth noting that the female penalty in terms of labor mobility becomes much less accentuated in urban areas, providing prima facie evidence that gender-related labor market biases are more present in rural than urban areas.

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Tables

Table 1. Descriptive Statistics

Variables	Obs.	Mean	Std.Dev.	Min.	Max.
Outcomes					
movers1	10,037	0.271	0.445	0	1
movers2	16,938	0.301	0.459	0	1
movers3	23,204	0.289	0.453	0	1
movers4	35,737	0.334	0.471	0	1
Number of months looking for a job	35,737	7.318	12.74	0	240
Individual characteristics					
Household Head	35,737	0.363	0.481	0	1
Female	35,737	0.490	0.500	0	1
Married	35,737	0.230	0.421	0	1
Age	35,737	30.73	10.43	13	83
Vocational high school	35,737	0.224	0.417	0	1
Bachelor and higher degree	35,737	0.0433	0.203	0	1
Location characteristics					
Core	35,602	0.151	0.358	0	1
Non-metro Rural	35,602	0.470	0.499	0	1
Non-metro Urban	35,602	0.157	0.364	0	1
Periphery Rural	35,602	0.0565	0.231	0	1
Periphery Urban	35,602	0.129	0.335	0	1
Single District Metro	35,602	0.0361	0.187	0	1
Multi-district metro of Jakarta	35,602	0.128	0.334	0	1
Urban	35,737	0.588	0.492	0	1
Labor market characteristics					
Look job:Job Fair	35,737	0.180	0.0609	-0.132	0.687
Look job:Advertisement	35,737	0.220	0.104	-0.110	0.638

Look job:Friend or family	35,737	0.782	0.119	0.286	1.109
Log(minimum wage)	35,737	13.53	0.495	12.06	14.81
Prices					
log(CPI)	35,737	4.428	0.268	3.493	4.840
log(CPI housing)	35,737	4.472	0.240	3.560	4.850
Other characteristics					
Urbanization rate	35,524	0.535	0.323	0	1
Share of Raskin household beneficiaries	34,076	0.438	0.238	0.0013	0.963
Log(Public transport cost per capita)	13,294	9.961	0.667	7.053	12.16
Log(Total government expenditure)	31,847	27.73	0.953	17.23	30.86

Table 2. Probability of finding a job after a negative labor shock

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Sample	All	Urban (Sk)	Urban (WB)	All	Urban (Sk)	All	Urban (Sk)	All	Urban (Sk)
Variable	movers1	movers1	movers1	movers2	movers2	movers3	movers3	movers4	movers4
Individual characteristics									
Household Head	0.096*** (0.014)	0.084*** (0.017)	0.073*** (0.020)	0.094*** (0.011)	0.100*** (0.014)	0.113*** (0.009)	0.121*** (0.011)	0.135*** (0.007)	0.140*** (0.010)
Female	-0.052*** (0.010)	-0.020 (0.012)	-0.044*** (0.013)	-0.063*** (0.008)	-0.029*** (0.010)	-0.068*** (0.007)	-0.035*** (0.008)	-0.080*** (0.006)	-0.037*** (0.007)
Married	0.073*** (0.012)	0.068*** (0.015)	0.062*** (0.016)	0.070*** (0.009)	0.062*** (0.012)	0.070*** (0.008)	0.060*** (0.009)	0.072*** (0.007)	0.062*** (0.008)
Age	0.012*** (0.003)	0.010*** (0.003)	0.013*** (0.003)	0.013*** (0.002)	0.011*** (0.002)	0.011*** (0.002)	0.010*** (0.002)	0.012*** (0.001)	0.012*** (0.002)
Age squared	-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)
Vocational high school	-0.009 (0.010)	0.018 (0.012)	-0.005 (0.013)	-0.026*** (0.008)	0.001 (0.010)	-0.024*** (0.007)	-0.001 (0.008)	-0.025*** (0.006)	-0.002 (0.007)
Bachelor and higher degree	-0.041** (0.020)	-0.008 (0.023)	-0.014 (0.027)	-0.066*** (0.017)	-0.028 (0.020)	-0.063*** (0.015)	-0.038** (0.016)	-0.050*** (0.012)	-0.019 (0.013)

