Economics Bulletin

Volume 43, Issue 3

Okun's law: Place-of-birth-specific unemployment in Sweden

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Abstract

This paper examines the sensitivity of place-of-birth-specific unemployment to business cycle fluctuations in Sweden by using Okun's law. The findings indicate that foreign-born males are more exposed to business cycle fluctuations in comparison to their Swedish-born counterparts. One plausible explanation for this disparity is the occupation of the former group, which tends to exhibit a more pronounced reaction to changes in the business cycle.

I am grateful for the encouragement from Professor Ali Ahmed at Linköping University. I also want to thank Professor Georg Stadtmann at the European University Viadrina for his feedback.
Citation: Umba Nsabimana, (2023) "Okun's law: Place-of-birth-specific unemployment in Sweden ", *Economics Bulletin*, Volume 43, Issue 3, pages 1539-1547
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Submitted: March 23, 2022. **Published:** September 30, 2023.

1. Introduction

Periods of weak economic growth in Sweden have historically had different impacts on the unemployment rates of the Swedish-born and foreign-born populations. Figure 1 depicts the changes in unemployment rates for the Swedish-born versus foreign-born population during the contraction of 2001-2004 (Engdahl and Nybom, 2021), the Global Financial Crisis, and The coronavirus disease 2019 (COVID-19). As seen in Figure 1, the unemployment effect during these periods was more severe for the foreign-born population compared to the Swedish-born population. In this paper, I will investigate the sensitivity of place-of-birth-specific unemployment to business cycle fluctuations.

