

## **Projected Student & Economic Outcomes from the Cal Grant Equity Framework**

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### ***A. Introduction***

In recent years, California has been considering expanding the Cal Grant program to increase the number of college graduates. One major reform proposal is the "Cal Grant Equity Framework" (hereafter the "Equity Framework"), which aims to cover the entire cost of attendance, including tuition and fees and other expenses such as textbooks, housing, and meals. If enacted, the California Student Aid Commission (CSAC) estimates it would benefit approximately 110,000 community college students and 40,000 four-year students (CSAC, 2022a). However, CSAC also estimates it would cost the state an extra \$315 million annually (CSAC, 2022a). The additional cost may raise concerns among some lawmakers about the program's financial sustainability. Yet how would the cost of the program expansion compare to the benefit it generates, both for students and for the state? In other words, would it be worth the cost? This working paper, commissioned by Strategy Labs with support from Lumina Foundation, aims to fill a missing piece of the benefit-cost equation by estimating the long-term economic benefit of the Cal Grant expansion based on the best empirical evidence available.

In summary, we find that proposed reform would have substantial impacts on the state economy and that its economic return would substantially outweigh the cost. Using middle-range estimates of the impact of financial aid, and using CSAC's estimates of increased eligibility and cost as starting points, the model developed for this analysis shows additional lifetime earnings generated by the reform of \$9.0 billion, of which governments in the state would collect \$989 million through direct state and local taxes alone, excluding the indirect multiplier effects of higher attainment a less conservative model might include. The cost-benefit ratio of this investment is 3.14, meaning the state would collect \$3.34 for every dollar spent on the program's expansion.

### ***B. Background: Cal Grant Equity Framework***

The Equity Framework aims to cover the entire cost of education, including tuition and fees and other necessary non-academic expenses, such as housing, food, and other costs. It proposes consolidating the current eight programs into two. One is Cal Grant 2, which would pay \$1,648 per year for students who attend a community college. The other new program is Cal Grant 4 for four-year students. This program would fully cover tuition, approximately \$7,000 at CSU and \$13,000 at UC campuses. In both programs, eligible students would also receive a maximum of

\$2,800 per year through CalFresh Access, a food stamps-type program that would help cover meal costs.

Another key feature of the Equity Framework is its transparency to students. Under the current financial aid system, it is difficult for students and parents to know whether and how much they qualify for in advance. The proposed reform would address this problem so that they know the amount of aid they can expect to receive before they file for an application. Beginning in October 2023, the Federal government will use the new "Student Aid Index" (SAI) to determine federal aid eligibility based on household income and size only, doing away with the long-used Expected Family Contribution (EFC). The Equity Framework proposes that students would become automatically eligible for the full amount of the Cal Grant program as long as they are Pell-eligible. Streamlining Cal Grant and Pell Grant eligibility would significantly reduce the complexity of the financial aid system, which might have alienated the population it aimed to support. The Equity Framework also proposes no minimum GPA requirement for Cal Grant 2 and a 2.0 GPA for Cal Grant 4. In other words, Pell-eligible students would qualify for Cal Grants as long as the institution admits them.

