Enrollment, Tuition Subsidies and Welfare: Evidence from Ontario's Tuition Grant

Click here for the latest version

Abstract

This paper estimates the effect of tuition subsidies on post-secondary enrollment, identifies the channels through which subsidies operate, and evaluates their welfare implications. I exploit the introduction of Ontario's 30% Tuition Grant (OTG) in 2012, which provides up to $1,680 ($780) annually to income-eligible students enrolled in university (college), using a triple-difference design that leverages variation in parental income, province of residence, and program rollout. Linked administrative tax and post-secondary records for 1.5-generation immigrant children permit direct observation of parental resources and enrollment decisions. Eligibility for the grant increased enrollment by 2.7 percentage points. The response is concentrated among students whose parents hold little to no capital income, consistent with binding liquidity constraints. I embed the estimated enrollment elasticity in a two-period sufficient-statistics framework to decompose the welfare gain into a liquidity benefit and a fiscal externality. I find that an additional dollar of grant spending raises social welfare by $1.3, with the fiscal externality from the expanded tax base as the dominant channel.

JEL Classification: I22, I28, I38

Keywords: tuition subsidies, enrollment, liquidity constraints, fiscal externality, immigrants

Kritagya Dhanda
Economics Department
McMaster University
1280 Main Street West
Hamilton, ON L8S 4M4, Canada
dhandak@mcmaster.ca

1 Introduction

Every year governments across the OECD commit tens of billions of dollars to lowering the price of post-secondary education. The economic logic is familiar: a tuition subsidy lowers the cost of enrolling, higher enrollment raises lifetime earnings through the college wage premium, and the incremental tax revenue that flows from those higher earnings can, under plausible parameters, exceed the mechanical cost of the subsidy itself (Lawson, 2017). A large body of quasi-experimental work has established that eligibility for an additional $1,000 of grant aid raises the probability of enrollment by roughly three to four percentage points, with the largest and most transparent programs delivering the largest responses (Dynarski, 2003; Deming and Dynarski, 2009; Castleman and Long, 2013). Previous work, however, has rarely observed household resources with sufficient detail to directly identify which students face binding liquidity constraints. Instead, it finds large price responses in groups that are *inferred* to be constrained based on their observable demographic and socioeconomic characteristics (Deming and Dynarski, 2009; Castleman and Long, 2013). Such proxies are informative but inevitably contestable since a larger response among low income or minority students is equally consistent with differences in preferences, information, expected returns, or academic preparation as it is with binding constraints (Oreopoulos and Dunn, 2013a; Park and Scott-Clayton, 2018; Dynarski and Scott-Clayton, 2006; Currie, 2004; Johnson, 2013).

The purpose of this paper is to address this limitation. I exploit the introduction of Ontario's 30% Tuition Grant (*OTG*) in 2012—a place-, income-, and time-contingent subsidy worth up to $1,680 ($780) per year to income-eligible students enrolled in a degree program in four year universities (two year colleges). I link the enrollment and tax records of 1.5 generation immigrant children[1] to the tax records of their parents in the years leading up to the post-secondary deci-

[1]These are individuals who immigrated to a new country as children or adolescents, typically before the age of 18, alongside or to join their parents. They complete only part of their schooling in the destination country. For a literature review of immigrant children and their earnings, assimilation and inter-generational mobility relative to second and native born children, see Rumbaut (1991); Corak (2011); Allensworth (1997); Connolly et al. (2023); Borjas (1993).

sion, drawing on the Longitudinal Immigration Database (IMDB), income-tax returns (T1FF), and the Post-secondary Student Information System (PSIS). This linkage provides direct measure of objects that the prior literature has been forced to proxy: parental income, and crucially—parental holdings of capital income (dividends, interest, and realized capital gains) and savings (RESPs/scholarship income) in the years immediately preceding the schooling decision. Because a household with little or no capital income has fewer liquid assets to draw upon to smooth the up-front cost of tuition, the distribution of pre-decision capital income furnishes a direct, resource-based measure of the liquidity position of the family. To the best of my knowledge, this is the first study of a tuition subsidy that identifies the liquidity-constraints from observed family resources linked at the parent–child level.

I use a difference-in-difference-in-differences (DDD) design that leverages three sources of variation embedded in the *OTG*'s eligibility rules: parental income below the $160,000 threshold (*income*), residence in Ontario rather than the rest of Canada (*place*), and enrollment in 2012 or later (*time*). The linked IMDB–T1FF–PSIS data cover the universe of landed immigrant children and their parents observed between 2009 and 2014, and permit the enrollment margin to be tied to family resources measured in the years before the decision. I find that eligibility raised enrollment in Ontario degree programs by 2.7 percentage points. The enrollment is large and statistically significant among children whose parents report little to no liquid resources in the years leading up to enrollment. I further document heterogeneity in the enrollment response by world area of birth and landing age, consistent with the age-at-arrival literature (Schaafsma and Sweetman, 2001b; Connolly et al., 2023; Adnan et al., 2023). Finally, with evidence on the enrollment, I use the reduced-form elasticity estimate to quantify the change in welfare produced by the subsidy. I adopt a two-period life-cycle model of education choice and labour supply with my estimated elasticity to calibrate a sufficient statistics formula for the impact of increasing a tuition subsidy on welfare. With the baseline enrollment rate and grant levels[2] of 37% and 1,870$ respectively, the

[2]Baseline grant levels is estimated using Canada Student Financial Assistance Program in pre-*OTG* periods: 2009-2011.

reduced form estimate produces an enrollment elasticity of roughly 0.11. This estimated elasticity is squarely within the range established in the U.S. literature (Dynarski, 2003; Deming and Dynarski, 2009; Castleman and Long, 2013). The framework implies that an additional dollar of grant spending raises social welfare by about $1.3, with the fiscal externality as the dominant channel.

This paper connects to, and builds on, two strands of research on the subsidy response to price of post-secondary education and the barriers to access. The first estimates the causal effect of grant aid on enrollment. Early evaluations of the federal Pell Grant found little enrollment response (Hansen, 1983; Kane, 1995), a puzzle later attributed less to the irrelevance of price than to the complexity, opacity, and late timing of the aid-application process (Deming and Dynarski, 2009; Bettinger et al., 2012; Park and Scott-Clayton, 2018). Programs with transparent rules and salient benefits tell a sharply different story. Dynarski (2003) shows that the elimination of the Social Security Student Benefit reduced enrollment by roughly four percentage points per $1,000 of forgone aid; broad-based state merit programs such as Georgia's HOPE scholarship produced enrollment gains of four to six percentage points per $1,000 (Cornwell et al., 2005; Dynarski, 2000); and regression-discontinuity evaluations of need-based grants layered atop the Pell confirm that marginal aid raises attendance, credit accumulation, and degree completion (Castleman and Long, 2013). A complementary literature demonstrates that lowering the non-financial cost of applying that eases technical barriers to FAFSA by providing personalized assistance, or waiving application fees can move enrollment as much as sizable transfers, underscoring that both price and process shape access (Bettinger et al., 2012; Oreopoulos and Dunn, 2013b). The consensus enrollment elasticity that emerges from this body of work, on the order of 0.1–0.3, is the benchmark against which I evaluate the *OTG*. The second strand studies the economic assimilation of immigrant children, and in particular the role of age at arrival. A robust body of evidence documents a critical window after which later arrival is associated with sharply worse earnings and educational attainment (Schaafsma and Sweetman, 2001b; Connolly et al., 2023; Adnan et al., 2023). Post-secondary enrollment is a plausible channel through which this integration operates,

yet the responsiveness of immigrant children to price interventions, and how that responsiveness varies with age at arrival and region of origin, has not previously been estimated.

A central contribution of this paper is that it quantifies the relative importance of the distinct channels through which a tuition subsidy affects welfare. The closest antecedent to this paper is Lawson (2017), which uses U.S. data and a sufficient-statistics approach to assess two key rationales for tuition subsidies: liquidity constraints and fiscal externalities. Unlike the return to college, summarized as a single wage differential between attending and not attending, my framework considers the full wage distribution that governs the return to education and identifies liquidity constraints through parent-child linkage. This distinction is important because the post-secondary earnings premium is neither homogeneous nor confined to a binary margin. Acemoglu and Pischke (2001) document substantial heterogeneity in wage returns to two- versus four-year institutions and in the quality of schooling across them, while Carneiro and Heckman (2002) argue that parental environment in the child's formative teenage years explain much of the variation in college participation. Identifying mechanisms that explain human capital accumulation decisions is important to evaluating the welfare implications of tuition subsidies because parental environments during formative years may generate heterogeneity in college participation and, consequently, in returns to financial assistance.

The remainder of the paper proceeds as follows: Section 2 describes the institutional background. Section 3 describes the data as well as the sample selection criteria. Section 4 sets out the empirical strategy and the key identification assumptions. Section 5 presents the main results and the heterogeneous treatment effects. Section 6 describes the results of embedding the reduced form estimate in a two-period life cycle model and investigates which channel is dominant in increasing welfare. Section 7 concludes.

2 Institutional Background

Ontario's 30% Tuition Grant was implemented in January 2012, following a 2011 provincial election commitment by the incumbent government. The grant pays eligible students up to $1,680 per year in a university program and $780 per year in a college program. To qualify, a student must: (i) be enrolled full-time at a public Ontario college or university in a first-entry program; (ii) be a Canadian citizen, permanent resident, or protected person; (iii) be an Ontario resident living with parents; (iv) have left high school within the last four years; and (v) have gross parental income of $160,000 or less. Under these rules, roughly five of every six Ontario students were eligible.