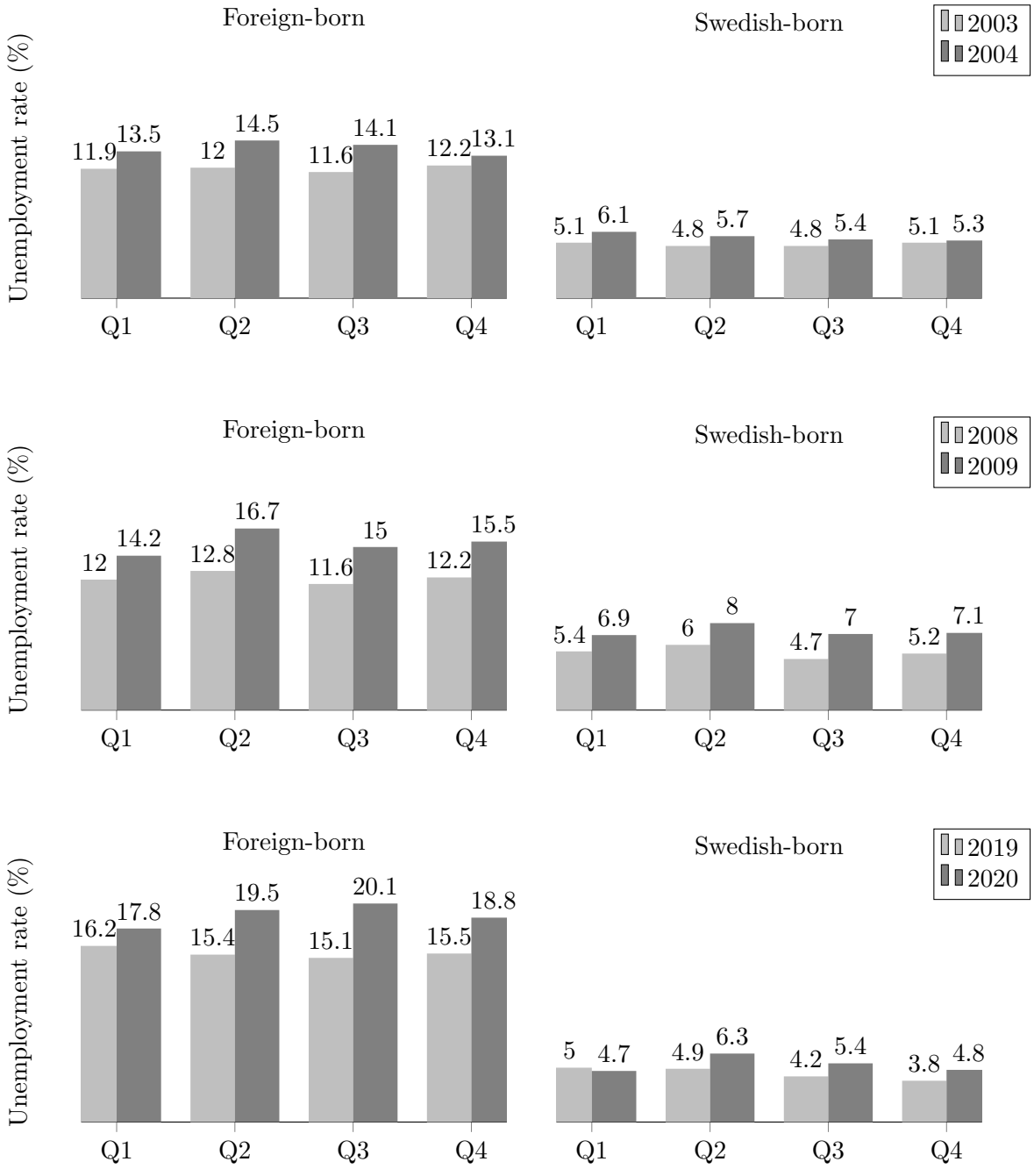

Figure 1: Quaterly unemployment rates for Swedish-born and foreign-born population. Source: Eurostat, Employment and Unemployment (LFS).

2. Empirical Approach and Data

The inverse relationship between unemployment rate and real GDP growth rate, which was suggested by Okun (1962), is referred to as Okun's law. There are several versions of Okun's law (Knotek II, 2007), and for this paper, I make use of the first difference version (see, among others, Micallef, 2017; Kim and Park, 2019; Butkus et al., 2020). The regression specifications are given by,

$$\Delta u_t = \alpha + \beta y_t + \epsilon_t \tag{1}$$

where Δu_t denotes the change in unemployment rate between year t and year t-1 while y_t denotes the real GDP growth rate in year t. The constant term is α while ϵ_t is the error term. Okun's coefficient is denoted by β and should be interpreted as "1 percentage point increase in GDP growth rate will lead to a decrease in unemployment rate by β% compared to the previous period" (Ibragimov, M. and Ibragimov, R., 2017).

Since age and gender are considerable factors when analyzing unemployment rates (Hutengs and Stadtmann, 2014), they are taken into consideration. Since it is also inefficient to estimate Okun's coefficients separately for each age cohort with respect to their gender and place of birth as suggested by equation (1), I make use of the panel data method (Hutengs and Stadtmann, 2014; Dunsch, 2017) where each of the panels consists of annual changes in unemployment rate for different age cohorts with respect to gender and place of birth as well as the real GDP growth rate. Thus, the following panel least squares dummy variable (LSDV) model will be used in the analysis,

$$\Delta u_{i,t} = \alpha_i \phi_i + \beta_i \phi_i y_t + \epsilon_{i,t} \tag{2}$$

where $\Delta u_{i,t}$ is the change in unemployment rate for age cohort i with respect to gender and place of birth at time t, while ϕ_i is a dummy variable for the different age cohorts. Interacting ϕ_i with y_t allows β_i to capture the Okun's coefficients for the age cohorts.

Equation (2) indicates that there is reverse causality and thus endogeneity in the LSDV model (Huang et al., 2020). However, similar to previous studies (see, among others, Hutengs and Stadtmann, 2014; Micallef, 2017; Dunsch, 2017; Kim and Park, 2019; Butkus et al., 2020) that use the first difference version of Okun's law, I work under a strict exogeneity assumption. Further, potential heteroscedasticity, serial correlation, and cross-sectional dependencies that is common in panel data may lead to inefficient estimates and biased standard errors (Butkus et al., 2020), and as a consideration, I will estimate the LSDV model using Prais–Winsten regression with panel-specific AR1 autocorrelation and panel- corrected standard errors.