Location characteristics

Core	-0.034		-0.074***		-0.077***		-0.067***	
	(0.025)		(0.019)		(0.016)		(0.013)	
Non-metro Rural	0.032	0.055***	0.025	0.065***	0.034**	0.061***	0.026**	0.056***
	(0.021)	(0.013)	(0.016)	(0.010)	(0.014)	(0.009)	(0.011)	(0.007)
Non-metro Urban	-0.060***		-0.071***		-0.063***		-0.072***	
	(0.023)		(0.017)		(0.014)		(0.012)	
Periphery Urban	-0.085***		-0.073***		-0.072***		-0.074***	
	(0.026)		(0.019)		(0.016)		(0.014)	
Single District Metro	-0.107***		-0.142***		-0.116***		-0.137***	
	(0.032)		(0.025)		(0.021)		(0.018)	
Multi-district metro of Jakarta	0.055**		0.035*		0.030**		0.027**	
	(0.023)		(0.018)		(0.015)		(0.013)	

(continued)

Table 2. (continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	movers1	movers1	movers1	movers2	movers2	movers3	movers3	movers4	movers4
Labor market characteristics									
Share of job seekers using Job Fair	-0.152 (0.237)	0.318 (0.349)	0.056 (0.295)	0.040 (0.124)	0.098 (0.162)	0.099 (0.101)	0.146 (0.128)	0.061 (0.078)	0.063 (0.103)
Share of job seekers using Job Ads	-0.024 (0.208)	-0.477* (0.266)	-0.140 (0.245)	-0.241** (0.111)	-0.137 (0.132)	-0.248*** (0.080)	-0.155* (0.091)	-0.201*** (0.066)	-0.139* (0.079)
Share of job seekers using family	-0.104 (0.217)	0.349 (0.391)	0.190 (0.292)	-0.019 (0.109)	-0.026 (0.142)	0.014 (0.083)	-0.022 (0.102)	-0.103 (0.065)	-0.082 (0.085)
Log(minimum wage)	-0.100 (0.076)	-0.155 (0.095)	-0.154* (0.087)	-0.044 (0.055)	-0.054 (0.068)	-0.048 (0.046)	-0.067 (0.054)	-0.025 (0.037)	-0.061 (0.046)
Prices									
log(CPI)	-0.264 (0.294)	0.245 (0.511)	-0.095 (0.375)	-0.151 (0.212)	-0.035 (0.281)	-0.289 (0.177)	-0.246 (0.225)	-0.067 (0.141)	-0.044 (0.187)
log(CPI housing)	-0.271 (0.279)	-0.624 (0.421)	-0.480 (0.343)	-0.380** (0.171)	-0.361 (0.223)	-0.487*** (0.142)	-0.378** (0.181)	-0.431*** (0.110)	-0.498*** (0.147)
Observations	10,037	4,694	6,176	16,892	9,908	23,114	14,359	35,602	20,924
R-squared	0.091	0.047	0.056	0.102	0.066	0.108	0.075	0.123	0.085

Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1; all regressions estimated with least squared method and include province and survey round fixed effects.

Table 3. Probability of finding a job after a negative labor shock: effect of urban residence