The OTG belongs to a broader shift in Canadian student aid toward grant-based support. The Canada Student Loans Program (CSLP) was created in 1964 under the Canada Student Loans Act to widen access, initially through government-guaranteed loans issued by banks and credit unions and administered by the provinces and Yukon. In 1995 the Canada Student Financial Assistance Act (CSFAA) introduced a risk-shared loan regime; on August 1, 2000 it was amended to permit directly financed federal loans, after which financial institutions no longer issued student loans and the federal–provincial governments bore default losses. Participating provinces have their own student financial assistance programs that complement the CSLP by providing additional financial assistance up to established maximum amounts[3]. In August, 2009 the Canadian Student Grants (CSG) was initiated that provided non-taxable, non-repayable assistance to targeted groups of students, including students from low- and middle-income families, students with a disability recognized by the CSFA Program and students with children under the age of 12. Although the maximum loan available to students did not rise between 2006 and 2019, grants grew from an average of about 7% to 32% of federal support, driven by a permanent 50% increase in grants for low- and middle-income students in 2016–2017 and a more progressive eligibility threshold from 2017–2018. The OTG formed part of this provincial-level expansion of affordable post-secondary

[3]For further details on the established amounts see Liu (2025)'s work on the effects of need-based financial aid on educational decisions and outcomes that provides exhaustive details of low-middle income thresholds that vary by province and family size.

access[4].

3 Data

The analysis in this paper is based on three linked administrative datasets: (i) the Postsecondary Student Information System (PSIS), (ii) annual individual tax returns (T1FF) and (iii) the Longitudinal Immigration Database (IMDB). The PSIS is a longitudinal administrative dataset based on student and institutional data reported by all public Canadian universities and colleges. The PSIS provides details on student enrollments, full/part time status, field of study and degree completion at Canadian public and not-for-profit private postsecondary institutions from 2009–10 to 2020–21.

Using a family identifier, I link postsecondary students in the PSIS to landed immigrants in the IMDB. The IMDB contains information in the landing files for all new permanent residents to Canada since 1980.[5] The IMDB includes standard demographic variables (e.g., sex and date of birth), information on country of origin, country of birth, country of prior residence, and immigrant class of admission (e.g., refugee and humanitarian, economic, business class, etc.). Since the landing file data is derived from immigrant application files, I also observe unique measures—that are seldom observed by researchers—such as self-reported mother tongue, fluency in English and French, years of schooling of both parents and children and intended occupation. These variables are populated by the applicant and then verified by an Immigrant, Refugee and Citizenship Canada (IRCC) officer through supporting documentation and an interview process[6]. In what follows, I describe in detail the sample restrictions and the key variables used in this study.

[4]For further information, review Canada Student Financial Assistance Regulations, Actuarial Reports (2019-2025) of Canada Student Financial Assistance Program

[5]Note that I do not observe any children born in Canada, only students and their parents or other family members that immigrated to Canada.

[6]Lying on an application or in an interview with an IRCC officer or document fraud is a serious crime and can lead to removal from Canada or bans from entering the country. (**?**).

3.1 PSIS

My analysis focuses on all students that enrolled in degree type programs at entry-level programs for the first time at an Ontario college or university between the 2009–10 and 2014–15 academic years. It thus excludes all those enrolled in graduate, and post graduate programs, or first enrolling in years outside of the stated observation window. I use repeated cross sections of first time enrollees in colleges and universities that were born in the years from 1991 to 1997 from the Post Secondary Information System (PSIS). I make these sample restrictions because these birth cohorts reach the age of making the decision of post-secondary education and the eligibility criteria of the *OTG* subsidy is most salient.

I construct the prospective-student sample from immigrant children in the IMDB linked to their parents' tax records, independently of whether they appear in PSIS. I then attach PSIS enrollment records to this population, retaining children without an observed enrollment record. The qualifying-enrollment outcome identifies first full-time enrollment between ages 18 and 22 in short-cycle tertiary programs (ISCED level 5) or Bachelor's and equivalent first-degree programs (ISCED level 6). Children with no qualifying enrollment are coded zero, including those observed only in programs outside these categories. As a result, the effects identified pertain to the implications of provincial aid eligibility for first-time recipients during their initial year of full-time study in degree programs in Ontario.

3.2 IMDB-T1FF

Immigration landing files are linked to individual income tax returns (T1FF) from 1982 to 2023 and third-party information returns (T4 wage slips issued by employers) from 1997 to 2020. These two sources are analogous to 1040 forms and W-2 forms in the United States. Linkages are formed by Statistics Canada using deterministic and probabilistic linkages. Of immigrants admitted between 1980 and 2020, over 85.3% had at least one T1FF record (during the period 1982-20203) and over 70.3% were linked to at least one T4 record (during the period 1997-2020). The T1FF

are a yearly cross-sectional of individual tax returns. The data contain information on the incomes, deductions and tax credits of the individual and their family. Census families are created from information provided annually to the Canada Revenue Agency in personal income tax returns.[7] These data also include geographic information at various levels, including province of residence, province in which the tax return is filed and various statistical areas[8]. I retain parent–child-linked observations only when the preceding year's tax records provide the information required to construct parental income and assign province of taxation and residence. Observations without the required prior-year coverage or geographic information are excluded from the analytical sample

The main variables I use from the IMDB-T1FF include, individual earnings, total family income, the education deductions for the child, tuition deductions reported by the parent and tuition credits earned. Since eligibility for the tuition tax credit depends on the income of the child's parents during the previous (tax) year, I subtract the child's total income from the total family income to calculate gross parental income. I then create a binary treatment eligibility indicator equal to one for students whose parental income in the preceding year of observation is below the eligibility threshold ($160,000) and zero otherwise. Indicator variable on province of residence is based on main parent's province of taxation in the preceding year. Table 1 provides Summary Statistics of my sample that reports T1ff outcomes of parents and children and characteristics.

Table 1: Insert Table 1 Here

4 Empirical Strategy

I estimate the causal effect of eligibility for the 30% discount on tuition on enrollment outcomes using a difference-in-difference-in-differences (DDD) approach. My research design compares the

[7]Both legal and common law spouses are attached by the spousal Social Insurance Number listed on the tax form, or by matching based on name, address, age, sex and marital status. Children are identified through a similar algorithm and supplementary files.

[8]These include area divisions such as Census Division (CD), Census Metrpolitan Areas (CMAs), Economic Regions (ERs), Census sub-divisions (CSDs) and Census Tracts (CTs).)

probability of enrolling in a degree program in a university or college in Ontario for those who reside in Ontario to those who do not (first difference), those whose parental income is below the eligibility threshold to those whose is above (second difference) and to those who enrolled before and after the policy's introduction in 2012 (third difference)[9]. My main estimating equation is:

$$\begin{aligned} Y_{ipt} = \alpha &+ \beta_1 \,\text{TREAT}_i + \beta_2 \,\text{POST}_t + \beta_3 \,\text{REZ}_{ipt} + \beta_4 \,(\text{TREAT}_i \times \text{POST}_t) \\ &+ \beta_5 \,(\text{TREAT}_i \times \text{REZ}_{ipt}) + \beta_6 \,(\text{POST}_t \times \text{REZ}_{ipt}) \\ &+ \beta_7 \,(\text{TREAT}_i \times \text{POST}_t \times \text{REZ}_{ipt}) \\ &+ \gamma_p + \delta_t + \varepsilon_{ipt}. \end{aligned} \tag{1}$$

where the dependent variable Y_{ipt}, is a binary indicator of enrollment into a full time degree program in a college or university by individual i in province p in year t. It *switches-on* if the immigrant child enrolled in full time degree program in a university or college in Ontario and 0 otherwise. My baseline specification is based on a sample of students whose parental income is within $25,000 of the $160,000 threshold (i.e. $135,000 to $185,000) for two reasons. First, prospective *would-be* immigrant students on either side of the policy cutoff would be observationally similar in demographic observables and family resources. Second, this is the policy relevant margin where decision to enroll is most likely to shift. Reassuringly, my estimates remain stable for moderate expansions; significance attenuates with wider bandwidths that is consistent with reduced local comparability (see table 7).

$TREAT_i$ is a binary indicator that takes the value of 1 if the parental income of the immigrant student in the prior year was less than $160,000 CAD and equal to zero otherwise. $POST_t$ is a binary indicator variable that takes the value of 1 if the tax year observed greater or equal to 2012. REZ_{ipt} is a binary indicator variable that takes the value 1 if the province of taxation of immigrant child with main parent residing in Ontario and 0 otherwise. The coefficient β_7 can be

[9]I also present a results of difference-in-difference estimates in the appendix as shown in Figure 6a with standard errors clustered at census metropolitan area (CMA) level and for robustness I present results of subsidy response in enrollment in immigrant families with sibling cohorts with standard errors clustered at main parent's identifier in the administrative data

interpreted as the causal effect of the tuition discount on enrollment. γ_p are provincial fixed effects that allows me to capture time-invariant provincial factors and differences between provinces that affect enrollment, δ_t are year fixed effects that capture national time trends and seasonality of enrollments. By interacting income, place and time dimensions, the subsidy response in enrollment is identified only from the *would-be* students that belong to income eligible families that reside in Ontario after 2012. The empirical design absorbs any province wide shocks common to both income eligible and non-eligible families by $TREAT_i \times REZ_{ipt}$ interaction. Any Ontario specific shock that coincide with 2012 that is common to income eligible and non eligible families is absorbed by $REZ_{ipt} \times TREAT_i$ interaction and a Canada wide change common in the income-enrollment gradient is absorbed by $TREAT_i \times POST_t$ interaction. ε_{ipt} is the idiosyncratic error term. I cluster the standard errors at the province level as the primary policy eligibility is place-based and it is the highest level of aggregation (Abadie et al., 2017). Given the small number of provinces (clusters) I also report Webb wild-cluster-bootstrap p-values in my results.