The empirical approach uses place-of-birth-specific annual unemployment rates with respect to age and gender in Sweden over the period of 1997-2020, and as such, deriving the change in unemployment rates would put the earliest starting point of the analysis in 1998. The unemployment data were derived from the Employment and Unemployment (LFS) database by the European Statistical Office (Eurostat), while the data for the real GDP growth rate, for the period of 1998-2020, were derived from the Employment and Labour Market Statistics database by the Organisation for Economic Co-operation and Development (OECD).

Figure 2 displays all the place-of-birth-specific annual unemployment rates with respect to gender and age from 1997 to 2020. It is noted that there are significant differences in unemployment rates for foreign-born and Swedish-born populations regardless of age and gender, with the former populations having higher unemployment rates.

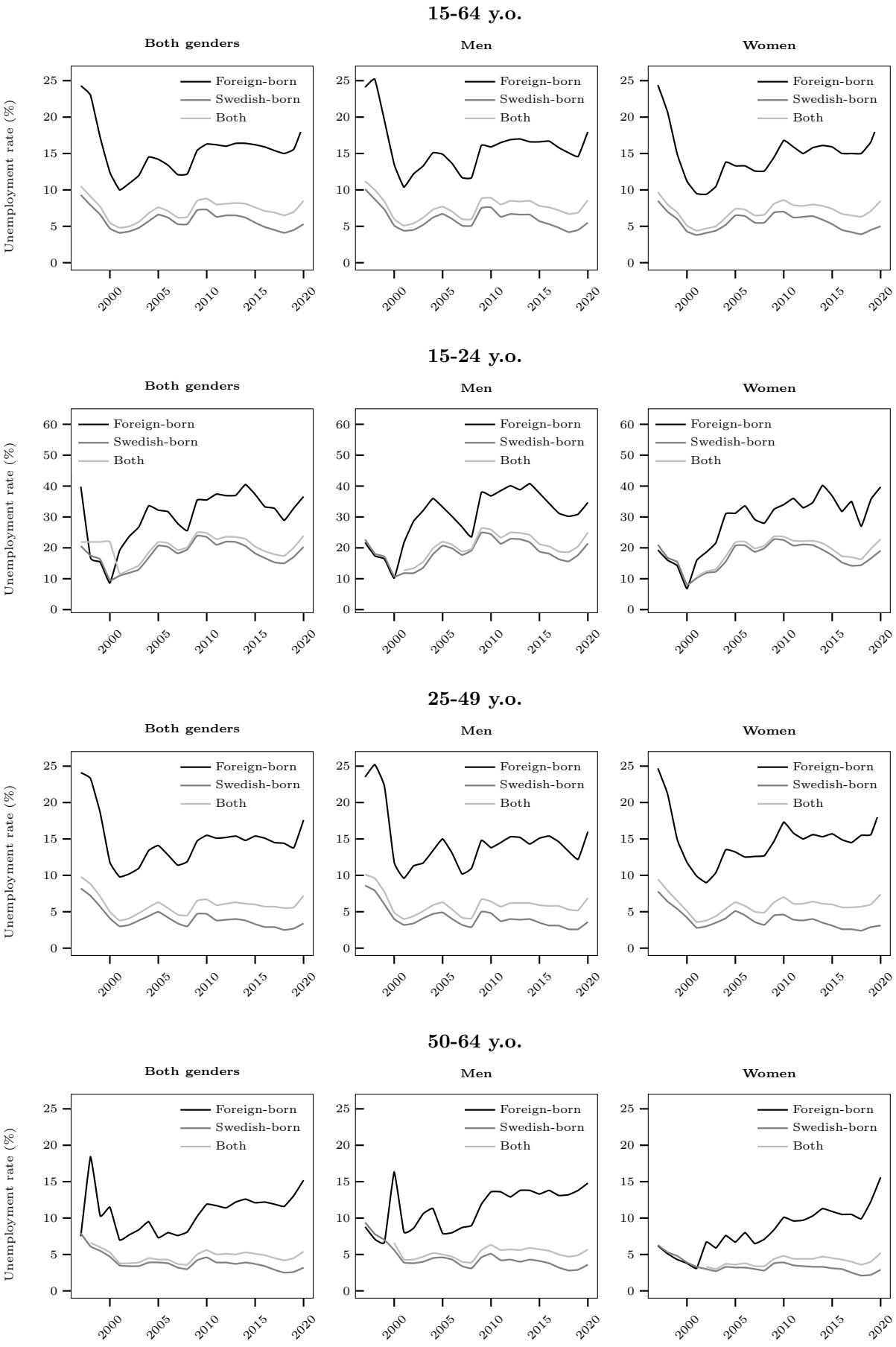

Figure 2: Place-of-birth-specific annual unemployment rates from 1997 to 2020.
Note: Some of the unemployment rates starts at a later date due to a lack of available data.

Figure 3 depicts the trend of change in the total unemployment rate and the real GDP growth rate. Here we notice that a dive in the growth rate is usually accompanied by a spike in the change in unemployment rate, as clearly noticed during the Global Financial Crisis.

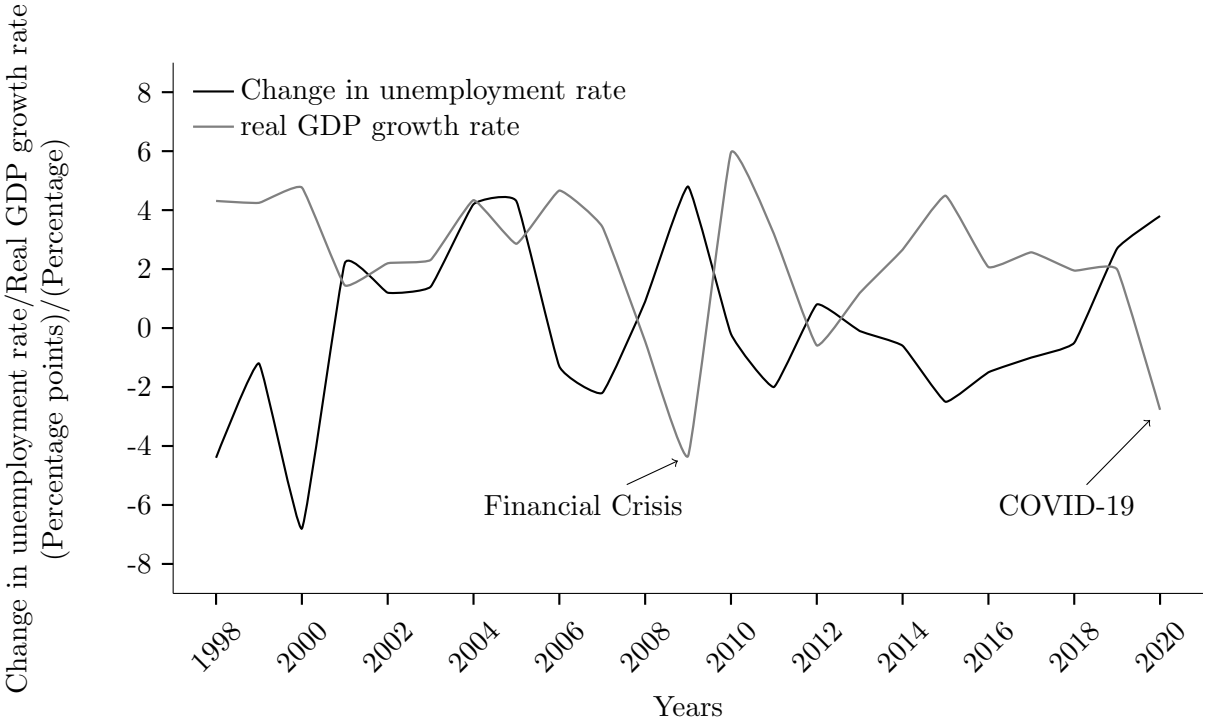

Figure 3: Change in total unemployment rate and real GDP growth rate between 1998-2020.

