

THE IMPLICATIONS OF EARLY INDEPENDENCE ON FUTURE FINANCIAL WELL-BEING AMONG UK YOUNG PEOPLE: A LONGITUDINAL ANALYSIS WITH PSM-DID

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ABSTRACT

Leaving biological parents represents a significant turning point in young adults' early independence, and the timing of this independence tends to influence their future outcomes. This research explores the implications of leaving biological parents on young adults' financial situation in their later life. The analysis used data from Wave 1-12 of Understanding Society. More importantly, this paper employed PSM and DID methods to determine the casual effects of leaving age on the future financial situations. The result suggests that the age when leaving biological parents significantly influences future economic well-being. Specifically, leaving before 16 years old would negatively affect future economic well-being compared to people leaving after 16, while leaving before 26 years old would cause positive impacts on future economic well-being compared to those who leave after 26. Thus, between 16-26 years old is an optimal age range for young adults to be independent.

Keywords: leaving home, PSM, DID, economic well-being, Understanding Society.

1. INTRODUCTION

A life course is defined as a series of socially recognized events and roles a person partakes in their life (Elder & Giele, 2009). Studies using the life-course perspective focus especially on the timing and sequencing of age-related life transitions (Neugarten et al., 1965). To elaborate the life course perspective further, early experiences go through a process of accumulation and are reflected in the outcomes many years later. For instance, events such as marriage, divorce, engagement in crime, or disease incidence occurring in individuals' early ages will influence their future decisions.

Young adults in modern society are experiencing life courses that are dramatically different from those at any point in human history. This difference can be detected in the definition of adulthood. Specifically, adulthood nowadays is delayed and less predictable. This delay and unpredictability of adulthood are represented by the asynchrony between legal and actual adulthood when individuals are equipped with the capacity to live independently. Several social factors cause this phenomenon. First, the broad implementation of secondary and mass higher education has established a phase of institutional separation for people between the ages of 15 and 20 (Husén, 1987). This institutional segregation is especially severe in China, where mass education is employed. Since an increasing number of young people spend a longer time in education, the adulthood of young people these days is delayed and becomes more challenging. Furthermore, modern people tend to emphasize credentialism, thus regarding the educational level as the most important criterion for evaluating a person's ability to acquire certain jobs. This biased social ideology forces young people to pursue higher diplomas. However, this endless pursuit of higher academic qualifications might reduce young adults' ability to maintain an independent livelihood

when they are actually in legal adulthood. As a result, the reliance on parents' money to pay tuition and life expenses requires young adults nowadays more recourse to become independent.

After realizing the delayed independence in modern society, understanding its influence on young people's future financial well-being therefore becomes significant. To be specific, comprehending the implication of leaving age from parental house on future outcomes can be beneficial from various perspectives. First, parents can provide suggestions to their children regarding the optimal time to move out, ensuring they will get better financial well-being. Besides, the government can develop targeted policies and programs that support young adults at critical times, thus reducing youth unemployment and poverty. These policies or programs might include housing subsidies, educational grants, and financial literacy programs aimed at specific groups. Most importantly, economists can more precisely anticipate labor market trends, such as workforce mobility and the availability of young workers. Leaving home at an appropriate age reduces future financial stress, resulting in a more stable and productive workforce, thus being conducive to the broader economy.

2. LITERATURE REVIEW

2.1 Factors affect early independence

Some scholars have identified various factors that can influence the age at which young people leave their parental houses. Specifically, in 1993, researchers found that women are more likely to leave home at an earlier age than men (Buck & Scott, 1993). In 1989, scholars discovered that the number of children in the family, sex of the child, and region act as crucial factors in predicting the age of departure from parent houses (Mitchell et al., 1989). In 1991, a survey suggested that high levels of transferable parental resources expedite the process of leaving home, whereas high levels of non-transferable parental resources hinder it (Gierveld et al., 1991). In 2007, studies showed that the perceived opinions of parents and the perceived housing market situation have correlations with the actual timing of leaving the parental house (Billari & Liefbroer, 2007). In 2018, research concluded that the timing and pattern of achieving financial independence during the transition to adulthood impact early adult financial well-being (Bea & Yi, 2019).

2.2 Implications of early independence on financial well-being

However, most of the existing investigations only show the factors affecting the timing of departure from parental houses rather than the influence of the leaving age itself. In other words, though the reason for early independence has been investigated thoroughly, few studies have focused on the influence of early independence on future outcomes.

It deserves to gain more attention from scholars that the time of independence can cumulatively affect young people's future financial well-being. Young adults are more inclined to build capabilities in adapting to new environments, money management, and coping with adversity and setbacks if they leave their parental home early since they are equipped with more social experiences. On the other hand, early independence can also lead to negative results. Without formal education, young people tend to earn low incomes and perhaps struggle with finding a stable residence. In addition, transitioning to independent living at an early age often postpones marriage, encouraging young people to embrace less traditional family values and adopt more egalitarian views compared to those who remain in their parental homes (Goldscheider & Waite, 1986). Therefore, whether early independence is beneficial to young people's future financial status or not has still not been fully answered. In other words, the optimal age of leaving the parental house, a representation of independence, is worthy of an investigation.

Of more significance, the existing research related to leaving age and financial independence is mostly considered explorations of correlations rather than casual effects. Thus, one of the most important contributions of this paper is the methodology being used to show casual effects.

2.3 The longitudinal effect of independence on financial well-being

Furthermore, many existing papers explore the casual effects only with cross-sectional data but rarely use panel data for analysis, which performs better when considering the time dimension. Recent research suggests that individuals' perceptions of financial well-being can vary from day to day (Totenhagen et al., 2018). However, traditional methods, such as cross-sectional methods, may mask these changes (Sorgente et al., 2021). Therefore, the second significant contribution of this paper is the consideration of time dimension with the application of panel data in examining the dynamic changes in an individual's future financial outcome. Given the significance of this field and the limitations of existing literature, this research aimed to determine the casual effect of young adults' early independence on future financial outcomes.