	(1)	(2)	(3)	(4)
Variable	movers1	Movers2	Movers3	Movers4
Individual characteristics				
Household Head	0.100*** (0.014)	0.095*** (0.011)	0.113*** (0.009)	0.135*** (0.007)
Female	-0.048*** (0.010)	-0.062*** (0.008)	-0.068*** (0.007)	-0.079*** (0.006)
Married	0.071*** (0.012)	0.066*** (0.009)	0.066*** (0.008)	0.068*** (0.007)
Age	0.013*** (0.003)	0.014*** (0.002)	0.012*** (0.002)	0.013*** (0.001)
Age squared	-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)
Vocational high school	0.004 (0.010)	-0.012 (0.008)	-0.012* (0.007)	-0.013** (0.006)
Bachelor and higher degree	-0.031 (0.020)	-0.058*** (0.017)	-0.055*** (0.014)	-0.039*** (0.012)
Location characteristics				
Urban	-0.111*** (0.009)	-0.125*** (0.007)	-0.128*** (0.006)	-0.127*** (0.005)
Labor market characteristics				
Share of job seekers using Job Fair	-0.147 (0.237)	0.061 (0.124)	0.112 (0.101)	0.081 (0.078)
Share of job seekers using Job Ads	-0.035 (0.208)	-0.240** (0.111)	-0.261*** (0.080)	-0.228*** (0.066)
Share of job seekers using family	-0.078 (0.216)	0.003 (0.108)	0.043 (0.082)	-0.084 (0.065)
Log(minimum wage)	-0.112	-0.052	-0.053	-0.030

	(0.076)	(0.055)	(0.045)	(0.036)
Prices				
log(CPI)	-0.264 (0.290)	-0.189 (0.209)	-0.300* (0.174)	-0.062 (0.139)
log(CPI housing)	-0.341 (0.277)	-0.439*** (0.168)	-0.520*** (0.140)	-0.460*** (0.109)
Observations	10,037	16,938	23,204	35,737
R-squared	0.096	0.108	0.114	0.129

Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1; all regressions estimated with least squared method and include province and survey round fixed effects

Table 4a. Length of job search (2nd stage of Heckman selection regressions)

	(1)	(2)	(5)	(6)
Variable	Number of months looking for a job			
Individual characteristics				
Household Head	-4.843*** (0.316)	-4.710*** (0.314)	-7.492*** (0.551)	-6.264*** (0.634)
Female	-5.820*** (0.929)	-5.380*** (0.932)	-8.614*** (1.231)	-5.850*** (1.417)
Married	-10.450*** (1.605)	-9.652*** (1.604)	-16.356*** (2.255)	-11.227*** (2.605)
Age	2.192*** (0.150)	2.118*** (0.150)	3.218*** (0.256)	2.189*** (0.237)
Age squared	-0.031*** (0.003)	-0.029*** (0.003)	-0.046*** (0.004)	-0.030*** (0.004)
Vocational high school	6.167*** (1.099)	5.581*** (1.088)	7.486*** (1.213)	4.489*** (1.361)
Bachelor and higher degree	6.944*** (1.237)	6.275*** (1.221)	7.013*** (1.219)	3.865*** (1.348)
Location characteristics				
Core	-0.078 (0.170)			
Non-metro Rural	0.467*** (0.140)		0.997*** (0.100)	
Non-metro Urban	-0.190 (0.192)			
Periphery Urban	0.565*** (0.195)			
Single District Metro	0.508* (0.266)			
Multi-district metro of Jakarta	-1.935***			

	(0.382)			
Urban		-0.040		
		(0.096)		
Labor market characteristics				
Share of job seekers using Job Fair	-0.912*	-0.704	-2.833***	-5.224***
	(0.552)	(0.549)	(0.785)	(1.489)
Share of job seekers using Job Ads	0.117	0.430	-1.990*	1.619*
	(0.766)	(0.763)	(1.090)	(0.966)
Share of job seekers using family	12.052***	12.066***	9.513***	5.195***
	(0.613)	(0.612)	(0.879)	(0.977)
Log(minimum wage)	-2.315***	-1.954***	-2.714***	-3.791***
	(0.520)	(0.481)	(0.756)	(0.860)
Prices				
log(CPI)	17.233***	17.306***	14.014***	13.785***
	(1.543)	(1.503)	(2.258)	(2.797)
log(CPI housing)	-5.727***	-5.860***	-11.664***	-14.057***
	(1.024)	(1.020)	(1.775)	(2.775)
Sample restrictions	No	No	Urban (Sk)	Urban (WB)
Observations	409,551	411,791	197,895	149,080
R-squared	0.122	0.121	0.116	0.109

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1; all regressions estimated through the 2-step Heckman estimator (see Table 3b for first stage results) and include province and survey-round fixed effects

