The Effect of Higher Education Expansion on Subjective Social Status in Taiwan: A Mechanism-Based APC Analysis

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Introduction

This study investigated the effects of higher education expansion on individuals' subjective social status (SSS) among individuals in Taiwan over time, with a focus on gender differences. The original argument of SSS focused on its cross-national coherence that individuals intended to report their subjective social position in the middle on a 10-point scale because their reference group is not the entire society but the person around them, such as family, friends, and colleagues (Evans & Kelly 2004; Kelly and Evans 1995). Hence, researchers will obtain a more moderate viewpoint of social class rather than objective social status.

Recent studies have also proved this moderate viewpoint in individuals' life courses, arguing that SSS's transition is gentler than individuals' objective social status (Nolan & Weissttanner, 2022; Vigna, 2023). Therefore, these studies have assumed that individuals' reference groups are stable over time. However, this study argued that individuals' reference groups could change through individuals' life courses'. For instance, Wei (2022) investigated the migrant workers' SSS with a longitudinal dataset. He found that the change of reference group happened when migrant workers moved from rural areas to cities, which declined their SSS even after they moved back to the countryside. What's the effect of reference group change on individuals' SSS worth researchers to further investigate.

In many factors that influenced the composition of individuals' reference groups, this study focuses on higher education expansion in Taiwan for the following reasons. First, Taiwan's rapid expansion of higher education started in the mid-1990s, resulting in over 90% of college entrance rate among young adults. Second, studies are already pointing out how the expansion of higher education can harm young adults' earnings and occupational prestige, especially for elite students (Kuan et al. 2019; Kuan & Peng 2020). Similarly, this expansion also raises public concerns about the devaluation of a college degree due to credential inflation. This study believes that such a trend can effectively alter the composition of reference groups among individuals in Taiwan. Therefore, this study aims to investigate the effect of higher education expansion on individuals' SSS over time and across different birth cohorts.

At least two perspectives shed light on the impact of higher education expansion on individuals' SSS. One is the new institutional perspectives on educational sociology. Scholars argue that education not only enhances individual academic levels but also alters the composition of society (Baker, 2009, 2014; Meyer, 1979). Specifically, education enhances individuals' cognitive ability and makes them more self-aware of their health conditions (Baker et al., 2011) at the macro level. Furthermore, education expansion also contributed to gender equality by providing more opportunities for female students to pursue higher education (Tsai 2004) at the micro level. As a result, the education system has become an independent and crucial institution for conferring status. Additionally, it contributes to a more integrated global society in social and economic aspects, supports the legitimacy of certain states and societies, and provides a foundation for social movements (Schofer et al., 2021).

However, other scholars have identified the negative impact of higher education expansion, especially in increasing social inequality (Chmielewski, 2019; Domina et al., 2017; Zajacova & Lawrence, 2018). These scholars pointed out that the effect of education expansion is negative. It will widen the gap between advantaged and disadvantaged groups, polarize individuals' reference groups, and ultimately contribute to social inequality. Although these arguments hold different attitudes toward higher education expansion, the common ground is that higher education expansion did alter the composition of individuals' reference groups at both micro and macro levels. Hence, this study argues that analyzing the individuals' SSS transition under the changing reference group composition can provide insight into how social changes at the macro level affect individuals' self-evaluation at the micro level.

Further, since we are interested in long-term transition within a specific society before and after education expansion, such an effect can decompose into three time-related aspects. First, higher education can increase the likelihood of young people receiving higher education over time (Age effect). Second, as discussed above, it also altered the demographic composition and individuals' reference groups within a society(Cohort Effect). Finally, the timing of the survey related to the educational expansion may affect an individual's self-evaluation of SSS (Period effect). Therefore, the APC analysis is an appropriate method to estimate the impact of educational expansion over time, considering the effects of age, cohort, and period.

The problem with the APC decomposition method lies in its perfect collinearity among these time-related variables (Fosse & Winship, 2019a; 2019b; Yang & Land, 2013). Based on the review of different APC decomposition methods (Fosse & Winship 2019a), this article adopted the mechanism-based APC approaches by Fosse et al. (2020) as the currently most appropriate method for decomposing age, period, and cohort

effects for this study. The following sections will elaborate on our research design and present our preliminary findings with this specific method.

Research Design

1. Research Hypotheses

Based on the previous discussion regarding how the changing composition of the reference group can influence the change of individuals' SSS over time, this study formulates two contrasting research hypotheses that draw on both positive and negative views of higher education expansion.