5 Results

In this section I present the triple difference estimates of the tuition subsidy on 1.5 generation immigrant students. More specifically I start by presenting the main estimates of my model and proceed to investigate those estimates by institute type: universities and colleges. I then proceed to present the heterogeneity in my results by world area of birth and landing age of the 1.5 generation immigrant children.

5.1 Main Results

Table 2 presents the enrollment responses to *OTG* for income-eligible Ontario resident immigrant children post 2012. I report the impact of the 30% tuition discount on enrollment of both university and college. In column 3, the enrollment response to the *OTG* subsidy in Ontario institutes of immigrant children residing in Ontario increased by 2.7 percentage points. The succeeding

columns report the estimates while controlling for observable characteristics of immigrant parents, children and their world area of birth.

Columns (6) and (9) in table 2 also presents the results of enrollment response of immigrant children in Ontario universities and colleges respectively. Interestingly, enrollment response is concentrated in Ontario universities and post 2012, income eligible immigrant children's enrollment increased by 4 percentage points. In contrast, there is no significant change in the enrollment response in colleges. Relatedly, the sign of enrollment response to the subsidy for college is suggestive of the *OTG* policy to change the tastes in access of post-secondary education.

Table 2: Enrollment response to *OTG* by institute type in Ontario

	Ontario PSE Institutes			Ontario Universities			Ontario Colleges		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Treatment × *Post* × *Ontario*	0.027	0.030	0.027	0.030	0.032	0.040	-0.001	-0.003	-0.008
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.009)	(0.002)	(0.002)	(0.002)
	[0.084]	[0.069]	[0.040]	[0.100]	[0.082]	[0.073]	[0.165]	[0.610]	[0.278]
Child controls	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Parent controls	No	No	Yes	No	No	Yes	No	No	Yes
Enrollment rate		0.370			0.340			0.310	
N					14,770				

Note: Clustered standard errors in parentheses; Webb wild-cluster-bootstrap p-values in square brackets. Enrollment rate proportions of children enrolled in degree type programs offered at PSE institutes in Ontario based on ISCED classification code.

5.2 Mechanisms

Two mechanisms could generate the enrollment response: the grant may relax liquidity constraints faced by households with relatively lower observed liquid assets, or it may indirectly address an information problem by making the net price salient (Oreopoulos and Dunn, 2013b). In contrast to previous literature that infers liquidity constraints from demographic proxies (Deming and Dynarski, 2009; Castleman and Long, 2013), I test the liquidity channel using *measured* family resources. Table 3 reports two splits. First, I differentiate families by positive capital income in

parents' tax files over the child's ages 15–17. The response is concentrated in the immigrant families that report no capital income. Second, the results from splitting children by their Registered Education Savings (RESP) or scholarship income (if any) at age 18 indicates that the enrollment response is large and significant among the immigrant children that report no RESPs. Together, these resource-based contrasts indicate the response is driven by families with relatively few liquid assets, consistent with binding liquidity constraints at the margin. The results are robust to sub-samples defined by zero and positive capital income and in specifications that interact triple difference estimator with capital income (see table 8).

Table 3: Enrollment response to *OTG* by measured parent and child resources

	Parental capital-income (ages 15–17)			*RESP/Scholarship proxy (at age 18)*	
	Bottom Tercile	Middle Tercile	Upper Tercile	Liquidity Constrained	Not Liquidity Constrained
Treatment × *Post* × *Ontario*	0.032	0.010	0.018	0.047	−0.043
	(0.010)	(0.014)	(0.012)	(0.009)	(0.011)
	[0.095]	[0.929]	[0.431]	[0.082]	[0.094]
Enrollment rate	0.348	0.388	0.395	0.357	0.253
N	6,540	1,020	7,110	8,610	2,315

Note: Clustered standard errors in parentheses; Webb wild-cluster-bootstrap p-values in square brackets. All specifications include child and parent controls.

5.3 Heterogeneity

Place-based programs have shown a positive impact on enrollments in post-secondary education institutes but the policy potentially impacts immigrant children differently on the basis of observable characteristics. The tuition discount changes the sticker price for post secondary education and immigrant families differ systematically in their socio-economic backgrounds, education norms, english fluency, credit constraints and parental education background. These pre-migration and post-migration characteristics shape both the baseline probability of enrolling for higher education and choice of the level of the program in the post secondary institute. For example, children of immigrant parents born in regions with highly competitive or costly higher education systems

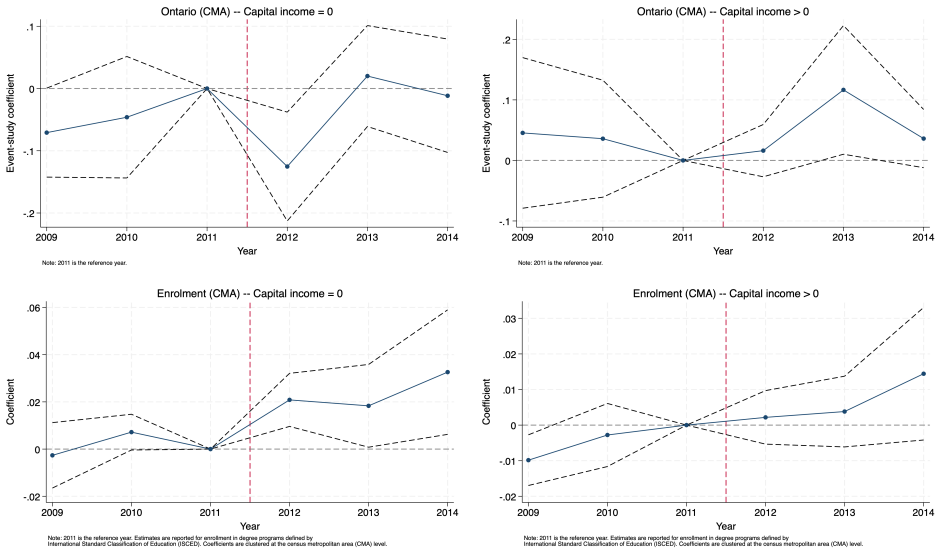


Figure 1: The Effect of the 30% Ontario Tuition Grant subsidy initiated in year 2012. The top panel compares probability of enrolling in a degree program in an institute in Ontario by 1.5 generation immigrant children with gross parental income near the policy threshold ($135,000-$185,000). The bottom panel compares probability of enrolling in a degree program in an institute in Ontario by 1.5 generation immigrant children that reside in Ontario versus rest of Canada with gross parental income below the policy threshold ($160,000). The event study plots on the left are of those children whose parents report no capital income in years leading up to enrollment decisions whereas on the right event study plots, parents report positive capital income. Standard errors are clustered at Census metropolitan area (CMA) level with dashed lines as 95% confidence intervals of point estimates.

may be more responsive to changes in the sticker price of post secondary education, or children facing higher financial constraints may have higher price elasticities (Mitze et al., 2013; Villarraga-Orjuela and Kerr, 2017; Conger and Turner, 2017).

5.3.1 *World Birth Area*

In my sample, immigrant parents born in Europe, Africa and the Middle East have about 6 months less years of education than that of their Asian counterparts. Moreover, immigrant parents from Southern and Eastern Asia and Asia-pacific are more likely to have attained a degree program than the European, African and Middle-East born immigrant parents. Table 4 presents meaningful differences in enrollments by world area of birth. On average the enrollment response to the tuition subsidy is postive and statistically significant for children immigrated from Africa and Middle East and not for children immigrating to Canada from other world birth areas. Children of relatively higher educated parents have a higher baseline of post secondary enrollment that is close

to saturation. One possible mechanism explaining these results is that these immigrants choose post-secondary education as necessary investment regardless of the change in the sticker price of post secondary education. In contrast, children of parents from Africa and Middle-East with lower education qualification, lower average years of schooling and more information frictions are more price sensitive.

Table 4: Effect of the tuition grant on enrollment by world area of birth

	Africa/M.E.	E. Asia	Europe	Oceania/other	S.-C. America	S. Asia
Treatment × *Post* × *Ontario*	0.157	−0.037	−0.055	0.067	0.138	−0.067
	(0.031)	(0.027)	(0.047)	(0.027)	(0.064)	(0.043)
	[0.043]	[0.290]	[0.611]	[0.200]	[0.182]	[0.311]
Enrollment rate	0.407	0.462	0.324	0.223	0.354	0.515
N	2,845	2,270	3,545	2,730	1,015	2,260

Note. Clustered standard errors in parentheses; Webb wild-cluster-bootstrap p-values in square brackets. All specifications include child and parent controls.

5.3.2 *Landing Age*

There is growing evidence of landing age as an integral factor explaining adult outcomes of children immigrating at a certain age in childhood specifically to their intergenerational mobility of income and earnings (Connolly et al., 2023; Schaafsma and Sweetman, 2001a; Pendakur and Pendakur, 2016) and education outcomes (Bleakley and Chin, 2004; Åslund et al., 2015; Hull, 2023; Ansala et al., 2020). There is a common theme in these studies that a critical point exists between the ages eight and 12 followed with a sharp decline in the observe earnings and education attainment. Table 5 presents the estimates of enrollment increase by age of arriving in Canada. Specifically, I report the estimates by making three categories of landing age (i) few months to five years of age (ii) ages six to 11 and (iii) 12 to 18. Table 5 suggests that enrollment of 1.5 generation immigrant students with landing ages groups of zero to five, six to 11 increased by 5.5 and 0.1 percentage points respectively but this response is not statsitically significant. In contrast, column 3 of Table 5 reports a sign reversal that points to previous literature documenting declining earnings and education attainment for later arrval cohorts.