Table 4b. Length of job search (1st stage Probit of Heckman selection regressions)

	(1)	(2)	(3)	(4)
Variable	1 if number months looking for a job is positive			
Individual characteristics				
Household Head	-0.102***	-0.101***	-0.140***	-0.138***
	(0.002)	(0.002)	(0.004)	(0.003)
Female	-0.295***	-0.296***	-0.308***	-0.304***
	(0.002)	(0.002)	(0.003)	(0.003)
Married	-0.500***	-0.499***	-0.554***	-0.544***

	(0.002)	(0.002)	(0.004)	(0.003)
Age	0.045***	0.045***	0.049***	0.060***
	(0.001)	(0.001)	(0.001)	(0.001)
Age squared	-0.001***	-0.001***	-0.001***	-0.001***
	(0.000)	(0.000)	(0.000)	(0.000)
Vocational high school	0.351***	0.347***	0.296***	0.299***
	(0.002)	(0.002)	(0.003)	(0.003)
Bachelor and higher degree	0.395***	0.389***	0.292***	0.301***
	(0.004)	(0.004)	(0.005)	(0.004)
Location characteristics				
Core	0.015***			
	(0.005)			
Non-metro Rural	0.012***			0.010***
	(0.004)			(0.003)
Non-metro Urban	0.039***			
	(0.005)			
Periphery Urban	0.033***			
	(0.005)			
Single District Metro	0.055***			
	(0.007)			
Multi-district metro of Jakarta	-0.107***			
	(0.006)			
Urban		0.024***		
		(0.002)		
Labor market characteristics				
Look job:Job Fair	-0.060***	-0.060***	-0.245***	-0.024
	(0.019)	(0.019)	(0.039)	(0.031)
Look job:Advertisement	-0.124***	-0.125***	-0.101***	-0.180***
	(0.023)	(0.023)	(0.035)	(0.031)
Look job:Friend or family	0.103***	0.104***	0.078**	0.107***

	(0.018)	(0.018)	(0.035)	(0.028)
Log(minimum wage)	-0.091***	-0.074***	-0.127***	-0.121***
	(0.014)	(0.014)	(0.024)	(0.020)
Prices				
log(CPI)	0.081*	0.074*	0.190**	0.119*
	(0.044)	(0.043)	(0.090)	(0.068)
log(CPI housing)	0.007	0.011	-0.428***	-0.201***
	(0.033)	(0.032)	(0.067)	(0.051)
Sample restrictions	No	No	Urban(Sk)	Urban(WB)
Observations	7,902,238	7,940,166	2,443,723	3,332,304
Pseudo R-squared	0.116	0.116	0.123	0.121

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1; all regressions estimated through the 2-step Heckman estimator (see Table 3b for first stage results) and include province and survey-round fixed effects.

Annex

Table A.1: Variable definition and data source

Variable	Description	Source
movers1	1 if moving job due to contract had finished, 0 otherwise.	Sakernas, BPS
movers2	1 if moving job due to the business had collapsed or the contract had finished, 0 otherwise.	
movers3	1 if moving job due to lay off, the business had collapsed, or the contract had finished, 0 otherwise.	
movers4	1 if moving job due to lay off, the business had collapsed, the income was insufficient, or the contract had finished, 0 otherwise.	
dsjob	1 if length time for searching search for a job, 0 otherwise	
tsjob	Length of time to search for a job	
urban	1 if urban, 0 if rural (BPS definition).	
hhead	1 if observation is the household head, 0 otherwise.	
female	1 if female, 0 if male.	
age	Age	
agesq	Age squared	
vocational	1 if had vocational high school education, 0 otherwise.	
skilled	1 if had bachelor and higher degree, 0 otherwise.	
lookingjob_effort_jobfair	1 if looking job effort is by registering with job fair, 0 otherwise.	
lookingjob_effort_apply	1 if looking job effort is by applying advertised job, 0 otherwise.	
lookingjob_effort_ct_famfriend	1 if looking job effort is by contacting families/friends, 0 otherwise.	
bjfair	Estimated probability of registering with a job fair by province and period (year, round of Sakernas enumerations).	World Bank staff calculations using Sakernas
bapadv	Estimated probability of applying advertised job by province and period (year, round of Sakernas enumerations).	
bfrfam	Estimated probability of contacting friend or family to find a job by province and period (year, round of Sakernas enumerations).	
lnminwage	Log(minimum wage)	BPS, World Bank staff calculations
lnpci_housing	log(CPI housing)	
lnpci	log(CPI)	