Prior to conducting the quantitative analysis, hypotheses were formulated:

H1: A lower age of leaving the parental house can lead to young people's higher future financial well-being (including subjective financial situation and objective income).

H2: A higher age at which young people leave their parental homes can lead to their higher future financial well-being (including subjective financial situation and objective income).

H3: The age of leaving the parental house has no correlation with future financial well-being (including subjective financial situation and objective income).

3. DATA AND METHODOLOGY

3.1 Sample

This paper utilized data from Understanding Society, a long-term household panel survey spanned over 20 years. The study was based at the Institute for Social and Economic Research at the University of Essex. Significantly, Understanding Society was built on the successful British Household Panel Survey (BHPS), administered from 1991 to 2009 and involved approximately 10,000 households. Understanding Society began in 2009 and interviewed around 40,000 households, including 8,000 original BHPS households. This research used data from the BHPS and UKHLS to form the analytical sample (Understanding Society User Guide, 2017).

The analysis of this study was divided into two sections. In the first section, a sample from UKHLS Wave 1 and Wave 2 was used for a cross-sectional propensity score matching analysis. After screening, I merged the data from the two waves to form a sample of 3249 observations. The sample involved individuals between 15 and 76 years old: 1682 men and 1567 women. The second section of the analysis was a longitudinal PSM-DID analysis. For this part, I appended the data from BHPS and UKHLS together to enlarge the sample size. The BHPS sub-sample merged the last wave of BHPS and Wave 2 to Wave 12 of UKHLS. The UKHLS sub-sample merged Wave 1 to Wave 12 of UKHLS together. Then, the two sub-samples were appended. I further screened the sample by keeping only those living with at least one of their biological parents at the starting year. After data cleansing, the sample size was 663, involving individuals between 14 to 25 in 2009.

3.2 Method

This research consists of two sections: The first was a cross-sectional propensity score matching. Before matching, 'psestimate' command, proposed by Imbens and Rubin in 2015, was used to

select a linear or quadratic function of covariates to include in the estimation function of the propensity score. The second section was a PSM-DID (propensity score matching and difference-in-difference).

3.2.1 Cross-sectional Propensity Score Matching

In the first section, the confound variables were screened with 'psestimate'. Following this, propensity score matching (PSM), a technique used for making causal inferences in non-experimental settings (Luvsandorj, 2023), was employed to explore the casual effects between the age of living in the parental home and future subjective financial situation and objective income. PSM allows researchers to balance the treatment groups on confounding variables to make them comparable with control groups. Specifically, this method can remove confounding bias from observational cohorts where the benefit of randomization is not possible. PSM reduces the effects of confounding factors by matching already treated subjects with control subjects who exhibit a similar propensity for treatment based on preexisting covariates that influence treatment selection. Thus, it establishes a new control group by discarding outlier control subjects. This new control group can reduce the unwanted effects of covariates, allowing for a more accurate measurement of the intended variable (Kane et al., 2020). After matching, I ran tests to check the balance of the matching process. Subsequently, I added the generated weight from PSM into the linear regression model to better determine whether leaving age is significant among the factors influencing future financial well-being. It should be noted that I used variables from a later wave to measure the future outcomes of early independence. Since the retrospective timing of leaving home was only asked in the first wave, the effect of leaving home might occur at a later age. Therefore, I used the variable from the later wave as the outcome.

3.2.2 Models of propensity score matching (PSM) and linear regression

For individual i , there are two possible outcomes based on whether the treatment is applied or not.

$$y_i = \begin{cases} y_{1i}, & \text{if } D_i = 1 \\ y_{0i}, & \text{if } D_i = 0 \end{cases} \quad (1)$$

D_i indicates whether individual i receives a particular treatment, with 1 representing treated and 0 representing untreated; y_{1i} denotes the outcome for the individual when they receive the treatment; y_{0i} denotes the outcome for the individual when they do not receive the treatment.

Under the given observable characteristic x_i , the probability that individual i enters the treatment group is:

$$P(x_i) = P_r(D_i = 1 | x = x_i) = E(D_i | x_i) \quad (2)$$

According to equation (1) and (2), the Average treatment effect on treated (ATT) can be estimated using the following formula:

$$\begin{aligned} \text{ATT} &\equiv E\{y_{1i} - y_{0i} | D_i = 1\} \\ &= E[E\{y_{1i} - y_{0i} | D_i = 1, p(x_i)\}] \\ &= E[E\{y_{1i} | D_i = 1, p(x_i)\} - E\{y_{0i} | D_i = 0, p(x_i)\} | D_i = 1] \end{aligned} \quad (3)$$

The treatment is predicted with a logistic regression. The outcome is predicted with a linear regression:

$$\begin{aligned} \text{Treatment} &= \text{cons} + \beta_1 \text{Gender} + \beta_2 \text{Age} + \beta_3 \text{Ethnicity} + \beta_4 \text{Fajob} + \beta_5 \text{IntAct} + \varepsilon \quad (4) \\ \text{Outcome} &= \text{cons} + \text{ATT} * \text{Treatment} + \beta_1 \text{Gender} + \beta_2 \text{Age} + \beta_3 \text{Ethnicity} + \beta_4 \text{Fajob} + \beta_5 \text{IntAct} + \varepsilon \end{aligned} \quad (5)$$

Then, I conducted a linear regression to compare the coefficients and significant level of the treatment with the ATT from the PSM model. The linear regression model is:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 \dots + \beta_n X_n + \epsilon \quad (6)$$

In this research, the linear model implemented the following dependent variables and covariates:

$$\text{FutureObj} = \text{ATT} * \text{Treat} + \beta_1 \text{FutureX}_i + \beta_2 Z_i + \epsilon \quad (7)$$

$$\text{FutureSbj} = \text{ATT} * \text{Treat} + \beta_1 \text{FutureX}_i + \beta_2 Z_i + \epsilon \quad (8)$$

The dependent variables are objective income and subjective financial situation from Wave 2 (2010). The treatment is leaving parental house before 16 from Wave 1 (2009). The *FutureX_i* is a vector of individual covariates from future wave. *Z_i* is the vector of variables used for matching from the Wave 1.