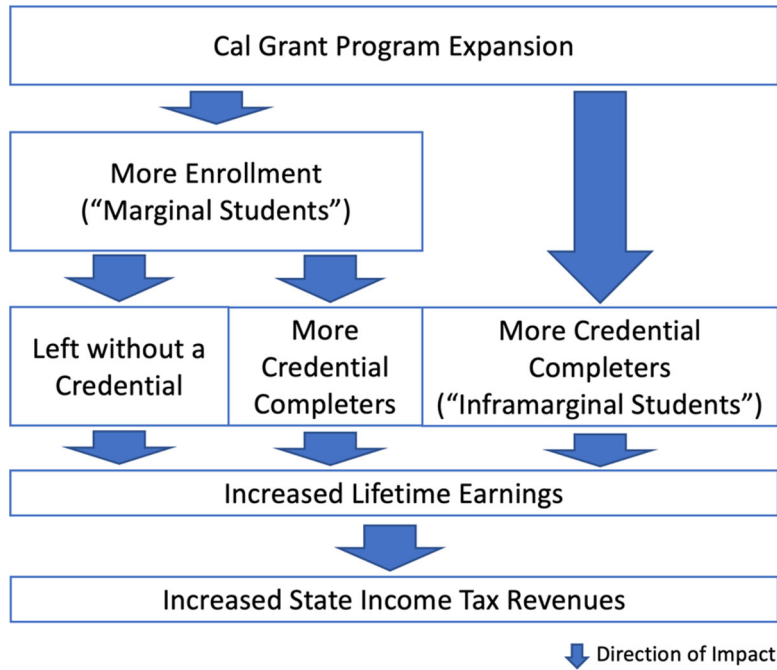
According to CSAC (2022a)'s estimates, the Equity Framework would increase the number of Cal Grant recipients from the current level of 202,196 to 311,238 at community colleges and 138,091 to 180,571 at four-year universities. In total, approximately 150,000 additional students would become newly eligible for Cal Grant. The cost required for program expansion is \$314.7 million per year.

### ***C. Analytical Framework***

Financial aid improves college completion for two types of students: "marginal" and "inframarginal" students (Denning, 2019). The former refers to those who would have not otherwise enrolled if it were not for the program's expansion, some of whom will earn a degree, while others benefit with at least "some college." The latter corresponds to those who would have enrolled anyway but who are able to complete degrees only because of financial aid. Following this conceptual framework, **Figure 1** below illustrates how the expansion of the Cal Grant program leads to the long-term economic benefits to the state. The blue arrow represents the direction of impact.

First, the program's expansion would lower the cost of college for many students, resulting in more enrollment ("marginal students"). Some of the additional enrolled students, though not all, would eventually obtain a degree or certificate. Cal Grant's expansion would also increase the likelihood of earning a postsecondary credential among those who would have enrolled anyway ("inframarginal students"), as represented by the arrow directly connecting the boxes of "Cal Grant Program Expansion" and "More Credential Completers." In other words, the program expansion would have sizable impacts on both enrollment and credential completion, respectively.

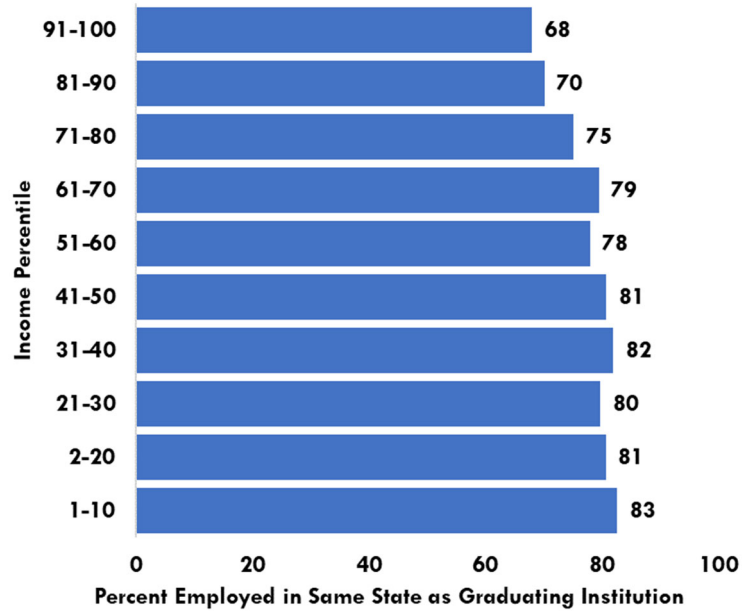
**Figure 1. Impact Diagram of Cal Grant Reform**



The next type of impact relates to the higher expected incomes of the additional college graduates. College graduates can expect higher earnings, as shown by the arrow from "More Credential Completers" to "Increased Earnings." A more modest level of increased earnings could also be expected for those who start but do not complete college (e.g., Belfield & Bailey, 2011; Oreopoulos & Petronijevic, 2013), and the curved arrow represents that flow. Finally, those who earn more would pay more taxes in various forms such as state income, sales, and/or real estate taxes. This model estimates how much the program's expansion would increase enrollment, completion, lifetime earnings, and state and local tax revenues over time.

