The Efficacy of Vouchers in Higher Education: The Case of Colorado

By: Nicholas W. Hillman, David A. Tandberg, and Jacob P. K. Gross

In 2004, Colorado introduced the “Colorado Opportunity Fund,” a voucher-based model for financing public higher education. Instead of appropriating funds directly to public colleges and universities, the state now provides vouchers that students redeem once they enroll in college. Allocating state appropriations to students instead of institutions, advocates argued, would create cost efficiencies and expand college access. Proponents believed that having students “vote with their feet” would create market forces that incentivized colleges to keep costs low, retain students, and improve their overall quality (Fischer 2005). Critics, however, questioned the underlying logic of proponents’ arguments and also their intentions in advocating for the voucher system (Prescott 2010).

“Market-based” reforms, like Colorado’s voucher plan, have become increasingly popular as states continue to grapple with scarce resources (McLendon and Mokher 2009). The prevailing logic is that greater competition and consumer choice will induce colleges to be more responsive to students and accountable for their outcomes. While this logic may be appealing

Abstract

This policy brief explores the impact of Colorado’s voucher-based model for financing public higher education on institutional cost efficiency and access. It is based on a study recently published in Research in Higher Education, titled “Market-Based Higher Education: Does Colorado’s Voucher Model Improve Higher Education Access and Efficiency?” The study is available at: http://link.springer.com/article/10.1007/s11162-013-9326-3.

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to policymakers, it is based on little empirical evidence within the higher education sector (Fryar 2012). Nevertheless, several states have introduced business-like “pay for performance” funding programs or deregulation efforts designed to improve cost efficiencies and expand college access. Though so far Colorado is the only state to adopt a voucher-based system for funding higher education, other states such as Ohio and Texas have explored similar models (Camou and Patton 2012; Hamilton 2011).

In this study, we explore whether the Colorado Opportunity Fund (COF) has achieved its goals of improving efficiency and expanding access. We find limited evidence that the policy improved efficiency within the four-year sector. Though it did appear to boost cost efficiency among community colleges, this may have resulted from a reduction in college access for some underrepresented groups.

To understand the origins and design of Colorado’s voucher model, we begin with a brief discussion of the state’s fiscal environment leading to the adoption of the policy.

### The Taxpayer Bill of Rights

In 1992, Colorado voters passed a referendum amending the state constitution to include a “Taxpayer Bill of Rights.” This amendment significantly restricts the amount of tax revenue growth and public expenditures allowed each fiscal year. The end result was the most restrictive limit on taxes and expenditures in the country and one of only a few that was constitutionally mandated. As government agencies, the amount of revenue public colleges and universities could take in was significantly curtailed under the bill, impacting both tuition and fees and state appropriations. Colleges found it difficult to generate enough revenue to support their operations and feared long-term financial consequences.

### Implementing the Colorado Opportunity Fund

The Colorado Opportunity Fund was proposed as a way of circumventing revenue restrictions imposed by Colorado’s constitutional tax and expenditure limitations (TEL). Under Colorado law, public agencies receiving less than 10 percent

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**Summary of Key Findings**

- The Colorado Opportunity Fund negatively impacted access for Hispanic students at both community college and four-year institutions.
- Access appeared to shift for African Americans, with a modest decline at four-year institutions and an increase at community colleges.
- Enrollments of low-income students in community colleges declined after the introduction of COF.
- COF appeared to improve cost efficiency at community colleges to be more efficient; both the cost per full-time equivalent (FTE) undergraduate and cost per completion declined post-policy implementation.
- COF yielded little to no efficiency gains at four-year colleges and universities.
of their operating budgets from direct state support (i.e., state appropriations) can receive “enterprise status” and are no longer subject to TEL rules. Gaining enterprise status would allow colleges to raise tuition at higher rates. Under COF, state appropriations would no longer be allocated directly to public colleges, allowing them to achieve enterprise status; rather, funds would go directly to students in the form of vouchers. In 2004, the state legislature codified the COF by passing SB 04-189, and by 2005 the state had implemented the new funding model.

The implementation of COF was complicated from the beginning. Students faced higher tuition bills, and they had to opt into the voucher program to get help paying them. To receive a voucher, however, they first had to apply to and enroll in college. Furthermore, the purchasing power of vouchers could not keep pace with tuition inflation. As shown in Table 1, the average voucher was valued at $2,400 (36 percent of public four-year tuition) in 2005, but by 2010 it had declined to $1,320 (21 percent of tuition).