Table 5: Effect of Tuition Grant on Enrollment by Landing Age

	Ages 0–5	Ages 6–11	Ages 12–18
Treatment × *Post*	0.055	0.001	-0.003
× *Ontario*	(0.040)	(0.009)	(0.022)
	[0.340	[0.895]	[0.842]
Enrollment Rate	0.467	0.369	0.160
N	5,725	6,525	2,520

Note. Standard errors are reported in parentheses and are clustered at the provincial level. The unit of observation is enrollment of student in 1.5 generation in Canadian public post secondary institute from 2009-2014. The dependent variable is the probability of enrolling in an Ontarion university/college in degree equivalent program in a given year.

6 Welfare Analysis

To evaluate the welfare consequences of the grant I adopt a two-period life-cycle model following Lawson (2017). The model is partial-equilibrium wherein wages are fixed and production is not modelled. In the first period a young person decides whether to attend college ($s_i \in \{0, 1\}$); individuals differ in parental resources A_i. In the second period they choose labour supply. A student enrolls if utility from enrolling exceeds utility from not enrolling. The government chooses a tuition subsidy b and a proportional labour-income tax rate τ subject to its budget constraint. The objective is to quantify the channels through which a marginal change in the subsidy affects welfare.

I feed the reduced-form estimate into the framework using the calibration in Table 6. With these values, an additional dollar of grant spending raises social welfare by about $1.3, and the decomposition in figure 6 shows the fiscal externality operating through the expanded tax base as the dominant channel. Because families near the $160,000 threshold have relatively small measured liquidity constraints, the liquidity benefit contributions are modest. Equation 8 considers the effect of a small increase to the tuition subsidy b, starting from its current level $\bar{b}$. L measures the welfare effect of transferring $1 from workers in time period 1 to prospective students in time period 0. It is recovered from the ratio of the effect on enrollment of changing liquid assets and the effect on enrollment of changing relative prices without providing immediate income to students

(see Appendix D). If students are highly constrained, their marginal utility of income will be large and redistribution will generate welfare gains. Separately, net fiscal externality has cost and benefit components both scaled by the enrollment elasticity with respect to tuition subsidies informed by the reduced form estimate. First component follows that the government spend more on both the grant (b) and the spending required when an additional individual attends a post secondary institute (p). Second pertains to the net benefit from the effect on enrollment that increases the tax base (ΔY_s). This is aligned with the Theory of the Second Best, wherein income-tax distorts the education decision, introducing a new distortion, such as a new tuition subsidy, improves efficiency. With distortionary taxes the resulting increase in tax revenues as a result of an increase in tuition subsidy will raise welfare (see Appendix 8).

Table 6: Welfare calibration

Symbol	Description	Value
S	Baseline enrollment rate	0.37
$\hat{\beta}_{\text{DDD}}$	DDD estimate (No capital-income)	0.032
Δb	Additional grant induced by the policy ($000s)	1.68
b	Baseline annual grant ($000s)	1.87
e	Annual tuition cost ($000s)	7.54
$\partial S/\partial a_1$	Income effect on enrollment	$0 - 0.0021$
τ	Effective tax rate	0.28
r	Annual discount rate	0.03
ΔY_s	PV of lifetime earnings gain ($000s)	90.00
ε_{Sb}	Enrollment elasticity (reduced form)	0.11

$$\left.\frac{dW}{db}\right|_{b=\bar{b}} \simeq S \times \left[\underbrace{L}_{\text{Liquidity Effect}} \underbrace{- \left(\frac{b+p}{b}\right) \epsilon_{Sb} + \frac{\tau S}{b} \epsilon_{Sb} \Delta Y_s}_{\text{Net Fiscal Externality}}\right] \tag{2}$$

7 Conclusion

This paper asks whether a tuition subsidy raises post-secondary enrollment, investigates mechanisms of the subsidy response, and estimates welfare consequences, and answers all three ques-

tions for a growing but understudied population of 1.5-generation immigrant children in Canada using linked administrative tax and education records. This paper has three main findings.

First, I find that eligibility raised enrollment in Ontario degree programs by about three percentage points. On a baseline enrollment rate of 37%, this is an increase of roughly 8%, corresponding to on the order of several hundred additional enrolled students in the affected cohorts, and it implies an enrollment elasticity of about 0.11 that is squarely within the 0.1–0.3 range established by the U.S. quasi-experimental literature. The effect operates entirely at the university margin and the college estimate is small, negative, and statistically insignificant. Furthermore, there is no detectable reallocation across STEM (Science, Technology, Education and Mathematics) and non-STEM fields.

Second, because the linked IMDB–T1FF–PSIS data measure family resources directly, I identify liquidity constraints from *observed* parental capital income and children's RESP/scholarship income rather than from demographic proxies. The enrollment response is concentrated among families in the bottom tercile of pre-decision capital income and among children without observable liquid resources, and it is negative and significant among children with such resources. This resource-based contrast provides direct evidence that the response reflects binding liquidity constraints at the margin.

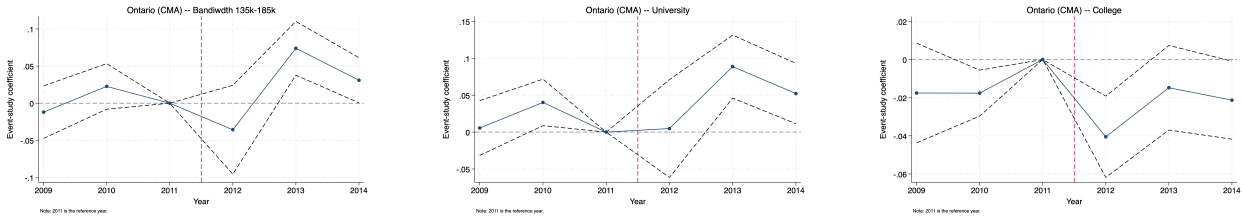
Third, embedding the reduced-form elasticity in a two-period sufficient-statistics framework calibrated following Lawson (2017), I decompose the welfare effect of a marginal grant dollar into a liquidity benefit, a mechanical transfer cost, and a fiscal externality. A marginal grant dollar raises social welfare by about $1.3, with the fiscal externality from the expanded tax base as the dominant channel. The liquidity benefit is small for this near-threshold population.

Appendix A Validation Checks

The identification assumption underlying the triple-difference specification is that, absent the introduction of the subsidy, enrollment in Ontario would have evolved relative to the comparison provinces similarly for families on either side of the eligibility threshold. This assumption is particularly important in the present setting because enrollment trends may differ systematically across provinces and family income levels. A difference-in-differences comparison between Ontario and other provinces for families below the policy threshold ($160,000) could therefore confound the effect of the subsidy with pre-existing differences in enrollment dynamics. Relatedly, restricting the sample to only residents of Ontario could potentially confound subsidy response by inter-provincial trends across provinces.

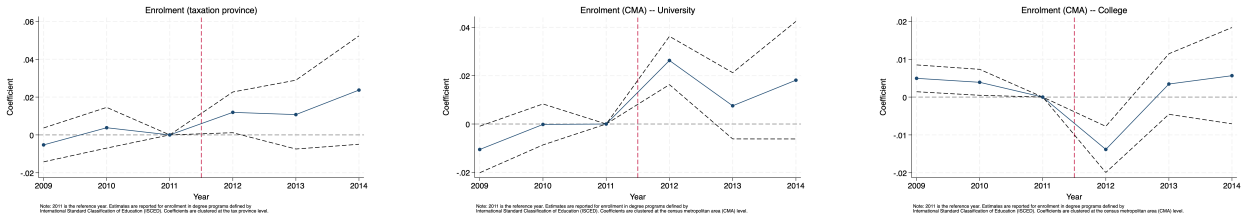
To assess the plausibility of this assumption, I examine a series of double-difference event studies separately for (i) immigrant families below and above the subsidy eligibility threshold ($135,000-$185,000) for the residents of Ontario (ii) immigrant families below the subsidy eligibility threshold ($160,000) for all immigrant residents of Canada. These specifications compare the evolution of enrollment in Ontario PSE institutes with above income eligible residents and that in the comparison provinces respectively, in each year relative to the introduction of the subsidy. The resulting estimates therefore provide a direct assessment of whether the Ontario–comparison-province enrollment gap evolved similarly across the two groups prior to the policy change.

Ontario immigrant residents' enrollment in range of $135,000 - $185,000



(a) Degree programs (b) University (c) College

Below policy threshold $160,000 - All provinces



(d) Degree programs (e) University (f) College

Figure 2: The Effect of the 30% Ontario Tuition Grant subsidy initiated in year 2012. The top panel compares probability of enrolling in a degree program in an institute in Ontario by 1.5 generation immigrant children with gross parental income near the policy threshold ($135,000-$185,000). The bottom panel compares probability of enrolling in a degree program in an institute in Ontario by 1.5 generation immigrant children that reside in Ontario versus rest of Canada with gross parental income below the policy threshold ($160,000). Standard errors are clustered at Census metropolitan area (CMA) level with dashed lines as 96% confidence intervals.

Appendix B PSIS Data Collection

The PSIS database required filtering and inspection in preparation for analysis. The first step was to rectify multiple entries for the same student, a situation that arises for two reasons: At the data capture moment, students may be enrolled in two or more programs which would result in appearing in the dataset multiple times. Also, students may be enrolled in both undergraduate and postgraduate programs in the PSIS reporting year. To resolve this, I drop students enrolled in graduate (i.e. Masters, Ph.D. and Post-Doc) degree programs. I match each student's initial year of enrollment with their parent's tax returns so that the enrollment and tuition subsidy eligibility for each student is observed at most once. In each repeated cross section of the PSIS year that still contains a student's enrollment for each year, each student's unique identifier was aggregated to

arrive at one entry for each individual student. This step also resolves multiple entries based on registration in more than one program, doing so by giving precedence to majors (i.e. minors were eliminated).

