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Rethinking the Role of Employment Barriers in Active Labor Market Policy: Evidence from a Fixed Effects Analysis

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ABSTRACT

Using a panel dataset from a five-wave survey of participants in Singapore's Work Support Programme (WSP) from 2010 to 2016, we quantify the cumulative negative impact of facing multiple employment barriers and demonstrate the association between the individual stressors and labor market indicators. Using a fixed effects model to reduce the confounding effects of unobservables, we find that a one standard deviation increase in the number of employment barriers brings about a 2.7 to 3.5 percentage point increase in the probability of being unemployed and a 58 SGD to 78 SGD decrease in individual earnings.

Keywords: employment, income, barriers, longitudinal, Singapore

Introduction

Following the Great Recession in 2007–2008, active labor market policies (ALMPs) were ramped up in many OECD countries as a reaction to tepid growth and increasing unemployment levels. The suite of programs under the aegis of ALMPs includes job training, job search assistance and monitoring, and subsidized private and public employment. These programs help persons who are unemployed, including those who are long-term unemployed, and persons who are at risk of being unemployed. The intensification of employment activation is reflected in the increased public spending on ALMPs. In particular, the percentage of GDP spent on ALMPs by OECD countries increased by 14% between 2007 and 2012 (Martin, 2014). However, the evidence for the success of ALMPs are mixed. In particular, while Card et al. (2018) suggest strong overall positive effects, the effectiveness of these programs differs by type and by demographic subgroup.

In this paper, we argue that while ALMPs aim to improve labor market potential via training, job search, and placement programs, employment barriers that hamper the effectiveness of ALMPs continue to operate. We investigate the impact of employment barriers on labor market performance by utilizing a panel dataset from a five-wave survey of participants in the Work Support Programme (WSP) from 2010 to 2016. The WSP was administered by the then Ministry of Community Development, Youth and Sports (MCYS) to provide financial aid and other in-kind assistances to individuals with labor market potential. Besides providing temporary financial assistance, the program worked with beneficiaries to overcome barriers to employment. The types of support provided covered the areas of employment, financial management, health, children, shelter, and nutrition.

ALMPs and barriers to employment

Research on ALMPs has found evidence that on average ALMPs have been effective in increasing employment (Card et al., 2018; Hendra et al., 2015; Kim, 2012). Training programs implemented as part of an active labor market policy appear to have the strongest average effects compared to other types of programs. Card et al. (2018) found that while the mean short-run effects of training programs is a modest 2.0 percentage point increase in the probability of employment, there are significant medium and long run effects in the region of 6.6 to 6.7 percentage points. Similar results were found in Dolenc (2012), Ibarrarán et al. (2010), and Tamm (2018).

Although smaller in magnitude compared to training programs, job placement and monitoring programs have also proven to have significant positive and long-lasting effects on employment and labor market performance (Card et al., 2018; Graversen & Van Ours, 2008). More explicitly, Maibom et al. (2017) found that participation in individual meetings with case workers every other week for the purpose of job search assistance and monitoring has significant positive effects on the employment rates in both the medium and the long run.

While these active labor market policies have encouraging average effect sizes, the impacts on different participant groups are heterogeneous. In particular, our scan of the literature reveals that disadvantaged individuals benefit less from employment assistance interventions, especially in the long-run. Hall et al. (2017) find that while individuals with a high probability of finding work respond to activation program interventions, those with already weak labor market prospects (in the dimensions of low education, mental health, and physical health) experience no intervention effect. Similarly, Osikominu (2013) finds that, compared to those who are more highly qualified, individuals with low formal qualifications and elementary occupations gain comparatively little, in terms of securing employment, after attending a long-term training program. Finally, Card et al. (2018) also find that disadvantaged participants (i.e. low-income or low labor market attachment) have a lower mean long-term effect compared to the average participant. These disadvantaged individuals face persistent employment barriers. The employment barriers literature exposes gaps, such as health problems, domestic problems, caregiving needs, and low education, that must be addressed in tandem with active labor market policies.

In particular, we can ask what else, other than educational/skills interventions, could be used to encourage employment and increased earnings. Ayala and Rodríguez (2007) studied determinants of welfare duration and exit using a Spanish dataset. They found that belonging to an ethnic minority and the lack of employability is important determinants of welfare exit. Salient barriers to employment include health problems, drug abuse, and social isolation. Another study by S. Danziger et al. (2002) looked at employment barriers affecting participants in the Temporary Assistance for Needy Families (TANF) program. The authors noted that while most state programs emphasize job search assistance services, they do not resolve the problem of participants having barriers to employment. These barriers include lack of basic work skills and experience, inadequate knowledge of workplace norms, transportation problems, health and mental health problems, substance abuse, and domestic violence. They found that welfare recipients have unusually high levels of certain barriers to employment, such as self-reported physical and mental health problems, domestic violence, and lack of transportation. However, they have only low levels of the barriers of drug and alcohol dependence or poor knowledge of work norms. In addition, most recipients were found to have multiple barriers and that the number of barriers is strongly and negatively associated with employment status. Using the same dataset, Nam (2005) also found that a lack of a high school degree, low work experience, substance dependence, physical health problems, children's health or emotional conditions, domestic violence, and transportation barriers have significant associations with leaving welfare (through leaving home or going to prison) or with welfare reentry. And, the former group tends to face more barriers to employment compared to the latter. The results of this study suggest that having employment barriers have far-reaching effects on the potential for self-sufficiency. Moreover, the frequent return to welfare observed in participants who face multiple barriers might be symptomatic of fundamental gaps being perennially unaddressed.

