Free University?
An Investigation of Australia's 1974 Free Higher Education Policy and Its Impact on Enrollment, Degree Completion, Later-Life Occupational Status, and Income

Yaxuan (Annie) Cui[1]

Professor Robert Garlick, Faculty Advisor
Professor Peter Arcidiacono, Faculty Advisor
Professor Michelle Connolly, Seminar Advisor

Duke University
Durham, North Carolina
April 2024

[1] Annie graduated from Duke in May 2024 with the Highest Distinction in Public Policy and High Distinction in Economics. She works as a business analyst for McKinsey and Company in New York City. She can be reached at annie.y.cui@outlook.com.

Acknowledgment

First of all, I would like to pay my deepest gratitude to my advisors, Dr. Robert Garlick and Dr. Peter Arcidiacono, for their mentorship and feedback throughout my research process. I am also deeply indebted to my thesis seminar professor and advisor, Dr. Michelle Connolly, for her invaluable knowledge, critical feedback, and help along every step of my thesis journey. There is no way that I could have finished this thesis without her help. Her mentorship extends well beyond the classroom, guiding me not only intellectually but also professionally as my role model.

I also want to thank the Melbourne Institute for collecting the *Australia Household, Income, and Labour Dynamics* dataset, as well as the Australian Data Archive for granting access to the dataset. Last but not the least, I want to acknowledge the precious input from Dr. Edward Tower, Dr. Lawrence Kreicher, and Dr. Charlie Becker as I polished the thesis for publication.

Abstract

To what extent has Australia's free higher education policy of 1974 impacted students' decisions regarding university enrollment, degree completion, and later-life human capital development? In this paper, I analyze the impact of the policy from both national descriptive statistics and individual-level enrollment and degree completion decisions using the Australian Household Income and Labour Dynamics Survey. I find that the policy has significantly increased the likelihood of female enrollment in higher education, low-income students' likelihood of diploma degree completion, and is positively associated with later-life occupational status. However, this study does not find a clear relationship between the policy, bachelor's degree attainment, and later-life disposable income. Policymakers need to carefully consider the efficiency and efficacy of broad-based tuition policy instruments when imagining bridges to achieve universal access to higher education.

JEL Classification: I22; I23; I26

Keywords: Tuition Pricing; Higher Education; Human Capital Development

1. Introduction

"Education is the key to equality of opportunity…We believe that a student's merit, rather than a parent's wealth, should decide who should benefit from the community's vast financial commitment to tertiary education" (Whitlam, 1972). Australian Prime Minister Gough Whitlam voiced these aspirations and went on to abolish all tuition for Australian tertiary education – from universities to technical colleges – on January 1, 1974 (Australian Government, 1973a). This free education policy removed all tuition fees and made universities and colleges of advanced education free for students regardless of citizenship, conditional on admittance through standardized testing (Abbott & Doucouliagos, 2003).

In 1973, the country started with 133,126 students enrolled in higher education; within a year, the number of enrollments in undergraduate degrees more than doubled from 39,045 to 86,923. By the end of the free education era in 1989, total undergraduate enrollment climbed to over 441,074 students – more than 10 times its initial size. In terms of Australia's 15-to-19-year-old population, the university student population expanded from 9.23% in 1973 to 31.93% in 1989. Historically underrepresented female student population by 53% (18.36 pp), from 34.62% of the total student population in 1973 to 52.98% in 1989 (Department of Education, Training and Youth Affairs, 2001, pp. 6-7; Australian Bureau of Statistics, 2019).

However, the free education did not last long. In 1987, the Hawke-Keating Labor government introduced an AUD$250 Higher Education Administrative Charge for every university student (Whitlam Institute, 2023). In 1989, the government reintroduced tuition fees. These changes prompt the question: **to what extent has the elimination of tuition impacted individuals' decisions regarding enrollment, degree completion, and human capital development?**

This paper attempts to answer this question through a two-pronged approach. Inspired by the descriptive approach of Murphy et al. (2019), this study starts by evaluating the broad arc of the policy repercussions and impacts from a descriptive graphical lens using national statistics, and then juxtaposes these aggregate trends against a quasi-experimental design. For the national descriptive analysis, this study synthesizes a series of datasets from the Australian Bureau of Statistics to compile a longitudinal dataset at the university and state levels to track the changes in student enrollment, graduation, and teacher-student ratio across time. For the quasi-experimental design, the study draws upon the Australian Household, Income, and Labour

Dynamics Survey (HILDA) to build a regression discontinuity model. I set the 1974 enactment as the cutoff to examine the discontinuity between individuals enrolled and graduated from higher education before and after the introduction of the policy.

Using both national- and individual-level analyses, this study finds that the free education policy has markedly boosted female higher education participation and diploma completion rates among students from low-income households. In the long term, I find that the policy serves as a significant positive predictor for later-life occupational status. In contrast, the study does not document any statistically discernible impact on individuals' disposable income, suggesting that the policy's impact does not yield significant change to individuals' later-life financial situations.

The rest of the thesis proceeds in the following structure. Section 2 details findings from existing literature, and Section 3 provides more context on the free education policy and Australia's higher education landscape. Section 4 sheds light on the data and describes the process of constructing the data for both national and individual analyses. Section 5 evaluates the national trends in response to the policy, and Section 6 builds upon the descriptive analysis to develop an empirical framework for the individual-level analysis. Section 7 reports and interprets the empirical results. Section 8 discusses the limitations of this study, and Section 9 concludes.

2. Literature Review

This study builds upon three strands of tuition pricing literature: enrollment, degree completion, and later-life outcomes.

2.1. Impact of Tuition Pricing on Enrollment

In terms of enrolment literature, existing literature primarily assesses the impact of tuition changes through two lenses: (1) targeted instruments, such as specific changes in the amount, eligibility criteria, and implementation method of financial aid and merit scholarships (Dynarski 2003, 2008; Cornwell et al., 2006; Angrist et al., 2016); and (2) national-level tuition changes, where countries move from fee to free (Hübner, 2012; Tullao & Ruiz, 2022), or in the opposite direction (Dearden et al., 2008).

In both categories of educational pricing literature, scholars concur with the opinion that removing tuition fees increases students' incentive to enroll in universities while increasing fees decreases first-time enrollment. In targeted instrument studies, Dynarski (2000), Dynarski (2003), and Cornwell et al. (2006) find the Georgia HOPE scholarship substantially increases college enrollment by 4 to 6 percentage points (pp) for every $1,000 additional aid to students. In Pell Grant studies such as Seftor and Turner (2002) and Bettinger (2004), every additional $1,000 is associated with a 9.2 pp increase in college attendance rate.

Even just the *knowledge* of reduced tuition can significantly boost students' likelihood of applying and enrolling in universities. In a 2018 University of Michigan in Ann Arbor experiment, promising low-income applicants free tuition led to tripling application rates and doubling enrollment (Dynarski et al., 2018). A reduced public university price is also associated with shifting students from enrolling in 2-year to 4-year colleges (Angrist et al., 2016) and from private to public 4-year colleges (Goodman, 2008; Dynarski, 2008).

The "universal" tuition studies echo the results of the targeted instrument analyses on the extensive margin of enrollment changes. A series of papers have analyzed Germany's state-staggered introduction and elimination of tuition fees (Minor, 2023; Bahrs & Siedler, 2019; Hübner, 2012). Across these studies, scholars find that tuition introduction substantially decreases enrollment, with a statistically significant number of first-year students migrating from fee-charging to free-tuition states for university (Alecke et al., 2013; Denning, 2017). In England, Dearden et al. (2014) looked at the transition from upfront tuition to income-contingent loan in 2004 and estimate a positive increase of 4 percentage points for every £1,000 grant among low-income 18-19-year-old students.

Scholars disagree on the exact magnitude of the decrease – varying from 2.7 to 7 percentage points for every €1,000 increase in tuition (Minor, 2023; Bahrs & Siedler, 2019; Hübner, 2012). They also debate the extent to which the student's family income level drives these changes in enrollment. Hansen (1983) and Kane (1995) find that the introduction of targeted Pell Grant aids had no impact on the college enrollment decisions of low-income high school graduates. In contrast, Bahrs and Siedler (2019) find that low-income students tend to be more price-sensitive to tuition rises: degree acquisition intention dropped by 33 pp among 17-year-olds from the lowest 10 percentile households compared to 8 pp for the average students.

Scholars also disagree on the role of the student's gender. On the one hand, several scholars argue that women are more price-sensitive and respond to tuition changes at significantly greater margins than men (Dynarski, 2008; Minor, 2023). On the other hand, Bahrs and Siedler (2019) find the male indicator variable held no effect on the surveyed students' intention to acquire a higher educational degree.

2.2.Impact of Tuition Pricing on College Persistence and Degree Attainment

The immediate impact of tuition price on students takes two forms: 1) the extensive margin of first-time enrollment, and 2) the intensive margin of degree persistence and attainment. While lowering tuition has a clear causal link with increasing general enrollment, its relationship with degree persistence and completion is much more ambiguous.

Among the targeted instrument studies, scholars debate the extent to which lowering tuition increases degree completion. On the one hand, a group of merit scholarship and financial aid scholars argue that lowering the costs of attending university elevates degree persistence and completion rate, though at a much smaller margin compared to the effect size on college attendance decisions (Dynarski, 2003; Castleman & Long, 2016; Barr, 2019). Despite the increase in completion rates, Angrist et al. (2016) document that students take longer to graduate. On the other hand, Garibaldi et al. (2012) exploit a regression discontinuity to find that tuition increases are not associated with more dropouts but reduced probabilities of delayed graduation.

National-level studies echo Garibaldi's argument. Drawing upon Germany's staggered introduction of intuition, Bietenbeck et al. (2023) illustrate that higher tuition substantially increases students' degree completion – the higher the amount of tuition paid, the higher the degree completion rates. He argues that the imposition of tuition fees substantially stimulated study efforts and subsequently degree completion among already-enrolled students, robust even after controlling for per-student resources and educational quality. Similarly, Azmat and Simion (2018) document a 1-to-3 percentage point increase in students' degree completion rate because of tuition hikes at English universities.

2.3.Impact of Tuition Pricing on Later-Life Outcomes

The clear increase in enrolment and ambiguous change in degree attainment leads to a question: could changes in higher education tuition impact the students' later-life outcomes, such as income and occupation? I ask this question in light of the established positive relationship between later-life income and educational attainment (Tamborini et al., 2015; Hout, 2012). If the free education policy led more students to enroll and subsequently spend more years in higher education, this policy may have the potential to impact students' later lives.

However, not many studies have paid attention to the impact of university pricing on later-life income and occupation. Azmat and Simion (2018) are among the first to analyze this area, exploring the impact of tuition changes on students' early labor market performance, defined as their employment status, type of contract, and earnings. They observe marginal improvements in labor outcomes for students from high-income families and marginally worse for low-income. The mixed findings suggest the potential for further exploration.

2.4. Contribution to Literature

This paper adds to the *universal free education* literature at the higher education level in three ways. First, the paper explores the policy in the context of Australia. While many scholars have analyzed Australia's income-contingent loan system, little attention has been paid to the transition from fee-charging to free higher education (Birch & Miller, 2006; Croucher et al., 2013; Higgins, 2019). The case of Australia presents a unique opportunity to study universally free higher education both in terms of their short-term enrollment and graduation decisions and long-term income outcomes. Existing literature on nationwide tuition change has predominantly focused on two countries: the United Kingdom (Murphy et al., 2019; Hassani-Nezhad et al., 2021) and Germany (Minor, 2023; Bahrs & Siedler, 2019; Hübner, 2012).

This paper builds upon the existing literature and takes an Australian lens to the predominantly Germany-England discussions of higher education pricing policies. As the first to systematically document the impact of Australia's complete shift from fee-charging to free higher education, the paper seeks to test the external validity and applicability of existing literature outside the typical academic territory of Germany and England.

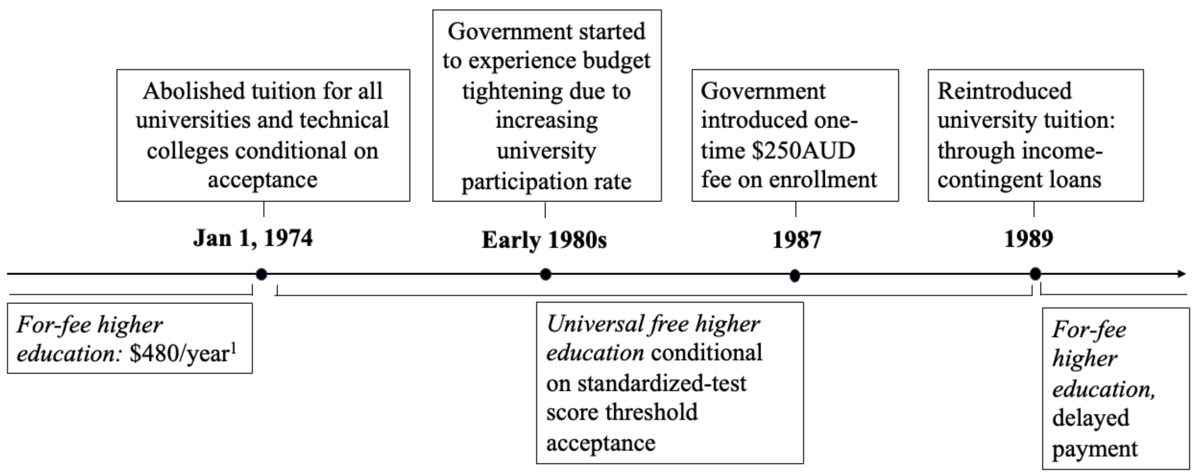
Second, I study price changes at the fee-to-no-fee margin, which differs from the existing higher education studies which mostly focus on the no-fee-to-fee transition. The effect of removing fees might differ from the imposition of fees due to individuals' loss aversion psychology – where they prefer to avoid losses asymmetrically over receiving equivalent gains (Lecouteux & Moulin, 2015; Boatman et al., 2017). Furthermore, zero may be a "special price" that induces a strong effect on enrollment, as suggested by Bietenbeck et al. (2023).

Finally, this study is one of the first to explore the relationship between tuition fee elimination and long-term human capital development, analyzing both the *short-term* incentive changes of enrollment and degree completion as well as the *long-term* repercussions of occupational status and income. Furthermore, I evaluate the policy at both national and individual levels, leveraging descriptive and quasi-experimental designs to develop a more comprehensive, nuanced understanding of the policy impact.

3. Institutional Setting and Policy Context

On January 1, 1974, the Commonwealth Government of Australia, also known as the federal government, abolished tuition fees for students at all Australian universities, Colleges of Advanced Education, and selected Technical Colleges that lead to formal qualifications (Australian Bureau of Statistics, 1975, p.660). All students regardless of nationality could attend Australian higher education for free, conditional on acceptance determined based on the student's grade from their school-leaving exams (Norton, 2012; Ey, 2021). The federal government implemented the national free education by assuming full fiscal responsibility for all universities and colleges and prohibiting universities from charging tuition fees. There were no private universities or colleges such that the policy equally applied to every institution.

Figure 1. Timeline of Australian Higher Education Pricing



Alongside the abolition of tuition, the Government also passed the *Student Assistance Act 1973* to provide means-tested living allowances for students across the country at all levels of higher education (Australian Government, 1973b; Australian Bureau of Statistics, 1975, p. 662). The policy opened doors for individuals who historically struggled to access higher education – such as low-income, mature-age, and female students (Macintyre et al., 2017, p.27).

Before 1974, Australian higher education institutions had three sources of funding: 1) the Commonwealth paying for around a quarter of university funding, 2) the respective state government, and 3) student tuition fees (Norton, 2012; Whitlam Institute, 2023). In 1956, nearly fifty percent of university students received some financial aid, some from government-funded scholarships and some from other sources (Tompkins, 1958). For tuition-paying students, the national average cost was AUD$480 per year, equivalent to AUD$2141 in 1989 (Norton, 2012).

However, as student numbers rapidly expanded, the government's funding for universities remained constant in real terms between 1975 and 1985. Pressures began to mount, given the dual tensions of tightening government budgets and rising demand for higher education (Abbott & Doucouliagos, 2003, p.14; Macintyre et al., 2017, p.16).

In 1987, John Dawkins, the Minister for Employment, Education and Training at the time, proposed to re-introduce university tuition but could not pass the policy in Parliament. Instead, the Government imposed an annual Higher Education Administrative Charge of AUD$250 per student, equivalent to AUD$288.23 in 1989 (Macintyre et al., 2017, p.14). The eventual abolition of free higher education came into force on 1 January 1989, setting the new price of higher education at AUD$1,800 per year (Chapman & Ryan, 2005; Ey, 2021). Despite the re-introduction of fees, the government still significantly subsidized higher education, with the new price only accounting for 20% of the average student cost (Norton, 2012; Dow, 2015). Students also had the option to delay tuition payments through an income-contingent loan.

The abolition and re-introduction of tuition have been highly controversial for the public and policymakers even to this day (Knott, 2014; Blanchett, 2014; Vicki, 2015; Cassidy, 2023). I take the abolition of fees as a "treatment" to estimate the impact of free higher education on enrollment, educational attainment, and later-life outcomes.

4. Data

Exploiting the timing of nationwide free higher education between 1974 and 1989, this study uses a two-pronged approach to understand the policy, starting with a descriptive analysis of national trends and then progressing to a quasi-experimental design at the individual level.

4.1. National Level Data

This national-level analysis focuses on four metrics: the numbers of new enrollment, degrees conferred, teacher-student ratio, and state government outlay on universities. To track these variables consistently across the policy period, I construct a new longitudinal compilation of higher education statistics between 1963 and 1991 by drawing upon 6 datasets from the Australian Bureau of Statistics: 1) Year Books, 1964-1994; 2) University Statistics, 1969-1982;

3) Tertiary Education, 1984-85; 4) University Statistics (Preliminary), 1979; 5) University and Advanced Education Student Statistics, 1982-84; and 6) Expenditure on Education, 1970-87.