(continued)

Table A.1: (continued)

Variable	Description	Source
dDistrict1	1 if a district is a core area, 0 otherwise.	World Bank staff calculations using Susenas, Sakernas and BPS
dDistrict2	1 if a district is a non-metro rural, 0 otherwise.	
dDistrict3	1 if a district is a non-metro urban, 0 otherwise.	
dDistrict4	1 if a district is a periphery rural, 0 otherwise.	
dDistrict5	1 if a district is a periphery urban, 0 otherwise.	
dDistrict6	1 if a district is a single district metro, 0 otherwise.	
dJKTMetro	1 if a district is a multi-district metro of Jakarta, 0 otherwise.	
urbanshare	Urbanization rate (in percent) by district.	Susenas, World Bank staff calculations
lptrcost_pc	Log(Monthly public transport cost per capita) by district.	
shBLT	Share of BLT household beneficiaries by district.	
ltot_exp	Log(Total government expenditure) by district.	Ministry of Finance Indonesia, World Bank staff calculations
shGdpXsect6	Share of public expenditure in housing & public facilities on regional GDP by district.	
shGdpXsect7	Share of public expenditure in health sector on regional GDP by district.	
shGdpXsect10	Share of public expenditure in education sector on regional GDP by district	
shGdpXsect12	Share of public expenditure in infrastructure on regional GDP by district	
shGdpXsect11	share of public expenditure in social protection on regional GDP by district	
sht_land	Share of villages using land transport as main mode by district.	Podes, World Bank staff calculations
sht_landseariver	Share of villages with land, sea, or river as main transport by district.	
sht_seariver	Share of villages with sea or river transport as main mode by district.	
sht_air	Share of villages using air transport as main mode by district.	

shroadasphalt	Share of villages with asphalt road as a land transport main mode by district.
shroadhardened	Share of villages with hardened road as a land transport main mode by district.
shroadsoil	Share of villages with sand soil road as land transport main mode by district.
shroadother	Share of villages with other land transport main mode by district.

Table A2: Probability of finding a job after a negative shock: Additional robustness

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Sample	All	All	All	All	Urban	Urban	Java
Variable	movers1	movers1	movers1	movers1	movers1	movers1	movers1
Individual characteristics							
Household Head	0.078** (0.032)	0.080** (0.032)	0.078** (0.032)	0.080** (0.032)	0.025 (0.039)	0.024 (0.039)	0.072*** (0.020)
Female	-0.068*** (0.023)	-0.070*** (0.023)	-0.067*** (0.023)	-0.069*** (0.023)	-0.026 (0.027)	-0.031 (0.027)	-0.039*** (0.013)
Married	0.084*** (0.026)	0.081*** (0.026)	0.082*** (0.026)	0.079*** (0.026)	0.088*** (0.032)	0.090*** (0.032)	0.051*** (0.016)
Age	0.011** (0.006)	0.012** (0.006)	0.012** (0.005)	0.012** (0.006)	0.015** (0.006)	0.016** (0.006)	0.011*** (0.004)
Age squared	-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)
Vocational high school	-0.023 (0.023)	-0.020 (0.023)	-0.010 (0.023)	-0.008 (0.023)	-0.000 (0.026)	-0.001 (0.026)	0.004 (0.013)
Bachelor and higher degree	-0.007 (0.042)	-0.007 (0.042)	-0.002 (0.042)	0.001 (0.042)	0.048 (0.048)	0.045 (0.048)	-0.044 (0.032)
Location characteristics							
Core	0.007 (0.051)	0.123* (0.074)					0.005 (0.031)
Non-metro Rural	0.073* (0.042)	0.058 (0.044)			0.070*** (0.025)	0.059 (0.039)	0.001 (0.026)
Non-metro Urban	-0.008 (0.044)	0.057 (0.052)					-0.042 (0.027)
Periphery Urban	-0.064 (0.052)	-0.001 (0.064)					-0.088*** (0.030)
Single District Metro	-0.037	0.028					