Hypothesis 1: The first hypothesis based on the new institutionalist posits that when higher education becomes more widely accessible, more individuals can attain a higher education degree, increasing their social status. Hence, higher education expansion positively affects SSS at the individual and collective levels.

Hypothesis 2: Contrary to the new institutionalist perspective, the second hypothesis argues that as higher education becomes more widely accessible, the composition of the reference group changes and the perceived value of higher education degrees decreases. This decrease in perceived value can reduce individuals' social status, as attaining a higher education degree is no longer seen as a significant achievement. Moreover, the expansion also polarizes those with and without higher education. Hence, the expansion would depress SSS at individual and collective levels.

2. Research Methods: The Mechanism-based APC

This study will use the mechanism-based APC method that Fosse et al. (2020) proposed as our primary analytical strategy. This approach offers several advantages over other APC methods as it requires fewer statistical assumptions. Furthermore, by incorporating well-thought mechanisms, this method facilitates the establishment of causal relationships and can even lead to theoretical breakthroughs in ongoing debates.

The process of the mechanism-based APC analysis is based on the following three steps.

(1) The Linearized APC (L-APC) model

As described by Fosse et al. (2020), the L-APC model broke down the APC effect into two components: linear and non-linear. Fosse et al. (2020) argued that collinearity only arises in linear relationships. Therefore, assuming the non-linear component is negligible, researchers can derive the expression for the linear APC relationship (Equation 1). In this equation, the asterisk denotes the composition of APC slopes, and

v represents a specific value used to evaluate the method. L-APC estimation involves calculating the slope of the unknown APC effect at a particular value. Fosse et al. (2020) contended that this approach allows for exploring age, period, and cohort effects with fewer methodological assumptions.

$$\alpha^* = \alpha + \nu$$

$$\pi^* = \pi - \nu \qquad (1)$$

$$\gamma^* = \gamma + \nu$$

(2) Bounding Analysis

Furthermore, Fosse et al. (2020) combined the previous expression to obtain Equation 2. In Equation 2, θ_1 represents the combination of age and period effects, while θ_2 refers to the combination of period and cohort effects. They proposed that θ_1 and θ_2 could comprise a canonical solution line, with θ_1 as the upper limit and θ_2 as the lower limit. Researchers can use this canonical solution line and its corresponding plot to examine age, period, cohort variations, and effects on the dependent variable of interest. Importantly, this approach also provides researchers with information to constrain one of the APC variables to achieve interval estimation of APC effects, which can also be applied in the structural equation modeling (SEM) analysis of the mechanism-based APC.

$$\theta_1 = \sigma + \pi \qquad (2)$$

$$\theta_2 = \pi + \gamma$$

(3) The mechanism-based APC

Fosse et al. (2020) further proposed that researchers can incorporate mechanisms to replace one of the APC effects using the information provided by previous bounding analysis. This approach aligns with Pearl's (2000) front-door strategy and enables researchers to evaluate the individual effects of APC variables. The method is straightforward, requiring researchers to substitute one of the APC variables with mechanisms using a structural equation model. For instance, Altman and Bachmeier (2021) used the BMI index in 25-year-olds, educational level, and media effect to replace the cohort effect when examining the impact of obesity on individuals' objective and subjective health status. To conduct sensitivity tests, Fosse et al. (2020) suggested incorporating the linear and non-linear effects of the substituted APC variables into models to determine whether their impact has been entirely accounted for.

3. Data and Measurement

In this study, we utilized multiple waves of data from the Taiwan Social Change Survey (TSCS) to conduct the mechanism-based APC analysis and estimate the impact of educational expansion on individuals' subjective social status (SSS). The TSCS is a nationally representative dataset that asks many same questions every five years, providing rich information for investigating the influence of educational expansion on SSS. Our sample included data from surveys conducted in 1992, 1997, 2002, 2007, 2009, 2012, 2017, and 2019, with a total analytical sample size of 12,970 cases after excluding individuals younger than 20 and older than 65.

There is one thing worthy of mentioning. This study will separate the male and female samples to analyze the higher educational expansion on individuals' SSS. Scholars have argued that males' and females' occupational trajectories are different—females' trajectories are—influenced by marriage and childbirth, resulting in a U-shape course (Goldin 1994). Besides, past studies have found that when married female respondents evaluate their social status, they will consider their spouse's status (Kuan 2006). Last, scholars studied the relationship between SSS and their health conditions and found different patterns in male and female respondents (Karvanen & Rahhonen 2011). Hence, separating the male and female samples will simplify the complexity of our analysis.