I use Australia's federal Year Books as the main source of statistics since the chapters on education offer a comprehensive record of all the variables of interest – from total enrollment to the number of teaching staff. However, the Year Books also had two inconsistencies. First, the Year Books stopped recording by-university income and expenditure in 1973 and replaced it with the levels of outlay and government expenditure at the state level. Second, in 1972, the Year Books stopped providing a by-university breakdown of undergraduate and postgraduate enrollment and teaching staff statistics. By 1982, the Year Books stopped recording by-state breakdown of enrollment and staff statistics. I therefore complemented the Year Books by University Statistics and the Tertiary Education datasets between 1969-82 and 1984-85, filling in the missing values while also validating the figures from Year Books.

To address the missing university expenditure after 1974, I use the current outlay on universities per state from Expenditure on Education Australia datasets. Although different from per-university expenditure, this was the closest available measure for approximating the level of funding dedicated to university education for each student.

To capture the differential impacts on formal university degrees (i.e., bachelor's degree) and vocational diplomas, I collect data for both universities and colleges of advanced education (CAE). Founded by the Australian Government in 1967, the CAEs were university-equivalent institutions with less academic rigor, shorter in qualification length, more vocational in focus, and typically focused on diploma and undergraduate teaching rather than research (Abbott & Doucouliagos, 2003, p.7; Archer, 1967).[2] Under the jurisdiction the State Governments, CAEs were also substantially smaller in size with an average enrollment of 1,410 students. In comparison, the federally run universities in 1974 housed an average of 8,389 students (Australian Bureau of Statistics, 1974; Abbott & Doucouliagos, 2003, p.7; Archer, 1967). This CAE system ended in 1988, when the Government merged all CAEs into universities to achieve "economies of administration" (Dawkins, 1988, p.42; Abbott & Doucouliagos, 2003, p.19).[3]

---

[2] Although founded with a vocational focus, the CAEs drifted to become more university-like in its later years and offered increasing numbers of bachelor's degrees alongside a small number of master's degrees (Harman, 1977).
[3] For a graph of charting the number of universities and CAEs between 1963-1991, see Appendix 1.

I therefore use CAEs' enrollment and graduation data as a proxy for diploma participation and degree completion. Despite my best attempt to address the missing value problem, this dataset only possesses full enrollment, graduation, and teaching data between 1963-85 on universities and between 1970-82 on colleges of advanced education. As a result, the final sample contains full data for 12 years and partial data for 29 years. I break down the summary statistics at year level by exposure to free higher education in *Table 1*. I define exposure as having reached 18 years old, the typical university entrance age when the policy was in place (1974-89). In aggregate, I observe substantial increases in enrollment and degree completion at both universities and colleges under free higher education compared to the control.

4.1.1. Constructing the Variables of Interest

Table 1. National Summary Statistics (1963-1991)

	Number of Years			**Full Sample**	**Free Higher Education**	
	Full	Policy	No Policy		Present	Absent
University Statistics						
New UG enrollment, raw	28	15	13	42925	46347	38976
				(28959)	(15804)	(39547)
Female	16	12	4	16615	18791	10089
				(4280)	(2049)	(681.1)
Male	16	12	4	21426	23006	16686
				(2912)	(788.1)	(396.5)
Total UG enrollment, raw	23	12	11	107763	128993	84604
				(25951)	(6163)	(17577)
Number of UG degree conferred	25	15	10	23830	28366	17026
				(12308)	(9398)	(13449)
Colleges of Advanced Education						
New CAE enrollment, raw	23	12	11	32646	56238	6908
				(29499)	(19571)	(9824)
Female	23	12	11	15315	27683	1822
				(15095)	(10011)	(2686)
Male	23	12	11	17332	28555	5089
				(14607)	(9630)	(7169)
Total CAE enrollment, raw	26	15	11	95041	151639	17862
				(79112)	(51024)	(25391)
Number of CAE degree conferred	20	11	9	16854	28383	2763
				(15696)	(10568)	(6274)
Per-Student Resource						
University Teacher-Student Ratio	23	12	11	.1185	.0947	.1445
				(.0280)	(.0077)	(.0153)
CAE Teacher-Student Ratio	17	13	4	0.0679	0.0640	0.0806
				(0.0089)	(0.0059)	(0.0017)
Real Current Outlay on Universities (In 1,000 AUD)	18	14	4	1634	1734	1286
				(233.6)	(97.16)	(244.9)

New Enrollment and Degree Completion as a Percentage of University-Aged Population

New enrollment is reported in aggregate, by gender, and by the level of higher education separately for bachelor's enrollment at universities and enrollment at colleges of advanced education. I standardize these measures as a percentage of Australia's 15- to 24-year-old population which I define as the country's university-aged population (Australian Bureau of Statistics, 2019). The public dataset on age distribution only presents data in categories of 15-19 and 20-24, preventing me from focusing on 18-22. For universities, I focus on the undergraduate level because it is typically the first point of entry to a university. I include both new enrollment and graduating numbers to account for student attrition and dropouts.

Graduation as a Percentage of the Enrolled Cohort

Integrating the degree conferred with enrollment, I create a "3-year lead" variable to adjust the degree conferred and enrollment to be from the same entrance cohort since most undergraduate degrees in Australia are three years (Australian Government, 2024). Under this design, the graduating class of 1973 would have started their degree in 1970. I then calculate the degree completion rate, defined as the share of the enrollment cohort that completes a bachelor's degree. In the case of CAE, I look at all enrollees and degrees conferred without specification to the type of qualification given the institutions' vocational focus.

Teacher-Student Ratio, National, By State, and By University

I divide the number of full-time equivalent teaching staff at each university by total enrollments. Teaching staff refers to all ranks of professorships and teaching positions. I also calculate the teacher-student ratio at the state level, dividing the number of university teaching staff by total university enrollment, and separately for colleges of advanced education. This variable could be interpreted as a proxy measure of teaching resources and, arguably, the educational quality per student, given existing literature on the impact of student-staff ratios on academic performance (Bettinger & Long, 2018; Arias & Walker, 2004; Bandiera, Larcinese & Rasul, 2010).

Inflation-Adjusted Current Outlay on Universities, By State

I complement the teaching staff per student measure with another quality proxy, the inflation-adjusted current outlay on universities by state, to evaluate whether the free education policy has brought any disruptions to the quality of higher education. Current outlay refers to state government transactions and transfer payments for university operations and are recorded in nominal terms of 1,000 of Australian dollar. I adjusted the values to 1991 terms using Australia's consumer price index. The quality proxies are designed based on Murphy et al. (2019) study where they find a substantial drop in government funding per student under free education.

4.2. Individual Level Data: Household Income and Labour Dynamics Survey, Wave 12

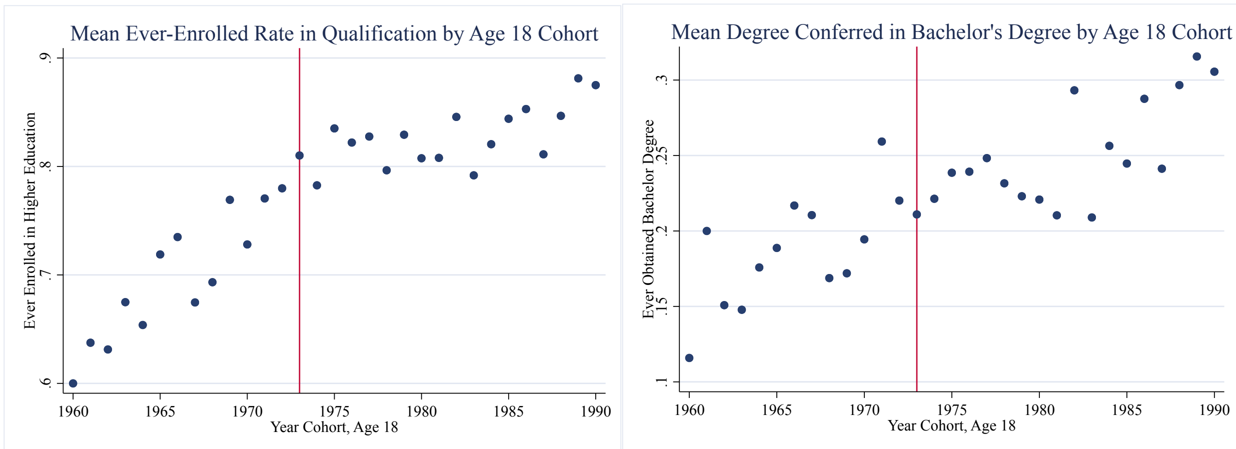
Building upon the national trends, this study uses the 12th wave of the HILDA Survey to assess the impact of the policy through a regression discontinuity design. HILDA is an ongoing population-representative longitudinal survey of individuals and households administered annually from 2001 to today. The survey interviews over 17,000 adults – proportionally distributed across all age groups from 15 to over 75 – and asks them about all facets of their lives, including but not limited to health, income, and education. I focus on four variables in HILDA: 1) enrollment in higher education; 2) attainment of bachelor's degrees and diplomas; 3) the respondent's age; and 4) the respondent's state of highest pre-university schooling.

The HILDA survey is prime for analyzing the policy for two reasons. First, given its wide age and geographical distribution, the sample covers Australians attending university both before and after the policy at a relatively even distribution. To further mitigate any potential education-survivability bias from extremely old respondents and avoid the income-contingent loan after 1989 from confounding the results, I limit the sample to people who reached the age of 18, the typical university-entrance age, between 1963 and 1989. In this restricted sample, 34.93% of respondents were university-age before and 65.07% after the introduction of the policy.

Second, while most population-representative surveys contain questions on the respondents' educational backgrounds, HILDA is unique in that it contains educational attainment data points alongside a wide array of other statistics, such as respondent's later-life occupational status and the state where the respondent completed their highest pre-university education. The specificity enables matching the national-level indices with individual-level data.

The final sample consists of 7,203 individual responses to enrollment in higher education with an indicator mean of 0.793 with a standard deviation of 0.405; 7,198 responses to the question on bachelor's degree completion with a mean of 0.267 and standard deviation of 0.442; and 7,194 responses to diploma completion with a mean of 0.534 and a 0.499 standard deviation.

Figure 3. Distribution of Respondents by Higher Education Enrollment and Degree Completion



4.2.1. Key Variables of the HILDA Dataset

Ever Enrolled in Higher Education

Higher education is defined as any post-secondary qualifications, including but not limited to diploma, bachelor's degree, and post-graduate diploma. Since HILDA does not provide information on the level of education nor the name of the institution that the individuals have enrolled, this study sets $IfEnrolledHigherEd_i = 1$ if the individual has completed an undergraduate degree, including but not limited to advanced diploma, associate diploma, full diploma, or bachelor's degree. The study does not include post-graduate diplomas because those are typically subsequent degrees after having already completed a bachelor's degree.

Ever Attained a Bachelor's Degree or Diploma

The bachelor's degree completion variables are defined using two dimensions. First, the number of bachelor's or honours bachelor's degree the individual has obtained, setting $IfCompleteUG_i = 1$ if the individual has received one or more degrees. Second, I capture any missing value by letting $IfCompleteUG_i = 1$ if the individual indicates bachelor as their highest level of education. Diploma completion is defined in the same manner, setting $IfCompleteDiploma_i = 1$ if the individual has completed an advanced, associate diploma, or full diploma. The study does not include post-graduate diploma because those are typically for individuals after completing bachelor.

The Year of Age-18 and Real GDP Per Capita

Let $IfFreeEd_i$ serve as the indicator for exposure to free university policy, where $IfFreeEd_i = 1$ if the respondent *i* reached the typical university-entrance age, 18, during the policy enactment (1974-89). A student's observed age-of-18 year is computed by adding 18 to

Table 2. HILDA Summary Statistics (1963-1989)

	Sample Size (*i*)			Full Sample	Free Higher Education	
	Full	Policy	Pre-Policy		Present	Absent
Descriptive Features						
Female	7203	4366	2837	.531	.531	.531
				(.499)	(.499)	(.499)
Year in which respondent was 18	7203	4366	2837	1976.925	1981.083	1970.526
				(7.627)	(4.263)	(7.22)
If ever university-entrance-age (18) during policy ($IfFreeEd_i$)	7203	4366	2837	.606	1	0
				(.489)	(0)	(0)
Real GDP per capita	7203	4366	2837	22302.21	23811.41	19979.64
				(3094.22)	(1725.13)	(3290.94)
If Torres Strait Islander or Indigenous	7202	4365	2837	.019	.022	.014
				(.137)	(.148)	(.116)
If born in non-English-speaking cntry	7202	4366	2836	.142	.141	.144
				(.349)	(.348)	(.351)
Outcomes						
If ever enrolled in higher education	7203	4366	2837	.793	.822	.748
				(.405)	(.383)	(.434)
If obtained a bachelor's degree	7198	4364	2834	.267	.282	.244
				(.442)	(.450)	(.430)
If obtained a diploma	7196	4361	2833	.534	.556	.499
				(.499)	(.497)	(.500)
If completed Grade 10	7190	4360	2830	.873	.905	.823
				(.333)	(.293)	(.382)
Disposable Income	7203	4366	2837	49447.19	51691	44455.13
				(44012.55)	(41830.64)	(46492.3)
Respondent's Occupational Status	7203	4366	2837	37.79	44.509	28.980
				(30.59)	(29.015)	(30.859)
Controls						
University Teaching Capacity in Resp's State of Schooling	4790	2827	1963	.115	.096	.089
				(.031)	(.016)	(.048)
CAE Teaching Capacity in Resp's State of Schooling	2886	2114	772	.072	.066	.089
				(.029)	(.010)	(.048)
If the eldest child in the family	7200	4364	2836	.309	.296	.329
				(.462)	(.456)	(.470)
If mother completed higher ed	6996	4068	2628	.450	.305	.247
				(.221)	(.460)	(.432)
If father completed higher education	6584	3997	2587	.502	.527	.462
				(.500)	(.499)	(.499)
If mother employed when resp. 14	7101	4292	2809	.492	.533	.429
				(.500)	(.499)	(.495)
If father employed when resp. 14	7130	4318	2812	.921	.920	.922
				(.269)	(.271)	(.267)
Father's occupational status	7091	4291	2800	42.088	42.826	40.958
				(22.963)	(23.365)	(22.288)
Mother's occupational status	6947	4216	2731	30.880	32.898	27.763
				(25.805)	(26.000)	(25.192)

their recorded birth year. To isolate the relationship between age cohort and academic decisions and sweep out any year-related confounders, I control for the year as a continuous variable from 1 in 1963 to 26 in 1989 and account for the economic cycle using Australia's real gross domestic product per capita $RealGDP_{pc_i}$ in the year of which the participant reaches 18 years of age.

Teacher-Student Ratio for Respondent's State of Secondary Schooling

I match the teacher-student ratio from the national dataset with the HILDA Survey based on the state where the individual acquired their highest level of secondary schooling.[4] I choose to match at the level of secondary schooling because the alternative matching unit – the university at which the individual acquired their highest tertiary qualification – is subject to 2 measurement errors: 1) individuals may have attended multiple higher education institutions but this unit only captures the university where they acquired their highest level of qualification; 2) this variable would be a missing value for individuals who did not enroll or did not graduate from higher education. As a result, the university-level teacher-student ratio would only have data for individuals who *graduated* from the institution. This data set-up therefore leads me to prefer the *state-level teacher-student ratio* to capture the state-average per-student resources.

I acknowledge that the *state-level ratio* may not be the most accurate proxy for understanding the allocation of teaching resources per student since it is not matched based on the state of the individual's bachelor's degree or diploma enrollment and is therefore subject to measurement errors. Nevertheless, most Australian students stay within their high school state for their higher education: as of 1971, only 5.28% of university students were interstate (Australian Bureau of Statistics, 1972). The *state-level teacher-student ratio* therefore should not differ much from the actual *by-university* or *by-college teacher-student ratio.*

Control Variables

The study controls for gender, parents' completion of some form of higher education, whether parents were employed when the participant was 14, alongside participants' Indigenous identity, birth order, whether they were born in a non-English-speaking country, and the state of their highest secondary schooling. These controls are all encoded as dummy variables. In addition to the common controls, the study also accounts for the participant parents' occupational socioeconomic status ranked on a continuous scale from 0 to 100, with 0 denoting the lowest

[4] Secondary school is the Australian-British terminology for middle and high school.

possible social status, such as unskilled laborers, and 100 as the highest status such as surgeons. The status ranking is based on the 2006 Australian Socioeconomic Index, an internationally comparable scale (McMillan et al., 2009).

Summary statistics for the restricted sample are shown in *Table 2*, broken up by exposure to the free education policy. Echoing the significant increases at the national level, I observe sizable differences across all outcome variables between the treated and control samples as shown in the last two columns. Individuals under the free education period were 7.4 pp more likely to enroll in higher education, 3.8 pp more likely to complete a bachelor's degree, and 5.7 pp more likely to finish a diploma degree. However, as I show later in regressions, the impacts vary significantly by demographical groups and are more complex than their initial appearance.

5. National Trends

5.1. New Enrollment and Degrees Conferred at Universities and Colleges

From a descriptive lens, new enrolment increased substantially at both universities and colleges of advanced education upon the introduction of the free higher education policy. *Panel 1* illustrates three notable discontinuities.