The complete model is displayed as following:

$$Y1 = \alpha + \beta_1 \text{lvage} + \beta_2 \text{ag} + \beta_3 \text{eth} + \beta_4 \text{fajb} + \beta_5 \text{gd} + \beta_6 \text{conf} + \beta_7 \text{empstat} + \beta_8 \text{mar} + \beta_9 \text{edu} + \epsilon \quad (m1)$$

$$Y2 = \alpha + \beta_1 \text{lvage} + \beta_2 \text{ag} + \beta_3 \text{eth} + \beta_4 \text{fajb} + \beta_5 \text{gd} + \beta_6 \text{conf} + \beta_7 \text{empstat} + \beta_8 \text{mar} + \beta_9 \text{edu} + \beta_{10} \text{inc} + \beta_{11} \text{incsat} + \beta_{12} \text{lfsat} + \beta_{13} \text{finfut} + \epsilon \quad (m2)$$

3.2.3 Measurements of variables

The outcome variables were objective income (m1) and subjective evaluation of current financial situation (m2). Objective income was measured by individual annual net income. The subjective financial situation was measured by a scale rating from 1 to 5, where 1 signifies ‘living comfortably’ and 5 signifies ‘finding it very difficult.’

Individual future variables were measured by confidence about yourself (β_6), employment status (β_7), marital status (β_8), educational level (β_9) in model 1, and income (β_{10}), income satisfaction (β_{11}), life satisfaction (β_{12}), future financial expectation (β_{13}) in model 2. Individual matching variables were measured by leaving age from the parental house (β_1), age (β_2), ethnicity

(β_3), father's working status (β_4), and gender (β_5). The treatment was leaving age, which was a categorical variable with 1 representing leaving biological parents before the age of 16 and 0 representing not leaving biological parents. Ethnicity was recorded as a categorical variable, with 1 indicating local white people in Britain, 2 indicating other non-local white people, and 3 indicating nonwhite people. Besides, the father's working status was measured by a binary variable where 1 indicated the father was working, while 0 indicated the father was not working, deceased, or not living with the respondents. In addition, employment status was also recorded as a categorical variable with 1 denoted employed, 2 unemployed, and 3 out of the labor force. Educational level was treated as a continuous variable where a higher value indicated higher educational attainment. Marital status was a binary variable, where 0 represented never married and 1 represented married or had a partner once. Self-confidence was measured by a scale rating from 1 to 5, where 1 signifies 'very confident' and 5 signifies 'not confident at all'. Life and income satisfaction were also determined by a scale of 1 to 7 where 1 represents 'completely dissatisfied' and 7 represents 'completely satisfied.' The future financial expectation was measured by a scale rated from 1 to 3, where 1 representing 'better off,' 2 representing 'about the same,' and 3 representing 'worse than now.'

3.2.4 Prior assumptions of propensity score matching (PSM)

Common Support Assumption: For any possible value of x_i , $0 < p(x_i) < 1$. This assumption implies an overlap between the treatment group and the control group for this variable, which is a prerequisite for matching.

Balancing Assumption: Given $p(x_i)$, D_i is independent of x_i . This assumption implies that for a given $p(x_i)$, the treatment is assigned randomly. In other words, prior to receiving the treatment, there are no differences between the treatment group and the control group, and any effect observed in the treatment group is entirely due to the treatment.

3.2.5 Regular process of propensity score matching (PSM)

The investigation of the casual effects using propensity score matching involve six steps:

Step 1: Using 'psestimate' command to select the covariates. In order to better ensure balance of the covariates between the treated and control groups, using 'psestimate' command to select the covariates at the very first is necessary.

Step 2: Estimating propensity scores. By employing logistic regression model with treatment group as the dependent variable and the balancing factors as predictors, the value of propensity score can be obtained (Staffa & Zurakowski, 2018).

Step 3: Pairing individuals from the control group with those from the treatment group can be done based on their propensity scores, ensuring that all factors are balanced. In this analysis, the nearest neighbor matching method was utilized.