In this study, we investigate the impact of higher education expansion on subjective social status (SSS), which is assessed by interviewees on a 10-point scale ranging from one (indicating the lowest societal position) to ten (indicating the highest). We measure higher education expansion at both individual and collective levels. At the individual level, we use the highest level of education attained as a proxy for the influence of higher education expansion. At the collective level, we use the proportion of college students in the population at age 18 as an index of higher education expansion, representing its effect on the social-demographic composition of society. Additionally, we consider several variables that may mediate the relationship between age and SSS, including occupation and income (Chang and Tan 2014; Pappitz 2016), working status (Autin et al. 2016; Demakakos et al. 2008), religious beliefs (Chen and Williams 2016), and marital status (Hu et al. 2005), based on previous studies.

Preliminary Findings

We present our preliminary findings following Fosse et al.'s (2020) suggested order for the mechanism-based APC analysis. Figure 1 shows the results of the bounding analysis, which mainly explores the temporal variation of the effects of age, cohort, and period on individuals' SSS. Figure 2 and Figure 3 shows the male and

female results separately.

The results of the bounding analysis (Fosse and Winship 2019a, 2019b; Fosse et al. 2020) suggest that we should constrain the age effect. Figure 1 illustrates that after constraining the age effect, individuals' SSS was affected by cohort and period differences. We found that individuals' SSS during specific periods, such as the Asian financial crisis in the 1995-1999 interval, the Internet bubble in the 2000-2004 interval, and the Financial Crisis in the 2010-2014 interval, was lower than those of other periods. The results also indicated cohort differences in individuals' SSS and identified a turning point in the 1960-1964 cohort. Those born after this time have higher SSS than those born before.

(Figure 1 should be here)

The results of the mechanism-based APC analysis of the male sample presented in Figure 2 show that, except for income, our proposed mechanisms thoroughly explain the direct effect of age on individuals' SSS. However, in the cohort part, our proposed mechanism does not entirely substitute the cohort effect, indicating the presence of some non-linear relationships between cohort and individuals' SSS that were not captured in the proposed mechanism. Furthermore, the results of the period effect suggest a negative impact on individuals' SSS. On the other hand, the analysis also found a positive impact of higher education expansion on both the collective and individual levels. Higher education expansion increases individuals' years of education, leading to an increase in their SSS. The study also reveals that institutional transitions can alter the composition of social-demographic groups by providing more opportunities for people to attend higher education, as previous researchers have expected (Baker, 2009, 2014; Meyer, 1979).

(Figure 2 should be here)

The result of the female sample, presented in Figure 3, is quite similar to the male sample. Our proposed mechanisms mediated the age effect. The mechanical effect on individuals' SSS reveals the same pattern as their male counterparts. A similar pattern can also be found in the cohort part. Our indicator for higher education expansion positively affects individuals' SSS. However, the only difference is that the indicator for the mechanism mediation power in the cohort aspect has no impact on individuals' SSS. Further, the indicator of higher education expansion also helps the female sample's highest educational years, which fits our hypothesis 1. The period effect negatively affects individuals' SSS, the same as the male sample.

(Figure 3 should be here)

The results from our mechanism-based APC analysis support our research hypothesis 1, which suggests that higher education expansion positively affects individuals' SSS. Further, the gender differences are not as wide as this article assumed initially. This pattern may be related to higher education expansion and the increasing female labor participation rate, which aligns with what scholars argued about the positive effect of education expansion (Baker 2009, 2014; Meyer 1979; Tsai 2004). However, this finding raises three more questions that require further investigation. Firstly, previous research has shown a negative relationship between educational expansion and objective social status (such as income and occupational prestige) at the individual level (Kuan et al. 2019). Whether such a relationship holds at the collective level remains to be seen, and further investigation is needed. Secondly, our results show that older interviewees tend to report lower SSS. Exploring the relationship between this phenomenon and their health conditions is important. Lastly, Taiwan's industrial conditions so far are relatively stable. Hence, it is crucial to investigate whether ongoing rapid global socioeconomic changes affect individuals' SSS in Taiwan.