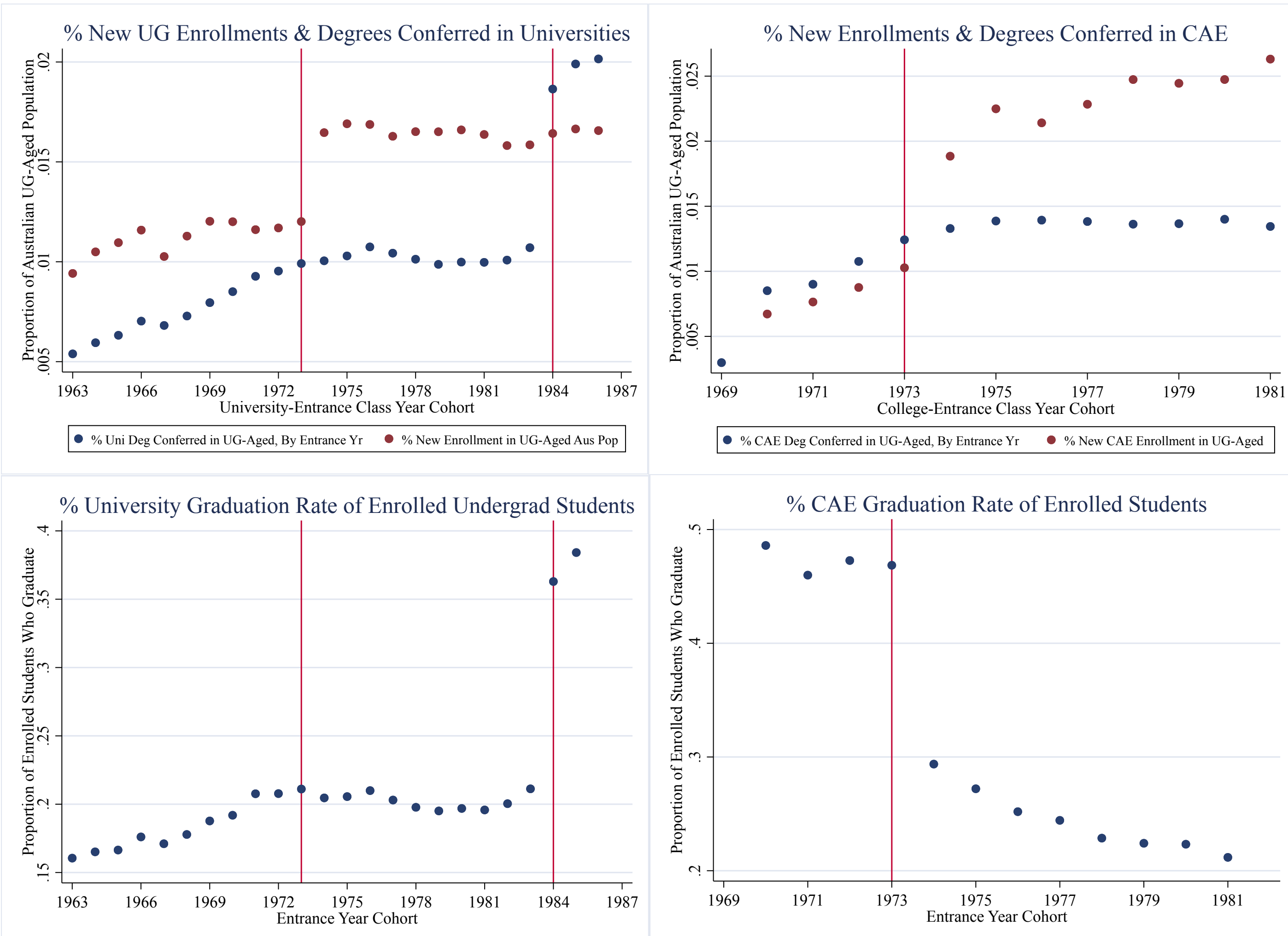
First, upon the introduction of the policy, new enrollment increased substantially at both universities and colleges of advanced education at statistically significant margins confirmed by the structural break test with p-values = 0. Between 1973 and 1974, the share of Australian youths enrolling at universities for the first time increased by 36.7% (0.44 pp).[5] Similarly for colleges, the share of youths enrolling rose at an even larger margin by 84.3% (0.86 pp). This increase in new enrollment in periods of declining tuition aligns with existing literature on England and Germany (Hübner, 2012; Minor, 2023; Dearden et al., 2014).

Second, while new enrollment jumped significantly, the graduation rate for enrolled students dropped significantly at colleges of advanced education. Comparing students who started college in 1973 against 1974, the 1974 cohort's graduation rate almost halved from 46.86% to 29.38%.[6] The discontinuity is statistically significant and confirmed by the structural break test. Furthermore, this decline did not stop after 1974 but continued to deepen over the

[5] Defined as Australian citizens aged between 15 and 24. Such a broad category is used because the Census dataset divides age distribution by 15 – 19 as a category, and 20 – 24 as a separate category.
[6] Due to missing data, I only have complete enrollment and degrees conferred figures for CAE over 1970-80.

1975 to 1980 cohorts though at a slower rate. Juxtaposed against increased enrollment, these trends imply a higher dropout rate at colleges of advanced education.

Panel 1. Enrollment & Graduation, of University-Aged Population & Out of Enrolled Cohort



While graduation declined significantly at colleges, this study does not observe an equally sized discontinuity in the graduation rates of enrolled university students between 1973 and 1974. Nevertheless, the year is still a turning point for graduation where it transitions from an increasing to a decreasing trend. The turning point is statistically significant at the 10% level under the structural break test. This observation runs along a similar vein as Angrist et al. (2016) who find that free tuition delayed degree completion.

Third, degree completion of bachelor's degrees at universities skyrocketed for the 1984 college-entrance cohort, jumping by 15.17 pp from 21.12% to 36.29%. The discontinuity started among the 1984 cohort likely because in 1987, the Parliament imposed a $250AUD Higher

Education Administrative Charge upon all university students and started debating the reintroduction of tuition fees (Macintyre et al., 2017, p.14). Given the 3-year-bachelor setup of Australian universities, the 1984 cohort was deciding whether to graduate, dropout, or re-enroll for a fourth year in 1987 (Australian Government, 2024). While previous cohorts did not feel the pressure to graduate in three years, the 1984 cohort may have felt threatened by the looming fee re-introduction, resulting in a 71.7% (15.17 pp) increase in graduation. This explanation is consistent with existing literature that associates tuition increase with higher degree completion rates (Bietenbeck et al., 2023; Garibaldi et al., 2012; Azmat & Simion, 2018) and quicker speed of degree completion (Angrist et al., 2016).

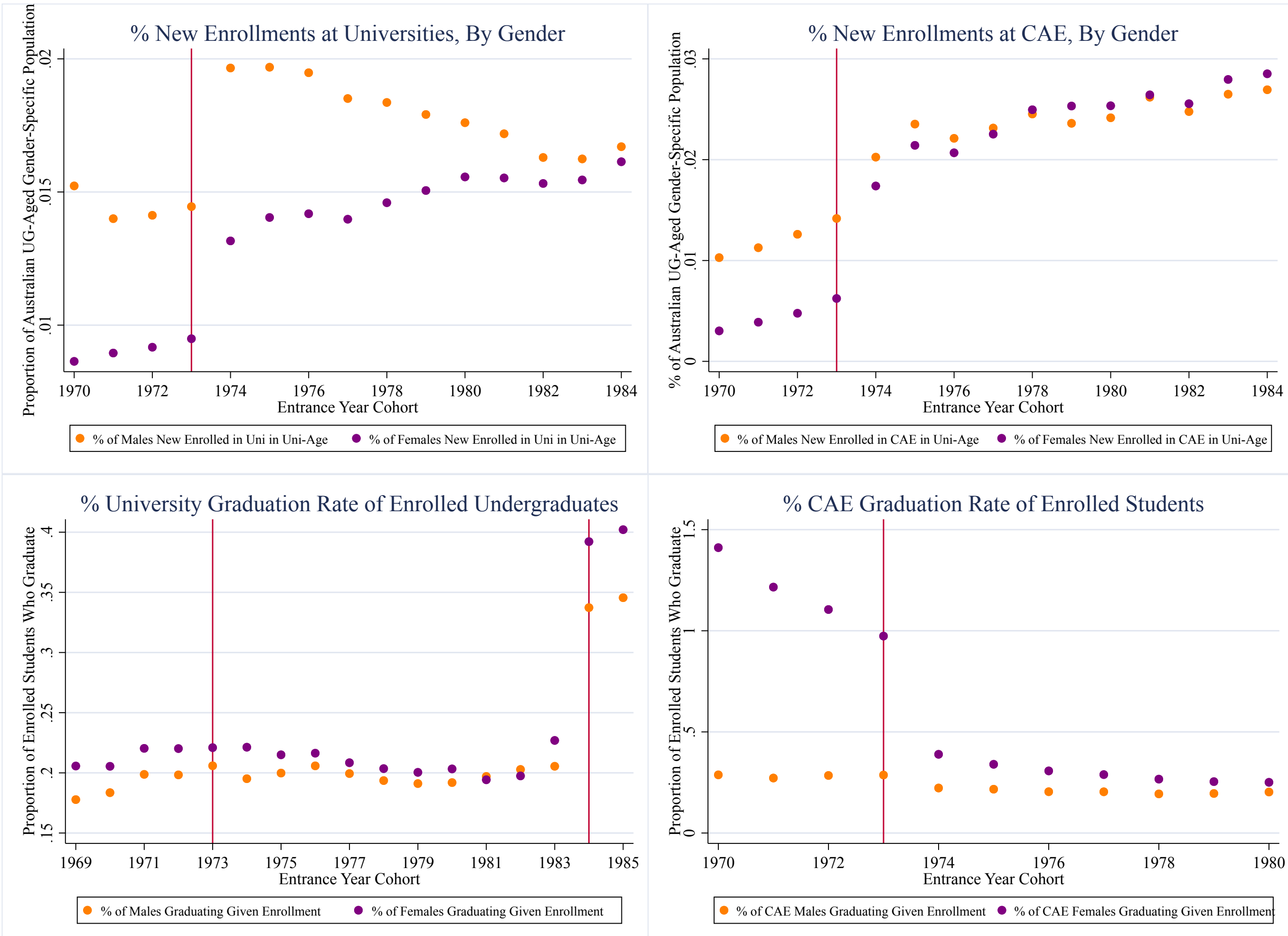
5.2.By-Gender Trends of Enrollment and Graduation

Panel 2 illustrates a by-gender breakdown of new enrollment and graduation rates. While both universities and colleges experience a discontinuous jump in new enrollment, they differ in composition. For universities, male and female new enrollment moved mostly in sync, both exhibiting substantial increases over 1973-74 although jumps were greater for men. Male new enrollment increased by 0.52 pp between 1973-74, compared to a 0.367 pp increase among women. Nevertheless, the difference quickly dissipated in the ensuing years as female new enrollment caught up while male figures declined consistently.

For colleges of advanced education, the female initial enrollment response seemed much larger than their male counterparts. Females started on a substantially lower new enrollment rate in 1973 at 0.624%, but their new enrollment rate more than doubled to 1.739% in 1974. The 1.115 percentage point increase is more than double of their male counterparts' 0.52 percentage point increase. Furthermore, female college students' response to tuition changes is persistent across time, eventually overtaking male student new enrollment in 1977 as illustrated in *Panel 2*.

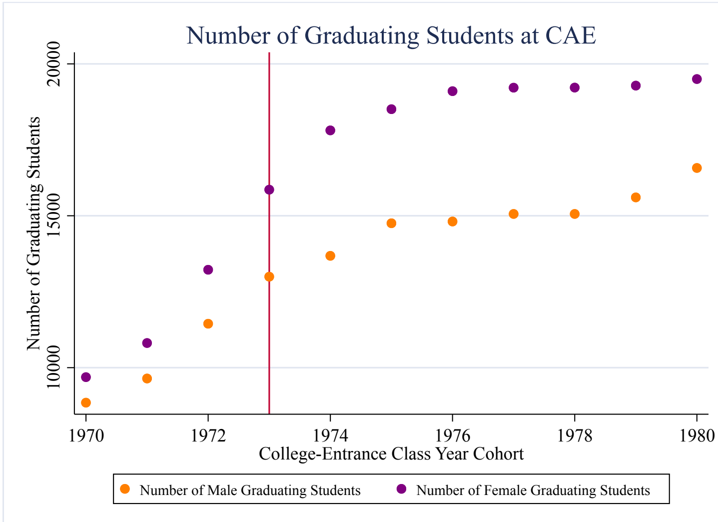
This gender difference could be interpreted as females displaying a stronger price elasticity especially in the event of decreasing tuition at colleges of advanced education. The relatively higher price responsiveness of females echoes existing literature on women being more price-sensitive in general than men (Awawda et al., 2022) and Lörz, Schindler and Walter's (2011) analysis of Germany that suggests that women are more risk averse with a heavier emphasis on costs and success probabilities when deciding whether to pursue higher education.

Panel 2. Enrollment & Graduation, Broken Down By Gender



In terms of graduation over 1973-74, the university graduation rates among already-enrolled undergraduates do not vary much across genders, but the CAE graduation rate showcases a substantial decline for women but not for men. This sharp decline could be interpreted as a consequence of the increases in new female enrollment. *Figure 4* confirms this observation: graduating numbers have remained roughly constant, with small increases over 1973 – 1976 and then plateauing.

Figure 4. Number of Graduating Students at Colleges of Advanced Education



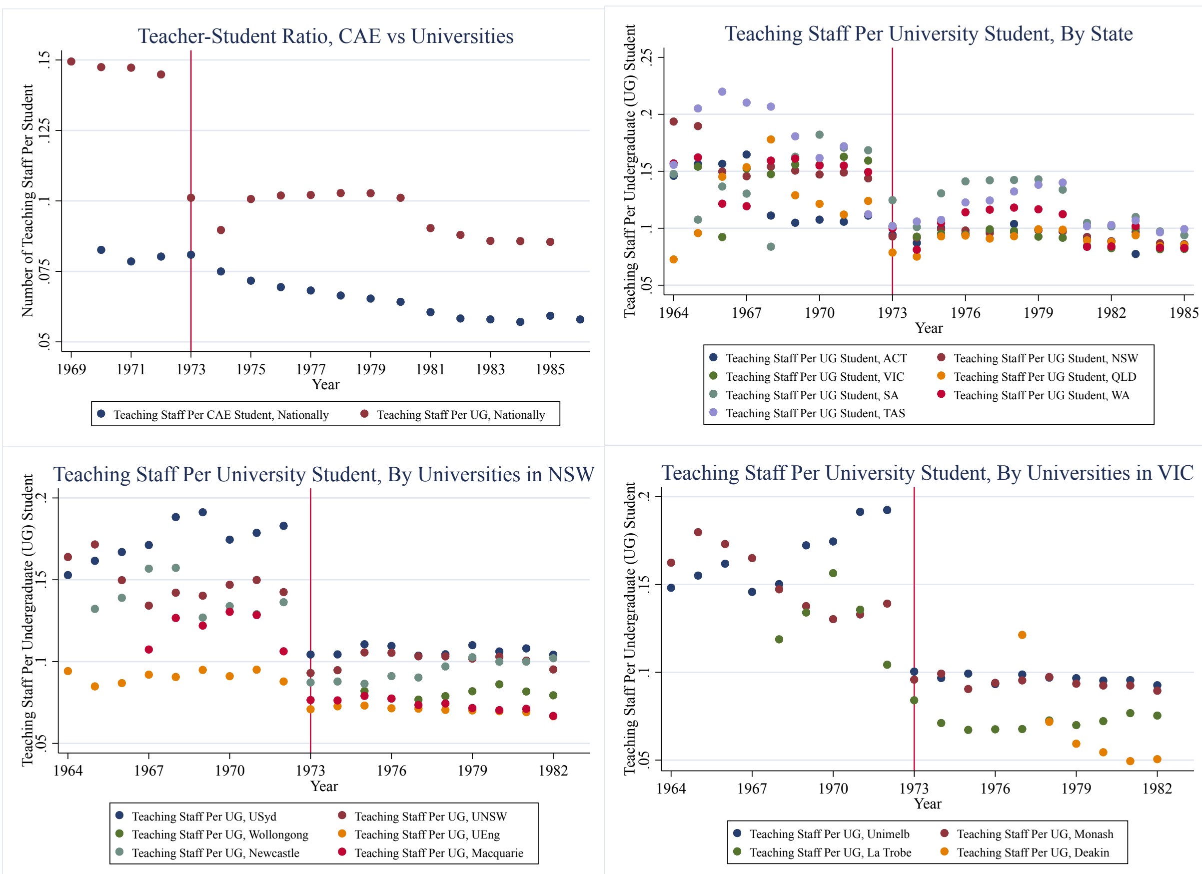
In terms of the graduation discontinuity in 1984, the substantial increase in *Panel 1* seems to be driven by both female and male increases. Female university students seemed more responsive to the information shock, increasing by 16.53 pp from 22.69% to 39.22% graduation rate within one year, compared to their male counterparts' 13.18 pp increase.

Across genders and institutions, the increase in new enrollment is juxtaposed against relatively stagnant, if not declining, rates of graduation. These contrasting trends of rising enrollment and declining graduation could be explained in three ways. First, the free education policy removed the price pressure of higher education which might have reduced students' incentives to graduate on time or even not to graduate, echoing previous studies by Angrist et al. (2016) and Garibaldi et al. (2012) on delayed graduation. Second, the policy might have lowered the quality of higher education, undermining students' academic performances and thereby increasing the likelihood of dropout. Third, when a greater proportion of the general population enrolls in higher education, the average quality of students may decline given diminishing marginal returns. The discontinuities provide some preliminary evidence supporting the first hypothesis; the following section then explores the second and third hypotheses.

5.3.Educational Resources and Quality

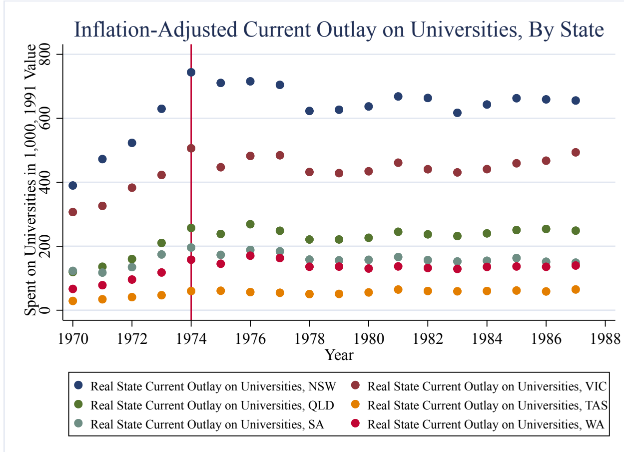
Using teaching staff as a proxy for quality of education, *Panel 3* illustrates that the teacher-student ratio decreased sharply in 1973 at national, state, and university levels as confirmed by structural break tests with p-values = 0. A deeper dive into the raw data suggests that the decrease was driven by a combination of the booming enrollment and a hiring freeze for part-time teaching staff members in 1973 to less than a third of the 1972 levels (Australian Bureau of Statistics, 1974). The Year Books that recorded the statistics did not explain why the hiring freeze occurred, but a hypothesis is that the universities may be decreasing hiring in anticipation that their overall budget might decrease in 1974 due to the policy.