Subsequent studies provided a wealth of evidence for the pertinence of different types of barriers to employment. For instance, Bowie and Dopwell (2013) studied a sample of 30 women from the major minority groups in the US and identified barriers such as unaddressed physical and mental health problems of the respondents themselves or their children, neighborhood and housing problems, intimate partner relationship problems, and food insecurity. These problems were found to be compounded by the complicated TANF rules and regulations. Powers et al. (2013) utilized data from Louisiana's Strategies to Empower People (STEP) participants from 2003 to 2006. Their study compared the characteristics of connected and disconnected welfare leavers¹. Significant barriers to connectedness are physical health problems, child health problems, and transportation problems. Other barriers that were marginally significant include social support measures such as sharing living expenses with a partner, living rent free and receiving informal financial assistance.

The literature on employment barriers gives us a list of salient and important employment barriers and studies their individual effects. However, perhaps the disabling effects of employment barriers results not from the possession of any single barrier, but a multiplicative effect of having many. Speiglmán et al. (2011) analyzed data from TANF cases in California where welfare is given only to the child. Some relevant barriers to employment (of the child's mother) that were anticipated by the researchers include low education, lack of full-time work experience, transportation (e.g., no access to a car), instability in living arrangement, having a child under 6, having problems finding child care, physical and mental health issues, substance dependence, domestic violence, and children's health condition. Equally importantly, the authors show that while having zero or one barrier was associated with a 69% chance of employment, having two or more barriers was associated with a significantly lower 24% chance of employment.

Our research adds to the body of knowledge on barriers to employment by, firstly, quantifying how the negative impacts of facing employment barriers pile up. Next, we study the association between the individual stressors and labor market indicators. Lastly, our empirical strategy reduces the confounding effects of unobservables by using a fixed effects model.

Methods

Why fixed effects?

One problem with using observational data in an OLS model is that of omitted variable bias. The threat of omitted variable bias comes about because of the possibility that there are some unobserved variables that are correlated with both the dependent variable and one or more independent variables. For example, the individual's cognitive ability is likely to be correlated to both his wages and his education. In an OLS regression of wages on education, we are likely to overestimate the role of education since individuals who have higher cognitive ability are likely to be higher educated. Hence, while we might find that education is positively correlated to wages, this effect could be driven by the higher cognitive ability that highly educated individuals have. In other words, even if it were possible to give more years of education to individuals with relatively lower cognitive ability, the marginal effect of one year of education will not be as large as implied by the coefficient estimated in this OLS regression.

The fixed effects model addresses a key part of this omitted variable bias. In particular, the model allows us to remove the confounding effects coming from unobservable variables that do not change over time. Of course, the regression coefficients may still be biased by unobservable variables that change over time. However, addressing those concerns is beyond the scope of our paper and of our data.

Regression model

Using the panel data method of fixed effects, we regress our key dependent variables, unemployment status, full time status, and real self-earnings, on the employment status of spouses and the count of employment barriers. We also control for a vector of variables describing the financial situation of the family and family demographic characteristics. These variables are as follows: the number of earners in the household, the

number of dependents in the household, age, and its square. We also include both individual and time dummies, as is required in a fixed effects model.

In particular, we use the following specification:

$$y_{it} = \alpha + \beta_1 \text{workingspouse}_{it} + \beta_2 \text{empbarrcount}_{it} + \mathbf{B}' \mathbf{X}_{it} + \gamma_i + \gamma_t + \varepsilon_{it}$$

y_{it} represents the value of the dependent variable for individual i at time t , and can be unemployment status, full-time work status or real earnings of the individual. $\text{workingspouse}_{it}$ is the employment status of the individual's spouse at time t and empbarrcount_{it} is a linear count of the number of employment barriers faced by the individual i at time t . An individual can face up to 6 employment barriers at a time, and following Ng (2013), we use the following categories of employment barriers: being a single parent, having a low education level, having a physical chronic health condition, having Generalized Anxiety Disorder (GAD), having a child with a physical or mental disability, and having a child with behavioral difficulties.

We include a vector of background controls (\mathbf{X}_{it}) relating to the demographic characteristics and financial situation of the family: the number of earners in the household, the number of financial dependents in the household, age, and its square. γ_i and γ_t are fixed effects for individuals and time, respectively. And, ε_{it} is assumed to be exogenous given the explanatory variables on the right-hand side of the equation. In addition, we introduce dummy variables for surveys conducted by Interviewers 27 and 43, who conducted about 26% and 23% of all the interviews in the sample.

S. Danziger et al. (2002) showed that the count of employment barriers, along with some individual employment barriers, are significant in predictors of employment. These barriers include low education, insufficient work experience, lack of access to transportation, health problems, and major depression. Our results affirm this paper by showing that the same general results are still at play in the present day, and hold in longitudinal data across a variety of labor market performance measures.

We then regress the dependent variables on the individual employment barriers. This allows us to ascertain the relative importance of each type of employment barrier. In our paper, we found that some individual barriers, such as chronic health status and having GAD, were significant predictors of labor market performance on their own. However, even with chronic health status controlled for, the count of the other five employment barriers has significant influences on both unemployment and individual earnings. This suggests that while chronic health problems are a significant problem on their own, the other five barriers, while they may not be working on their own, have significant cumulative effects that cannot be ignored. Hence, our results suggest that policies should work on solving multiple problems simultaneously.