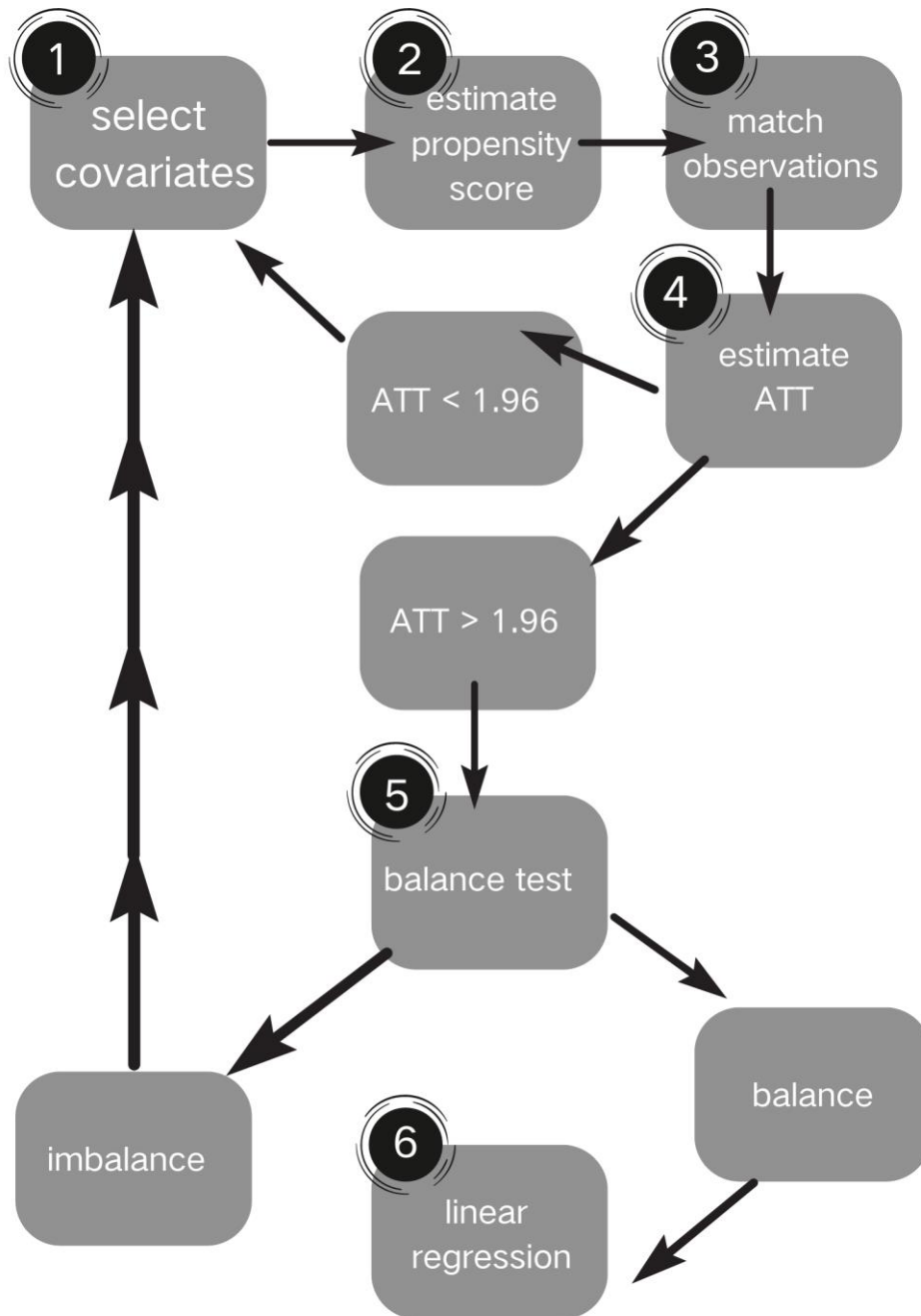
Step 4: Estimating ATT. With the purpose of investigating whether leaving parental house at the age of 16 (treatment) has positive or negative effect on future financial well-being (outcome), the average treatment effect on treated (ATT) ought to be quantified and examined for interpretation.

Step 5: Evaluating data balance. In attempt to make sure the propensity matching procedure conforms with the prior balancing assumption, the matching result should be assessed with balance diagnostics, graphically or analytically.

Step 6: Conducting linear regression model. I used subjective financial situation and objective income separately as the outcome among treatment groups in linear regression model.

The visualization of the PSM regular process can be seen in the following figure.

Regular process of propensity score matching (PSM)



3.2.6 Longitudinal PSM-DID

Though PSM technique can reduce selection bias by reducing systematic differences of observable characteristics of participants and non-participants, systematic differences may arise from characteristics that are not detectable with the available data. For instance, there may be variations in internal motivation between participants and non-participants. To mitigate this selection bias, the effect of these unobservable traits is controlled for by subtracting the average outcome values of non-participants from those of participants, before and after implementing a program Difference in Differences (DiD). Consequently, applying a conditional DiD estimator (PSM-DiD) to assess the effects of a treatment may greatly enhance evaluation results by minimizing the selection bias. The process of PSM-DID is complicated while there are several common practices in relevant studies. For example, there is a matching at each year, or there is a matching at the pre-treatment period. For matching at each year, the attritions across waves will contribute to higher bias, and thus this research adopted the second choice. The sample for the analysis of PSM-DID were young people aged between 14 and 25 years old at the time of interview of wave 2009 and who were still living with parents. The treatment was different from that of the first section of analysis. The treatment for the longitudinal PSM-DID was ‘whether respondent stop living with biological parents before the age of 26.’ According to the UK government, the average age of young people of moving out of parents’ home is 26.2 (Eurostat, 2023). Therefore, leaving parental home before the age of 26 indicates independence earlier than the average. The time of treatment was manually set to year 2017 because most of the sample would be around 26 years old by that time.

The longitudinal PSM-DID involved two steps of analysis. First, I ran a PSM with cross-sectional characteristics of the pre-treatment period. The matching method was nearest neighbor matching. The PSM was conducted by the ‘psmatch2’ package of Stata, and the weight obtained was passed onto other periods. The second step was a DID with panel data from wave 2009 to wave 2020. The weight from PSM of the last step was used in the DID model for the analysis of causal effects between control and treated group. In the PSM-DID model, I incorporated two-way fixed effects at individual and time level.

Estimate the propensity score: $P(X_i)$, which reflects the probability of receiving treatment based on the covariates X_i .

$$P(X_i) = P_r(T_i = 1 | X_i) \quad (9)$$

Apply the DID model on the matched sample to estimate the treatment effect.

$$Y_{it} = \alpha + \delta Post_t + \gamma T_i + \theta(T_i * Post_t) + \varepsilon_{it} \quad (10)$$

Incorporate the individual fixed effects and time fixed effects in the PSM-DID model.

$$Y_{it} = \alpha_i + \delta Post_t + \gamma T_i + \theta(T_i * Post_t) + \lambda_t + \beta X_{it} + \varepsilon_{it} \quad (11)$$

In the final model, α_i is the individual specific time-invariant characteristics such as gender and ethnicity. λ_t is the time fixed effect which is a categorical indicator control for the year. It is constant across all units but vary over time t . βX_{it} is a vector of covariates for everyone i at time t .