Panel 3. Teacher-Student Ratio, National (Universities vs CAE), State, and Universities



The decrease in teaching staff per student nevertheless reflects a drop in the accessibility of teachers for students accompanying the entrance of free education. *Figure 5* confirms this observation of declining per-student institutional resources. Unrelated to the hiring of teachers, the current outlay graph was on a consistent upward trend before 1974 but started to decline and then plateau after 1974. Coupled with *Panel 3,* these figures tell a common story of decreasing per-student educational resources accompanying the rises in enrollment and declines in degree completion. To confirm whether the declining resources have influenced student graduation and to explore other impacts of the policy, this study now progresses to the quasi-experimental design.

Figure 5. Inflation-Adjusted State Government Current Outlay on Universities



6. Empirical Setup

6.1. Estimating Enrollment Decisions

Higher education decisions have been known to have an established connection with personal characteristics such as gender (Lörz, Schindler & Walter, 2011), Indigenous identity (Nakata et al., 2019; Gore et al., 2017), immigrant status (Mantovani et al., 2018), and the eldest child (Kuba et al., 2018; Booth & Kee, 2009). Gender, in particular, has long possessed a strong predictive power over educational enrollment and attainment. Until recently, women have been found to enroll in higher education at lower frequency; tend to avoid disciplines such as engineering; and households were less willing to spend on their daughters' higher education compared to sons (Wan, 2017; Tusiime et al., 2017; Lörz & Mühleck, 2019).

Beyond these personal controls for exogeneity, parental characteristics also play a significant role in predicting an individual's higher education decisions. Hotz et al. (2018) find that children of wealthier families are more likely to pursue and graduate from college than their poorer counterparts. Similarly, Dearden et al. (2008) explore the distributional impact of higher education price reforms and suggest that parental income and anticipated graduate lifetime earnings have significant influence over students' decisions to pursue higher education.

Parents' educational attainments also affect students' decisions to enroll and finish higher education (Suhonen & Kahunen, 2019). Children with parents possessing more financial liquidity and resources are found to face lower implicit schooling costs and thus more likely to pursue postsecondary qualifications (Christian, 2007; Keane & Wolpin, 2001).

Since the free education policy was an exogenous national policy available to all individuals in 1974, there is no clear control group that allows me to separate the enrollment and graduation decisions from a general trend. I therefore attempt to control for the time trend in two ways. First, I set year as a continuous variable, designed as $yr_{int} = yr_{actual} - 1962$ – such that $yr_{int} = 1$ in 1963, $yr_{int} = 2$ in 1964 and vice versa. Second, I control for Australia's gross domestic product per capita each year, $RealGDP_{pc_i}$, to control for the macroeconomic condition, especially given GDP's established negative correlation with students' enrollment and graduation decisions (Dellas & Sakellaris, 2003; Adamopoulou & Tanzi, 2017).

I set the 1974 enactment as the cutoff to examine the discontinuity between individuals enrolled at universities before and after the introduction of the policy. The discontinuity design follows the trend of educational scholars leveraging exogenous changes to isolate and estimate the treatment effect of tuition changes on students' schooling with fixed effect or state dummies (Cornwell et al., 2006; Bahrs & Siedler, 2019). I start with the following regression:

$$
\begin{aligned}
(1.0)\quad & \Pr(IfEnrolledHigherEd_i = 1|\boldsymbol{X_i}) \\
& = \Phi(\beta_0 + \beta_1 IfFreeEd_i + \beta_2 IfFemale_i + \beta_3 IfFemale_i \times IfFreeEd_i + \beta_4 Yr_{int} \\
& + \beta_5 RealGDP_{pc_i} + \beta_6 IfMomCompletedHighEd_i + \beta_7 IfDadCompletedHighEd_i \\
& + \beta_8 IfMomEmployed_i + \beta_9 IfDadEmployed_i + \beta_{10} MomOccupStatus_i \\
& + \beta_{11} DadOccupStatus_i + \beta_{12} IfEldestChild_i + \beta_{13} IfIndigenous_i \\
& + \beta_{14} IfImmigrant_i + u_i)
\end{aligned}
$$

$$
\begin{aligned}
(1.1)\quad & \Pr(IfEnrolledHigherEd_i = 1|\boldsymbol{X_i}) \\
& = \Phi(\beta_0 + \beta_1 IfFreeEd_i + \beta_2 IfFemale_i + \beta_3 IfFemale_i \times IfFreeEd_i + \beta_4 Yr_{int} \\
& + \beta_5 RealGDP_{pc_i} + \beta_6 IfMomCompletedHighEd_i + \beta_7 IfDadCompletedHighEd_i \\
& + \beta_8 IfMomEmployed_i + \beta_9 IfDadEmployed_i + \beta_{10} MomOccupStatus_i \\
& + \beta_{11} MomOccupStatus_i \times IfFreeEd_i + \beta_{12} DadOccupStatus_i \\
& + \beta_{13} DadOccupStatus_i \times IfFreeEd_i + \beta_{14} IfEldestChild_i + \beta_{15} IfIndigenous_i \\
& + \beta_{16} IfImmigrant_i + u_i)
\end{aligned}
$$

where $\Pr(IfEnrolledHigherEd_i = 1)$ refers to the likelihood of enrollment for individual *i,* and $IfFreeEd_i$ denotes the individual's exposure to the free education policy defined as whether they reached 18 years old, the typical university/college-entrance age, throughout the course of the policy (1974-89). u_i is the error term. β_1 captures the estimated impact of the policy on enrollment of the male baseline population, β_3 illustrating the impact on females, β_{11} the impact on children based on mothers' occupational status, and β_{13} the impact on participants with fathers of different occupational statuses.

For the coefficient estimates to resemble a causal effect, the model needs to assume that exposure to the free education policy between 1974 and 1989 is not related to any unobserved factors of educational attainment after controlling for time-invariant determinants – namely, $\mathbb{E}[y_i u_i | \boldsymbol{X_i}] = 0$, where $\boldsymbol{X_i}$ refers to the controls and y_i the outcomes of interest.

I therefore incorporate a vector of state of highest schooling dummies, denoted as $\boldsymbol{S_i}$, to account for the individual's school- and state environment which may influence their enrollment decisions. Namely, a better school or a more well-resourced district or state would likely breed more students going to higher education in comparison to a less well-off region. For example, 66% of 24–64-year-olds in the Australia Capital Territory have a post-high-school qualification, compared to 40% in Tasmania, a state with less academic resources (OECD, 2022). Past literature accounts for this difference by using school- and district-level fixed effects or adding a measure of high-school graduates from the state (Hemelt and Marcotte, 2008; Garlick, 2019).

$$(1.2) \quad \Pr(IfEnrolledHigherEd_i = 1 | \boldsymbol{X_i}) \\ = \Phi(\beta_0 + \beta_1 IfFreeEd_i + \beta_2 IfFemale_i + \beta_3 IfFemale_i \times IfFreeEd_i + \beta_4 Yr_{int} \\ + \beta_5 RealGDP_{pc_i} + \beta_6 IfMomCompletedHighEd_i + \beta_7 IfDadCompletedHighEd_i \\ + \beta_8 IfMomEmployed_i + \beta_9 IfDadEmployed_i + \beta_{10} MomOccupStatus_i \\ + \beta_{11} MomOccupStatus_i \times IfFreeEd_i + \beta_{12} DadOccupStatus_i \\ + \beta_{13} DadOccupStatus_i \times IfFreeEd_i + \beta_{14} IfEldestChild_i + \beta_{15} IfIndigenous_i \\ + \beta_{16} IfImmigrant_i + \boldsymbol{S_i} + u_i)$$

6.2.Estimating Graduation Decisions

Following the enrollment analysis, I explore the impact of the policy on individuals' graduation decisions in a similar manner at both the bachelor's degree and the diploma level. I distinguish between the levels of qualification for two reasons. First, the process of completing a diploma differs from that of a bachelor's degree. Diplomas fall between a high school and a university degree as a vocational-oriented sub-baccalaureate, yielding different levels of human capital returns and vocational benefits compared to a bachelor's degree (Crissey & Bauman, 2010). The factors determining whether individuals graduate would therefore be likely different.

Second, bachelor and diploma were typically taught at different institutions, and institutional differences could significantly impact students' graduation decisions. In Hemelt and Marcotte (2008), the scholars find that students are more sensitive to fluctuations in tuition at a teaching-focused institution compared to research-intensive universities. In the context of

Australia, the diploma-granting colleges were typically more vocational, teaching-heavy, and housed an average of 1,410 students. In comparison, universities were substantially larger with an average enrollment of 8389 students in 1973 and were much more research-intensive (Australian Bureau of Statistics, 1974; Abbott & Doucouliagos, 2003, p.7; Archer, 1967). These distinctions may impact student outcomes (Australian Government, 2023).

In addition to the diploma-degree distinction, I also add the teacher-student ratio as a control given its role as an indicator for quality. While public consensus believes that a higher teacher-student ratio implies better teaching quality and thereby higher performance and graduation rates, existing literature provides mixed results on its relationship with student performance in higher education, suggesting ambiguous or even negligible impact on student cognitive performance and graduation (McDonald, 2013; Bound & Turner, 2007).

I include both state-level teacher-student ratio and the state of highest schooling dummies because they control for different components of the environment where the individual grew up. Representing per-student resources in the state at the time when the individual turned 18, the teacher-student ratio is time-variant, while the dummies capture time-invariant characteristics of the state. This distinction ensures the two variables are not subject to multicollinearity.

$$
\begin{aligned}
(2.0)\quad & \Pr(IfObtainedBachelor_i = 1|\boldsymbol{X_i}) \\
& = \Phi(\beta_0 + \beta_1 IfFreeEd_i + \beta_2 IfFemale_i + \beta_3 IfFemale_i \times IfFreeEd_i + \beta_4 Yr_{int} \\
& + \beta_5 RealGDP_{pc_i} + \beta_6 IfMomCompletedHighEd_i + \beta_7 IfDadCompletedHighEd_i \\
& + \beta_8 IfMomEmployed_i + \beta_9 IfDadEmployed_i + \beta_{10} MomOccupStatus_i \\
& + \beta_{11} DadOccupStatus_i + \beta_{12} UniTeacherStu_i + \beta_{13} IfEldestChild_i \\
& + \beta_{14} IfIndigenous_i + \beta_{15} IfImmigrant_i + \boldsymbol{S_i} + u_i)
\end{aligned}
$$

$$
\begin{aligned}
(2.1)\quad & \Pr(IfObtainedBachelor_i = 1|\boldsymbol{X_i}) \\
& = \Phi\big(\beta_0 + \beta_1 IfFreeEd_i + \beta_2 IfFemale_i + \beta_3 IfFemale_i \times IfFreeEd_i + \beta_4 Yr_{int} \\
& + \beta_5 RealGDP_{pc_i} + \beta_6 IfMomCompletedHighEd_i + \beta_7 IfDadCompletedHighEd_i \\
& + \beta_8 IfMomEmployed_i + \beta_9 IfDadEmployed_i + \beta_{10} MomOccupStatus_i \\
& + \beta_{11} MomOccupStatus_i \times IfFreeEd_i + \beta_{12} DadOccupStatus_i \\
& + \beta_{13} DadOccupStatus_i \times IfFreeEd_i + \beta_{14} UniTeacherStu_i + \beta_{15} IfEldestChild_i \\
& + \beta_{16} IfIndigenous_i + \beta_{17} IfImmigrant_i + \boldsymbol{S_i} + u_i\big)
\end{aligned}
$$

For diplomas, I do not have the national statistics on the number of teaching staff broken down by each college of advanced education, institute of technology, or technical college, so the diploma model is limited to using the state-level teacher-student ratio:

$$(3.0)\quad \Pr(IfObtainedDiploma_i = 1|\boldsymbol{X_i}) = \Phi(\beta_0 + \beta_1 IfFreeEd_i + \beta_2 IfFemale_i + \beta_3 IfFemale_i \times IfFreeEd_i + \beta_4 Yr_{int} + \beta_5 RealGDP_{pc_i} + \beta_6 IfMomCompletedHighEd_i + \beta_7 IfDadCompletedHighEd_i + \beta_8 IfMomEmployed_i + \beta_9 IfDadEmployed_i + \beta_{10} MomOccupStatus_i + \beta_{11} DadOccupStatus_i + \beta_{12} DipTeacherStu_i + \beta_{13} IfEldestChild_i + \beta_{14} IfIndigenous_i + \beta_{15} IfImmigrant_i + \boldsymbol{S_i} + u_i)$$

$$(3.1)\quad \Pr(IfObtainedDiploma_i = 1|\boldsymbol{X_i}) = \Phi\big(\beta_0 + \beta_1 IfFreeEd_i + \beta_2 IfFemale_i + \beta_3 IfFemale_i \times IfFreeEd_i + \beta_4 Yr_{int} + \beta_5 RealGDP_{pc_i} + \beta_6 IfMomCompletedHighEd_i + \beta_7 IfDadCompletedHighEd_i + \beta_8 IfMomEmployed_i + \beta_9 IfDadEmployed_i + \beta_{10} MomOccupStatus_i + \beta_{11} MomOccupStatus_i \times IfFreeEd_i + \beta_{12} DadOccupStatus_i + \beta_{13} DadOccupStatus_i \times IfFreeEd_i + \beta_{14} DipTeacherStu_i + \beta_{15} IfEldestChild_i + \beta_{16} IfIndigenous_i + \beta_{17} IfImmigrant_i + \boldsymbol{S_i} + u_i\big)$$

6.3.Estimating Later-Life Occupational Status and Income

To explore whether the policy impacts on enrollment and graduation translated to long-run changes in human capital, I draw upon an ordinary least square design using the dependent variables of later-life occupational status and disposable income. Based on the human capital theory, I know that the tuition change likely has two channels of "effect": first, impacting higher education enrollment and/or degree completion which then affects occupation and income; second, through other unobserved determinants. Given these conditions, I test both for the "total effect" of the free education policy (4.0) and the by-channel impact (4.1). Let $\boldsymbol{C_i}$ represent a vector of control variables consisting of Yr_{int}, $RealGDP_{pc_i}$, $IfMomCompletedHighEd_i$, $IfDadCompletedHighEd_i$, $IfMomEmployed_i$, $IfDadEmployed_i$,$MomOccupStatus_i$, $DadOccupStatus_i$, $IfEldestChild_i$, $IfIndigenous_i$, and $IfImmigrant_i$:

$$(4.0)\quad OccupStatus_i = \beta_0 + \beta_1 IfFreeEd_i + \beta_2 IfFemale + \beta_3 IfFemale_i \times IfFreeEd_i + \gamma \boldsymbol{C}_i + \boldsymbol{S_i} + u_i$$

$$(4.1)\quad OccupStatus_i = \beta_0 + \beta_1 IfFreeEd_i + \beta_2 IfFemale_i + \beta_3 IfFemale_i \times IfFreeEd_i + \beta_4 IfEnrolledHigherEd_i + \beta_5 IfObtainedBachelor_i + \beta_6 IfObtainedDiploma_i + \beta_7 IfEnrolledHigherEd_i \times IfFreeEd_i + \beta_8 IfObtainedBachelor_i \times IfFreeEd_i + \beta_9 IfObtainedDiploma_i \times IfFreeEd_i + \gamma \boldsymbol{C}_i + \boldsymbol{S_{school_i}} + u_i$$

$$(5.0)\quad Income_i = \beta_0 + \beta_1 IfFreeEd_i + \beta_2 IfFemale + \beta_3 IfFemale_i \times IfFreeEd_i + \gamma \boldsymbol{C}_i + \boldsymbol{S_i} + u_i$$

$$(5.1)\quad Income_i = \beta_0 + \beta_1 IfFreeEd_i + \beta_2 IfFemale_i + \beta_3 IfFemale_i \times IfFreeEd_i + \beta_4 IfEnrolledHigherEd_i + \beta_5 IfObtainedBachelor_i + \beta_6 IfObtainedDiploma_i + \beta_7 IfEnrolledHigherEd_i \times IfFreeEd_i + \beta_8 IfObtainedBachelor_i \times IfFreeEd_i + \beta_9 IfObtainedDiploma_i \times IfFreeEd_i + \beta_{10} OccupStatus_i + \gamma \boldsymbol{C_i} + \boldsymbol{S_i} + u_i$$

Similar to enrollment and degree completion estimations, I use dummies to control for respondents' state of highest schooling – where the individuals grew up before higher education. Through these dummies, I hope to capture any state-specific factors that might have influenced them during their teenage years and isolate the effect of the policy.[7]

7. Individual Results

The individual-level results largely align with the national trends, both finding a large enrollment increase, especially among female students. However, the regressions tell a more complex, heterogeneous impact of the policy, suggesting a significant enrollment impact on females but no impact on male students. The enrollment and graduation models from Section 7.1 to 7.3. are population-weighted probit models using robust standard errors. I report average marginal effects. The later-life models in 7.4. are ordinary least square regressions using robust standard errors. Standard errors are recorded in parentheses, with asterisks denoting statistical significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

7.1. Policy Impact on Enrollment in Higher Education

Between column (1) and (2) of *Table 3*, I lost 1,132 observations – 18.6% of the column (1) sample – because the state of highest schooling dummy is defined on the condition that the individual has completed their education in Australia. As a result, the lost 1,132 samples consist of individuals who did not go to school in Australia – essentially, people who spent their teenage years overseas. Despite the significant reduction in the sample size to only include "Australia-grown" individuals, the magnitude or direction of the coefficient estimates do not vary substantially, suggesting a stable pattern of enrollment across the upbringing environments.

[7] Results are similar with no variation in statistical significance if the empirical design also controls for the state of current residence dummies. The main regression did not include the design with both dummies because it risks "overcontrolling", since the free education policy might influence subsequent migration decisions. See Appendix 2 for the regression estimates including both state of highest schooling and state of current residence dummies.