3. Empirical Result

Figure 4 presents the place-of-birth-specific Okun's coefficients. All the point estimates are negative, which confirms the validity of Okun's law. Looking at Okun's coefficients for both genders aged 15-64, we see that the point estimate is stronger for the foreign-born population (-0.30) compared to the Swedish-born population (-0.20), which suggests that the former population is more sensitive to business cycle fluctuations. Though when we look at different age cohorts, we can see that the point estimates become weaker with age, regardless of place of birth, which also suggests that older people are less sensitive to business cycle fluctuations. While the point estimate for the foreign-born population aged between 15 and 24 years was weaker (-0.55) than the Swedish-born population (-0.65), its confidence interval overlaps and is greater than the entire area of the latter population.

Looking at the Okun's coefficients for males aged 15-64, we observe bigger differences in the Okun's coefficient point estimates between the Swedish-born (-0.25) and foreign-born (-0.49) populations. With further examination of the different male age cohorts, we can see that foreign-born males aged 15 to 24 had the overall highest Okun's coefficient (-1.02).

Okun's coefficient results for females are not as straight forward in their interpretation. This is due to the fact that the confidence interval for the foreign-born female populations overlaps the entire confidence interval of the Swedish-born female populations in all cases (i.e., age cohorts) while also overlapping the zero value of Okun's coefficient[1].

[1]If the Okun's coefficient is zero, it indicates that changes in the real GDP growth rates cause no change in unemployment rates, which in reality is very unlikely and also a contradiction to Okun's Law.