We make several assumptions for this analysis. The assumption most likely to produce an overestimate of gains to the state is that students would remain in California after college. This assumption is a generalization that clearly has gaps. Some graduates will leave the state. But to a first approximation, it is true. California's rates of out-migration are below the national average (even though net migration is currently negative), at less than 2% per year. Out-of-state migration is also lower for the lower-income graduates targeted by these reforms. In the national Baccalaureate and Beyond study, while 68% of bachelor's graduates in the highest decile of family income were employed within the same state 12 months after completion, the 83% of those in the lowest decile of family incomes stayed in-state for work (B&B:16/17). This suggests that the additional graduates resulting from Cal Grant reform are more likely than average to remain in state for employment.

**Figure 2. Percent of Bachelor's Graduates Employed in Same State as Degree Institution w/in 12 Months, by Family Income (Baccalaureate & Beyond 16/17)**



Other assumptions and simplifications, however, tend to produce underestimates of the benefits to the state. For example, this analysis only focuses on direct state and local revenues as the final public sector outcome, leaving out the “externalities” or indirect benefits of having more college graduates are sometimes used and that typically produce higher cost-benefit multipliers. These can be important but are harder to estimate. For example, skilled workers can improve the productivity of other workers (Moretti, 2004), while more education leads to better health and might reduce the state’s health care costs (Buckles et al., 2016). Directly affected graduates can also lead indirectly to higher educational attainment in their families and communities (McMahon 2009). We ignore such real but hard-to-estimate spillover effects. Overall, these assumptions may equal or outweigh the assumption of in-state retention, allowing this model to focus on a relatively simple calculation of direct costs and benefits.

We also note that the research literature we rely on for these estimates varies in the time frames studied to estimate gains in enrollment or completion. Rarely, however, is the time horizon longer than about eight years. We assume that the effects of the program apply to each annual cohort of newly eligible students, and each year of investment, but do not predict the precise timing of the additional enrollments or completions. Some would likely occur right away, while others might require time for the program expansion to become well-understood and for students and potential students to be able to revise their time and budget assumptions accordingly.

## ***D. Estimating the Economic Return to Equity Framework***

### **i. Four-year Students**

#### **Expected Impact on Access**

Beneficiaries of Cal Grant expansion consist of two groups: 1) those who would not have enrolled at all were not for the reform ("marginal students") and 2) students who would have enrolled regardless but might not have completed ("inframarginal students"). We need reasonable numbers for both populations to estimate the economic return to the reform, as they would bring extra benefits to the state. Well-designed research studies on financial aid generally agree that reducing unmet need increases enrollment, and a rough rule of thumb from the research is that \$1,000 in an annual financial aid increases college enrollment by roughly 3 to 5 percentage points (e.g., Deming & Dynarski, 2009; Dynarski & Scott-Clayton, 2013; Page & Scott-Clayton, 2016; Bartik et al., 2017). This working paper assumes that enrollment in the four-year sector in California will increase by 4% for every \$1,000 in grant aid, the midpoint estimate of grant impact on enrollment suggested in the literature.

CSAC (2022a) estimates that 40,000 students would become newly eligible for Cal Grant 4. Of those, how many students would have not enrolled if it were not for the reform? Here is how we estimate the figure. CSAC (2022b, 2022c) shows that CSU students roughly explain 81% (32,500 students) of newly eligible students relative to UC students with 9% (3,500) and private institutions with 10% (4,000). CSU's and UC's annual in-state tuition and fees are roughly \$7,000 and \$13,000 respectively, so we assume that eligible students would receive \$9,800 at CSU and \$15,800. These amounts include additional benefits of \$2,800 from CalFresh. For students who attend private institutions, we assume that the total aid amount aid is \$11,800 per year, with \$9,000 from Cal Grant 4 and \$2,800 from CalFresh. Based on these assumptions, we estimate that an additional enrollment at CSU due to the reform is 12,740 ( $32500 \times 0.04 \times 9.8$ ), 2,212 at UC ( $3500 \times 0.04 \times 15.8$ ), 1,888 at private institutions ( $4000 \times 0.04 \times 11.8$ ). In total, 16,840 students out of 40,000 newly eligible students would be predicted to enroll in the four-year sector because of the reform.