4. RESULTS

4.1. Propensity score matching

Before doing PSM, I selected the covariates used for matching with the command ‘pestimate’ in Stata. According to the results, among many individual background variables, the variable of father’s occupation had the most significant performance. Thus, I used it as a covariate in the benchmark model. The other variables such as gender, ethnicity, and age as covariates was treated as to be selected. The first order covariates selected were father’s occupation, ethnicity, age, and gender. The second order covariates were the interaction term between age and father’s occupation, age and ethnicity, age and age, ethnicity and father’s occupation (See Appendix). Then I used psmatch2 command to generate the propensity score and matched these variables between the treatment group and the control group. Table 1 presents the result of propensity score matching and the value of ATT.

Table 1. PSM results with subjective financial situation as outcome

Leaving home at the age of 16	Coefficient	Std. err.	P>z	
Father’s working status	-1.753	0.339	0.000	
Ethnicity	-0.821	0.176	0.000	
Age	-0.091	0.032	0.004	
Gender	0.04	0.085	0.634	
Age # Father’s job	-0.038	0.012	0.001	
Ethnicity # Father’s job	0.326	0.103	0.002	
Age # Ethnicity	0.017	0.007	0.018	
Age # Age	0.001	0	0.038	
_cons	2.952	0.561	0.000	
P-value	0.000			
Pseudo R2	0.146			
Number of obs	3,249			

Variable	Sample	Treated	Controls	T-Stat
Subjective financial situation	ATT	2.518	2.396	2.23

Treatment assignment	common support	Total
	off support	on support
Untreated	12	2,253
Treated	0	984
Total	12	3,237

In table 1, the matching result shows that the amount of sample in common support is 3,249. Confounding variables in this case are gender, father’s occupation, age, ethnicity, the interaction term between age and father’s occupation, age and ethnicity, age and age, ethnicity and father’s occupation. P-value < 0.001 indicates that the model is statistically significant overall. The R-squared is 14.55%, which might be perceived as a relatively low value in the first sight. However, the reason to use propensity scores is to create balanced groups on the set of covariates. R-squared, the plausibility of the selection model, and any other considerations about the propensity score model are irrelevant, except for its ability to achieve balance on the covariates (Ho et al., 2007). Thus, the R-squared is not necessary in assessing the effectiveness of the propensity score at achieving balance and should be neglected. Most of the treated observations (984 out of 984) and control observations (2,253 out of 2,265) are on support, which suggests that the matching process was successful in finding comparable treated and control units. This further ensures the validity of the conclusion, which is that early independence is unfavorable to individual’s perception of future subjective financial status.

The ATT value is 2.5, which is positive and significant at 5% level. Higher value of outcome variable indicates worse perception of financial states in 2010 (see 3.2.3 Measurements of variables). This result suggests that leaving biological parents before the age of 16 will have lower subjective financial situation when growing up than those who did not. The coefficient of the confounding variables indicates that father’s occupation has negative correlations with subjective financial situation. This negative coefficient suggests that having a father who has stable job can lead to lower chance of leaving parental house at the age of 16. Negative coefficient of ethnicity reflects that non-white people living in Britain have higher chance of leaving parental house at the age of 16. Furthermore, positive coefficient of gender variable reveals that women are more likely to leave house at the age of 16 than men.

Table 2. PSM results with objective income as outcome

Leaving home at the age of 16	Coefficient	Std. err.	z	P>z
Father’s working status	-1.753	0.339	-5.18	0.000
Ethnicity	-0.821	0.176	-4.67	0.000
Age	-0.091	0.032	-2.87	0.004
Gender	0.040	0.085	0.48	0.634
Age # Father’s job	-0.038	0.012	-3.18	0.001
Ethnicity # Father’s job	0.326	0.103	3.17	0.002
Age # Ethnicity	0.017	0.007	2.37	0.018
Age # Age	0.001	0.000	2.07	0.038
_cons	2.952	0.561	5.26	0.000
P-value	0.000			
Pseudo R2	0.1474			
Number of obs	3,249			
Variable	Sample	Treated	Controls	T-stat
Objective income	ATT	557.637	531.212	0.800
Treatment	common support			

assignment	off support	on support	Total
Untreated	4	2,488	2,492
Treated	0	1,066	1,066
Total	4	3,554	3,558

Table 2 presents the result of matching procedure when using objective income as outcome. The matching result shows that the amount of sample in common support is 3,558. Most of the treated observations (1066 out of 1066) and control observations (2488 out of 2492) are on support, which suggests that the matching process was successful. Confounding variables are same with table 1. A P-value smaller than 0.001 and 14.47% R-squared indicate that the model is statistically significant overall. The ATT value is 557.6, which is positive but not significant at 5% level. This result suggests that leaving biological parents before the age of 16 will not significantly influence individual's objective income.

Table 3 presents the balancing test result of the matching procedure. According to table 3, the t-test before matching shows a significant difference (P=0.000), while after matching, the p values for the t-test among all the variables are higher than 0.05. This result indicates that the matching procedure has successfully satisfied the balancing assumption. In addition, the column of V(T)/V(C) compares the variance of the treated group (T) to the control group (C) for each covariate. Values close to 1 indicate similar variances, suggesting good balance. For instance, the variance for ethnicity in the unmatched data was 0.92, but after matching, it was 1, showing that the variance became more similar between the treated and control groups. These results show that this matching procedure performed well, and therefore satisfied the previous balancing assumption. Figure 1 further illustrates the distribution of propensity scores for both the treated and untreated groups, helping to assess whether the matching process has successfully balanced the covariates between these groups. The graph displays a generally symmetrical pattern, especially in the central range of propensity scores (around 0.1 to 0.6). The green bars (representing the treated group) and the red bars (representing the untreated group on support) are closely aligned, indicating that the matching process have successfully paired individuals from both groups with similar propensity scores. The minimal presence of blue bars (untreated off support) also contributes to the symmetry of the graph. This suggests that most untreated individuals had propensity scores that overlapped with those of the treated group, reinforcing the idea that the matching process had effectively balanced the groups.