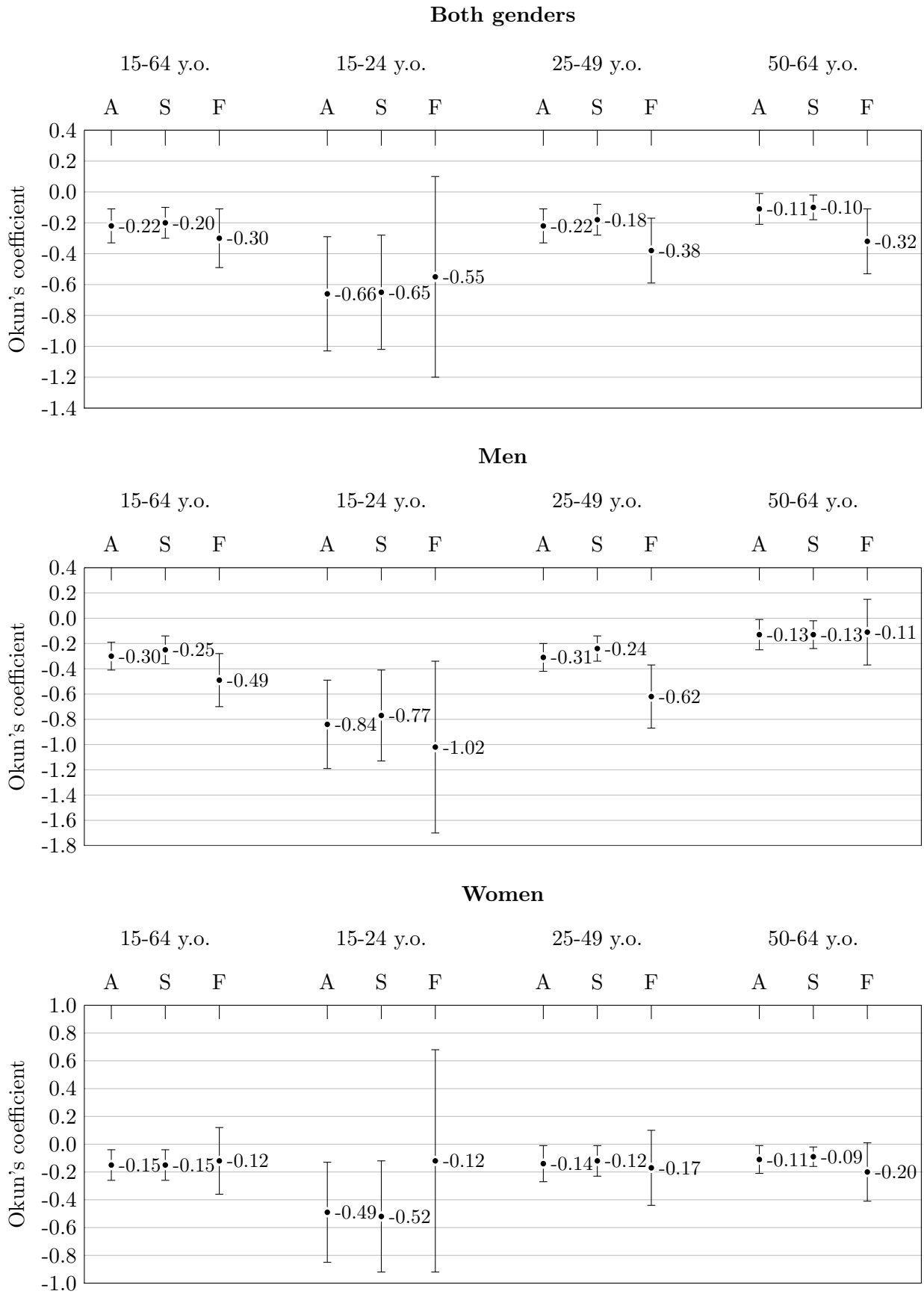

Figure 4: Okun coefficient estimates.
Note: Point estimates with a 95% confidence interval vertical line.
Classifications: A=All, S=Swedish-born, F=Foreign-born.

4. Discussion and Conclusion

The purpose of this paper is to investigate the sensitivity of place-of-birth-specific unemployment to GDP changes in Sweden. The method uses Okun's law, with the conclusion that foreign-born populations have stronger Okun's coefficient point estimates and that the differences are most noticeable when comparing Swedish-born and foreign-born males, while the results are not as clear when comparing females. The confidence interval for the foreign-born population overlaps the confidence interval for the Swedish-born population in most cases, which would indicate greater uncertainty about the effect of business cycle fluctuations on the unemployment rates of the foreign-born population.

As to why the foreign-born population is more affected by business cycle fluctuations, one possible explanation could be that some of the biggest employers of the foreign-born population in Sweden, such as the transportation, hotel, and restaurant industries, are more sensitive to business cycle fluctuations (Konjunkturinstitutet., 2020).

It should be noted though that this study does not take into account the educational attainment level differences between the foreign-born and Swedish-born populations, which according to Butkus et al. (2020) is an important factor that affects the size of the Okun's coefficient and concludes that tertiary educated people react significantly less to business cycle fluctuations. Figure 5 shows that the same percentage of the foreign-born and Swedish-born population have a tertiary education (ISCED 5-8)[2], though when we look at the lowest educational attainment level, ISCED 0-2, we can see a significantly higher percentage among the foreign-born population at 33% compared to the Swedish-born population at 14.9%.