This count may appear to be too high. However, the Kalamazoo program in Michigan, which pays all tuition for students attending any institution within Michigan, raised the enrollment rate for the eligible cohort at four-year institutions by 18-27% (Bartik et al., 2021). Given that the total undergraduate enrollment in fall 2020 at UC and CSU combined is about 568,000 according to IPEDS, our estimate is not necessarily unrealistic.

#### **Expected Impact on Completion**

As with enrollment, the literature also suggests that increasing aid helps more low-income students graduate even after netting out the impact on enrollment. Castleman and Long (2016) found that an additional \$1,000 in need-based aid per year increased the 6-year graduation rate for

public four-year students in Florida by 3.5 percentage points.<sup>1</sup> Goldrick-Rab et al. (2016) estimated that the grant program awarding a maximum of \$3,500 per year helped four-year students in Wisconsin graduate on time by 4.7% (or 1.3% for every \$1000). Page et al. (2019) analyzed the impact of the Dell Scholars Program, which offers up to \$20,000 per year. They found that the program increased the six-year graduation rate for the recipients by 25 percentage points, or 1.25 percentage points if we rescale this rate by a \$1,000 basis. Denning et al. (2019) found that an additional \$1,000 in Pell Grant increased the chance of six-year graduation for four-year students by 4.8 percentage points in Texas. Eng and Matsudaira (2021) argued that Denning et al. (2019)'s estimate is on the higher end of the distribution and partially driven by the fact that the Pell increase led to increased aid from other sources in Texas. They estimated that the average effect of Pell is lower and likely to be about 1 percentage point using the nationwide data on Pell recipients from 2002 to 2010.

Scholars have also evaluated the impact of some Cal Grants specifically on completion, and the finding is comparable to those previous findings. A recent study by Bettinger et al. (2019) found that being eligible for the Cal Grant A program increases the chance of earning a bachelor's degree within six years by 4.6 percentage points after comparing students whose high school GPA is just above and below the eligibility threshold. Given that the additional award amount for those above the cutoff is \$4,300, the impact translates into roughly 1.1 percentage points per every \$1,000 in Cal grant.

To summarize, the estimated impact on the six-year completion rate in the literature ranges from 1 to 4 percentage points for every \$1,000 in aid, conditional on enrollment. This working paper assumes that bachelor's degree completers in California would increase by 2.5% for every \$1,000 in grant aid, a roughly midpoint estimate of grant impact on degree completion suggested in the literature. We estimate that the number of additional bachelor's degree completers due to the Equity Framework is 7,963 at CSU ( $32,500 * 0.025 * 9.8$ ), 1,383 at UC ( $3,500 * 0.025 * 15.8$ ), and 1,180 students at private institutions ( $4,000 * 0.025 * 11.8$ ). In total, the Equity Framework's reform would help 10,525 students earn a bachelor's degree.

#### **Impact on Lifetime Earnings and State and Local Tax Revenues through Enrollment Expansion**

Recent studies suggest that enrollment in four-year institutions substantially increases an individual's earning power in the labor market over a lifetime, which is the appropriate timeframe for states to consider in thinking about program benefits to students and the state. Hoekstra (2009) found that attendance in a flagship public university in an anonymous state increased earnings by 20% for white males aged 28 to 33. Zimmerman (2014) found a similar return to attendance in the least selective public institution using data in Florida. Smith et al. (2020) estimated that attending "any" public 4-year institution in Georgia increased their annual household income around age 30 by 20%, compared to those who did not participate in college or enrolled in community college. Consistently similar estimates from these studies, which are conducted in different states while focusing on different types of institutions, suggest that

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<sup>1</sup> This rate is not conditional on enrollment (Denning, 2019). Thus, the impact of aid conditional on enrollment may be higher.

enrollment in the four-year sector in California is also likely to yield a similar economic return. Thus, this study also assumes that the wage premium for four-year enrollment in California is 20%.