Table 3. Likelihood of Enrolling in Higher Education

	Table 3: Outcome = Likelihood of Enrolling in Higher Education			
	Full Sample (1)	**Full Sample (2)**	**Full Sample, State Dummies**	**Sample Restricted to Grade 10 Completes, State Dummies**
Main				
$IfFreeEd_i$	-0.0227	0.0411	0.0237	-0.0257
	(0.0238)	(0.0356)	(0.0348)	(0.0356)
$IfFemale_i \times IfFreeEd_i$	0.0884***	0.0910***	0.0988***	0.102***
	(0.0242)	(0.0241)	(0.0251)	(0.0260)
$DadOccupStatus_i \times IfFreeEd_i$		-0.00102	-0.000962	-0.000541
		(0.000623)	(0.000662)	(0.000651)
$MomOccupStatus_i \times IfFreeEd_i$		-0.00105**	-0.00122**	-0.000633
		(0.000519)	(0.000557)	(0.000542)
Control				
$IfFemale_i$	-0.0890***	-0.0918***	-0.0982***	-0.109***
	(0.0187)	(0.0188)	(0.0192)	(0.0206)
Yr_{int}	-0.00758	-0.00781	-0.00635	-0.00309
	(0.00547)	(0.00542)	(0.00574)	(0.00583)
$RealGDP_{pc_i}$	0.0000286**	0.0000292**	0.0000260**	0.0000166
	(0.0000123)	(0.0000122)	(0.0000131)	(0.0000134)
$IfMomCompletedHighEd_i$	0.0703***	0.0711***	0.0805***	0.0755***
	(0.0161)	(0.0160)	(0.0167)	(0.0163)
$IfDadCompletedHighEd_i$	0.0468***	0.0471***	0.0381***	0.0256**
	(0.0124)	(0.0124)	(0.0130)	(0.0130)
$IfMomEmployed_i$	0.00987	0.00956	-0.00829	-0.0108
	(0.0125)	(0.0125)	(0.0133)	(0.0135)
$IfDadEmployed_i$	0.0195	0.0178	0.0154	0.0241
	(0.0283)	(0.0273)	(0.0264)	(0.0280)
$DadOccupStatus_i$	0.00196***	0.00257***	0.00235***	0.00159***
	(0.000316)	(0.000499)	(0.000522)	(0.000521)
$MomOccupStatus_i$	0.00144***	0.00208***	0.00242***	0.00168***
	(0.000292)	(0.000412)	(0.000453)	(0.000449)
$IfEldestChild_i$	0.0277**	0.0270**	0.0352***	0.0274**
	(0.0131)	(0.0130)	(0.0136)	(0.0135)
$IfIndigenous_i$	-0.0823*	-0.0821*	-0.0754	-0.0833*
	(0.0453)	(0.0453)	(0.0469)	(0.0489)
$IfImmigrant_i$	0.0112	0.0137	0.00971	-0.00303
	(0.0187)	(0.0183)	(0.0285)	(0.0287)
State Dummy?	No	No	Yes	Yes
Observations	6070	6070	4938	4396

Pseudo R-squared	0.0802	0.0822	0.0838	0.0721

Between columns (2) and (3) of *Table 3*, I lost 542 observations for not completing up to Grade 10 education. I chose Grade 10 as the restriction boundary given its role as the cutoff year where students decide to pursue the U.S.-high-school-equivalent curriculum that typically leads to university education, or pivot to vocational education that usually culminates in a diploma (Department of Foreign Affairs and Trade, n.d.).[8] Although the loss of 542 seems small, the change fits the contextual background since children are required by law to enroll in education until 15 – the average age of students in Grade 10. Therefore, Grade 10 would be the first year where students can voluntarily decide whether to complete or not (Public Record Office Victoria, n.d.). The signs of the controls, such as the female indicator, real GDP, birth order, parents' completion of higher education, and parents' occupational status, are consistent with past work.

Across all four columns of *Table 3*, gender serves as a consistently positive predictor of higher education enrollment. Being female is associated with a statistically significant increase of around 8.84-9.10 pp in an individual's likelihood of enrollment under the free education policy. In columns (3) and (4), the effect size becomes even larger, hovering between 9.88 and 10.2 pp after controlling for state time-invariant characteristics and restricting the sample to students who have completed Grade 10. The female premium aligns with the substantial increases in female new enrollment at the national level and appears particularly contrasting against their male counterparts who do not display any discernible association with the policy.

The female premium could be interpreted as women demonstrating a higher price elasticity of higher education demand and therefore being more responsive to the policy-induced tuition changes. This interpretation aligns with Minor's (2023) study of the German free university policy where he finds that female enrollment is more sensitive to the introduction of tuition fees. Lörz et al. (2011) also echo this interpretation, suggesting that women tend to evaluate higher education enrollment with a more risk-averse lens and place a heavier emphasis on study costs and success probabilities compared to their male counterparts.

Note that the female free education premium exists against a significant gender enrollment gap. As reflected by the coefficient estimates for the control $IfFemale_i$, this study

[8] The Australian curriculum is structured as 4 years of junior school (U.S. middle school equivalent) from Grade 7 to 10, and then 2 years of senior school (U.S. high school equivalent) for Grade 11-12 (Australian Government, n.d.).

finds that women on average were around 8.90-10.9 pp less likely to enroll in higher education than men in the absence of the policy. This pattern of gender disparity pattern has long been a trend across numerous studies, where families were more willing to invest in their sons' education rather than daughters (Wan, 2017; Tusiime et al., 2017; Lörz & Mühleck, 2019).

The female premium under the free education policy compensates for this persistent gender enrollment gap. Across all four columns of *Table 3*, the positive estimates for $IfFemale_i \times IfFreeEd_i$ are roughly the same size as the negative estimates for $IfFemale_i$, significantly reducing or even cancelling out the gender enrollment gap to close to zero. This observation carries important implications for it highlights that fee elimination carries a statistically significant positive impact in bridging the gender enrollment gap, making the overall likelihood of enrollment statistically identical between men and women.

A potential critique is that the policy's impact on bridging gender enrollment and enrollment gap may be more attributable to the time trend rather than the policy, given the rise of gender equality movements during that era (Broderick, 2011). The regression cannot rule out the potential role of changing gender norms in underpinning this change in female higher education enrollment, but it attempts to account for the time trend by including the control Yr_{int}, I find that the year trend estimates are statistically indistinguishable from zero.

I also experiment with incorporating an additional interaction control, $IfFemale_i \times Yr_{int}$, and do not notice any discernible changes in the regression estimates (Appendix 3). I am not using the specification with $IfFemale_i \times Yr_{int}$ as the main model because $IfFemale_i \times Yr_{int}$ and $IfFemale_i \times IfFreeEd_i$ are extremely multicollinear with a pairwise correlation of 0.8296. The multicollinearity likely arises from how I defined $IfFreeEd_i$ based on the year individuals turned 18 years of age.

The national trends in **Section 5.2** ***Panel 2*** also support my observation that the female premium is likely not a product of the gender equality time trend but an impact of the policy. A clear discontinuity exists for female enrollment between 1973-74 when the policy first started.

The estimated effects of other determinants, such as parents' occupational status, are generally not distinguishable from zero after restricting the sample to Grade 10 completes (column 3). For example, *Table 3* columns (2) and (3) provide weak evidence for mothers' occupational status being a statistically significant predictor of enrollment. A 10-unit decrease in mothers' occupational status index is associated with a 1.05 to 1.22 percentage point increase in the individual's likelihood of enrolling in higher education under the policy. To contextualize, a 10-point increase in the index characterizes the difference in socioeconomic status between a waiter (36.5) and an accounting clerk (45.5) and could distinguish someone as upper- rather than lower-middle-income (McMillan et al., 2009).

There are multiple implications of such findings. The mother and father's occupational status indices serve as a proxy for parents' income (McMillan et al., 2009). After incorporating the control $MomOccupStatus_i$, the study still finds that students from high-income families are more likely to enroll in higher education, but the policy held a small counteracting impact. The negative coefficient on the occupational-status free-education interaction term seems to indicate that the policy disproportionately benefitted low-income students but not at a substantial margin. However, the estimated effect of fathers' occupational status is statistically indistinguishable from zero across all columns of *Table 3*. It is not clear to me why a single parent's occupational status would hold a stronger predictive power than the other.[9] The ambiguous estimated effects of family income proxies necessitate further research before rushing to conclude any by-income distributional impact of the free education policy.

The state of highest schooling dummy does not seem to be statistically significant or improve the sample fit. Based on this observation, I find no evidence that the enrollment impact of the policy differs by state.

7.2. Policy Impact on Ever Receiving a Bachelor's Degree

Table 4 differs from *Table 3 (Enrollment Estimation)* in that there is no loss of observations between column (1) and column (2) after the addition of the state of highest schooling dummy. This is because the state teacher-student ratio is defined partially relying on the state of highest schooling dummy, as elaborated in **Section 4.2**. Therefore, the inclusion of the teacher-student ratio would have removed any observations with missing values for states.

Note that the sample size for *Table 4* is much smaller than for *Table 3*, because I only have information on the *state-level teacher-student ratio* between 1963-85 rather than *Table 3*'s sample of 1963-89. The dropped observations between *Table 4* columns (1/2) and (3) consist of

[9] To explore whether this "special" role of mother's occupational status is related to gender, I interacted female with all control variables and incorporated these interaction controls into the regression model (1.2). Results are presented in Appendix 3. I cannot conclude any statistically discernible role of mothers specifically for females.

individuals who completed some middle or high school but did not pursue further education. The broad scope of the $IfEnrolled_i$ variable – being inclusive of enrollment in all types of higher education – explains why only 849 observations (20.76% of the column 1 sample) were dropped.

Echoing the enrollment results, *Table 4* also presents evidence for the presence of a *gender difference*. Compared to the baseline, being female is associated with an increase of 8.02 pp of graduating during the free education period at the 1% confidence interval. The *female premium* persists even after including state dummies and limiting the sample to conditional on enrollment in higher education without significant changes, albeit at a slightly smaller magnitude of 7.21 pp but still statistically significant at 5%.

Table 4. Likelihood of Ever Receiving a Bachelor's Degree

	Table 4: Outcome = Likelihood of Ever Receiving a Bachelor's Degree[10]			
	Full Sample (1)	**Full Sample (2)**	**Full Sample, State Dummies**	**Sample Restricted to Enrollees in Higher Ed, State Dummies**
Main				
$IfFreeEd_i$	-0.0456	-0.0330	-0.0261	-0.0428
	(0.0333)	(0.0439)	(0.0443)	(0.0543)
$IfFemale_i \times IfFreeEd_i$	0.0802***	0.0808***	0.0829***	0.0721**
	(0.0273)	(0.0273)	(0.0272)	(0.0339)
$DadOccupStatus_i \times IfFreeEd_i$		-0.0000369 (0.000643)	0.0000955 (0.000645)	-0.000356 (0.000787)
$MomOccupStatus_i \times IfFreeEd_i$		-0.000371 (0.000560)	-0.000369 (0.000560)	-0.000256 (0.000689)
Control				
$IfFemale_i$	-0.0364*	-0.0372*	-0.0381*	-0.0109
	(0.0208)	(0.0210)	(0.0210)	(0.0265)
Yr_{int}	-0.00496	-0.00495	-0.00427	-0.00338
	(0.00591)	(0.00590)	(0.00587)	(0.00742)
$IfMomCompletedHighEd_i$	0.0993***	0.0997***	0.0985***	0.0974***
	(0.0165)	(0.0165)	(0.0165)	(0.0203)
$IfDadCompletedHighEd_i$	0.00728	0.00755	0.00833	0.00128
	(0.0149)	(0.0149)	(0.0148)	(0.0183)
$IfMomEmployed_i$	-0.0289**	-0.0289**	-0.0300**	-0.0329*
	(0.0141)	(0.0141)	(0.0141)	(0.0174)
$IfDadEmployed_i$	0.0244	0.0240	0.0251	0.0289
	(0.0291)	(0.0292)	(0.0288)	(0.0362)
$DadOccupStatus_i$	0.00341***	0.00343***	0.00340***	0.00341***
	(0.000326)	(0.000507)	(0.000509)	(0.000624)
$MomOccupStatus_i$	0.00198***	0.00221***	0.00218***	0.00199***
	(0.000312)	(0.000453)	(0.000455)	(0.000562)
$StateTeacherStudent_i$	-0.280	-0.279	-0.0218	-0.00737
	(0.317)	(0.318)	(0.371)	(0.470)
$IfEldestChild_i$	0.0466***	0.0467***	0.0492***	0.0536***
	(0.0141)	(0.0141)	(0.0141)	(0.0174)
State Dummy?	No	No	Yes	Yes
Observations	4089	4089	4089	3241
Pseudo R-squared	0.1061	0.1063	0.1094	0.0864

[10] I have not reported real GDP, indigenous identity, and immigrant status in *Table 4*. For their estimates, please see appendix 4.

The *female premium* appears particularly stark in light of the baseline free education indicator, $IfFreeEd_i$. Denoting men with parents of zero occupational status indices, I fail to find any evidence supporting that the policy yielded a discernible impact on these individuals' likelihood of ever obtaining a bachelor's degree. I may even extend this observation to argue that this study fails to find evidence for the policy's impact on all male bachelor's degree attainment, since the interaction terms of parents' occupation status and free education yield no statistically significant impact on bachelor's degree attainment.

These estimates suggest that the policy left a positive impact on the bachelor graduation outcomes for female students but a much more ambiguous, if not negligible, influence over men. Notably, this female graduation premium is against the contextual backdrop of a persistent gap in male and female degree attainment. As shown in columns (1) and (2) of *Table 4*, the female control, $IfFemale_i$, is 3.64-3.81 pp lower in individuals' likelihood of completing a bachelor's degree. Although this weakly significant effect dissipates to null after restricting the sample to only individuals who have ever enrolled in higher education, the estimates indicate that among the general population, there exists a gender attainment gap that disadvantages women.

In consideration of both the *female premium* and the *gender attainment gap,* the aggregate effect of the policy on women seems much more ambiguous given the noise in the coefficient estimates. Given the significant standard errors, the estimates contain significant variability, making it difficult to conclude whether the impact of the policy has fully bridged the negative attainment gap or not. More research is needed to clarify the relationship between the policy and degree attainment specifically in this gendered lens.

This study also does not find any statistically significant impact of the free education policy on individual bachelor's degree completion in relation to parents' occupational status. The estimated effects of parents' occupational status interactions are not distinguishable from zero, precluding me from establishing any kind of conclusion regarding the distributional impact of the policy on degree attainment. This finding aligns with previous literature on the distributional impact of tuition changes that suggest students from different incomes do not experience national-level higher education tuition reforms heterogeneously (Bietenbeck et al., 2023). As shown through the controls, higher-income students are still more likely to graduate from attain a bachelor's degree, and the policy does not seem to change this narrative.

Table 4 also invites further inquiry into the role of teacher-student ratio in driving degree completion outcomes conditional on enrollment in higher education. In **National Trends**, I posited that the number of degrees conferred declined perhaps because per-student resources fell sharply. However, I cannot identify any statistically significant effect of the teacher-student ratio on individuals' likelihood of ever obtaining a bachelor's degree under this empirical design.

Nevertheless, the estimates are very noisy with standard errors as large as ten times the size of the coefficient estimate (refer to $StateTeacherStudent_i$ in columns 3 and 4). Given such variability of the estimates, I cannot reject the possibility of the teacher-student ratio as yielding a positive or negative effect on individuals' likelihood of ever obtaining a bachelor's degree. This observation aligns with past works that describe increases in class size as having ambiguous, if not null, impact on learning (Bettinger & Long, 2018; Arias & Walker, 2004).

The ambiguous estimate for the teacher-student ratio sheds light on the need for more refined models to identify the real impact of per-student expenditure and resources on graduation. The current specification (*Table 4*) cannot accurately identify the exact impact for two reasons. First, the specification does not have information on university enrollment but only has broad "higher education" enrollment data points. As a result, I cannot limit column (4) to focus on the graduation rate among the enrolled university population. While I have data on the by-university teacher-student ratio for individuals who completed their degree, I do not have information for the *dropped-out* population. The specification therefore struggles to accurately model how each institution's expenditure and allocation of resources might have affected their students.

Despite the ambiguities in the *teacher-student ratio* variable, other controls in this model present some interesting patterns. For example, variables related to mothers consistently have a much stronger predictive power compared to fathers. Both mothers' completion of higher education and employment status when the child was 14 serve as strong predictors for the child's likelihood of obtaining a bachelor's degree. In contrast, the coefficient estimates for fathers are not statistically distinguishable from zero. This observation echoes Marks's (2007) study where he evaluates mother and father's comparative influences using samples from 30 countries and finds that mothers consistently hold a stronger, if not equivalent, impact on their children's educational and occupational attainment.

Surprisingly, the coefficient estimates for whether the mother was employed when the respondent was 14 years old are consistently negative at a statistically significant margin. Interpreted on its own, the negative coefficients feed into the popular notions that maternal employment takes time away from caring for their children and therefore negatively affects children's educational outcomes. The gender-role distinction between mother and father aligns with Bettinger, Hægeland and Rege's findings on stay-at-home parents (2014): mother's reduced labor force participation holds a significant positive treatment effect on children's tenth-grade GPA. However, this estimate may also be a reflection of a rise in the number of single mothers as society grew to become more accepting of children born out of wedlock. Further research is needed to test these hypotheses.

7.3.Policy Impact on Diploma Attainment

Similar to the narrative on university graduation, gender again serves as a positive predictor of the policy's impact on diploma completion, but this time with significantly less statistical power. *Table 5* reports the estimated effects on individuals' probability of completing a diploma. For each of the columns, I find no statistically significant impact of the policy upon men but a weakly positive impact on women's likelihood of obtaining a diploma. The weakly positive correlation dissipates to null after restricting the general sample to only students who have enrolled in higher education. I therefore cannot reject whether the policy yielded a positive or negative – if any – effect on individuals' diploma attainment by gender.

Despite the statistical variations in significance across the columns, one consistent observation emerges: the gender diploma completion gap seems to dissipate after the introduction of the policy. Interpreting the main independent variables in relation to the gender control $IfFemale_i$, I notice that the negative estimates for $IfFemale_i$ are either around the same size as the estimate for the female free-education interaction variable $IfFemale_i \times IfFreeEd_i$ such that they roughly cancel out each other (columns 1 and 2), or both estimates are statistically indistinguishable from zero (column 3).