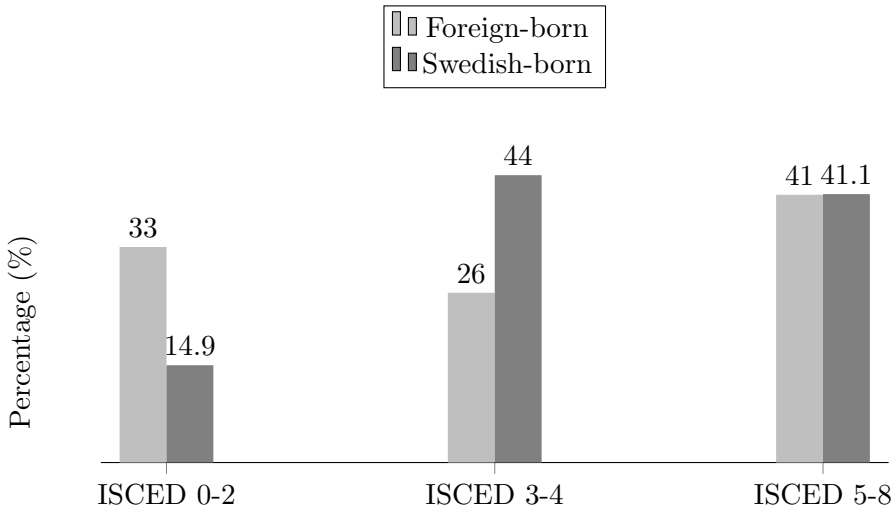

Figure 5: Educational attainment level in Sweden during 2022.
Source: Eurostat, Educational attainment statistics.

If we make the assumption that individuals with higher levels of education, irrespective of their origin, exhibit greater resilience to business cycle fluctuations and that industries such as transportation, hotels, and restaurants tend to attract individuals with lower levels of education and therefore a higher proportion of foreign-born individuals, then it may be reasonably inferred that foreign-born people are more adversely affected by business cycle fluctuations compared to their Swedish-born counterparts. However, owing to the unavailability of data pertaining to place-of-birth-specific unemployment rates by educational level, age, and gender at the time of writing this article, further research is warranted to comprehensively investigate this subject.

[2]See Table 2 for a clarification on the International Standard Classification of Education (ISCED)

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6. Appendix

Table 1. Place-of-birth-specific Okun coefficients

Place of birth	15-64 y.o.	15-24 y.o.	25-49 y.o.	50-64 y.o.	R^2	N
			Both genders			
All	-0.221***	-0.660***	-0.222***	-0.110**	0.36	92
	(0.053)	(0.186)	(0.055)	(0.048)		
Swedish-born	-0.199***	-0.652***	-0.179***	-0.098**	0.35	92
	(0.049)	(0.185)	(0.049)	(0.042)		
Foreign-born	-0.304***	-0.551*	-0.383***	-0.316***	0.18	87
	(0.097)	(0.328)	(0.106)	(0.104)		
			Men			
All	-0.296***	-0.841***	-0.311***	-0.126**	0.49	92
	(0.055)	(0.178)	(0.056)	(0.062)		
Swedish-born	-0.254***	-0.767***	-0.235***	-0.127**	0.43	92
	(0.055)	(0.182)	(0.050)	(0.054)		
Foreign-born	-0.494***	-1.018***	-0.621***	-0.107	0.28	85
	(0.104)	(0.340)	(0.125)	(0.129)		
			Women			
All	-0.151***	-0.488**	-0.141**	-0.107***	0.20	92
	(0.057)	(0.181)	(0.065)	(0.052)		
Swedish-born	-0.153***	-0.521**	-0.121**	-0.094***	0.23	92
	(0.053)	(0.203)	(0.056)	(0.033)		
Foreign-born	-0.117	-0.122	-0.172	-0.196**	0.08	83
	(0.120)	(0.403)	(0.134)	(0.105)		

Notes: Sample period is from 1998 to 2020. N is the number of observations, the standard errors are in parantheses and significance at ***1% level, **5% level, *10% level.

Table 2. International Standard Classification of Education (ISCED)

Classification	Definition
ISCED 0	Early childhood education ('less than primary' for educational attainment)
ISCED 1	Primary education
ISCED 2	Lower secondary education
ISCED 3	Upper secondary education
ISCED 4	Post-secondary non-tertiary education
ISCED 5	Short-cycle tertiary education
ISCED 6	Bachelor's or equivalent level
ISCED 7	Master's or equivalent level
ISCED 8	Doctoral or equivalent level

Note: ISCED 2011 (levels of education).