Another useful aspect of utilizing a longitudinal data set is the possibility of checking for effect-timing. That is, we want to see if employment barriers have a contemporary or lagged effect on our measures of labor market performance. To do this, for all the regression models described above, we also employ regression models with lagged employment barriers count and lagged individual employment barriers (Allison, 2015).

Results

Summary statistics

With reference to Table 1, which reports the summary statistics, the unemployment rate in our sample decreased from 44.65% in the first wave to 30.37% in wave 4 and then increased slightly to 32.55% in the fifth wave. These unemployment rates are significantly higher than the unemployment rate at the national level. Over the sample's period of 2010 to 2015, the national rate of resident unemployment decreased from 4.1% to 3.8% (see Appendix) (Ministry of Manpower (MOM), 2017). The percentage of employed individuals who are engaged in full-time employment has also been on an upward trajectory. However, while the percentage of full-time workers increased from 64.78% in Wave 1 to 76.39% in Wave 5, it has remained relatively stagnant for the last two waves.

Table 1. Summary statistics

	Wave 1 (n = 439)	Wave 2 (n = 425)	Wave 3 (n = 416)	Wave 4 (n = 405)	Wave 5 (n = 341)	All Waves (n = 2026)
<i>Variable/Statistic</i>	Mean (sd)	Mean (sd)	Mean (sd)	Mean (sd)	Mean (sd)	Mean (sd)
Unemployed (%)	44.65 (49.77)	33.88 (47.39)	30.29 (46.01)	30.37 (46.04)	32.55 (46.93)	34.55 (47.57)
Working Fulltime (%)	64.78 (47.86)	75.09 (43.33)	74.14 (43.86)	74.04 (43.92)	76.39 (42.56)	72.98 (44.42)
Personal Earnings (real SGD)	1039 (489)	1079 (480)	1114 (519)	1270 (623)	1330 (691)	1164 (573)
Count of Employment Barriers	2.32 (1.13)	1.60 (0.86)	1.88 (1.02)	1.93 (1.10)	2.10 (1.14)	1.96 (1.08)
Is single-parent (%)	15.49 (36.22)	15.06 (35.81)	12.50 (33.11)	12.84 (33.49)	11.73 (32.23)	13.62 (34.31)
Has low education (%)	89.98 (30.06)	89.18 (31.10)	87.98 (32.56)	85.43 (35.32)	85.63 (35.13)	87.76 (32.78)
Has chronic health condition (%)	38.95 (48.82)	N.A.	40.14 (49.08)	38.02 (48.60)	43.11 (49.60)	31.54 (46.48)
Has GAD (%)	36.22 (48.12)	29.88 (45.83)	18.75 (39.08)	20.74 (40.60)	20.23 (40.23)	25.52 (43.61)
Has child with disability (%)	20.50 (40.42)	14.59 (35.34)	19.47 (39.65)	19.01 (39.29)	21.70 (41.28)	18.95 (39.20)
Has child with behavioral difficulty (%)	30.75 (46.20)	11.29 (31.69)	9.38 (29.18)	16.79 (37.42)	27.86 (44.90)	19.00 (39.24)
Has a working spouse in household (%)	46.92 (49.96)	46.35 (49.93)	45.19 (49.83)	45.93 (49.90)	48.97 (50.06)	46.59 (49.90)
Number of income earners	0.56 (0.63)	0.58 (0.63)	0.64 (0.80)	0.76 (0.88)	0.80 (0.85)	0.66 (0.77)
Number of financial dependents	3.36 (1.56)	3.21 (1.51)	3.08 (1.43)	3.02 (1.52)	3.02 (1.73)	3.15 (1.55)
Age	40.56 (9.31)	41.47 (9.23)	42.69 (9.30)	44.21 (9.38)	45.28 (9.31)	42.71 (9.45)

Notes: * Information on chronic health condition was not collected in Wave 2.

In the measure of real personal earnings, we see an increase from 1039 SGD in the first wave to 1330 SGD in the last wave. However, to keep this in perspective, the real earnings in our sample are firmly within the bottom decile in the nation². In comparison, national median wages have increased from 3458 SGD to 3993 SGD between 2010 and 2015 (see Appendix Tables) (Ministry of Manpower & Singapore Department of Statistics (MOM and DOS), 2018). Interestingly, while the count of employment barriers has decreased from 2.32 in Wave 1 to 1.60 in Wave 2, it has been increasing from Wave 2 to Wave 5. The increase in the number of employment barriers suggests that low income families are increasingly facing more sources of stress.

We now turn to look at the individual types of employment barriers. First, we see that the percentage of single parents has been decreasing from 15.49% in Wave 1 to 11.73% in Wave 5. Similarly, the percentage of individuals with low education (defined as having at most some secondary education) has been decreasing from 89.98% in Wave 1 to 85.63% in Wave 5. The prevalence of chronic health problems, however, has been on an upward trajectory from 38.95% in Wave 1 to 43.11% in Wave 5.

In the area of mental health, GAD decreased between Waves 1 and 2, but increased from Wave 3 to Wave 5. Similarly, the proportion of individuals who have a child with disability decreased between Waves 1 and 2, but increased between Waves 3 and 5. The proportion of individuals living with a child with behavioral difficulty decreased significantly between Waves 1 & 3. However, it has increased dramatically from 9.38% in Wave 3 to 27.86% in Wave 5.