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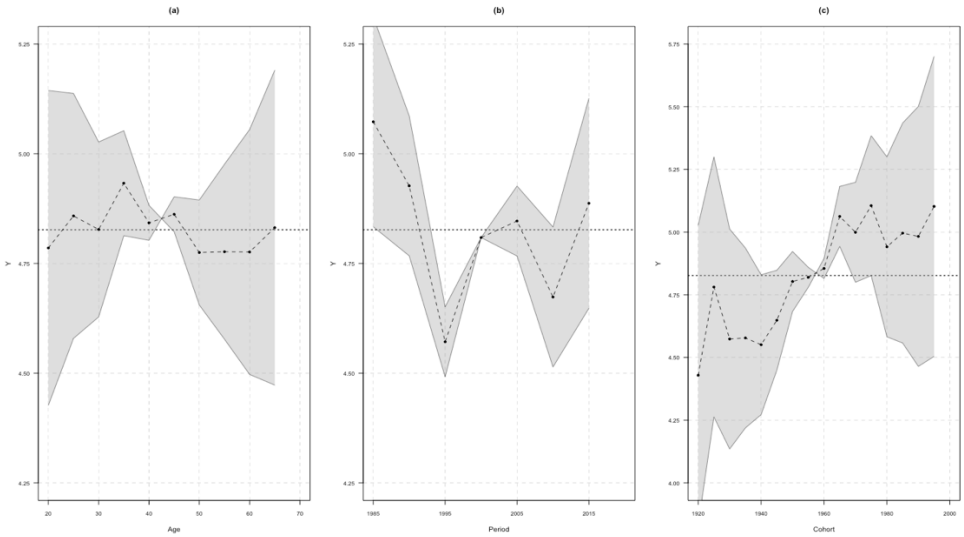

Figure 1 Bounding Analysis: Constraining on Age Effect

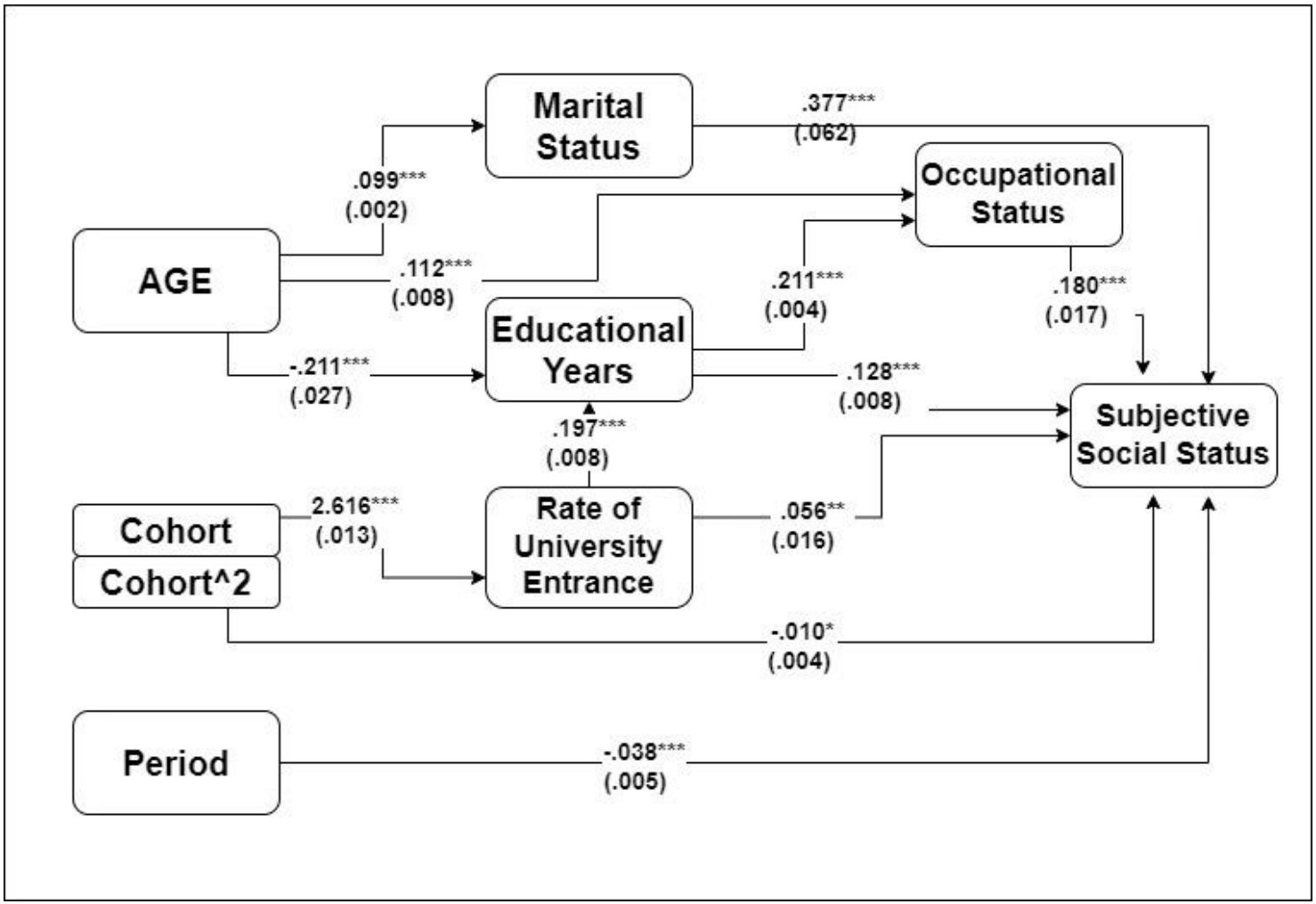

Figure 2 Male Sample Result of Mechanism-Based APC: Showing only APC-related Parts