Table 5. Likelihood of Ever Receiving a Diploma

	Table 5: Outcome = If Ever Received a Diploma[11]			
	Full Sample (1)	Full Sample (2)	Full Sample, State Dummies	Sample Restricted to Enrollees in Higher Ed, State Dummies
Main				
$IfFreeEd_i$	-0.0342	0.0648	0.0784	0.0773
	(0.0532)	(0.0698)	(0.0700)	(0.0714)
$IfFemale_i \times IfFreeEd_i$	0.0868*	0.0902*	0.0845*	0.0276
	(0.0488)	(0.0488)	(0.0487)	(0.0503)
$DadOccupStatus_i \times IfFreeEd_i$		-0.00340***	-0.00369***	-0.00343***
		(0.00116)	(0.00115)	(0.00115)
$MomOccupStatus_i \times IfFreeEd_i$		0.00135	0.00130	0.00228**
		(0.00107)	(0.00106)	(0.00107)
Control				
$IfFemale_i$	-0.102**	-0.104**	-0.0992**	-0.0261
	(0.0414)	(0.0415)	(0.0414)	(0.0433)
Yr_{int}	0.0173	0.0163	0.0164	0.00502
	(0.0172)	(0.0171)	(0.0171)	(0.0178)
$IfMomCompletedHighEd_i$	0.0346	0.0331	0.0308	-0.0160
	(0.0285)	(0.0284)	(0.0284)	(0.0277)
$IfDadCompletedHighEd_i$	0.0576**	0.0540**	0.0510**	0.0308
	(0.0238)	(0.0238)	(0.0237)	(0.0242)
$IfMomEmployed_i$	0.0141	0.0143	0.0151	0.0333
	(0.0229)	(0.0228)	(0.0228)	(0.0229)
$IfDadEmployed_i$	-0.0265	-0.0238	-0.0126	-0.0496
	(0.0466)	(0.0466)	(0.0466)	(0.0480)
$DadOccupStatus_i$	-0.00106*	0.00145	0.00171*	0.000428
	(0.000551)	(0.00103)	(0.00102)	(0.00104)
$MomOccupStatus_i$	0.000724	-0.000224	-0.000146	-0.00206**
	(0.000532)	(0.000971)	(0.000966)	(0.000973)
$StateTeacherStudent_i$	0.775**	0.775**	0.630	0.466
	(0.387)	(0.385)	(0.452)	(0.482)
State Dummy?	No	No	Yes	No
Observations	2480	2480	2480	2037
Pseudo R-squared	0.0120	0.0152	0.0228	0.0266

[11] I have not reported real GDP, indigenous identity, birth order, and immigrant status. For their estimates, please see appendix 4.

While gender becomes less significant, parents' occupation reemerges. Echoing previous analysis in **Section 7.1** which interprets the policy as benefitting individuals with lower mother occupational status index disproportionately, this model also finds that individuals with lower father occupational status are more likely to graduate with a diploma at a statistically significant margin as a result of the free education policy. For every one-unit decrease in fathers' occupational status index, the policy is estimated to increase individuals' likelihood of attaining a diploma by around 0.340 to 0.369 pp. Surprisingly, the estimate for mother's occupational index becomes weakly positive after limiting the sample to only students who enrolled in higher education. Further research is needed to understand this change.

The overall estimated effect of parents' occupational status still remains negative even after accounting for the mother's index. One possible interpretation is that the policy disproportionately benefitted the educational attainment of students from low-income families, consistent with the initial goal of the policy in "opening doors" to students who historically could not access higher education. This finding is consistent with prior studies on the impact of fee variations on low-income students at larger margins in comparison to other income cohorts (Hotz et al., 2018; Dearden et al., 2008; McPherson & Schapiro, 1991).

The statistical differences after including the state dummies shed light on the regional variability of diploma completion rates. Notably, the addition of state dummies substantially increases the fit of the model from 0.0152 in pseudo-R-squared to 0.0228. Although 0.0228 still indicates a relatively weak fit, this increase in model fit is accompanied by a series of changes in the coefficient estimates in columns (3) and (4). The negative impact of the female indicator becomes smaller in (3) and dissipates to null in (4), and the teacher-student ratio changes from statistically positive to negligible in impact. The variations highlight a potential heterogeneity in the college-level education dynamics across the states. The state disparity may have stemmed from the nature of these diploma-granting colleges as state-created institutions, different from the federal-supported university system (Commonwealth Bureau of Statistics, 1969).

7.4.Policy Impact on Later-Life Occupational Status and Income

Given the substantial increases in female enrollment and bachelor's degree attainment, to what extent did these changes translate into a long-term impact on human capital development? By assessing the impact through the respondent's later-life occupational index and disposable income at the time of survey collection, this study finds evidence for a significant positive impact on individuals' occupational status but fails to identify any discernible impact on income.

Later-Life Occupational Status

As shown in *Table 5*, the free education indicator, $IfFreeEd_i$, serves as a statistically significant and positive predictor of individuals' later-life occupational status index. Relying on an intent-to-treat framework, being university-entrance age (18) during the course of the policy (1974-89) is associated with an increase of 7.148 units in later-life occupational status index. Given **Section 7.1-3**, I know this estimated effect contains at least two channels of impact on individuals' occupational status: 1) the fee elimination impacting enrollment in higher education, which then possibly influences occupational status; 2) the fee elimination changing degree attainment at either the bachelor or diploma level, which may later influence individuals' status.

After I break the free education indicator into components in column (2), however, bachelor's degree completion is the only statistically significant determinant of the policy's impact on occupational status. The coefficient estimate, 7.328, seems to absorb most – but not all – of the predictive power of the column (1) $IfFreeEd_i$ indicator. I cannot find evidence for any discernible policy-induced influence from the other higher education determinants: higher education enrollment and diploma attainment. These estimates are also generally noisy.

A similar pattern exists among the controls, where bachelor attainment has a strong positive correlation with the status index while diploma attainment's estimate is statistically indistinguishable from zero. These baseline estimates suggest that enrolling in higher education (6.544) and obtaining a bachelor's degree (22.73) are associated with higher occupational status. The coefficients on the interaction terms highlight that the association between obtaining a bachelor's degree and later-life occupational status is stronger under the no-fee policy. These observations align with Jepsen et al. (2014) and Kane and Rouse's (1993) study where bachelor's degrees are found to yield a stronger labor-market return than diploma degrees.

Table 6: Later-Life Occupational Status and Income Regressions

	Outcome = Occupational Status		Outcome = Later-Life Income	
	With State Dummies	**With Dummies and Free Ed Indicator in Channels**	**With State Dummies**	**With Dummies and Free Ed Indicator in Channels**
Main				
$IfFreeEd_i$	7.148***	4.993**	-619.2	846.6
	(1.674)	(1.992)	(3384.6)	(3262.8)
$IfFemale_i \times IfFreeEd_i$	4.181**	1.390	-1984.0	-2437.0
	(1.842)	(1.692)	(3359.8)	(3281.1)
$IfEnrolledHighEd_i \times IfFreeEd_i$		2.723		-958.4
		(2.466)		(5720.7)
$IfObtainedBachelor_i \times IfFreeEd_i$		7.328***		-180.1
		(2.359)		(4423.5)
$IfObtainedDiploma_i \times IfFreeEd_i$		-0.347		888.2
		(2.187)		(5254.8)
Control				
$IfFemale_i$	-5.637***	-4.167***	-22452.9***	-22275.6***
	(1.478)	(1.408)	(2850.2)	(2725.5)
$IfEnrolledHighEd_i$		6.544***		9300.1*
		(1.975)		(5272.8)
$IfObtainedBachelor_i$		22.73***		7010.9
		(2.042)		(4423.9)
$IfObtainedDiploma_i$		2.763		-7027.8
		(1.847)		(4812.3)
Yr_{int_i}	-1.478***	-1.365***	-32.11	-74.68
	(0.403)	(0.361)	(468.5)	(463.5)
$RealGDP_{pc_i}$	0.00506***	0.00452***	0.151	0.191
	(0.000924)	(0.000836)	(1.026)	(1.017)
$IfDadCompletedHighEd_i$	0.271	-0.00326	-1478.0	-1442.0
	(0.981)	(0.883)	(1698.0)	(1721.2)
$IfMomCompletedHighEd_i$	1.242	-2.183**	196.9	-822.1
	(1.248)	(1.109)	(1740.8)	(1706.9)
$DadOccupStatus_i$	0.214***	0.0935***	182.1***	150.3***
	(0.0231)	(0.0212)	(50.97)	(53.69)
$MomOccupStatus_i$	0.125***	0.0552***	8.287	-9.510
	(0.0228)	(0.0204)	(34.14)	(33.56)
$OccupStatus_i$			613.3***	548.6***
			(29.35)	(35.79)
State Dummy?	Yes	Yes	Yes	Yes
Observations	4953	4947	4953	4947
Adjusted R-squared	0.138	0.306	0.248	0.257

Interestingly, the free education indicator $IfFreeEd_i$ is still a statistically significant predictor even after I "overcontrol" and separate the policy's impact into enrollment and attainment by adding the educational outcome interactions such as $IfEnrolledHighEd_i \times IfFreeEd_i$. As illustrated in column (2), the estimate suggests that the policy has a spillover effect that is not captured by its relationship with higher education enrollment or degree attainment, presenting an opportunity for further research. Other controls of the model work as expected based on past literature, such as the individual occupational status's positive correlation with parents' occupational status and the negative correlation with being female.

<u>*Disposable Income*</u>

As shown in *Table 6,* the estimated effect of the policy on individuals' disposable income is statistically indistinguishable from zero, both in terms of the policy's "total effect" (column 1) and after breaking down into enrollment and degree completion channels (column 2). Although the study fails to reject whether the policy has any impact on individuals' later-life income, other controls act as strong predictors following my expectations based on existing literature. For example, being female is associated with earning around $22452.9 less than men, consistent with previous studies on the gender earnings gap (Goldin et al., 2017).

I therefore do not find evidence for whether the positive increases in enrollment have translated to changes in disposable income. In particular, the estimate finds negligible impact of enrolling in higher education or graduating with a diploma. Synthesizing this insight with national statistics, the study can confirm that the policy has substantially increased enrollment and educational attainment of women but cannot arrive at a conclusion for whether it has impacted individuals' long-run human capital, particularly from an income lens.

8. Limitations

This study is the first attempt to understand the short- and long-term impact of Australia's free higher education policy (1974-89). By using both descriptive and quasi-experimental lenses, this study strives to disentangle the complex influences of the national education policy. This study is not without problems, and much can be improved through continuing research on this topic.

First, the study finds significant increases in female enrollment and bachelor's degree attainment associated with the free education policy but cannot rule out the hypothesis that the rise may be more attributable to the macro-level changes in gender norms and gender equality movements. While I controlled for years in the empirical design, this may not isolate all influences of the gender norms from the estimates. Nevertheless, the regression findings are echoed in the national trends which indicate a clear discontinuity in female enrollment and degree completion upon the policy's introduction in 1974. The abrupt change between 1973-74 supports my hypothesis that the policy yielded a substantial effect on women but also sheds light on the potential for further inquiry into the interplay between gender and tuition pricing.

Second, I illustrate that the policy left a more ambiguous impact on degree completion through both descriptive and quasi-experimental lenses, but the descriptive trends face a significant missing data issue, especially for the colleges of advanced education. I only have consistent data on the numbers of teaching staff, enrolled students, and degrees conferred at CAE between 1970-80 due to changes in the units of record by the Australian Bureau of Statistics. Future research could re-assess and validate the policy relationship given more data at hand.

Third, the study's quasi-experimental estimation does not distinguish between enrollment in universities versus colleges of advanced education. The individual-level data source, HILDA, does not have information on whether individuals enrolled in colleges or universities but only on whether an individual has ever enrolled in a course of higher education. This data is insufficient for predicting whether the enrollment was at universities or colleges of advanced education because I only know the graduating population. Furthermore, the colleges of advanced education "drifted" to become more like universities in the late 1970s, offering university-equivalent numbers of bachelor's degrees (Harman, 1977).

This blurred distinction between colleges (CAE) and universities implies that there may be a measurement error in my imputation of the teacher-student ratio. In the study, I used the teacher-student ratio of universities in the estimation of bachelor's degree attainment and used that of CAE to estimate diploma attainment. However, since some CAE also offered bachelor's degrees, some of their teaching staff might also apply to the bachelor's degree estimation but were not included in this study's empirical specification due to the lack of data.

Similarly, I also lack complete data on university-level teacher-student ratio which precluded me from identifying the role of per-student resource in mediating the policy's impact on degree attainment. The HILDA dataset only provides institutional information for individuals who completed their degrees and only for the institution at which they completed their highest level of qualification. Using the university-level ratio therefore would impose two problems. First, a measurement error since the individual's undergraduate institution may differ from the recorded university at which the respondents acquired their highest qualification. Second, a severe missing data problem since the variable does not account for drop-out students from the enrolment estimation. Future researchers with more refined data could explore the distinction between university versus CAE enrollment in greater depth.

Finally, the estimation may be subject to a national-level data measurement error in **Section 5.1** since I defined all undergraduate graduation rates by assuming that individuals are enrolled in a 3-year curriculum. Under this identifying assumption, a student graduating in 1979 is categorized as part of the 1976 entrance class. While 3-year curriculums are indeed the majority, there are two groups of students who I fail to account for in this assumption: 1) delayed graduations, and 2) honours students whose programs are 4-years in length. Future studies could establish a more sensitive model to explore the policy impact with these intricacies in mind. Accompanied by the national trends of stagnant graduation figures, the study necessitates better model specifications to investigate the impact of the free education policy on different types of higher education enrollment, degree completion, and human capital development.

9. Conclusion

This study investigates how changes in university's prices impacted Australian students' decisions of enrollment, degree completion, and later-life occupational status and disposable income. Existing studies primarily focus on the introduction or increases in tuition but not the removal of tuition. Moreover, the few national-level studies predominantly draw upon Germany and the United Kingdom samples, limiting the research's cross-cultural applicability (Minor, 2023; Bahrs & Siedler, 2019; Dearden et al., 2014; Denning, 2017). The study provides one of the first evidence of how Australia's almost two-decade-long national free tuition policy might have influenced individuals' higher education enrollment, degree attainment, and later-life economic outcomes.

Using both descriptive national trends and a regression discontinuity design, this study leaves with several significant findings. First, the study finds that the policy has significantly increased female higher education enrollments but fails to demonstrate a statistically significant relationship with female bachelor's degree attainment. Second, the study documents a clear and substantial improvement in low-income students' diploma completion rates following the introduction of the policy. Third, individuals' exposure to the free education policy 1) as a university-aged young adult, regardless of college entrance or not, and 2) successful completion of a bachelor's degree during the policy period both act as significant positive predictors for their later-life occupational status. However, the study does not find sufficient evidence to establish any relationship between the policy and later-life income.

My findings can be cross-referenced with existing literature pertaining to tuition pricing on a national scale. The literature provided me with pointers to potential variables worth special attention throughout my analysis, specifically by highlighting the importance of gender and parents' occupational status. For example, my observation of women as the disproportionate "winner" of the policy echoes previous studies by Minor (2023) and Lörz et al. (2011) who find that female enrollment and degree completion tend to be more price-sensitive than their male counterparts. My research then extends these theories by exploring the impact of national-level tuition changes in a new geography: Australia.

This study thereby informs education policymaking from two perspectives. From a macroscopic level, the study sheds light on the complexity of the free education policy and illustrates the need to carefully consider the efficiency and efficacy of broad-based tuition policy instruments when imagining bridges for universal access to higher education. From a more grounded perspective, the study highlights the roles of families and gender in determining how the policy may impact students. While this study cannot definitively explain the complete impact of the policy, it offers an innovative glimpse into the different facets of the policy impact and hopefully prompts future dialogue on leveraging tuition pricing changes to make higher education accessible to all.

10. Works Cited

Abbott, M., & Doucouliagos, C. (2003). The Changing Structure of Higher Education in Australia, 1949-2003. Retrieved from http://www.deakin.edu.au/fac_buslaw/sch_aef/publications/default.htm

Adamopoulou, E., & Tanzi, G. (2017). Academic drop-out and the Great Recession. *Journal of Human Capital* 11(1), 35-71. https://doi.org/10.1086/690650.

Alecke, B., Burgard, C. and Mitze, T. (2013). The effect of tuition fees on student enrollment and location choice – interregional migration, border effects and gender differences. *Ruhr Economic Paper* 404. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2221351

Angrist, J., Autor, D., Hudson, S., & Pallais, A. (2016). *Evaluating post-secondary aid: Enrollment, persistence, and projected completion effects* (No. w23015). National Bureau of Economic Research. http://www.nber.org/papers/w23015.

Archer, K.M. (1967). "1301.0 – Chapter 17: Education, Cultural Activities and Research." From *Official Year Book of Australia: No. 63, 1967*. Australia Bureau of Statistics. September 1967. https://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/1301.01967?OpenDocument.

Arias, J. J., & Walker, D. M. (2004). Additional evidence on the relationship between class size and student performance. *The Journal of Economic Education*, *35*(4), 311-329.

Australian Bureau of Statistics. (1967). 6302.0 – Average Weekly Earnings, Jun 1967. https://www.abs.gov.au/AUSSTATS/abs@.nsf/second+level+view?ReadForm&prodno=6302.0&viewtitle=Average%20Weekly%20Earnings~Jun%201967~Previous~04/10/1967&&tabname=Past%20Future%20Issues&prodno=6302.0&issue=Jun%201967&num=&view=&

Australian Bureau of Statistics. (1975). *Official Year Book of Australia* (No. 60). Aust. Bureau of Statistics. https://www.ausstats.abs.gov.au/ausstats/free.nsf/0/DBF3412730A55127CA257AF70011532D/$File/13010_1974_chapter19.pdf.

Australian Bureau of Statistics. (1992). *Education and Training in Australia*. *ABS Catalogue No. 4224.0,* Printed by Commonwealth Government Printer, Canberra, by P.J. Grills.