Bias of the data, showed in the column in table 3, is a measure of the difference in the covariates between the treated and control groups. A lower bias indicates better balance. One can draw the conclusion from figure 2, which is a further visualization of the reduction in bias, that before matching the bias was fairly high, while the matched dots were closely aligned on the 0% line, indicating the near elimination of bias. This result suggests that the matching procedure successfully reduced biases.

Table 3. Balancing test result of matching procedure

Variable	Unmatched		Mean		t-test		V(T)/	
	Matched	Treated	Control	%bias	t	p>t	V(C)	
Father's job	U	0.54	0.89	-83.6	-25.42	0.00	.	
	M	0.55	0.55	0	0	1	.	
Ethnicity	U	1.53	1.6	-8.1	-2.21	0.03	0.92	
	M	1.53	1.52	1.1	0.24	0.81	1	
Age	U	21.85	24.63	-31.6	-8.32	0.00	0.53*	
	M	22.06	21.95	1.2	0.32	0.75	1.05	
Gender	U	1.52	1.49	5.4	1.52	0.13	1	
	M	1.53	1.52	1.4	0.3	0.76	1	
Age # Father's job	U	10.91	21.2	-88.7			0.80*	
	M	11.1	11.09	0	0.01	1	1	
Ethn # Father's job	U	0.77	1.37	-63.4	-17.2	0.00	0.94	
	M	0.79	0.78	0.9	0.21	0.84	1.02	
Age # Ethnicity	U	32.1	37.22	-21.6	-5.81	0.00	0.76*	
	M	32.36	31.82	2.3	0.55	0.59	1.03	
Age # Age	U	487.8	659.26	-27.7	-7.28	0	0.50*	
	M	501.07	493.31	1.3	0.33	0.74	1.05	

Sample	Ps R2	LR		MeanBias	MedBias	B	R	%Var
		chi2	p>chi2					
Unmatched	0.147	640.53	0.000	41.3	29.7	95.9*	1.71	57
Matched	0	1.09	0.998	1	1.1	4.7	0.9	0

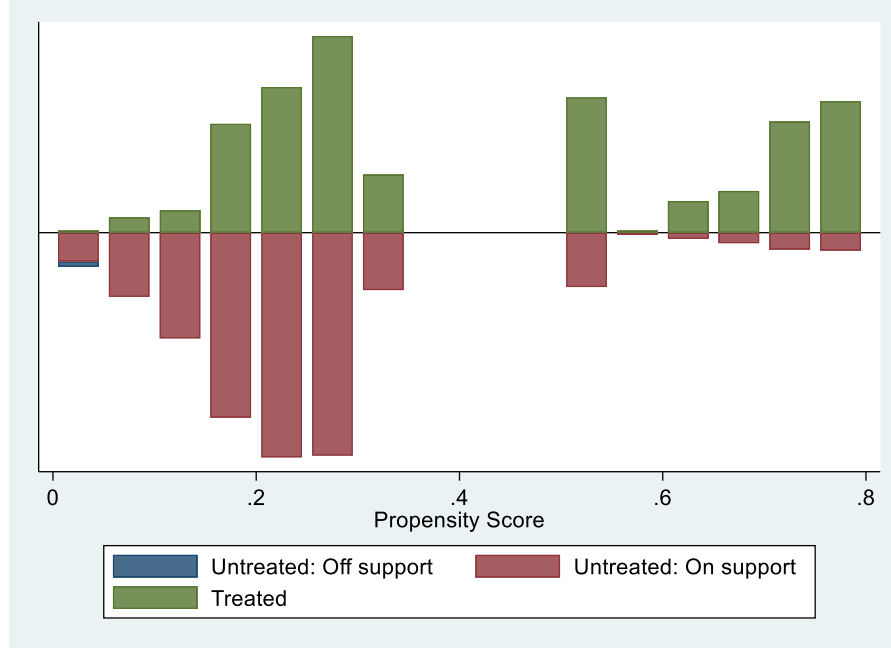


Figure 1. Visualization of the balancing test

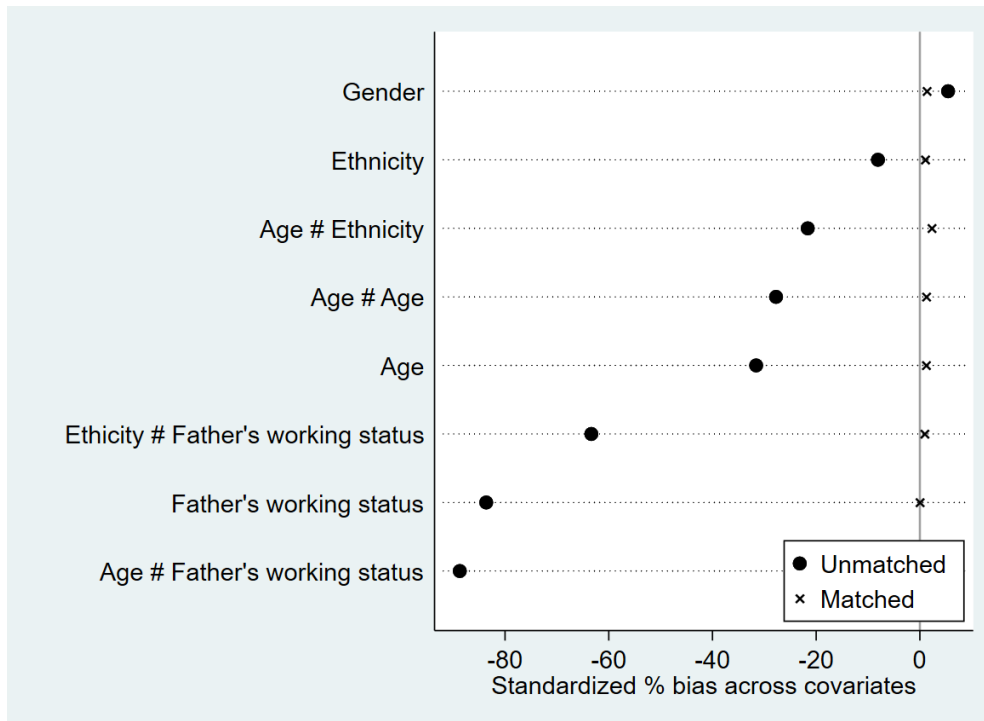


Figure 2. Visualization of the reduction of bias

Table 4 presents the result of linear regression on financial well-being. In model 1, where the response variable is the objective income, the categorical variable of whether observations living with their biological parents at the age of 16 or not is not significant at 5% level. This result coincides with the ATT value which is also not significant during the propensity score matching where objective income is outcome.