We make some additional assumptions to produce an estimate of economic return on Cal Grant's expansion. First, this model assumes that the wage premium begins to manifest from age 30. This is based on the projected average age of newly eligible four-year students at 25.9, if the reform succeeds (CSAC, 2022). We add four years of education and rounded it to the nearest integer, 30. Then, we use data from the Census to calculate the average earnings of adults with an associate degree or some college in California from age 30 to 64. We multiply average earnings at each age by 1.2 to obtain estimated earnings for Cal Grant 4 recipients. Finally, we sum the wage differences between the two groups at each year of age to get net gains in lifetime earnings and apply a 3% discount rate to convert the future earnings increases into a net present value (NPV).

We estimate additional lifetime earnings of Cal Grant 4 recipients at \$181,510 per person. We multiply this amount by 16,840, to yield approximately \$3.1 billion. This amount corresponds to the gross total of additional lifetime earnings of students who would not otherwise have enrolled without Cal Grant 4. We also calculate the additional state and local tax amounts they would pay. Following the Urban Institute's Tax Policy Center's estimate that state and local government tax revenues in California were about 11% of personal income in 2019 (Tax Policy Center, 2021), the most recent year available, we estimate that each additional individual would pay an \$19,966 in state and local taxes over a lifetime in net present value. Multiplying this amount by 16,840 students equals \$336 million, which is additional gross state income tax revenues collected over time. These tax receipts alone exceed the reform's additional expenditures, which CSAC estimates as \$314.7 million per year, meaning the private economic benefits to students would require no net increase in average tax rates.

#### **Impact on Lifetime Earnings and Tax Revenues through More Degree Completers**

The literature agrees that having a postsecondary credential increases an individual earning power in the labor market (Oreopoulos & Petronijevic, 2013). According to the Georgetown University Center on Education and the Workforce, the median lifetime earnings for those aged 25-64 with a high school diploma are \$1.6 million using Census data from 2009 to 2019 (Carnevale et al., 2021). In comparison, the lifetime earnings increase by \$300,000 for individuals with some college, \$400,000 with an associate degree, and \$1.2 million with a bachelor's degree (Carnevale et al., 2021). Our use of a net present value discount reduces this gap somewhat to account for the fact that most people would value a dollar today more highly than they would value a dollar in the future. Although earnings widely vary across fields, even within the same credential level, a college degree is generally associated with a higher earning power in the labor market (Oreopoulos & Petronijevic, 2013).

However, the earnings difference shown above is not necessarily the same as the causal impact of a college credential. Researchers argue that self-selection is one factor that introduces bias in the estimate of college return (Oreopoulos & Petronijevic, 2013; Lovenheim & Smith, 2022). Individuals may attend college because they believe they are likely to succeed in and after



college. The personal traits that prompted them to go to college may partly explain the earning premium (Oreopoulos & Petronijevic, 2013). Students also have different preferences for occupation, a field of study, and choice of institutions, and those individual "tastes" could differently affect earnings later in life (Lovenheim & Smith, 2022). Thus, there is a chance that the earning difference shown above overestimates (or underestimates in some cases) the earnings premium of a college degree.

Scholars have attempted to isolate self-selection from college premium calculation using a quasi-experimental technique (e.g., Angrist 1990; Card, 1994; Lemieux & Card, 2001; Angrist & Chen, 2010; Zimmerman, 2014; Smith et al., 2020). They estimate the wage premium of attending college by exploiting a natural experimental situation that sorts students into pseudo-treatment (e.g., enrolled in college) and control groups (e.g., did not enroll in college) and that is beyond the students' control. Overall, the wage premium remains strong throughout the literature. In fact, the college premium has kept rising since 1980, suggesting that the supply of college graduates is not keeping up with the demand growth (Oreopoulos & Petronijevic, 2013).