Appendix C Robustness Check

C.1 Sensitivity Test I

In this section I conduct sensitivity tests for each of our estimates to assess their robustness with respect to the choice of income bandwidth. My DDD design relies on comparing families just above versus just below the $160000 income threshold and a key identifying assumption is that families do not precisely manipulate their reported income to fall just below the cutoff to be eligible for the subsidy. To test this formally I conduct density discontinuity test (Cattaneo et al., 2020) for parental income of 1.5 generation immigrant children at the cutoff as a baseline and pre-post 2012 to detect policy-induced bunching and results are plotted in Figure 3.

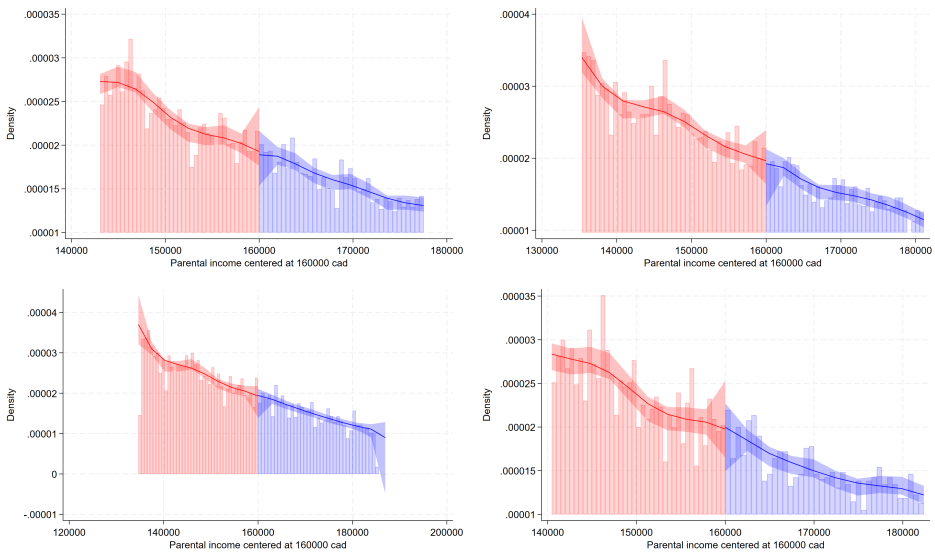


Figure 3: To formally test for manipulation of parental gross income reported for time period from 2009-14 is plotted above. From top left the income distributions are for whole sample for the observed time period, with top right panel showing for only Ontario residents and the bottom left and right panels show the test for pre and post periods of all residents of Canada respectively.

C.2 Sensitivity Test II

Next, to test the sensitivity of my main estimate, I run the triple difference design at different thresholds that includes enrollment records of students with parental income at different bandwidths. These income thresholds range from $50000 to $2000000. As can be seen in Figure 3, placebo thresholds there show no observed significant increase in enrollment.

Table 7: Robustness to Alternative Income Bandwidths

	Income Bands ($000s)			
	135–185	125–195	115–205	105–215
Treatment × Post × Ontario	0.032	0.020	0.014	0.005
	(0.010)	(0.006)	(0.007)	(0.003)
	[0.040]	[0.053]	[0.188]	[0.186]
Enrollment Rate	0.370	0.370	0.370	0.365
N	14,770	22,115	29,895	38,905

Notes: Each column reports estimates from the baseline triple-difference specification using alternative parental income bandwidths around the tuition subsidy eligibility cutoff. All specifications include child, parent, and immigrant demographic controls. Conventional standard errors are reported in parentheses, and wild cluster bootstrap p-values are reported in square brackets. Wild bootstrap inference uses the Webb six-point distribution with clustering at the provincial level.

C.3 Sensitivity Test III

I also present results of the mechanism test with respect to parental capital income in years leading up to the decision of post-secondary education of the child and prospective students' education savings at age 18. In contrast to table 3, table 8 presents and compares the enrollment response to the tuition subsidy based no liquid assets and positive liquid assets that furnish the decision to attend post secondary education.

Interestingly, the mechanism results are robust with models in which I interact the triple difference estimator with the inverse hyperbolic sin transformed values of capital income. The enrollment response among parent-child linkage with no capital income shows that the triple different coefficient remains positive and statistically significant as show in 8. Figure 5 shows the distribu-

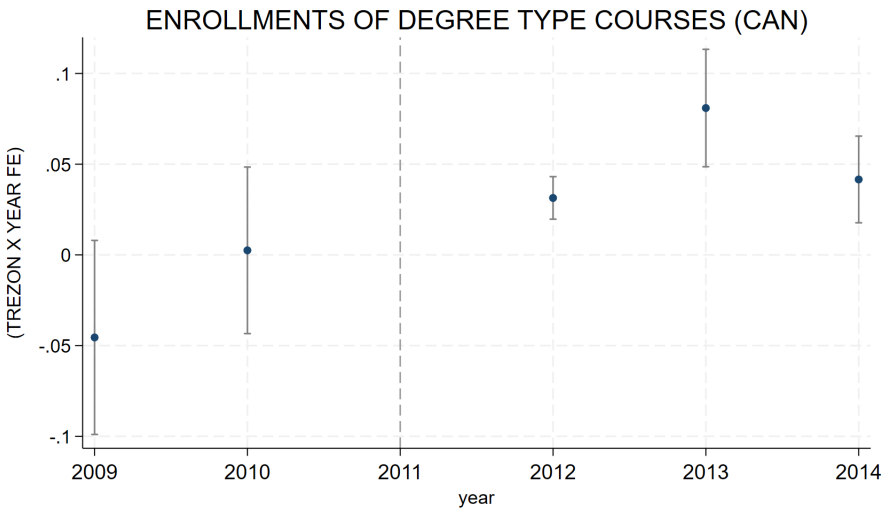


Figure 4: This figure present the dynamic DDD event-study specification reporting event-time coefficients on the Ontario × below-threshold interaction to verify whether the enrollment gap between income groups evolved similarly in Ontario and the comparison provinces prior to the policy change. The dependent variable is the probability of enrolling in a degree program in an institute in Ontario by 1.5 generation immigrant children with gross parental income near the policy threshold ($135,000-$185,000). The event study coefficients and 95% confidence intervals are based on standard errors clustered at the provincial level.

tion of capital income in parent child linkages.

Appendix D Model

This paper adopts a two-period life-cycle model following (Lawson, 2017). It is a partial equilibrium model where wages are fixed and production is not modeled. In period 0, a young person decides whether to attend college or not ($s_i \in \{0, 1\}$). Students differ in their parental resources (A_i). In period 1, they choose labor supply l_{st}. Student enrolls if the utility from enrolling is greater than utility of entering the labour market that is given by the working wage (w_{01}). Equation 3 shows the total lifetime utility of individual i, and social welfare $V = E(V_i)$ is utilitarian with equal weights[10]. The government chooses a tuition subsidy or grant b and a proportional labor income tax rate τ given in the government's budget constraint (see 5). The objective is to quantify the relative channels of the mechanisms through which a tuition subsidy may affect welfare. From the perspective of the government, V can thus be written as function of taxes $V(b, \tau(b))$, and the

[10]For more details refer Lawson (2017)

Table 8: Enrollment response to *OTG* by measured parent and child resources

	Parental capital income (ages 15–17)		*Child RESP (at age 18)*		*IHS Capital Income*
	Capital Income $= 0$	Capital Income > 0	RESP $= 0$	RESP > 0	Capital Income ≥ 0
	(1)	(2)	(3)	(4)	(5)
Treatment $\times$ *Post*	0.032	0.031	0.047	-0.043	0.025
$\times$ *Ontario (DDD)*	(0.010)	(0.014)	(0.009)	(0.011)	(0.007)
	[0.095]	[0.346]	[0.082]	[0.094]	[0.062]
DDD $\times$ *Capital Income*					0.002
					(0.003)
					[0.574]
Enrollment rate	0.348	0.390	0.357	0.253	0.370
N	6,450	8,230	8,610	2,315	14,770

Note: Clustered standard errors in parentheses; Webb wild-cluster-bootstrap p-values in square brackets. All specifications include child and parent controls. IHS = Inverse Hyperbolic Sin transformation.

social welfare gain from increasing the student grant b.

$$\begin{aligned}\max_{s_i\in\{0,1\},\, c^0,\, c_1^u,\, c^u,\, l_0,\, l_1} V_i = s_i \Bigg[& u(c_{ui}) + R_2 v^1(c_{vi}^1, l_{1i}) + \eta_i \\ & - \lambda_{1i}(c_{ui} + R_2 c_{vi}^1 - (b-e) - (1-\tau)\gamma_2 w_{11} l_{1i}) \\ & - \mu_i(c_{ui} - (b-e) - A_i) \Bigg] \\ & + (1-s_i)\Bigg[R_1 v^0(c_{vi}^0, l_{0i}) - \lambda_{0i}(R_1 c_{vi}^0 - (1-\tau)\gamma_1 w_{01} l_{0i}) \Bigg]\end{aligned} \tag{3}$$

$$u_c'(c_{ci}) = v_c'(c_{vi}, l_{1i}) + \mu_i \tag{4}$$

$$S(b+p) + G = \tau[S\gamma_2 E(Y_{11i}|s_i = 1) + (1-S)\gamma_1 E(Y_{01i}|s_i = 0)] = \tau Y \tag{5}$$

$$L = \frac{E_1[u'(c_{ui})] - v^0(c_v^0, l_0)}{v^0(c_v^0, l_0)} = \frac{\frac{\partial S}{\partial A}}{\frac{\partial S}{\partial b} - \frac{\partial S}{\partial A}} \tag{6}$$