Meanwhile, the results in model 1 suggest that people who are unemployed or out of labor force have lower objective income comparing with people who are employed. Females have higher objective income than males, which might result from occupational choices in Britain. As age increases, individuals' objective income increases. Local white people tend to have higher income than other white people. People who are married once tend to have higher income than people who never married. Higher confidence about yourself can lead to higher income.

On the contrary, in model 2, where the response variable is the subjective financial situation, the categorical variable of whether observations living with their biological parents at the age of 16 or not is significant at 5% level. This result further proves that early independence can pose negative effects on individual's future subjective well-being. In addition, since r-squared is greater than 28.3 %, the model is quite persuasive, explaining a considerable variation of the outcome variable. According to table 4, in model 2, higher future financial expectation will lead to lower subjective financial situation. However, higher income, self-confidence, and satisfaction with income can lead to higher perception of financial situation. People who are married once are more likely to sense lower financial situation than people who never married. Unemployed and people out of labor force have lower subjective financial situation than people who have works. A person whose father is working tends to perceive lower subjective financial situation than the person whose father does have a job. This phenomenon might result from higher expectation regarding the family's financial status. People who have lower education are more likely to perceive better financial situation. People's perceived financial situation increases with the increase of age.

Table 4. Linear regression on financial well-being

	M1		M2	
	Objective income		Subjective financial situation	
	coefficient	Std.err.	coefficient	Std.err.
Employment status (ref. unemployed)				
Unemployed	-476.070***	-43.535	0.562***	-0.06
Out of labor force	-121.002***	-34.824	0.199***	-0.05
Whether leaving bio parents at 16 (ref. no)				
Yes	58.197	-33.508	0.128**	-0.04
Gender (ref. male)				
Female	124.039***	-28.858	0.02	-0.04

Father working or not at 14 (ref. not working)				
Father working	-498.224	-118.73	0.176 ^{***}	-0.16
Age	82.660 ^{***}	-10.236	0.069 ^{***}	-0.01
Ethnicity (ref. local white)				
Other white	-362.259 ^{**}	-121.8	-0.004	-0.18
Non-white	163.064	-107.19	0.072	-0.14
Marital status				
Married or have partner once	511.496 ^{***}	-49.649	0.233 ^{***}	-0.07
Losing confidence about oneself	-100.889 ^{***}	-17.543	0.169 ^{***}	-0.03
Educational level	-2.046 ^{***}	-0.582	0.004 ^{***}	-0
Age # father's job	24.260 ^{***}	-3.908	-0.002	-0.01
Ethnicity # father's job	9.315	-38.78	-0.087	-0.05
Age # ethnicity	-6.849 ^{***}	-1.946	0.004	-0
Age # age	-0.745 ^{***}	-0.128	-0.001 ^{***}	0.000
Total net personal income			-0.000 ^{***}	0.000
Future financial expectation			-0.071 ^{***}	-0.02
Satisfaction with life overall			-0.022	-0.02
Satisfaction with income			-0.191 ^{***}	-0.01
Constant	-428.116 [*]	-168.22	1.910 ^{***}	-0.25
Observations	2546		2470	
Adjusted R^2	0.411		0.283	
AIC	40568.189		6490.89	
Standard errors in parentheses				

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

4.2. PSM-DID

In section 2, the paper further used PSM-DID to explore the effect of departure age from biological parents on subsequent financial situation with the consideration of the dynamics of time. According to table 5 and 6, which compare the balance between treated and control groups, the matching was balanced. Before matching, there were notable discrepancies between the treated and control groups regarding both ethnicity and age. However, after matching, the differences have been greatly reduced, as indicated by the reduction in bias and non-significant p-values. Therefore, the matching process had effectively balanced the treated and control groups for these covariates, improving the validity of any casual inferences made from the data.

After matching, I used tow-way fixed effect regression to estimate the DID model. According to table 7, the interaction term between treatment and time is significant at the 0.001 level. This result

suggests that the intervention of treatment has a significantly longitudinal effect on the outcome of individual. The negative coefficient of the DID interaction term (Treat*Time) indicates that leaving home before the age of 26 had a positive impact on the perception of financial situation of individuals after 2017. This different conclusion compared with findings from analysis section 1 is because of the different choice of age as a symbol of discriminating early dependence from late dependence. Furthermore, DID analysis in section two focused on within group variations rather than between group variations, which was what section 1 did. Given these considerations, the result in section 2 may suggest that leaving home during the young adulthood is related with more confidence about current situation and autonomy as an adult. The difference between this case and leaving parents at childhood is the degree of autonomy. For children, the decisions of not living together with biological parents are normally decided by parents or other adult relatives but not children themselves. However, for young adults, they build more confidence and make decisions to move out of parental home autonomously. Therefore, young adults' financial situations would not be worse even the independence might still be earlier than average.

In addition, table 7 presents that reducing financial expectation toward future will lead to higher subjective financial situation; increasing subjective well-being will make people perceive higher financial situation; along with the change of time, increasing income will lead to higher perception of financial situation; increasing satisfaction toward income and health condition will also increase subjective financial situation; people who are employed or out of labor force will perceive higher financial situation than people who are unemployed. The majority of the dynamic analysis results of these variables are in consistent with the results in section 1's static analysis. In model of section 2, I added variables like highest educational level, frequency of smoking, and year. However, these variables are not significantly influential to the outcome.