Nevertheless, nailing down the wage premium rate of a bachelor's degree as a single parameter is complex. Most of the studies cited above do not estimate a bachelor's degree's wage premium per se but rather a college enrollment. Researchers have tried to circumvent this problem by multiplying the return to one-year enrollment in college by four, given that obtaining a bachelor's degree takes four years by design (Oreopoulos & Petronijevic, 2013). Nevertheless, this approach has shortcomings. First, it does not account for college dropouts, delayed graduation, or proceeding to graduate schools. Second, it fails to account for the "sheepskin effect", a hypothesis which posits that college premium comes from a degree rather than credits (Jager & Page, 1996; Oreopoulos & Petronijevic, 2013; Lovenheim & Smith, 2022), though this is more relevant to a two-year degree (Lovenheim & Smith, 2022). While we acknowledge those limitations, we follow this method in this working paper as this is the best, if not ideal, option available to estimate the return to a bachelor's degree.

This working paper assumes that obtaining a bachelor's degree increases individual annual earnings by 34.8% compared to adults with some college or an associate degree in California, following the return rate of 8.7% per one year of education in college estimated by Zimmerman (2014) (Oreopoulos & Petronijevic, 2013). We chose this study as a reference point because, as far as we recognize, this is the most recent study that estimates the return to studying for one year at a four-year college<sup>2</sup>. With this rate, we estimate the additional lifetime earnings of additional completers at \$317,643 per person in net present value, gross total of additional lifetime earnings at \$3.343 billion, and additional state and local tax revenues at \$368 million.

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<sup>2</sup> Smith et al. (2020) is a more recent study in the same line of inquiry, but they did not calculate the return to one-year education in college.



## ii. Two-year Students

### Expected Impact on Access

Regarding the impact of grant aid on college access, the available evidence for community college is less comprehensive than for four-year students. Limited evidence suggests, however, that the impact is likely similar. For example, Denning (2017) found that a \$1,000 reduction in community college tuition led to a 5.1% increase in community college enrollment in Texas. The estimate is consistent with a similar study by Martorell et al. (2014). Reduction in the sticker price and awarding grants are not necessarily the same and could have differential impacts on college access. Still, we can consider tuition discounts as one form of financial aid reducing total unmet need and interpret their findings as equivalent to grant aid's impact. Following the estimate by Denning (2017), we estimate that an additional enrollment at CCC due to the reform is 24,242<sup>3</sup>. We also estimate that 40% of them (9,607 students) will earn a credential within six years, following the national average of credential completion rate for full-time community college students on Pell<sup>4</sup>.

### Expected Impact on Completion

As with enrollment, studies addressing grant aid's impact on community college completion are also scarce, and the available evidence does not necessarily converge. Marx & Turner (2015) found no impact of Pell on educational attainment for community college students in New York. Park and Scott-Clayton (2018) also found no effect of the Pell grant on the 3-year credential completion rate using statewide administrative data on community college students. Meanwhile, Liu (2020) found a positive impact of the Pell grant on community college completion. She exploited an unanticipated policy change that made Pell available for summer, finding that community college students who utilized Pell for summer became more likely to graduate. She estimated that the certificate and associate degree completion rate within 2.5 years increased by 2.0 and 2.7 percentage points for every \$1,000 increase in the Pell Grant. Lastly, Eng and Matsudaira (2020) found suggestive evidence that the effect on degree attainment is similar across the matriculating sector, suggesting that the impact of Pell is also roughly one percentage point for community college students, conditional on enrollment.

Scholars suggest that mixed findings in Pell are partly due to the complex application process that makes the aid less accessible to those it benefits the most (Bettinger et al., 2012; Park & Scott-Clayton, 2018; Dynarski & Scott-Clayton, 2006; Carruthers & Welch, 2019). The actual impact might be higher for the neediest students, who might not have filled out the FAFSA application and did not enroll (Liu, 2020). Also, the Pell Grant is “first-dollar” aid and often comes with other aid programs. Depending on states or institutions, the Pell grant amount could change the award amount from the other programs either positively (Denning et al., 2019) or negatively (Marx & Turner, 2015). A variation in how Pell interacts with other aids explains varying estimates of the Pell on completion from one context to another (Park & Scott-Clayton,

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<sup>3</sup> Here is the formula:  $109,000 * 5\% * \$4,448$

<sup>4</sup> According to the authors' calculation using data from Beginning Postsecondary Survey 2012/2017.