	(0.069)	(0.087)				
Multi-district metro of Jakarta	0.118**	0.146***				0.061**
	(0.046)	(0.053)				(0.024)
Urban			-0.099***	-0.080***		
			(0.021)	(0.022)		
Labor market characteristics						
Share of job seekers using Job Fair	-1.039	-0.943	-1.149*	-0.968	-0.244	-0.711
	(0.698)	(0.717)	(0.696)	(0.714)	(1.003)	(0.541)
Share of job seekers using Job Ads	0.735	0.793	0.836	0.848	0.256	0.271
	(0.720)	(0.729)	(0.715)	(0.725)	(1.043)	(0.409)
Share of job seekers using family	-1.012	-1.160	-1.159	-1.211	-0.674	-0.238
	(0.735)	(0.747)	(0.732)	(0.748)	(1.121)	(0.575)
Log(minimum wage)	-0.024	-0.100	-0.024	-0.114	0.072	-0.147
	(0.239)	(0.249)	(0.236)	(0.246)	(0.303)	(0.108)
Prices						
log(CPI)	0.903	0.686	0.617	0.523	-0.368	0.623
	(1.335)	(1.361)	(1.322)	(1.350)	(1.716)	(0.794)
log(CPI housing)	-0.454	-0.427	-0.443	-0.472	-1.095	-2.562***
	(0.836)	(0.851)	(0.826)	(0.838)	(1.032)	(0.967)

(continued)

Table A2: (continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Variable	movers1	movers1	movers1	movers1	movers1	movers1	movers1
Other characteristics							
Urbanization rate		-0.183*		-0.130**		0.051	
		(0.095)		(0.065)		(0.082)	
Share of Raskin household beneficiaries		0.067		0.012		0.056	
		(0.096)		(0.085)		(0.103)	
Log(Public transport cost per capita)		0.011		0.029		0.025	
		(0.035)		(0.034)		(0.041)	
Log(Total government expenditure)		-0.003		0.004		0.016	
		(0.026)		(0.023)		(0.027)	
Share govt exp: Housing & public facilities		11.425		11.147		5.988	
		(8.856)		(8.840)		(10.327)	
Share govt exp: Health		-4.672		-4.025		-9.215***	
		(3.459)		(3.277)		(3.349)	
Share govt exp: Education		0.261		0.055		0.829	
		(1.181)		(1.140)		(1.405)	
Share govt exp: Social Protection		19.361		24.387		3.263	
		(21.569)		(21.157)		(24.817)	
Share govt exp: Infrastructure		1.124		1.178		6.320**	
		(1.884)		(1.859)		(2.573)	
Share of villages using land transport as main mode		102.680*		92.248		24.490	
		(59.140)		(59.180)		(66.921)	
Share of villages using land, sea, river transport		102.524*		92.128		24.459	
		(59.145)		(59.184)		(66.934)	
Share of villages using sea/river transport		100.553*		90.291		24.767	
		(59.082)		(59.114)		(66.798)	
		-1.466		-1.273		0.684	

Share of villages using land transport with asphalt roads		(1.406)		(1.377)		(1.668)	
		-1.561		-1.359		0.663	
Share of villages using land transport with hardened roads		(1.403)		(1.374)		(1.668)	
		-1.402		-1.231		0.916	
Share of villages using land transport with sand and soil roads		(1.423)		(1.392)		(1.694)	
Observations	2,082	2,082	2,082	2,082	1,317	1,317	4,688
R-squared	0.103	0.112	0.105	0.114	0.088	0.099	0.066

Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1; all regressions estimated with least squared method and include province and survey round fixed effects; urban sample is defined according to the definition based on the classification of the districts of residence (see main text).