Table 5. propensity score matching results

Treatment	Coefficient	Std. err.	P>z
Ethnicity	-0.945	0.138	0.000
Age	0.176	0.028	0.000
_cons	-2.790	0.526	0.000
Number of obs	663		
Pseudo R2	0.1181		

Table 6. Balancing test result of matching procedure

Variable	Unmatched	Mean		% bias	% reduct	t-test	V(T)/	
	Matched	Treated	Control		bias	p>t	V(C)	
Ethnicity	U	1.177	1.708	-68.8		0.000	0.34*	
	M	1.177	1.175	0.2	99.7	0.976	0.98	
Age	U	18.740	17.166	52.5		0.000	0.96	
	M	18.740	18.732	0.3	99.5	0.978	1.01	
Sample	Ps R2	LR chi2	p>chi2	MeanBias	MedBias	B	R	% Var
Unmatched	0.117	102.07	0.000	60.6	60.6	88.1*	0.62	50
Matched	0	0	0.999	0.2	0.2	0.4	0.99	0

Table 7. PSM-DID results

Subjective financial situation	Coefficient	Std. err.	t	P>t
Treat*Time	-0.191	0.042	-4.61	0.000
Treated	-1.442	3.91E+6	-0.00	1.000
Time	0.340	0.421	0.810	0.420
Income	-0.000	0.000	-3.18	0.002
Marital status				
Never married	0.024	0.037	0.630	0.530
Satisfaction with health	0.046	0.009	5.050	0.000
Smoked frequency	0.053	0.040	1.330	0.183
Highest education				
Secondary education	-0.047	0.049	-0.95	0.341
Basic or other education	0.040	0.151	0.270	0.789
Satisfaction with income	-0.193	0.009	-20.75	0.000
Age	-0.019	0.044	-0.43	0.669
Future financial expectation	-0.091	0.013	-7.17	0.000
Subjective well being	0.023	0.002	9.350	0.000
Employment status				
Employed	-0.390	0.046	-8.55	0.000
Out of labour force	-0.249	0.046	-5.41	0.000
year				
2011	0.014	0.070	0.200	0.843
2012	0.034	0.106	0.320	0.748
2013	-0.020	0.140	-0.14	0.888

2014	0.029	0.183	0.160	0.872
2015	0.022	0.225	0.100	0.923
2016	0.129	0.269	0.480	0.632
2017	-0.026	0.116	-0.23	0.822
2018	-0.022	0.076	-0.30	0.766
2019	0.000	(omitted)		
2020	0.000	(omitted)		
<u>_cons</u>	4.145	2.11E+6	0.000	1.000
sigma_u	0.871			
sigma_e	0.700			
rho	0.607			
Number of obs:	663			
R-squared:	0.1610			

5. CONCLUSION AND DISCUSSION

This study explores the casual effects of early independence on young adults’ future financial outcomes. Early independence was quantified by the age of leaving biological parents, and financial outcome was divided into objective income and subjective perception of financial situation. Of more significance, this research used PSM-DID to investigate the casual relationship between young adults’ early independence and their future financial outcomes. Findings of current research reveal that the outcome of leaving biological parents at a relatively early age can be two-fold. First, it provides a clear conclusion that leaving parental house before 16 has negative effect on individual’s future subjective financial situation, while it does not have significant implications on individual’s future objective income. However, in section 2, considering 26 as a symbol of discriminating independence earlier than average rather than 16, it is remarkable that the long run effect under dynamic analysis may not be consistent. Specifically, leaving home before 26 may result in positive outcomes in subjective financial situation. Thus, it is remarkable that 16-26 is a relatively optimal range for young adults to be independent, and early independence tends to pose negative effects in short run but positive impact in long run.

There are some reasons that could explain the positive outcome of leaving biological parents earlier than most peers but not at a very young age. First, cognitive dissonance theory suggests that individuals who have made significant life changes, such as leaving home at the age of 16, as a symbol of financially independence, may adjust their perceptions to align with their actions (Harmon-Jones & Mills, 2019). Therefore, they might believe that they are better off financially because they have invested heavily in their independence. This mental adjustment can lead to a subjective sense of financial well-being that may not always match objective financial

indicators. Furthermore, common causes of departure from parental home at the age of 16 include escaping from a challenging domestic environment, or a desire for independence. These reasons often involve significant personal sacrifice and challenges. To cope with the difficulties encountered because of these decisions, individuals might mentally elevate their sense of financial well-being as a form of self-justification. In addition, leaving home early often requires individuals to manage their finances independently. This can lead to a stronger sense of personal accomplishment and autonomy. The ability to handle financial responsibilities on their own can enhance their confidence in managing money, which may translate into a more positive perception of their financial situation later in life, regardless of their actual financial status. Lastly, young people who leave parental house at the age of 16 tend to develop resilience and adaptability to the social environment earlier. These traits can lead to a perception of being more financially capable or resilient in the face of economic challenges. Their ability to navigate early financial struggles can make them feel more financially secure in adulthood.

Granted, the poorer subjective financial situation resulted from leaving before 16 possibly due to incomplete education, lack of maturity, or inadequate preparation for independence living. Young adults leaving at this age tend to make the decision of being independent passively because of a dramatic change in life course. It is normally the children's parents or other adult relatives who make the decisions rather than children themselves. Lack of ability and autonomy of living independently explains the negative outcomes of those children who left their parent at a young age.

Since this research didn't take the motivation of leaving house as an indicator in the model due to the limited of data. The variation of future financial outcome between two people who leave biological parents at the same age might not be well explained. Therefore, it is the limitation of this research, and future efforts are needed to investigate the motivation of being independent.

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