2018; Eng & Matsudaira, 2021). Thus, it is important to stress that no effect of Pell in the previous literature does not necessarily indicate that grant aid affects community college completion.

That said, the estimated effect on community college completion in the literature ranges from no effect to 2-3 percentage points. This working paper takes the middle point, assuming that a \$1,000 increase in grant aid would increase the likelihood of earning an associate degree by 1.0 percentage point in California. Using this rate, we predict that out of 109,000 students who become newly eligible, 4,848 students will obtain an associate degree due to the reform.<sup>5</sup>

### **Expected Impact on Lifetime Earnings and Tax Revenues through Enrollment Expansion and Increased Completion**

The consensus in the literature is that community college attendance and completion each result in increased individual earnings in the labor market. In a comprehensive literature review of earning premium studies for community colleges, Belfield and Bailey (2011) found that the annual earning return to an associate degree ranges from 13% to 22% compared to high school graduates. They also found that attending a community college even without obtaining a degree will increase earnings by 9 to 10%. More recent studies also reached a similar conclusion (e.g., Belfield & Bailey, 2017; Dadgar & Trimble; Xu & Trimble, 2016), suggesting that the wage premium of community college attendance and credential remains strong in the current labor market.

Following the literature, we assume a wage premium for community college enrollment of 10%. For an associate degree, we assume it is 17.5%, the middle point of the estimates range in Belfield and Bailey (2011). We also assume that the wage premium begins to appear from age 30 based on the projected average age of newly eligible two-year students at 26.6 (CSAC, 2022). We add three years of education and round it to the nearest integer, 30. Then we calculate the average earnings of adults with a high school degree in California from age 30 to 64, using data from the U.S. Census. We multiply the average earnings at each age by 1.1 to obtain average earnings for adults with some college and 1.175 for adults with an associate degree. Finally, we sum the wage differences between high school diploma and some college and associate degree at each year of age to obtain gains in lifetime earnings and apply a 3% discount rate to convert the earning gains into a net present value.

Based on these calculations, the additional lifetime earnings of Cal Grant 2 recipients would be \$89,131 per person in NPV. We multiply this amount by 29,090, which is the sum of the additional 24,242 enrollment and the 4,848 degree completers. A gross total of additional lifetime earnings that they would earn is \$2.6 billion<sup>6</sup>. We also estimate that each of them would pay additional state and local taxes of \$9,804 over a lifetime in net present value. Multiplying this amount by 29,090 students equals \$285 million, which is the total amount of additional state and local taxes they would pay over time.

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<sup>5</sup>  $109,000 * 0.01 * 4.448 = 4,848$  students

<sup>6</sup> Our estimate considers that the 9,607 completers who would have not otherwise enrolled (i.e., completers among marginal students) will be in the earnings track of associate degree holders.

## ***E. Conclusion***

This working paper estimates long-term economic returns to the Equity Framework, California's comprehensive reform proposal for the current Cal Grant program. We show that the economic return would likely substantially exceed the program expansion cost. We estimate that the Cal Grant expansion would attract approximately 17,000 students who would have not otherwise enrolled in the four-year sector and help roughly 11,000 students earn a bachelor's degree. Their additional lifetime earnings would be \$6.4 billion, and they would pay additional state and local taxes of \$704 million in net present value. The Cal Grant expansion for two-year students also would bring substantial economic returns to the state. An additional 24,000 students would likely attend a community college due to the reform, and the number of degree completers would increase by roughly 15,000 students. Incremental enrollments and completions for each annual cohort would occur over an unspecified number of years. The estimated gains in their lifetime earnings are \$2.6 billion, of which the public sector would recoup \$285 million via state and local taxes.

All combined, the gross additional lifetime earnings that the Cal Grant reform would generate would be \$9.0 billion, and the additional state tax revenues would be \$989 million. The direct public sector benefit-cost ratio is 3.14, meaning the state would collect \$3.14 in taxes for every dollar spent on the reform. While an analysis like this one is impossible without some assumptions and blind spots, there is enough room in the 3.14:1 ratio to suggest that the returns would be positive even if some of the factors used are necessarily imprecise.

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