The mean individual is about 41 years of age in Wave 1. As regards household finances, we find that the mean number of income earners increased from 0.56 in Wave 1 to 0.80 in Wave 5. The number of financial dependents has decreased from 3.36 in Wave 1 to 3.02 in Wave 5. Do note that the increase in number of income earners and reduction of financial dependents is likely to be driven by life-stage maturity. In particular, the fact that over the years, more of the children in these families reach an age where they would be able to find a job.

Overall, we find that our sample is a slice of the least economically well-off in Singapore's population and, while improving, have not caught up with the average person in the labor market. Correspondingly, they are more vulnerable to threats to quality employment and job stability. Knowing this, it is thus important that policymakers determine the pressure points causing these individuals to underperform in the economy.

Fixed effects regressions: barrier count

We regress three measures, each capturing a key area of labor market performance, on the count of employment barriers and a vector of relevant covariates. The labor market outcomes considered are unemployment, full-time work status, and real individual earnings.

With reference to Table 2, overall, we see that an increasing count of employment barriers causes a worsening of labor market outcomes in the area of employment status and earnings. In particular, an increase of one employment barrier is associated with an increase of 3 percentage points in the probability of being unemployed. And, an increase of once employment barrier is associated with a decrease of about 68 SGD in monthly individual earnings.

Table 2. Fixed effects regressions – Count of employment barriers

<i>Explanatory Variables/Dependent Variable</i>	(1) Unemployed	(2) Working Fulltime	(3) Personal Earnings ('000s of real SGD)
Count of Employment Barriers	0.031** (0.0070)	-0.015 (0.32)	-0.068*** (0.00)
Has working spouse	0.12*** (0.00)	-0.063 (0.15)	-0.13** (0.0050)
Number of Income Earners	0.021 (0.20)	-0.023 (0.40)	-0.0044 (0.87)
Number of Financial Dependents	0.0023 (0.84)	-0.037 (0.053)	0.0077 (0.72)
Age	-0.052* (0.024)	-0.025 (0.47)	0.10* (0.020)
Square of Age	0.00055* (0.014)	0.00025 (0.47)	-0.00094* (0.024)
Dummy for Interviewer 27	0.043 (0.059)	-0.0011 (0.97)	-0.070** (0.010)
Dummy for Interviewer 43	0.073** (0.0030)	0.18*** (0.00)	-0.056 (0.092)
Constant	82.89 (0.069)	48.38 (0.50)	-18.50 (0.81)
Survey Wave Fixed Effects	Yes	Yes	Yes
Individual Fixed Effects	Yes	Yes	Yes
Linear Year Trend	Yes	Yes	Yes
N	2026	1336	1336

Notes: p -values in parentheses: * $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

Another important variable that explains labor market performance is the presence of a working spouse. In particular, having a working spouse in the household reduces the probability of the individual being employed and their earnings. It is likely that this effect arises from spouses specializing in either the household or the labor market. In our regressions, we estimate that having a working spouse increases the probability of being unemployed by about 12 percentage points and, if the individual is already active in the labor market, decreases real earnings by approximately 130 SGD.

However, the count of employment barriers is not significantly related to the probability of being employed in a full-time job. One key difference between a full-time worker and a part-time worker is that the full-time worker works longer hours. Hence, taken with the results showing a significant relationship between employment barriers count and unemployment and personal earnings, we may conclude that employment barriers affect the probability of getting a job and the quality of jobs one gets, but not the number of hours one spends at work.

These results suggest that having more employment barriers has an overall detrimental effect on labor market performance. However, a further investigation is needed to determine if certain employment barriers are more salient than others.

Fixed effects regressions: individual barrier dummies

In the previous section, we used a count of employment barriers to capture the effects of multiple stressors on low-income families, and, we do find evidence that having a greater count of employment barriers significantly decreases labor market performance. In this section, we regress labor market outcomes on dummy variables which indicate the presence of each individual employment barrier. These estimates of the marginal effect of each employment barrier allow us to identify individual barriers that may have significant impact on labor market performance.

Having chronic health problems increases the probability of being unemployed. In particular, with reference to Table 3, we see that having a chronic health problem decreases the probability of being unemployed by about 4.8 percentage points. In addition, having chronic health problems also decreased earnings by 91 SGD. The strong negative effect brought about by having a chronic health problem is also a result that was found in cross-sectional studies (S. Danziger et al., 2002; Nam, 2005; Powers et al., 2013). As this result also holds in longitudinal analysis, we have evidence to suggest that a person who develops a chronic illness is likely to either drop out from the workforce, or if he manages to keep working, face a decrease in expected earnings. As chronic health problems are detected and treated at a later stage for low-income individuals, it is plausible they have a disproportionately larger negative impact on the labor market outcomes of the poor (Zhao, 2006). Hence, this result underscores the need for early detection and treatment of illnesses that threaten the financial independence of individuals.