Australian Bureau of Statistics. (2022). Personal Income in Australia. https://www.abs.gov.au/statistics/labour/earnings-and-working-conditions/personal-income-australia/2015-16-2019-20

Australian Data Archive. (2022). HILDA Survey. https://dataverse.ada.edu.au/dataverse/hilda

Australian Government. (1973a). *States Grants (Universities) Act (No. 3) 1973: No. 176 of 1973.* Federal Register of Legislation. Date of Assent: 12 Dec 1973. Date of Repeal: 24 June 1986. Repealed by *Statute Law (Miscellaneous Provisions) Act (No. 1) 1986.* https://www.legislation.gov.au/Details/C1973A00176

Australian Government. (1973b). Student Assistance Act 1973. *Department of Social Services, Federal Register of Legislation.* https://www.legislation.gov.au/C2004A00058/asmade/text.

Australian Government. (1986). *Statute Law (Miscellaneous Provisions) Act (No. 1) 1986: No. 76 of 1986.* Federal Register of Legislation. Date of Assent: 24 June 1986. Date of Repeal: 10 December 2015. Repealed by *Amending Acts 1980 to 1989 Repeal Act 2015.* https://www.legislation.gov.au/Details/C2004A03317

Australian Government. (1988). *Higher Education Funding Act 1988: No. 2, 1989.* Federal Register of Legislation. https://www.legislation.gov.au/Details/C2016C00171

Australian Government. (2024). Australia's education system. *Study Australia.* https://www.studyaustralia.gov.au/en/plan-your-studies/australias-education-system

Awawda, S., Chalak, A., Khader, Y., Mostafa, A., Abla, R., Nakkash, R., Jawad, M., Salloum, R. G., & Abu-Rmeileh, N. M. (2022). Gender differences in the price elasticity of demand for waterpipe and cigarette smoking in Lebanon, Jordan and Palestine: a volumetric choice experiment. *BMJ open*, *12*(7), e058495. https://doi.org/10.1136/bmjopen-2021-058495

Azmat, G., & Simion, S. (2018). Higher Education Funding Reforms: A Comprehensive Analysis of Educational and Labour Market Outcomes in England. *CEP Discussion Paper No. 1529.* Centre for Economic Performance, The London School of Economics and Political Science. https://files.eric.ed.gov/fulltext/ED583702.pdf

Bahrs, M., & Siedler, T. (2019). University Tuition Fees and High School Students' Educational Intentions. *Fiscal Studies, 40*(2), 117-147. doi:https://doi.org/10.1111/1475-5890.12185

Bandiera, O., Larcinese, V., & Rasul, I. (2010). Heterogeneous class size effects: New evidence from a panel of university students. *The Economic Journal*, *120*(549), 1365-1398.

Barr, A. (2019). Fighting for Education: Financial Aid and Degree Attainment. *Journal of Labor Economics* 37(2): 323-620.

Bettinger, E. (2004). How financial aid affects persistence. In *College choices: The economics of where to go, when to go, and how to pay for it* (pp. 207-238). University of Chicago Press.

Bettinger, E., Hægeland, T., & Rege, M. (2014). Home with mom: the effects of stay-at-home parents on children's long-run educational outcomes. *Journal of Labor Economics*, *32*(3), 443-467.

Bettinger, E. P., & Long, B. T. (2018). Mass instruction or higher learning? The impact of college class size on student retention and graduation. *Education Finance and Policy*, *13*(1), 97-118.

Bietenbeck, J., Leibeing, A., Marcus, J., & Weinhardt, F. (2023). Tuition fees and educational attainment. *European Economic Review 154 (2023),* 104431. https://doi.org/10.1016/j.euroecorev.2023.104431

Birch, E., & Miller, P. (2006). The Impact of HECS Debt on Australian Students' Tertiary Academic Performance. *Education Research and Perspectives*, *33*(1), 1-32.

Blanchett, C. (2014). Cate Blanchett thanks Gough Whitlam for free education. *ABC News.* https://www.youtube.com/watch?v=6uNhvvR6XKI.

Boatman, A., Evans, B. J., & Soliz, A. (2017). Understanding Loan Aversion in Education: Evidence from High School Seniors, Community College Students, and Adults. AERA Open, 3(1). https://doi.org/10.1177/2332858416683649

Booth, A. L., & Kee, H. J. (2009). Birth order matters: the effect of family size and birth order on educational attainment. *Journal of Population Economics*, *22*(2), 367-397.

Bound, J., & Turner, S. (2007). "Cohort Crowding: How Resources Affect Collegiate Attainment". *Journal of Public Economics*, 91(5-6), 877–899.

Broderick, E. (2011). The state of gender equality in Australia. *Australian Human Rights Commission.* March 12, 2011. https://humanrights.gov.au/about/news/speeches/state-gender-equality-australia

Cassidy, C. (2023). University of Melbourne vice-chancellor calls for free university education. *The Guardian*. June 21, 2023. https://www.theguardian.com/australia-

news/2023/jun/21/university-of-melbourne-vice-chancellor-calls-for-free-university-education.
Castleman, B. L., & Long, B. T. (2016). Looking beyond enrollment: The causal effect of need-based grants on college access, persistence, and graduation. *Journal of Labor Economics*, *34*(4), 1023-1073.
Christian, M. (2007). Liquidity constraints and the cyclicality of college enrollment in the United States. Oxford Economic Papers 59: 141-169. doi:10.1093/oep/gpl021
Chapman, B., & Ryan, C. (2005). The access implications of income-contingent charges for higher education: lessons from Australia. *Economics of Education Review 24*: 491-512. doi:10.1016/j.econedurev.2004.08.009
Commonwealth Bureau of Statistics. (1969). Chapter 15 – Education, Cultural Activities and Research. *Official Year Book of the Commonwealth of Australia*, *No. 55, 1969*. Prepared under the instruction of K. M. Archer. https://www.ausstats.abs.gov.au/ausstats/free.nsf/0/A65375B56B92F266CA2573AD0020029A/$File/13010_1969_chapter15.pdf.
Cornwell, C., Mustard, D. B., & Sridhar, D. J. (2006). The enrollment effects of merit-based financial aid: Evidence from Georgia's HOPE program. *Journal of Labor Economics*, *24*(4), 761-786.
Crissey, S. R., & Bauman, K. (2010, April). Between a diploma and a bachelor's degree: The effects of sub-baccalaureate postsecondary educational attainment and field of training on earnings. In *annual meeting of the Population Association of America. Dallas, TX*.
Croucher, G., Marginson, S., Wells, J., & Norton, A. eds. (2013). *The Dawkins Revolution: 25 Years On.* Melbourne University Press: Melbourne, Australia.
Dawkins, John. 1988. "Higher education: a policy statement." *Australia Department of Employment, Education and Training.* Canberra: Australia. https://nla.gov.au/nla.obj-2518053881/view?partId=nla.obj-2520347917#page/n49/mode/1up/search/economies.
Dearden, L., Fitzsimons, E., Goodman, A., & Kaplan, G. (2008). Higher Education Funding Reforms in England: The Distributional Effects and The Shifting Balance of Costs. *The Economic Journal, 118 (February):* 100-125.
Dearden, L., Fitzsimons, E., & Wyness, G. (2014). Money for nothing: Estimating the impact of student aid on participation in higher education. *Economics of Education Review, 43, 66-78.* https://dx.doi.org/10.1016/j.econedurev.2014.09.005.
Dellas, H., & Sakellaris, P. (2003). On the Cyclicality of Schooling: Theory and Evidence. *Oxford Economic Papers*, *55*(1), 148–172. http://www.jstor.org/stable/3488876
Department of Education, Training and Youth Affairs. (2001). *Higher Education Students Time Series Tables.* Commonwealth of Australia. ISSN 1440-5326. https://www.education.gov.au/higher-education-statistics/resources/time-series-data-1949-2000
Denning, J. T. (2017). College on the cheap: Consequences of community college tuition reductions. *American Economic Journal: Economic Policy*, *9*(2), 155-188.
Department of Foreign Affairs and Trade. (n.d.). Diplomatic Academy: Education learning and development module. *Australian Government.* https://www.dfat.gov.au/sites/default/files/australian-education-system-foundation.pdf

Department of Social Services. (2022). The Household, Income and Labour Dynamics in Australia (HILDA) Survey, GENERAL RELEASE 21 (Waves 1-21). *Melbourne Institute of Applied Economic and Social Research*. doi:10.26193/KXNEBO, ADA Dataverse, V4.
Dow, C. (2015). Reform of the higher education demand driven system (revised). *Parliament of Australia.* https://www.aph.gov.au/about_parliament/parliamentary_departments/parliamentary_library/pubs/rp/budgetreview201415/higheredu.
Dynarski, S. (2000). Hope for whom? Financial aid for the middle class and its impact on college attendance. *National Tax Journal*, *53*(3), 629-661.
Dynarski, S. M. (2003). Does Aid Matter? Measuring the Effect of Student Aid on College Attendance and Completion. *The American Economic Review*, *93*(1), 279–288. http://www.jstor.org/stable/3132174
Dynarski, S. (2008). Building the stock of college-educated labor. *Journal of Human Resources*, *43*(3), 576-610.
Dynarski, S., Libassi, C. J., Michelmore, K., & Owen, S. (2018). *Closing the gap: The effect of a targeted, tuition-free promise on college choices of high-achieving, low-income students* (No. w25349). National Bureau of Economic Research.
Ey, C. (2021). The Higher Education Loan Program (HELP) and related loans: a chronology. *Parliament of Australia.* https://www.aph.gov.au/About_Parliament/Parliamentary_Departments/Parliamentary_Library/pubs/rp/rp2021/Chronologies/HigherEducation
Jepsen, C., Troske, K., & Coomes, P. (2014). The labor-market returns to community college degrees, diplomas, and certificates. *Journal of Labor Economics*, *32*(1), 95-121. https://www.journals.uchicago.edu/doi/full/10.1086/671809
Kane, T. (1995). Rising Public College Tuition and College Entry: How Well Do Public Subsidies Promote Access to College? National Bureau of Economic Research, Working Paper No. 5164. https://www.nber.org/system/files/working_papers/w5164/w5164.pdf
Garlick, R. (2019). Quality-Quantity Tradeoffs in Pricing Public Secondary Education. *Economic Research Initiatives at Duke: Working Paper Series, 290.* https://ssrn.com/abstract=3453239
Garibaldi, P., Giavazzi, F., Ichino, A., & Rettore, E. (2012). College cost and time to complete a degree: Evidence from tuition discontinuities. *Review of Economics and Statistics*, *94*(3), 699-711.
Goodman, J. (2008). Who merits financial aid?: Massachusetts' Adams scholarship. *Journal of public Economics*, *92*(10-11), 2121-2131.
Gore, J., Patfield, S., Fray, L. *et al.* (2017). The participation of Australian Indigenous students in higher education: a scoping review of empirical research, 2000–2016. *Aust. Educ. Res.* 44, 323–355. https://doi.org/10.1007/s13384-017-0236-9.
Goldin, C., Kerr, S. P., Olivetti, C., & Barth, E. (2017). The expanding gender earnings gap: Evidence from the LEHD-2000 Census. *American Economic Review*, *107*(5), 110-114.
Hansen, W. L. (1983). Impact of student financial aid on access. *Proceedings of the Academy of Political Science*, *35*(2), 84-96.
Harman, G. (1977). Academic staff and academic drift in Australian colleges of advanced education. *High Educ* **6**, 313–335. https://doi.org/10.1007/BF00141371
Higgins, T. (2019) The Higher Education Contribution Scheme: Keeping Tertiary Education Affordable and Accessible. In *Successful Public Policy: Lessons from Australia and New*

Zealand, edited by Joannah Luetjens, Michael Mintrom, and Paul't Hart, 59–86. ANU Press, 2019. http://www.jstor.org/stable/j.ctvh4zj6k.10.

Hassani-Nezhad, L., Anderberg, D., Chevalier, A., Lührmann, M., & Pavan, R. (2021). Higher education financing and the educational aspirations of teenagers and their parents. *Economics of Education Review 85(102175).* https://doi.org/10.1016/j.econedurev.2021.102175.

Hemelt, S. W., & Marcotte, D. E. (2008). Rising Tuition and Enrollment in Public Higher education. *The Institute for the Study of Labor in Bonn,* Discussion Paper Series No. 3827. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1305811.

Hotz, J.V., Wiemers, E. E., Rasmussen, J., & Koegel, K. M. (2018). The Role of Parental Wealth and Income in Financing Children's College Attendance and Its Consequences. *National Bureau of Economic Research:* Working Paper 25144. https://www.nber.org/system/files/working_papers/w25144/w25144.pdf.

Hout, M. (2012). Social and economic returns to college education in the United States. *Annual review of sociology*, *38*, 379-400.

Hübner, M. (2012). Do tuition fees affect enrollment behavior? Evidence from a 'natural experiment' in Germany. *Economics of Education Review* 31(2012): 949-960.

Keane, M. P., & Wolpin, K. I. (2001). The Effect of Parental Transfers and Borrowing Constraints on Educational Attainment. *International Economic Review* 42(4), 1051–1103. http://www.jstor.org/stable/826985

Knott, M. (2014). Gough Whitlam's free university education reforms led to legacy of no upfront fees. *The Sydney Morning Herald.* October 21, 2014. https://www.smh.com.au/politics/federal/gough-whitlams-free-university-education-reforms-led-to-legacy-of-no-upfront-fees-20141021-119bws.html

Kuba, R., Flegr, J., & Havlíček, J. (2018). The effect of birth order on the probability of university enrolment. *Intelligence*, 70, 61-72. https://doi.org/10.1016/j.intell.2018.08.003.

Lecouteux, G., & Moulin, L. (2015). To gain or not to lose? Tuition fees for loss averse students. *Economics Bulletin*, *35*(2), 1005-1019.

Lörz, M., & Mühleck, K. (2019). Gender differences in higher education from a life course perspective: transitions and social inequality between enrolment and first post-doc position. *Higher Education*, *77*, 381-402.

Lörz, M., Schindler, S., & Walter, J. (2011). Gender inequalities in higher education: extent, development and mechanisms of gender differences in enrolment and field of study choice. *Irish Educational Studies,* 30(2): 179-198. https://doi.org/10.1080/03323315.2011.569139

Mantovani, D., Gasperoni, G., & Albertini, M. (2018). Higher education beliefs and intentions among immigrant-origin students in Italy. *Ethnicities*, 18(4), 603-626. https://doi.org/10.1177/1468796818777549

Marks, G.N. (2007). Are Father's or Mother's Socioeconomic Characteristics More Important Influences on Student Performance? Recent International Evidence. *Soc Indic Res* **85**, 293–309. https://doi.org/10.1007/s11205-007-9132-4

Murphy, R., Scott-Clayton, J., & Wyness, G. (2019). The end of free college in England: Implications for enrolments, equity, and quality. *Economics of Education Review 71*, 7-22. https://doi.org/10.1016/j.econedurev.2018.11.007.

McPherson, M. S., & Schapiro, M. O. (1991). Does Student Aid Affect College Enrollment? New Evidence on a Persistent Controversy. *The American Economic Review*, *81*(1), 309–318. http://www.jstor.org/stable/2006804.

Norton, A. (2012). Graduate Winners: Assessing the public and private benefits of higher education. *Grattan Institute.* https://grattan.edu.au/wp-content/uploads/2014/04/162_graduate_winners_report.pdf.

McDonald, G. (2013). Does size matter? The impact of student–staff ratios. Journal of Higher Education Policy & Management, 35(6), 652–667. https://doi.org/10.1080/1360080X.2013.844668

McMillan, J., Beavis, A., & Jones, F. L. (2009). The AUSEI06: A new socioeconomic index for Australia. *Journal of Sociology*, *45*(2), 123-149. https://www.acer.org/au/ausei06#:~:text=AUSEI06%20is%20intended%20for%20use,to%20100%20(high%20status).

Macintyre, S., Brett, A. and Croucher, G. (2017). *No End of a Lesson: Australia's Unified National System of Higher Education.* Melbourne University Press: Victoria, Australia.

Minor, R. (2023). How tuition fees affected student enrollment at higher education institutions: the aftermath of a German quasi-experiment. *Journal for Labour Market Research*, *57*(1), 28.

Nakata, M., Nakata, V., Day, A., & Peachey, M. (2019). Closing Gaps in Indigenous Undergraduate Higher Education Outcomes: Repositioning the Role of Student Support Services to Improve Retention and Completion Rates. *The Australian Journal of Indigenous Education*, *48*(1), 1–11. doi:10.1017/jie.2017.36.

OECD. (2022). Australia: Education at a Glance 2022: OECD Indicators. https://www.oecd-ilibrary.org/sites/6fbed98f-en/index.html?itemId=/content/component/6fbed98f-en#:~:text=This%20is%20also%20the%20case,%25)%20was%2026%20percentage%20points.

Public Record Office Victoria. (n.d.). School attendance regulation. https://prov.vic.gov.au/archive/VF120.

Seftor, N. S., & Turner, S. E. (2002). Back to school: Federal student aid policy and adult college enrollment. *Journal of Human Resources*, 336-352.

Suhonen, T., & Karhunen, H. (2019). The intergenerational effects of parental higher education: Evidence from changes in university accessibility. Journal of Public Economics, 176(2019): 195-217. https://doi.org/10.1016/j.jpubeco.2019.07.001.

Tamborini, C. R., Kim, C., & Sakamoto, A. (2015). Education and lifetime earnings in the United States. *Demography*, *52*(4), 1383-1407.

Thomson, Vicki. 2015. "In the media: Free education never existed." *Group of Eight: Australia.* January 29, 2015. https://go8.edu.au/free-education-never-existed.

Tompkins, P. (1958). Australian Higher Education and the Murray Report. *The Journal of Higher Education, 29*(7), 361-409. doi:10.2307/1978751

Tullao, T. S., & Ruiz, M. G. C. (2022). Unintended consequences of free education in public colleges and universities in the Philippines 1. In *Critical Perspectives on Economics of Education* (pp. 43-61). Routledge.

Tusiime, M., Otara, A., Keleeba, A., et al. (2017). Gender differences in enrollment and graduation rates in private and public higher learning institution in Rwanda. Rwanda Journal, 4(1): Series B. 10.4314/rj.v4i1.2B.