The consumption Euler Equation (4) shows that the liquidity constraint does not bind ($\mu_i = 0$) then marginal utility today is equal to the marginal utility when I enroll and smooth consumption with labour hours l_{1i}. If liquidity constraints do bind ($\mu_i > 0$ which implies $a_{t+1} = a_t$) then marginal utility of working today is higher than choosing post secondary education and μ_i measures how much *she* would pay to relax the liquidity constraint by 1\$. She may forego college not because its return is too low, but because she cannot finance consumption during enrollment which the tuition subsidy relaxes. To solve empirically-implementable version of

$$\frac{dW}{db} = \frac{\delta V}{\delta b} + \frac{\delta V}{\delta \tau}\frac{\delta \tau}{\delta b} \tag{7}$$

I solve the government budget and normalize the welfare gain into dollar amount by $\frac{dW}{db} = \frac{dV/db}{v_c^0(c_v^0, l_0)}$ that expresses into welfare derivative as

$$\begin{aligned}
\left.\frac{dW}{db}\right|_{b=\bar{b}} &= S \times \left[L - \left(\frac{b+p}{b}\right)\epsilon_{Sb} + \left(1 + \frac{G+Sp}{Sb}\right)\epsilon_{Yb}\right] \\
&= S \times \left[L - \left(\frac{b+p}{b}\right)\epsilon_{Sb} + \left(\frac{Sb+G+Sp}{Sb}\right)\epsilon_{Yb}\right] \\
&= S \times \left[L - \left(\frac{b+p}{b}\right)\epsilon_{Sb} + \left(\frac{\tau Y}{Sb}\right)\left(\frac{\partial Y}{\partial b}\frac{b}{Y}\right)\right] \times \frac{dS}{dS} \\
&= S \times \left[L - \left(\frac{b+p}{b}\right)\epsilon_{Sb} + \left(\frac{dS}{db}\frac{b}{S}\frac{\tau}{b}\frac{dY}{dS}\right)\right] \times \frac{S}{S} \\
&= S \times \left[L - \left(\frac{b+p}{b}\right)\epsilon_{Sb} + \left(\epsilon_{Sb}\frac{\tau S}{b}\Delta Y_s\right)\right]
\end{aligned} \tag{8}$$

where G is the discounted total of other government spending over the lifetime of an individ-

ual (assumed exogenous) can be expressed in terms of taxes τY. The welfare derivative can be expressed with enrollment elasticity.

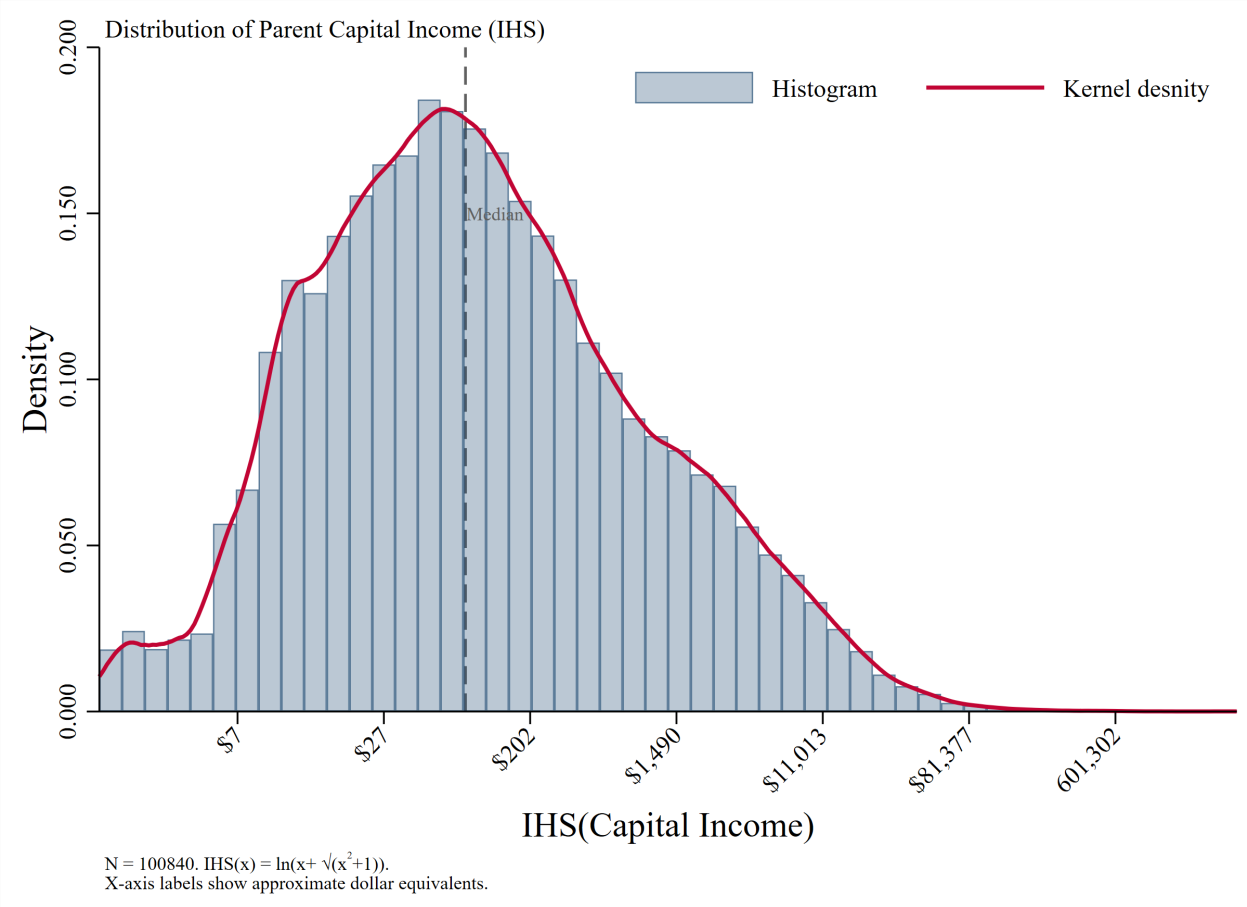
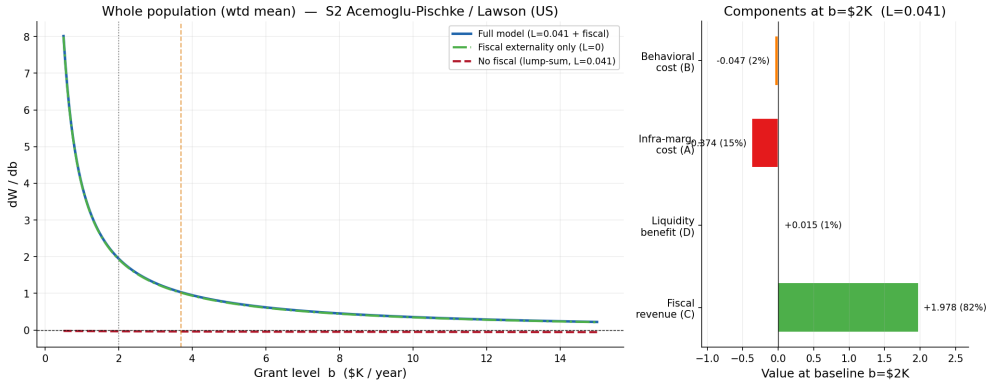
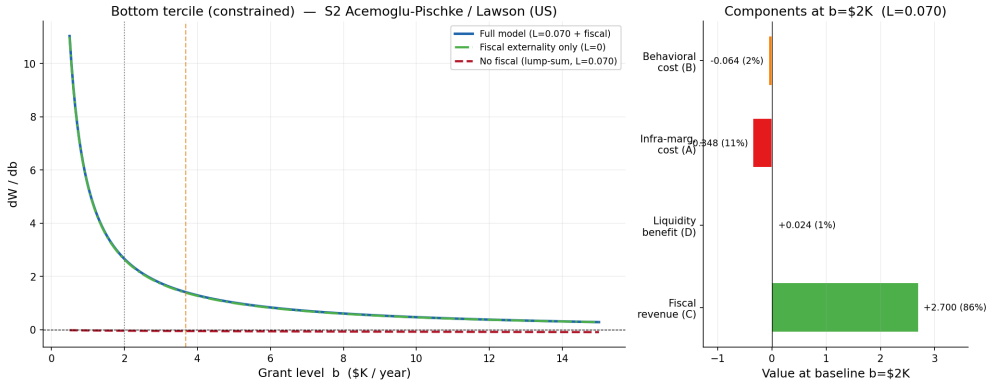


Figure 5

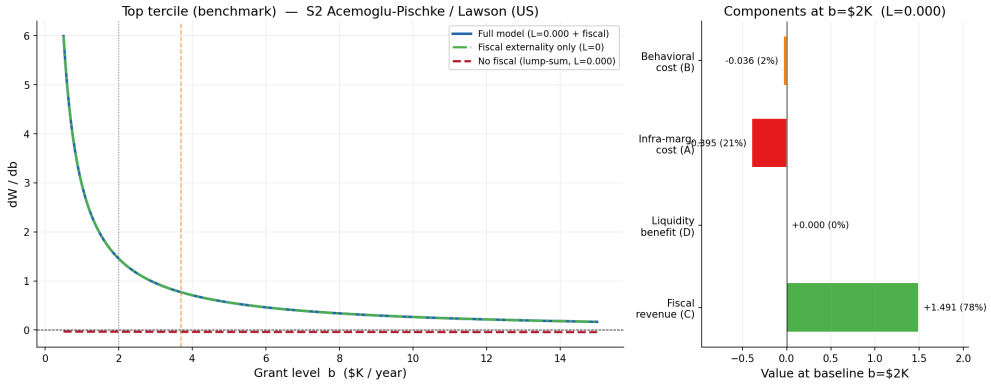
Welfare Gain Decomposition



(a) Whole Population



(b) Liquidity Constrained



(c) Liquidity Unconstrained

Figure 6

Table 9: Eligible vs. In-Eligible (Ontario, $135K-185$K)