Table 3. Fixed effects regressions – Individual employment barriers

<i>Explanatory Variables/Dependent Variable</i>	(1) Unemployed	(2) Working Fulltime	(3) Personal Earnings ('000s of real SGD)
Employment Barriers			
Is single parent	-0.035 (0.37)	-0.031 (0.56)	-0.047 (0.38)
Has low education	0.022 (0.70)	0.11 (0.084)	-0.17 (0.078)
Has chronic health condition	0.048* (0.038)	-0.050 (0.13)	-0.091** (0.0090)
Has GAD	0.051* (0.035)	0.0067 (0.84)	-0.053 (0.098)
Has child with disability	0.0037 (0.89)	-0.047 (0.26)	-0.10* (0.016)
Has child with behavioral difficulty	0.033 (0.21)	0.026 (0.52)	-0.030 (0.42)
Has Working Spouse	0.11** (0.0010)	-0.065 (0.14)	-0.13** (0.0060)
Number of Income Earners	0.020 (0.21)	-0.025 (0.37)	-0.0041 (0.88)
Number of Financial Dependents	0.0013 (0.91)	-0.038* (0.042)	0.0060 (0.78)
Age	-0.049* (0.032)	-0.027 (0.44)	0.093* (0.031)
Square of Age	0.00051* (0.020)	0.00027 (0.42)	-0.00083* (0.041)
Dummy for Interviewer 27	0.047* (0.041)	0.0014 (0.97)	-0.071** (0.0090)
Dummy for Interviewer 43	0.072** (0.0050)	0.18*** (0.00)	-0.050 (0.13)
Constant	84.55 (0.064)	47.08 (0.51)	-29.08 (0.70)
Survey Wave Fixed Effects	Yes	Yes	Yes
Individual Fixed Effects	Yes	Yes	Yes
Linear Year Trend	Yes	Yes	Yes
N	2026	1336	1336

Notes: p -values in parentheses: * $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

Nevertheless, one caveat that must be pointed out here is the following: Chronic health status is a self-reported variable. This could mean that participants report having a chronic health status only when it becomes salient to them, and this salience could be correlated to how well they perceive themselves to be faring in the labor market.

Looking at the other barriers, our estimates indicate that having GAD increases the probability of being unemployed by 5.1 percentage points. This suggests that increases in cognitive load beyond the individual's capacity, which is likely to be manifested in worsening mental health, is associated with the individual's propensity to find a job. In addition, having a child with disability decreases earnings by about 100 SGD, suggesting that caretaking responsibilities might be interfering with work demands.

Effect timing checks

We run the regression models above, together with a previous-wave lag of the key independent variables, to check if the timing of the effects falls into one of the following categories: contemporary effect, lagged

effect, or time-persistent effect. A contemporary effect is where variation in, say, the number of employment barriers affects labor market performance in that very time period. A lagged effect is defined to be one where a change in the explanatory variable of interest affects labor market performance, but only in a later period. Lastly, a variable with a time-persistent effect on labor market performance is one which negatively affects performance throughout the individual's life-cycle. These regression results are detailed in Tables 4 and Tables 5.

Table 4. Effect timing check – Count of employment barriers

<i>Explanatory Variables/Dependent Variable</i>	(1) Unemployed	(2) Unemployed	(3) Working Fulltime	(4) Working Fulltime	(5) Personal Earnings (‘000s of real SGD)	(6) Personal Earnings (‘000s of real SGD)
Count of Employment Barriers	0.031** (0.0070)	0.035** (0.0070)	-0.015 (0.32)	-0.022 (0.20)	-0.068*** (0.00)	-0.070*** (0.00)
Has working spouse	0.12*** (0.00)	0.13*** (0.00)	-0.063 (0.15)	-0.091 (0.11)	-0.13** (0.0050)	-0.19** (0.0010)
Number of Income Earners	0.021 (0.20)	0.016 (0.33)	-0.023 (0.40)	-0.015 (0.61)	-0.0044 (0.87)	-0.0046 (0.87)
Number of Financial Dependents	0.0023 (0.84)	0.012 (0.33)	-0.037 (0.053)	-0.046* (0.023)	0.0077 (0.72)	-0.019 (0.41)
Age	-0.052* (0.024)	-0.012 (0.73)	-0.025 (0.47)	0.021 (0.61)	0.10* (0.02)	0.12* (0.020)
Square of Age	0.00055* (0.014)	0.000096 (0.76)	0.00025 (0.47)	-0.00019 (0.64)	-0.00094* (0.024)	-0.0011* (0.024)
Dummy for Interviewer 27	0.043 (0.059)	0.043 (0.096)	-0.0011 (0.97)	0.0055 (0.88)	-0.070** (0.010)	-0.086* (0.011)
Dummy for Interviewer 43	0.073** (0.0030)	0.090** (0.0010)	0.18*** (0.00)	0.19*** (0.00)	-0.056 (0.092)	-0.099** (0.0060)
<u>One-wave Lag</u>						
Count of Employment Barriers		-0.014 (0.22)		-0.027 (0.13)		-0.019 (0.29)
Constant	82.89 (0.069)	148.00* (0.013)	48.38 (0.50)	52.87 (0.60)	-18.50 (0.81)	-71.73 (0.48)
Survey Wave Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Individual Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Linear Year Trend	Yes	Yes	Yes	Yes	Yes	Yes
N	2026	1579	1336	1083	1336	1083

Notes: p -values in parentheses: * $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