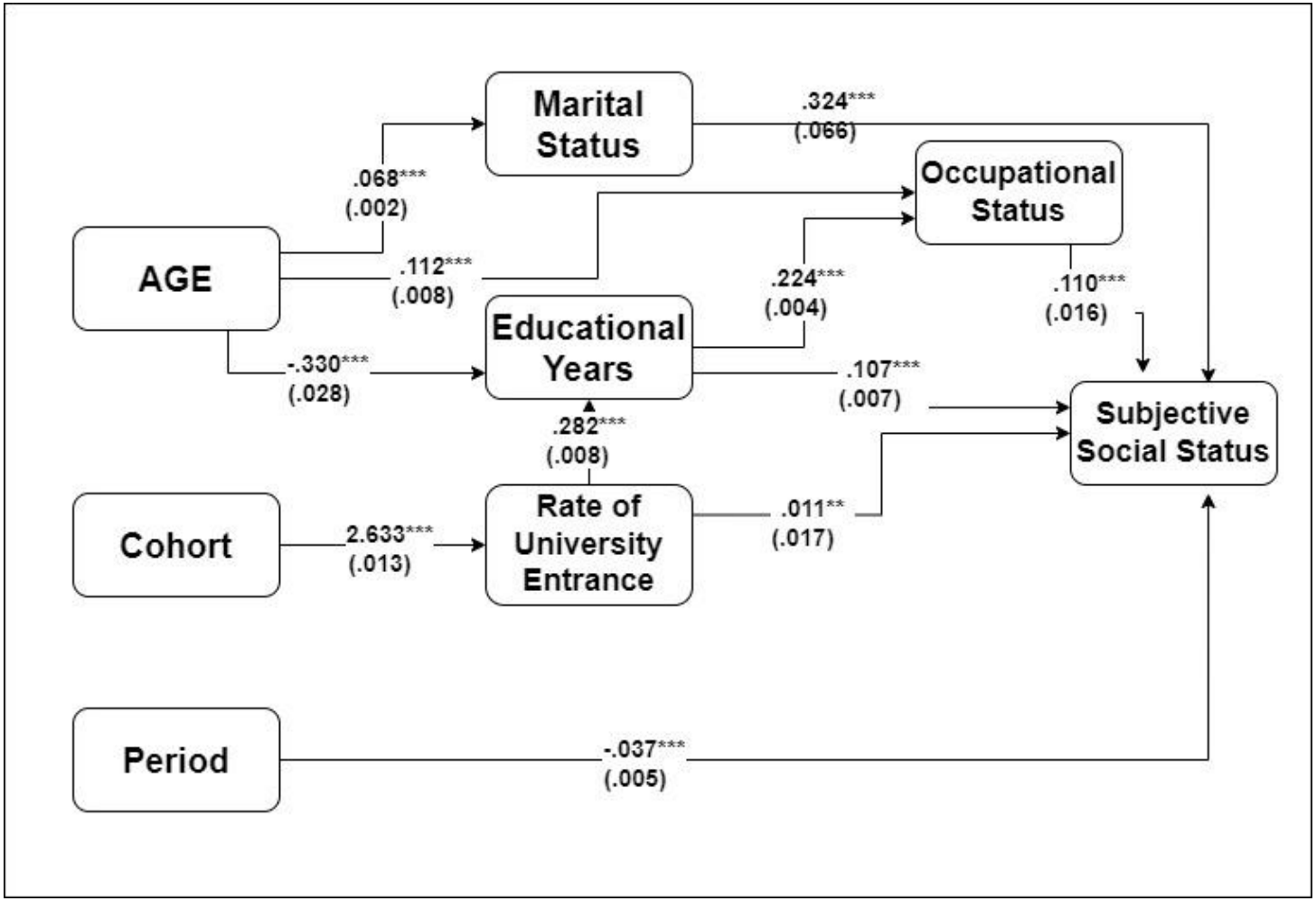

Figure 3 Female Sample Result of Mechanism-Based APC: Showing only APC-related Parts