	Diff. (Inelig.–Elig.)	SE
Panel A. Student-Parent characterstics		
Female Child (=2)	-0.011	(0.011)
Female Parent (=2)	-0.012	(0.009)
Landing Age	-0.308***	(0.081)
Arrived age 0–5	0.043***	(0.011)
Arrived age 6–11	-0.037***	(0.011)
Arrived age 12+	-0.006	(0.006)
Mother tongue: English	0.006	(0.008)
Mother tongue: Non-English	-0.006	(0.008)
Years of Schooling (child)	-0.117**	(0.049)
Years of Schooling (parent)	0.321***	(0.070)
Panel B. World-Birth Area of Child		
WBA(child): Europe	0.021**	(0.009)
WBA(child): Africa and Middle East	0.011	(0.009)
WBA(child): South Asia	-0.004	(0.008)
WBA(child): East Asia	-0.003	(0.008)
WBA(child): Oceania and Other Asia	-0.016**	(0.007)
WBA(child): South-Central America	-0.006	(0.006)
WBA(child): US and miscellanoues	-0.003	(0.004)
Panel C. Student-Parent Incomes and Deductions		
Gross Parent Income (t-1)	24779.680***	(154.452)
Capital Income (parent)	92.988**	(43.038)
Child tax benefit income (parent)	-90.854***	(15.159)
Education Deductions (parent)	35.800	(76.112)
Tuition Deductions (child)	269.649***	(73.753)
RESP-Scholarship Income (child)	27.509	(21.728)
Child T4 income (child)	-22.839	(121.192)
Panel D. Enrollment Outcomes		
Enrolled in PSE	0.014	(0.010)
Enrolled in ON PSE	0.026**	(0.011)
Enrolled in ON UNI	0.028**	(0.011)
Enrolled in ON COL	-0.002	(0.005)
Enrolled in ON STEM	0.021**	(0.010)
Enrolled in ON Non-STEM	0.010	(0.007)
N	9300	

Mean differences with standard errors in parantheses, Imbens-Rubin normalized are printed the log.
* p<0.10, ** p<0.05 *** p<0.01

Table 10: ONTARIO vs. REST OF CANADA (Below $160,000)

	Diff. (ROC–ON)	SE
Panel A. Student-Parent characterstics		
Female Child (=2)	0.019***	(0.002)
Female Parent (=2)	-0.016***	(0.002)
Landing Age	0.662***	(0.018)
Arrived age 0–5	-0.033***	(0.002)
Arrived age 6–11	-0.039***	(0.002)
Arrived age 12+	0.072***	(0.002)
Mother tongue: English	0.008***	(0.001)
Mother tongue: Non-English	-0.008***	(0.001)
Years of Schooling (child)	0.408***	(0.013)
Years of Schooling (parent)	-0.299***	(0.017)
Panel B. World-Birth Area of Child		
WBA(child): Europe	-0.003**	(0.001)
WBA(child): Africa and Middle East	-0.018***	(0.002)
WBA(child): South Asia	-0.109***	(0.002)
WBA(child): East Asia	0.087***	(0.002)
WBA(child): Oceania and Other Asia	0.059***	(0.001)
WBA(child): South-Central America	-0.023***	(0.001)
WBA(child): US and miscellanoues	0.008***	(0.001)
Panel C. Student-Parent Incomes and Deductions		
Gross Parent Income (t-1)	-5151.922***	(159.780)
Capital Income (parent)	231.683***	(14.296)
Child tax benefit income (parent)	155.549***	(14.916)
Education Deductions (parent)	-1123.599***	(11.046)
Tuition Deductions (child)	-656.310***	(12.664)
RESP-Scholarship Income (child)	14.671***	(3.592)
Child T4 income (child)	1885.139***	(24.624)
Panel D. Outcomes		
Enrolled in PSE	-0.289***	(0.002)
Enrolled in ON PSE	-0.427***	(0.002)
Enrolled in ON UNI	-0.362***	(0.001)
Enrolled in ON COL	-0.065***	(0.001)
Enrolled in ON STEM	-0.187***	(0.001)
Enrolled in ON Non-STEM	-0.092***	(0.001)
N	259360	

Mean differences with standard errors in parantheses,

Imbens-Rubin normalized are printed the log.

* p<0.10, ** p<0.05 *** p<0.01

Table 11: Summary Statistics: Ontario Sample ($135K–$185K)

	Full sample		Eligible (<$160K)		Ineligible (≥$160K)	
	Mean	SD	Mean	SD	Mean	SD
Panel A. Student-Parent characteristics						
Female Child (=2)	0.515	(0.500)	0.519	(0.500)	0.508	(0.500)
Female Parent (=2)	0.256	(0.436)	0.260	(0.439)	0.248	(0.432)
Landing Age	6.285	(3.764)	6.396	(3.776)	6.089	(3.735)
Arrived age 0–5	0.463	(0.499)	0.448	(0.497)	0.490	(0.500)
Arrived age 6–11	0.437	(0.496)	0.450	(0.498)	0.413	(0.493)
Arrived age 12+	0.100	(0.300)	0.102	(0.303)	0.096	(0.295)
Mother tongue: English	0.184	(0.388)	0.182	(0.386)	0.188	(0.391)
Mother tongue: Non-English	0.816	(0.388)	0.818	(0.386)	0.812	(0.391)
Years of Schooling (child)	1.316	(2.275)	1.358	(2.300)	1.241	(2.229)
Years of Schooling (parent)	16.210	(3.265)	16.094	(3.380)	16.414	(3.043)
Panel B. World-Birth Area of Child						
Europe	0.247	(0.431)	0.240	(0.427)	0.260	(0.439)
Africa and Middle East	0.203	(0.402)	0.199	(0.399)	0.209	(0.407)
South Asia	0.168	(0.374)	0.169	(0.375)	0.166	(0.372)
East Asia	0.151	(0.358)	0.152	(0.359)	0.148	(0.356)
Oceania and Other Asia	0.119	(0.324)	0.125	(0.331)	0.109	(0.312)
South-Central America	0.074	(0.261)	0.076	(0.265)	0.070	(0.255)
US and miscellaneous	0.039	(0.193)	0.040	(0.195)	0.037	(0.189)
Panel C. Student-Parent Incomes and Deductions						
Gross Parent Income (t-1)	1.55e+05	(13901.540)	1.46e+05	(7184.582)	1.71e+05	(7119.602)
Capital Income (parent)	410.253	(1989.950)	376.549	(1919.315)	469.537	(2107.448)
Child tax benefit income (parent)	203.876	(704.160)	236.845	(758.065)	145.991	(593.565)
Education Deductions (parent)	4225.966	(3528.728)	4212.975	(3529.154)	4248.775	(3528.386)
Tuition Deductions (child)	3279.417	(3147.151)	3181.175	(2830.608)	3450.824	(3628.188)
RESP-Scholarship Income (child)	128.532	(926.486)	118.510	(910.606)	146.019	(953.468)
Child T4 income (child)	3141.433	(5167.093)	3149.754	(5052.652)	3126.915	(5361.785)
Panel D. Outcomes						
Enrolled in PSE	0.628	(0.483)	0.623	(0.485)	0.637	(0.481)
Enrolled in ON PSE	0.598	(0.490)	0.588	(0.492)	0.614	(0.487)
Enrolled in ON UNI	0.545	(0.498)	0.535	(0.499)	0.563	(0.496)
Enrolled in ON COL	0.053	(0.224)	0.054	(0.225)	0.052	(0.221)
Enrolled in ON STEM	0.284	(0.451)	0.276	(0.447)	0.297	(0.457)
Enrolled in ON Non-STEM	0.114	(0.318)	0.111	(0.314)	0.121	(0.326)
N	9,300		5,925		3,375	

Sample: 1.5 Generation immigrants residing in Ontario with gross parental income in income bands 135K-185K, 2009-14, Means and standard deviations in parantheses.