Table 5. Effect timing check – Individual employment barriers

<i>Explanatory Variables/Dependent Variable</i>	(1) Unemployed	(2) Unemployed	(3) Working Fulltime	(4) Working Fulltime	(5) Personal Earnings (‘000s of real SGD)	(6) Personal Earnings (‘000s of real SGD)
Employment Barriers						
Is single parent	-0.035 (0.37)	-0.052 (0.17)	-0.031 (0.56)	-0.052 (0.42)	-0.047 (0.38)	-0.080 (0.20)
Has low education	0.022 (0.70)	0.015 (0.82)	0.11 (0.084)	0.18 (0.073)	-0.17 (0.078)	-0.011 (0.90)
Has chronic health condition	0.048* (0.038)	0.064* (0.027)	-0.050 (0.13)	-0.066 (0.094)	-0.091** (0.0090)	-0.060 (0.12)
Has GAD	0.051* (0.035)	0.055 (0.058)	0.0067 (0.84)	0.018 (0.66)	-0.053 (0.098)	-0.057 (0.14)
Has child with disability	0.0037 (0.89)	0.014 (0.66)	-0.047 (0.26)	-0.051 (0.29)	-0.10* (0.016)	-0.085 (0.087)
Has child with behavioral difficulty	0.033 (0.21)	0.042 (0.20)	0.026 (0.52)	0.024 (0.62)	-0.030 (0.42)	-0.056 (0.20)
Has Working Spouse	0.11** (0.0010)	0.11** (0.0020)	-0.065 (0.14)	-0.096 (0.087)	-0.13** (0.0060)	-0.19** (0.0010)
Number of Income Earners	0.020 (0.21)	0.015 (0.36)	-0.025 (0.37)	-0.026 (0.38)	-0.0041 (0.88)	-0.0069 (0.81)
Number of Financial Dependents	0.0013 (0.91)	0.013 (0.32)	-0.038* (0.042)	-0.050* (0.014)	0.0060 (0.78)	-0.022 (0.33)
Age	-0.049* (0.032)	-0.0010 (0.98)	-0.027 (0.44)	0.023 (0.59)	0.093* (0.031)	0.11* (0.023)
Square of Age	0.00051* (0.020)	-0.0000047 (0.99)	0.00027 (0.42)	-0.00021 (0.62)	-0.00083* (0.041)	-0.0010* (0.028)
Dummy for Interviewer 27	0.047* (0.041)	0.048 (0.068)	0.0014 (0.97)	0.012 (0.75)	-0.071** (0.0090)	-0.086* (0.013)
Dummy for Interviewer 43	0.072** (0.0050)	0.091** (0.0010)	0.18*** (0.00)	0.20*** (0.00)	-0.050 (0.13)	-0.10** (0.0050)

<u>One-wave Lag</u>						
Is single parent		-0.14**		-0.14*		0.013
		(0.0030)		(0.024)		(0.84)
Has low education		-0.092		-0.19		-0.29***
		(0.18)		(0.14)		(0.00)
Has chronic health condition		0.010		-0.021		-0.012
		(0.71)		(0.59)		(0.75)
Has GAD		0.025		-0.0097		0.017
		(0.31)		(0.79)		(0.61)
Has child with disability		-0.014		0.024		-0.00049
		(0.65)		(0.55)		(0.99)
Has child with behavioral difficulty		-0.034		-0.062		-0.091*
		(0.30)		(0.13)		(0.043)
Constant	84.55	153.30**	47.08	57.21	-29.08	-70.75
	(0.064)	(0.0080)	(0.51)	(0.57)	(0.70)	(0.48)
Survey Wave Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Individual Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Linear Year Trend	Yes	Yes	Yes	Yes	Yes	Yes
N	2026	1579	1336	1083	1336	1083

Notes: p -values in parentheses: * $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

First, we see that the count of barriers to employment is statistically significant in both the regressions containing only its contemporary version and the regressions containing its contemporary and lagged versions. This tells us that the lagged values cannot be shown to be causally related to labor market performance, and that it is plausible that the effects of barrier count on labor market performance are contemporary in nature.

Next, we find that the dummy variable for chronic health status also remains significant in both types of regressions (i.e. contemporary variables only and contemporary and lagged variables) for the labor market performance indicator of unemployment. Hence, it is possible that the effect of chronic health status on unemployment is immediate. However, the coefficient on the chronic health status dummy does not remain significant on individual earnings after the addition of its lag. This could be an artifact of collinearity between the contemporary and lagged versions of the chronic health status dummy, suggesting that an individual who has ever had chronic health problems is likely to face a permanent drop in earnings thereafter (e.g., from persistence of adverse health conditions).

For GAD, contemporaneous effects are significant for unemployment and remain marginally significant after the addition of its lag. This suggests that the effects of GAD on unemployment are contemporary. On the other hand, the dummy for having a child with a disability ceases to have a statistically significant effect on earnings after the addition of its lag. Similar to the above case with chronic health issues, this could mean collinearity between the contemporary and lagged versions of the dummy for having a child with disability.

Single parenthood and having a child with behavioral problems only have statistically significant effects in their lagged variables. In particular, single parenthood is only significant in the lagged regression for unemployment and full-time work status. This suggests that the shock of being a single parent has a period of gestation before manifesting as an inhibiting factor for labor market performance. Similarly, having a child with a behavioral problem has a long gestation period before it begins to negatively affect individual earnings.

Finally, we see that having a low education status in the previous wave predicts lower earnings in the current wave. Since this coefficient is driven by the group of individuals who improve their education status between periods, this result suggests that the benefits of investing in one's human capital development are not reaped

in the short run. This phenomenon is perhaps indicative of search frictions in the job market as one transitions out from their current job to another that will utilize these newly acquired skills and ability (Crépon et al. 2012).