Wan, C. (2018). Student enrolment in Malaysian higher education: Is there gender disparity and what can we learn from the disparity? *Compare, 48*(2), 244-261. doi:https://doi.org/10.1080/03057925.2017.1306435.
Whitlam, G. (1972). Men and Women of Australia! Election Speeches - Gough Whitlam, 1972 – Museum of Australian Democracy at Old Parliament House. *Museum of Australian Democracy at Old Parliament House.* Nov 13. https://electionspeeches.moadoph.gov.au/speeches/1972-gough-whitlam
Whitlam Institute. (2023). Education. *Whitlam Institute: Within Western Sydney University.* https://www.whitlam.org/whitlam-legacy-education#abolition-of-university-fees

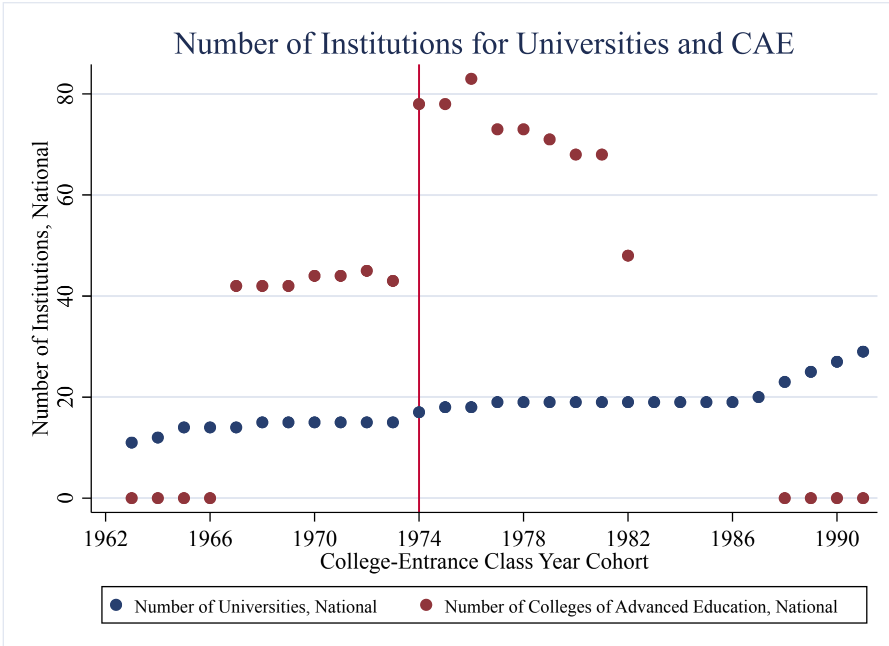
Data Sources:

Australian Bureau of Statistics. (1975-1991). *Expenditure on Education Australia 1973-89.* Australian Bureau of Statistics. Reference No. 5.44. Canberra: Printed in Australia by P.J. Grills Commonwealth Government Printer. Commonwealth of Australia 1975.
Australian Bureau of Statistics. (1978-1983). *University Statistics 1977-82-.* Australian Bureau of Statistics. Catalogue No. 4208.0. February 22, 1978. Canberra: Printed in Australia by P.J. Grills Commonwealth Government Printer. Commonwealth of Australia 1978.
Australian Bureau of Statistics. (1984). *University and Advanced Education Student Statistics Australia, 1982 to 1984, Summary.* Australian Bureau of Statistics. Catalogue No. 4222.0. September 12, 1984. Canberra: Printed in Australia by P.J. Grills Commonwealth Government Printer. Commonwealth of Australia 1984.
Australian Bureau of Statistics. (1992). *Education and Training in Australia*. *ABS Catalogue No. 4224.0,* pp.62. Printed by Commonwealth Government Printer, Canberra, by P.J.
Australian Bureau of Statistics. (1984). Australian National Accounts: National Income and Expenditure 1972-73, 1982-83. Canberra, Australia. Catalogue No. 5204.0. By R.J. Cameron. Printed by C.J. Thompson, Commonwealth Government Printer.
Australian Bureau of Statistics. (2019). Australian Historical Population Statistics, 2019. *3105.0.65.001.* 18 April, 2019. https://www.abs.gov.au/statistics/people/population/historical-population/latest-release.
Australian Bureau of Statistics. (2019). "Table 2.1 Population(a), age and sex, Australia(b), 30 June, 1901 onwards." 18 April 2019. *3105.0.65.001 Australian Historical Population Statistics, 2019.* https://www.abs.gov.au/statistics/people/population/historical-population/2016#data-downloads
Australian Bureau of Statistics. (2019). Australian Historical Population Statistics, 2019. *3105.0.65.001.* 18 April, 2019. https://www.abs.gov.au/statistics/people/population/historical-population/latest-release.
Australian Government. (2023). List of Australia's Universities. https://www.studyaustralia.gov.au/en/plan-your-studies/list-of-australian-universities#:~:text=Australia%20is%20home%20to%2041,and%20one%20private%20international%20university.
International Monetary Fund. (2018). Consumer price index (2010 = 100) – Australia. *International Financial Statistics and data files*.https://data.worldbank.org/indicator/FP.CPI.TOTL?end=2018&locations=AU&start=1960
McLennan, W. 1986. "Tertiary Education, Australia. 1984." *Australian Bureau of Statistics,* Catalogue No.4218.0. Canberra: Australia. Commonwealth Government Printer.

McLennan, W. 1987. “Tertiary Education, Australia. 1985.” *Australian Bureau of Statistics,* Catalogue No.4218.0. Canberra: Australia. Commonwealth Government Printer.
The World Bank. (2022). Inflation, consumer prices (annual %) – Australia. https://data.worldbank.org/indicator/FP.CPI.TOTL.ZG?locations=AU.
U.S. Bureau of Labor Statistics. (2011). Real GDP per Capita in Australia (DISCONTINUED) [AUSRGDPC]. retrieved from FRED, Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/series/AUSRGDPC. Retrieved on March 31, 2024.

11. Appendices

Appendix 1: Number of Universities and Colleges of Advanced Education Across Time



Appendix 2: Controlling For Two State Dummies (Only Main Results Presented)

	Outcome = Occupational Status		
	With State of Highest Schooling Dummy	**With State of Highest Schooling & Current Residence Dummies**	**With Both Dummies and Free Ed Indicator Separated Into Channels**
Main			
$IfFreeEd_i$	9.065***	9.033***	4.813**
	(1.468)	(1.465)	(1.998)
$IfFemale_i \times IfFreeEd_i$	1.357	1.394	1.441
	(1.695)	(1.693)	(1.692)
$IfEnrolledHigherEd_i \times IfFreeEd_i$			2.944 (2.469)
$IfObtainedBachelor_i \times IfFreeEd_i$			7.422*** (2.359)
$IfObtainedDiploma_i \times IfFreeEd_i$			-0.475 (2.187)
Control			
$IfFemale_i$	-4.003***	-4.011***	-4.188***
	(1.405)	(1.402)	(1.406)
$IfEnrolledHigherEd_i$	7.971***	7.860***	6.298***
	(1.212)	(1.212)	(1.976)
$IfObtainedBachelor_i$	27.38***	27.30***	22.57***
	(1.114)	(1.116)	(2.041)
$IfObtainedDiploma_i$	2.526**	2.591**	2.908
	(1.023)	(1.024)	(1.849)
Yr_{int_i}	-1.389***	-1.375***	-1.349***
	(0.361)	(0.361)	(0.360)
$RealGDP_{pc_i}$	0.00452***	0.00449***	0.00449***
	(0.000838)	(0.000835)	(0.000833)
State of Highest Schooling Dummy	Yes	Yes	Yes
State of Current Residence Dummy	No	Yes	Yes
Constant	-68.57***	-67.76***	-17.38***
	(13.73)	(13.70)	(3.671)
Observations	4947	4947	4947
Adjusted R-squared	0.304	0.304	0.306

	Outcome = Disposable Income		
	With State of Highest Schooling Dummy	**With State of Highest Schooling & Current Residence Dummies**	**With Both Dummies and Free Ed Indicator Separated Into Channels**
Main			
$IfFreeEd_i$	494.2	217.0	212.7
	(3470.4)	(3479.5)	(3282.5)
$IfFemale_i \times IfFreeEd_i$	-2416.9	-2117.6	-2124.3
	(3390.7)	(3396.4)	(3287.5)
$IfEnrolledHigherEd_i \times IfFreeEd_i$			-592.3 (5714.9)
$IfObtainedBachelor_i \times IfFreeEd_i$			164.6 (4425.1)
$IfObtainedDiploma_i \times IfFreeEd_i$			814.2 (5269.1)
Control			
$IfFemale_i$	-22294.1***	-22489.7***	-22491.5***
	(2801.4)	(2803.3)	(2729.7)
$IfEnrolledHigherEd_i$	8747.4***	8820.0***	9173.8*
	(2401.0)	(2406.4)	(5275.4)
$IfObtainedBachelor_i$	6890.9***	6508.3**	6415.4
	(2508.7)	(2534.6)	(4442.2)
$IfObtainedDiploma_i$	-6483.3***	-6636.1***	-7135.1
	(2182.1)	(2191.6)	(4835.0)
$RespOccupStatus_i$	548.2***		548.6***
	(36.03)		(35.79)
Yr_{int_i}	-69.68	-43.18	-46.90
	(463.6)	(461.3)	(461.2)
$RealGDP_{pc_i}$	0.184	0.136	0.145
	(1.020)	(1.015)	(1.012)
Constant	26640.1	27770.4	27637.2*
	(16992.6)	(16915.9)	(16725.8)
Observations	4947	4947	4947
Adjusted R-squared	0.257	0.259	0.259

Appendix 3: Incorporating $IfFemale_i \times Yr_{int}$ to Table 3 and 4 (Only Main Results)

	Table 3: Outcome = *Likelihood of Enrolling in Higher Education*			
	Full Sample (1)	Full Sample (2)	Full Sample, State Dummies	Sample Restricted to Grade 10 Completes, State Dummies
Main				
$IfFreeEd_i$	-0.0228	0.0406	0.0414	-0.00576
	(0.0265)	(0.0377)	(0.0372)	(0.0379)
$IfFemale_i \times IfFreeEd_i$	0.0885***	0.0918**	0.0654*	0.0660*
	(0.0369)	(0.0374)	(0.0355)	(0.0354)
$DadOccupStatus_i \times IfFreeEd_i$		-0.00102 (0.000623)	-0.000951 (0.000660)	-0.000529 (0.000648)
$MomOccupStatus_i \times IfFreeEd_i$		-0.00105** (0.000519)	-0.00122** (0.000556)	-0.000622 (0.000542)
Control				
$IfFemale_i$	-0.0889***	-0.0912***	-0.122***	-0.138***
	(0.0250)	(0.0252)	(0.0270)	(0.0289)
Yr_{int}	-0.00757	-0.00776	-0.00801	-0.00498
	(0.00553)	(0.00548)	(0.00586)	(0.00595)
$IfFemale_i \times Yr_{int}$	-0.0000135	-0.0000747	0.00303	0.00341
	(0.00240)	(0.00244)	(0.00235)	(0.00235)
State Dummy?	No	No	Yes	Yes
Observations	6070	6070	4938	4396
Pseudo R-squared	0.0802	0.0822	0.0838	0.0721

	Table 4: Outcome = Likelihood of Ever Receiving a Bachelor's Degree			
	Full Sample (1)	Full Sample (2)	Full Sample, State Dummies	Sample Restricted to Enrollees in Higher Ed, State Dummies
Main				
$IfFreeEd_i$	-0.0541	-0.0412	-0.0325	-0.0594
	(0.0422)	(0.0509)	(0.0514)	(0.0625)
$IfFemale_i \times IfFreeEd_i$	0.0963*	0.0964*	0.0952*	0.104
	(0.0550)	(0.0550)	(0.0549)	(0.0668)
$DadOccupStatus_i \times IfFreeEd_i$		-0.0000369 (0.000643)	0.0000955 (0.000645)	-0.000356 (0.000787)
$MomOccupStatus_i \times IfFreeEd_i$		-0.000371 (0.000560)	-0.000369 (0.000560)	-0.000256 (0.000689)
Control				

$IfFemale_i$	-0.0270	-0.0281	-0.0310	0.00832
	(0.0324)	(0.0325)	(0.0324)	(0.0410)
Yr_{int}	-0.00412	-0.00414	-0.00363	-0.00166
	(0.00636)	(0.00636)	(0.00632)	(0.00799)
$IfFemale_i \times Yr_{int}$	-0.00146	-0.00141	-0.00111	-0.00293
	(0.00408)	(0.00408)	(0.00407)	(0.00501)
State Dummy?	No	No	Yes	Yes
Observations	4089	4089	4089	3241
Pseudo R-squared	0.1062	0.1063	0.1095	0.0865

	Table 5: Outcome = Likelihood of Ever Receiving a Diploma			
	Full Sample (1)	Full Sample (2)	Full Sample, State Dummies	Sample Restricted to Enrollees in Higher Ed, State Dummies
Main				
$IfFreeEd_i$	-0.0269	0.0712	0.0851	0.0650
	(0.0628)	(0.0777)	(0.0779)	(0.0790)
$IfFemale_i \times IfFreeEd_i$	0.0732	0.0782	0.0719	0.0514
	(0.0799)	(0.0798)	(0.0795)	(0.0806)
$DadOccupStatus_i \times IfFreeEd_i$		-0.00340*** (0.00116)	-0.00369*** (0.00115)	-0.00344*** (0.00115)
$MomOccupStatus_i \times IfFreeEd_i$		0.00135 (0.00107)	0.00130 (0.00106)	0.00228** (0.00107)
Control				
$IfFemale_i$	-0.119	-0.118	-0.114	0.00315
	(0.0862)	(0.0860)	(0.0858)	(0.0868)
Yr_{int}	0.0163	0.0154	0.0154	0.00666
	(0.0177)	(0.0176)	(0.0176)	(0.0181)
$IfFemale_i \times Yr_{int}$	0.00173	0.00153	0.00159	-0.00304
	(0.00795)	(0.00793)	(0.00791)	(0.00788)
State Dummy?	No	No	Yes	Yes
Observations	2480	2480	2480	2037
Pseudo R-squared	0.0120	0.0152	0.0228	0.0266

Appendix 4: Female Indicator Sensitivity Analysis

	Outcome: Ever Enrolled	Outcome: Bachelor Attainment	Outcome: Diploma Attainment
$IfFreeEd_i$	0.0660*	-0.0286	0.0993
	(0.0385)	(0.0515)	(0.0803)
$IfFemale_i$	0.971**	0.156	0.787
	(0.431)	(0.434)	(1.593)
$IfFemale_i \times IfFreeEd_i$	0.0191	0.0930	0.0470
	(0.0403)	(0.0566)	(0.0899)
$IfFemale_i \times RealGDP_{pc_i}$	-0.0000646**	-0.0000121	-0.0000483
	(0.0000260)	(0.0000263)	(0.0000915)
$IfFemale_i \times IfMomHighEd_i$	0.0649*	0.0703**	0.0672
	(0.0335)	(0.0336)	(0.0572)
$IfFemale_i \times IfDadHighEd_i$	-0.0478*	0.00443	0.00890
	(0.0262)	(0.0296)	(0.0478)
$IfFemale_i \times IfMomEmployed_i$	0.0316	-0.0506*	-0.00227
	(0.0266)	(0.0282)	(0.0456)
$IfFemale_i \times IfDadEmployed_i$	-0.0468	0.0150	-0.0955
	(0.0521)	(0.0576)	(0.0941)
$IfFemale_i \times MomOccupStatus_i$	-0.000483	-0.000560	0.00143
	(0.000623)	(0.000628)	(0.00106)
$IfFemale_i \times DadOccupStatus_i$	0.000440	0.0000452	-0.00000416
	(0.000682)	(0.000677)	(0.00110)
$IfFemale_i \times IfEldestChild_i$	0.0000832	0.0283	-0.0401
	(0.0272)	(0.0284)	(0.0486)
$IfFemale_i \times IfIndigenous_i$	-0.109	-0.0280	-0.0650
	(0.0968)	(0.120)	(0.171)
$IfFemale_i \times IfImmigrant_i$	-0.0114	0.0164	-0.107
	(0.0571)	(0.0606)	(0.104)
State Dummy?	Yes	Yes	Yes
Sample Restriction?	Full Sample	Full Sample	Full Sample
Observations	4938	4089	2480
Pseudo R-squared	0.0885	0.1119	0.0263

Appendix 5: Omitted Variable Estimates

	Table 4: Outcome = Likelihood of Ever Receiving a Bachelor's Degree			
	Full Sample (1)	**Full Sample (2)**	**Full Sample, State Dummies**	**Sample Restricted to Grade 10 Completes, State Dummies**
$RealGDP_{pc_i}$	0.0000138	0.0000140	0.0000134	0.00000774
	(0.0000133)	(0.0000133)	(0.0000132)	(0.0000168)
$IfIndigenous_i$	-0.0671	-0.0664	-0.0590	-0.0396
	(0.0590)	(0.0589)	(0.0589)	(0.0763)
$IfImmigrant_i$	0.0305	0.0314	0.0280	0.0214
	(0.0305)	(0.0305)	(0.0302)	(0.0374)
State Dummy?	No	No	Yes	Yes

	Table 5: Outcome = Likelihood of Ever Receiving a Diploma			
	Full Sample (1)	**Full Sample (2)**	**Full Sample, State Dummies**	**Sample Restricted to Grade 10 Completes, State Dummies**
$RealGDP_{pc_i}$	-0.0000390	-0.0000360	-0.0000355	-0.00000711
	(0.0000462)	(0.0000461)	(0.0000459)	(0.0000477)
$IfEldestChild_i$	0.0284	0.0285	0.0254	0.00869
	(0.0242)	(0.0242)	(0.0242)	(0.0244)
$IfIndigenous_i$	-0.100	-0.102	-0.105	-0.0123
	(0.0866)	(0.0870)	(0.0854)	(0.0842)
$IfImmigrant_i$	0.00219	0.00807	-0.00132	-0.0125
	(0.0521)	(0.0521)	(0.0524)	(0.0524)
State Dummy?	No	No	Yes	Yes