Table 12: Summary statistics for Below $160K parental income threshold

	Ontario Pre-2012		Ontario Post-2012		Rest of Canada Pre-2012		Rest of Canada Post-2012	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Panel A. Student-Parent characterstics								
Female Child (=2)	0.514	(0.500)	0.518	(0.500)	0.534	(0.499)	0.537	(0.499)
Female Parent (=2)	0.364	(0.481)	0.355	(0.478)	0.341	(0.474)	0.346	(0.476)
Landing Age	9.237	(4.579)	8.550	(4.566)	9.690	(4.728)	9.495	(4.782)
Arrived age 0–5	0.245	(0.430)	0.296	(0.456)	0.229	(0.421)	0.240	(0.427)
Arrived age 6–11	0.403	(0.490)	0.408	(0.491)	0.367	(0.482)	0.365	(0.482)
Arrived age 12+	0.352	(0.478)	0.296	(0.457)	0.404	(0.491)	0.395	(0.489)
Mother tongue: English	0.147	(0.354)	0.169	(0.375)	0.148	(0.355)	0.184	(0.388)
Mother tongue: Non-English	0.853	(0.354)	0.831	(0.375)	0.852	(0.355)	0.816	(0.388)
Years of Schooling (child)	3.015	(3.328)	2.604	(3.257)	3.266	(3.433)	3.221	(3.458)
Years of Schooling (parent)	13.988	(4.316)	14.387	(4.363)	13.769	(4.477)	13.974	(4.477)
Panel B. World-Birth Area of Child								
Europe	0.156	(0.362)	0.120	(0.325)	0.144	(0.351)	0.128	(0.334)
Africa and Middle East	0.189	(0.392)	0.213	(0.410)	0.177	(0.382)	0.187	(0.390)
South Asia	0.245	(0.430)	0.258	(0.437)	0.136	(0.343)	0.148	(0.355)
East Asia	0.176	(0.381)	0.171	(0.376)	0.282	(0.450)	0.233	(0.423)
Oceania and Other Asia	0.118	(0.322)	0.125	(0.331)	0.163	(0.369)	0.200	(0.400)
South-Central America	0.095	(0.294)	0.088	(0.283)	0.068	(0.251)	0.071	(0.258)
US and miscellaneous	0.021	(0.143)	0.026	(0.159)	0.030	(0.169)	0.032	(0.176)
Panel C. Student-Parent Incomes and Deductions								
Gross Parent Income (t-1)	53619.284	(38876.880)	56749.464	(41437.393)	47973.228	(39868.469)	52090.110	(41916.437)
Capital Income (parent)	203.537	(3297.752)	222.940	(2829.961)	475.723	(3829.450)	404.807	(3884.189)
Child tax benefit income (parent)	2417.425	(3309.498)	2860.864	(3660.958)	2634.787	(3833.843)	2923.709	(4218.168)
Education Deductions (parent)	2158.808	(3163.058)	2345.343	(3295.230)	1148.918	(2423.314)	1074.632	(2364.311)
Tuition Deductions (child)	2120.283	(2649.492)	2277.581	(2545.576)	1621.683	(2930.905)	1430.596	(2763.991)
RESP-Scholarship Income (child)	99.644	(754.006)	57.042	(629.757)	113.168	(853.756)	76.549	(862.743)
Child T4 income (child)	3134.261	(4685.452)	2576.068	(4328.450)	4723.433	(6189.531)	4840.924	(6248.968)
Panel D. Outcomes								
Enrolled in PSE	0.479	(0.500)	0.588	(0.492)	0.222	(0.415)	0.256	(0.437)
Enrolled in ON PSE	0.446	(0.497)	0.558	(0.497)	0.061	(0.240)	0.074	(0.262)
Enrolled in ON UNI	0.369	(0.483)	0.487	(0.500)	0.053	(0.224)	0.064	(0.246)
Enrolled in ON COL	0.077	(0.266)	0.071	(0.256)	0.008	(0.092)	0.009	(0.097)
Enrolled in ON STEM	0.183	(0.387)	0.262	(0.440)	0.026	(0.160)	0.035	(0.184)
Enrolled in ON Non-STEM	0.101	(0.301)	0.113	(0.317)	0.013	(0.114)	0.014	(0.119)
N	66,405		50,345		78,740		78,735	

Sample: 1.5 generation immigrant in Canada, 2009–2014. ROC = Rest of Canada. Pre = before 2012; Post = 2012 onward. Means with standard deviation in

References

Abadie, A., S. Athey, G. W. Imbens, and J. Wooldridge (2017, Nov). When should you adjust standard errors for clustering? NBER Working Papers 24003, National Bureau of Economic Research, Inc.

Acemoglu, D. and J. S. Pischke (2001, May). Changes in the wage structure, family income, and children's education. *European Economic Review 45*(4-6), 890–904.

Adnan, W., J. Zhang, and A. Zheng (2023, Sep). Intergenerational mobility of immigrants by refugee status: An analysis of linked landing files and tax records. IZA Discussion Paper 16471, Institute of Labor Economics (IZA), Bonn.

Allensworth, E. M. (1997). Earnings mobility of first and "1.5" generation mexican-origin women and men: A comparison with u.s.-born mexican americans and non-hispanic whites. *The International Migration Review 31*(2), 386–410.

Ansala, L., U. Hämäläinen, and M. Sarvimäki (2020, March). Age at arrival, parents and neighborhoods: understanding the educational attainment of immigrants' children. *Journal of Economic Geography 20*(2), 459–480.

Åslund, O., A. Böhlmark, and O. N. Skans (2015). Childhood and family experiences and the social integration of young migrants. *Labour Economics 35*, 135–144.

Bettinger, E. P., B. T. Long, P. Oreopoulos, and L. Sanbonmatsu (2012, None). The role of application assistance and information in college decisions: Results from the h&r block fafsa experiment. *The Quarterly Journal of Economics 127*(3), 1205–1242.

Bleakley, H. and A. Chin (2004). Language skills and earnings: Evidence from childhood immigrants. *The Review of Economics and Statistics 86*(2), 481–496.

Borjas, G. J. (1993, January). The intergenerational mobility of immigrants. *Journal of Labor Economics 11*(1), 113–135.

Carneiro, P. and J. J. Heckman (2002). The evidence on credit constraints in post-secondary schooling. *The Economic Journal 112*(482), 705–734.

Castleman, B. L. and B. T. Long (2013, August). Looking beyond enrollment: The causal effect of need-based grants on college access, persistence, and graduation. Working Paper 19306, National Bureau of Economic Research.

Cattaneo, M., M. Jansson, and X. Ma (2020). Simple local polynomial density estimators. *Journal of the American Statistical Association 115*(531), 1449–1455.

Conger, D. and L. J. Turner (2017, None). The effect of price shocks on undocumented students' college attainment and completion. *Journal of Public Economics 148*(C), 92–114.

Connolly, M., C. Haeck, and A. M. L. Bourdais-Coffey (2023, May). Age at immigration and the intergenerational income mobility of the 1.5 generation. Working Papers 23-03, Research Group on Human Capital, University of Quebec in Montreal's School of Management.

Corak, M. (2011, Oct). Age at immigration and the education outcomes of children. IZA Discussion Paper 6072, Institute of Labor Economics (IZA), Bonn.

Cornwell, C. M., D. B. Mustard, and D. Sridhar (2005, Jan). The enrollment effects of merit-based financial aid: Evidence from georgia's hope scholarship. HEW 0501002, University Library of Munich, Germany.

Currie, J. (2004, May). The take up of social benefits. Working Paper 10488, National Bureau of Economic Research.

Deming, D. and S. Dynarski (2009, September). Into college, out of poverty? policies to increase the postsecondary attainment of the poor. Working Paper 15387, National Bureau of Economic Research.

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, March). Does aid matter? measuring the effect of student aid on college attendance and completion. *American Economic Review 93*(1), 279–288.

Dynarski, S. M. and J. E. Scott-Clayton (2006, May). The cost of complexity in federal student aid: Lessons from optimal tax theory and behavioral economics. Working Paper 12227, National Bureau of Economic Research.

Hansen, W. L. (1983). Impact of student financial aid on access.

Hull, M. C. (2023). What divides the first and second generations? family time of arrival and educational outcomes for immigrant youth. *Southern Economic Journal 89*(3), 754–787.

Johnson, M. T. (2013). Borrowing constraints, college enrollment, and delayed entry. *Journal of Labor Economics 31*(4), 669–725.

Kane, T. J. (1995, Jul). Rising public college tuition and college entry: How well do public subsidies promote access to college? NBER Working Papers 5164, National Bureau of Economic Research, Inc.

Lawson, N. (2017, November). Liquidity constraints, fiscal externalities, and optimal tuition subsidies. *American Economic Journal: Economic Policy 9*(4), 313–43.

Liu, Q. (2025). The effects of need-based financial aid on educational decisions and outcomes: Evidence from canada. *Canadian Journal of Economics/Revue canadienne d'économique 58*(4), 1470–1518.

Mitze, T., C. Burgard, and B. Alecke (2013, Nov). The effect of tuition fees on student enrollment and location choice: Interregional migration, border effects and gender differences. ERSA conference papers ersa13p883, European Regional Science Association.

Oreopoulos, P. and R. Dunn (2013a). Information and college access: Evidence from a randomized field experiment. *The Scandinavian Journal of Economics 115*(1), 3–26.

Oreopoulos, P. and R. Dunn (2013b). Information and college access: Evidence from a randomized field experiment. *The Scandinavian Journal of Economics 115*(1), 3–26.

Park, R. S. E. and J. Scott-Clayton (2018). The impact of pell grant eligibility on community college students' financial aid packages, labor supply, and academic outcomes. *Educational Evaluation and Policy Analysis 40*(4), 557–585.

Pendakur, K. and R. Pendakur (2016). Which child immigrants face earnings disparity? age-at-immigration, ethnic minority status and labour market attainment in canada. *International Migration 54*(5), 43–58.

Rumbaut, R. G. (1991). The agony of exile: A study of the migration and adaptation of indochinese refugee adults and children. In F. L. Ahearn and J. L. Athey (Eds.), *Refugee Children: Theory, Research, and Services*, pp. 53–91. Baltimore, MD: Johns Hopkins University Press.

Schaafsma, J. and A. Sweetman (2001a). Immigrant earnings: Age at immigration matters. *The Canadian Journal of Economics / Revue canadienne d'Economique 34*(4), 1066–1099.

Schaafsma, J. and A. Sweetman (2001b). Immigrant earnings: age at immigration mattersabstract. *Canadian Journal of Economics/Revue canadienne d'économique 34*(4), 1066–1099.

Villarraga-Orjuela, A. and B. Kerr (2017). Educational effects of banning access to in-state resident tuition for unauthorized immigrant students. *Educational Evaluation and Policy Analysis 39*(4), 620–643.