Robustness checks

Because having a chronic health problem is a barrier that seems to be individually salient at predicting unemployment and individual earnings, we do a further robustness check to ensure that our methodology is sound. In particular, we check that a count of the other five barriers to employment, without chronic health status, is statistically significant in explaining labor market performance (Table 6). Furthermore, we check that the coefficient on the alternative count of employment barriers remains statistically significant after conditioning on one's chronic health status (Table 7). Indeed, we do see that both the new count of employment barriers and chronic health status are significantly associated with unemployment and individual earnings. Though they are diminished compared to the original specification of the barrier-count, which includes chronic health status, we see the following effects: Having an additional barrier to employment would likely bring about a 2.7 percentage point increase in the probability of being unemployed and a decrease of 64 SGD in individual monthly earnings (Table 6). These coefficients are qualitatively unchanged after the addition of the chronic health condition dummy. The effects of having a chronic illness also seems to have similar magnitude compared to the earlier regressions (Table 7).

Table 6. Robustness checks – Alternative employment count

<i>Explanatory Variables/Dependent Variable</i>	(1) Unemployed	(2) Working Fulltime	(3) Personal Earnings ('000s of real SGD)
Count of Employment Barriers (without chronic health problem)	0.027* (0.033)	-0.0057 (0.76)	-0.064*** (0.0010)
Has working spouse	0.11*** (0.00)	-0.060 (0.17)	-0.13** (0.0070)
Number of Income Earners	0.021 (0.18)	-0.024 (0.39)	-0.0058 (0.83)
Number of Financial Dependents	0.0021 (0.85)	-0.036 (0.055)	0.0088 (0.68)
Age	-0.053* (0.021)	-0.026 (0.45)	0.11* (0.02)
Square of Age	0.00056* (0.012)	0.00026 (0.45)	-0.00096* (0.021)
Dummy for Interviewer 27	0.040 (0.079)	0.0026 (0.94)	-0.063* (0.021)
Dummy for Interviewer 43	0.071** (0.0050)	0.19*** (0.00)	-0.054 (0.11)
Constant	81.37 (0.075)	49.58 (0.49)	-14.36 (0.85)
Survey Wave Fixed Effects	Yes	Yes	Yes
Individual Fixed Effects	Yes	Yes	Yes
Linear Year Trend	Yes	Yes	Yes
N	2026	1336	1336

Notes: p -values in parentheses: * $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

Table 7. Robustness checks – Alternative employment count & dummy for chronic health condition

<i>Explanatory Variables/Dependent Variable</i>	(1) Unemployed	(2) Working Fulltime	(3) Personal Earnings ('000s of real SGD)
Count of Employment Barriers (without chronic health problem)	0.026* (0.045)	-0.0038 (0.84)	-0.061** (0.0010)
Has chronic health condition	0.047* (0.047)	-0.053 (0.11)	-0.093** (0.0080)
Has Working Spouse	0.12*** (0.00)	-0.062 (0.16)	-0.13** (0.0060)
Number of Income Earners	0.021 (0.20)	-0.023 (0.41)	-0.0042 (0.88)
Number of Financial Dependents	0.0024 (0.83)	-0.037 (0.050)	0.0074 (0.73)
Age	-0.050* (0.030)	-0.029 (0.41)	0.10* (0.020)
Square of Age	0.00053* (0.019)	0.00029 (0.39)	-0.00091* (0.026)
Dummy for Interviewer 27	0.042 (0.061)	-0.00081 (0.98)	-0.070** (0.010)
Dummy for Interviewer 43	0.071** (0.0040)	0.19*** (0.00)	-0.052 (0.13)
Constant	83.55 (0.067)	46.57 (0.51)	-19.68 (0.79)
Survey Wave Fixed Effects	Yes	Yes	Yes
Individual Fixed Effects	Yes	Yes	Yes
Linear Year Trend	Yes	Yes	Yes
N	2026	1336	1336

Notes: *p*-values in parentheses: **p* < 0.05 ***p* < 0.01 ****p* < 0.001

These results suggest that, even after controlling for chronic health status, the effects of having more employment barriers can be captured by simply knowing how many barriers one has to face. While the other individual barriers (e.g., GAD and having a child with disability) may seem to differ in terms of their effect-timings, we find that having multiple barriers has an undeniable and amalgamated contemporary effect on labor market performance.

Discussion

Given our general finding that having a greater count of employment barriers adversely affects the labor market outcomes for the average individual, what are the implications on policy? First, we must note that there has been a general increase in household earnings in the first decile and monthly earnings in our sample from the period 2010 to 2015. This may be due, in part, to the wider reach of social assistance schemes. However, the emphasis on a work-first productivist strategy (Ng, 2015) brings about an important trade-off. This trade-off was illustrated by the case of welfare reform in the United States under the Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA) that was passed in 1996 (S. K. Danziger et al., 2016; Haskins, 2016). After the Act was passed, there was an increase in “disconnected persons”, who are not active in the labor market and are not receiving welfare support from the government. In addition, while there was an increase in average family income, there was also an increase in extreme poverty, a decrease in the proportion of poor families receiving TANF, and an increase in the number of disconnected single-mothers (S. K. Danziger et al., 2016; Haskins, 2016).

These facts suggest that while the average family benefits from such a productivist welfare reform, this net benefit is driven only by families that have the capability to be active in the labor market. In contrast, families that experience a high incidence of employment barriers become disconnected, and consequently, will find themselves at a more disadvantaged position after the reform. The magnitude of this tradeoff is amplified by adverse employment conditions in the economy. Similarly, for the case of Singapore, the results of this paper show that employment barriers are indeed important in influencing an individual's labor market performance or participation. Hence, it is important to realize that an increasingly productivist strategy in social assistance will necessarily result in a tradeoff. In particular, families without employment barriers are more likely to escape poverty, but at the expense of families that have been left behind due to substantial barriers.

Second, to help families facing multiple barriers and to give them a fighting chance at escaping poverty, it is necessary to resolve these barriers before any attempts at labor market participation can be effective. Instead of reflexively pushing low-income individuals to find work at all costs, we have to triangulate the sources of barriers. This paper contributes by empirically identifying prevalent and pertinent barriers to employment. Next, there needs to be coordination between a wide variety of service providers and coordination among these providers in order to devise effective solutions for low-income families facing multiple barriers. For example, action plans can work on reducing barriers in a sequential and logical manner – medical attention to chronic health problems and caregiving for special needs children of low-income families need to be present before training or job counseling can be effective.

For example, in the US, Martinson and Holcomb (2007) recognize that innovative solutions were necessary to assist individuals with severe or multiple barriers to employment, such as physical or mental health problems, violence at home, and a criminal past. Some innovative employment approaches identified include service-focused employment preparation, which improves the employability of individuals through providing a combination of special targeted interventions, such as substance abuse treatment and mental health services, in combination with employment services, such as job matching and career guidance. Other pertinent examples are income and work supports, which aim to help families stay in the labor force after being initially employed. For example, in recognition of the administrative complexities of social assistance, some post-employment assistance programs assist individuals in accessing publicly funded financial schemes, such as the Earned Income Tax Credit (EITC) and child care assistance. When such barriers are not addressed, however, individuals are more likely to return to welfare.

Lastly, policymakers must be prepared to face the fact that having barriers may severely limit an individual's labor market potential to the extent that he or she will not have the capability to participate in the labor market for an extended period of time. In cases where the barriers presented are temporary, assistance is required during the period of time in which the individual cannot be expected to be active in the labor market. For instance, Ybarra (2014) shows that the TANF aims to support mothers with newborns by offering exemptions on the work criteria, although states vary in their offering of these exemptions. However, even when federal policy recognizes the presence of important barriers, there may still be individuals that are unaided, as implied by the issue of disconnected mothers mentioned in multiple recent sources (Shaefer & Edin, 2018; Haskins, 2016; S. K. Danziger et al., 2016). In cases where barriers to employment are chronic, the role of long-term assistance is pivotal in gradually helping these individuals on their transition out of poverty.

Conclusion

To summarize our results, an increase of one standard deviation of count of employment barriers will bring about a 2.7 percentage point to 3.5 percentage point increase in the probability of being unemployed. This increase of a single standard deviation, in count of employment barriers, is also associated with a 58 SGD to 78 SGD decrease in individual earnings. The influence of employment barriers is statistically significant. Though the magnitude of influence of any one barrier may not be particularly large, the average individual in our low-income sample has approximately two barriers, with many others having three to five barriers.

While various types of active labor market policies may be successful at encouraging the average family to be active in the labor market and become increasingly self-sufficient, there is heterogeneity in their effectiveness, and families facing strong barriers are left behind. Hence, while there is a work-first focus in many welfare regimes, the results of this study suggest that certain barriers should be addressed before an individual can successfully benefit from ALMPs.

Our research highlights the importance of barriers for low-income individuals and stemming from our topline findings, we can glean some future directions of research. First, future survey instruments for studies on employment barriers should collect data for a broader scope of employment barriers, including domestic issues and specific skill gaps that prevent individuals from moving up the career ladder. Second, greater fineness and detailed measurement of the intensity of employment barriers may help uncover even further heterogeneity in the effect of these barriers on labor market performance. Examples of these more extensive measurements include classifying the medical stage of physical health conditions and more accurately measuring the extent of caregiving needs for disabled children (e.g., quantifying the cost of formal child care services for children with special needs). Lastly, an impact measurement of a program designed specifically to tackle the challenges presented by employment barriers in low-income families may provide even more concrete evidence of the pertinence of these barriers as an impediment to economic self-sufficiency.

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Disclosure statement

No potential conflict of interest was reported by the authors.

Notes

1. Welfare leavers are defined as “disconnected” if they leave TANF without a job and are not living in a household with an employed person.
2. Assuming that only one spouse is working, real household income from earnings is equivalent to real personal earnings. The first decile (1st to 10th percentile) of real average monthly household income from work ranges from SGD 1726 to SGD 1949 over the same range of years (DOS 2017).

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Appendix Tables

Singapore labor force statistics (2010–2015)						
<i>Variables/Years</i>	2010	2011	2012	2013	2014	2015
Resident Unemployment Rate (%)	4.1	3.9	3.7	3.9	3.7	3.8
Mean Monthly household earnings in 1st decile (Real SGD)	1725.55	1741.06	1714.98	1737.69	1775.23	1948.57
Median monthly income from work (Real SGD)	3458.01	3577.92	3630.26	3762.80	3770.49	3993.20