While the voucher component is the hallmark of the state’s new financing model, the legislation also introduced fee-for-service and performance contracts for the state to “purchase” educational services not covered by vouchers, including graduate education, rural education, dual enrollment, and various professional degree programs. These contractual arrangements help colleges and universities gain enterprise status, since officially the state is contracting with institutions for these services instead of making direct appropriations.

### Demographic trends in Colorado

Colorado is less racially and ethnically diverse than most other states in the country. Non-Hispanic whites make up approximately 63 percent of the U.S. population, but they account for approximately 69 percent of Colorado’s 5 million citizens (U.S. Census Bureau 2014). While the state is whiter than most others, its Hispanic population is growing faster than the U.S. average. Today, approximately 21 percent of the state is Hispanic, compared to 17 percent nationally. However, the state’s African American population, at 4 percent, lags far behind the U.S. average (13 percent).

Furthermore, Colorado has a persistent problem educating its youth. Among the states, Colorado ranks 33rd in the percent of high school graduates enrolling directly in college following graduation and 34th in the percent of 18- to 24-year-olds enrolled in college. However, Colorado has always

<table>
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<th>Table 1: COF participation trends and purchasing power</th>
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<td>Total students enrolled in COF</td>
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<td>Annual voucher per student</td>
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<td>Average full-time undergraduate tuition</td>
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been an excellent importer of educated workers, ranking 5th in the percent of 25- to 64-year-olds with a bachelor’s degree or higher. This paradox has long worried and confounded education advocates.

When focusing on the youth population—and recent public high school graduates in particular—we can see how rapidly Colorado’s demographics changed between 2000 and 2010. Although the majority of the state’s recent high school graduates are white, students who are African American or Hispanic account for a growing number of graduates. Figure 1 shows the year-to-year change in the race/ethnicity of public high school graduates during this period, with the most rapid growth occurring among Hispanic students. The number of Hispanic high school graduates rose every year, rising sharply after 2004. The number of African American high school graduates also grew (except in 2005 and 2010), though their growth was not as steady.

Analysis

We first had to develop measures reflecting the expressed goals of the Colorado voucher program. We determined that these measures fell into two categories: 1) college access and 2) institutional cost efficiency.

For college access we chose three outcome variables:

1. Number of undergraduates receiving federal grant aid;
2. Number of undergraduates who are African American; and
3. Number of undergraduates who are Hispanic.

For cost efficiency we also chose three outcome variables:

1. Cost of delivering education per full-time equivalent (FTE) undergraduate;
2. Cost per completion; and
3. Number of completions per 100 FTE undergraduates.
To isolate the impact of the voucher program on the identified variables, we chose the quasi-experimental design called "difference-in-differences" and compared Colorado institutions with institutions in other non-voucher states (one difference) in the years before and after the policy intervention (the other difference). The difference in these differences told us much more about the policy’s impact than could traditional regression analysis or descriptive statistics. Rather than a simple pre/post analysis, this technique allowed us to see whether trends in Colorado were different than in other states after the policy was implemented.

The method required us to have several years of data before and after Colorado implemented the voucher program, so we examined changes in our outcomes of interest between the years 2000 and 2010. We also accounted for variations among each institution’s financial and enrollment profile and other observed and unobserved factors that might affect outcomes. Descriptive statistics for the variables used in our analysis are displayed in Table 2 below.

### Findings

In the tables that follow, we describe our findings and the estimated effects of the COF on various outcomes. We display and discuss only statistically significant results. Our analysis included colleges in four comparison groups—neighboring states, Western Interstate Commission on Higher Education (WICHE) states, states that adopted TEL policies, and states that never adopted TEL policies—to which we compared Colorado colleges.

It is important to note that if we found significant results in only one of the comparison groups, we were cautious in interpreting our results. However, if significant results were found

| Table 2: Institutional means for efficiency and access measures, pre- and post-COF |
|---------------------------------|-------|-------|--------|
| **Four-year colleges**          |       |       |        |
| Undergraduate FTE               | 8,627 | 9,331 | 8.2%   |
| Total completions               | 2,053 | 2,316 | 12.8%  |
| Total expenditures (1000s)      | $101,549 | $110,014 | 8.3% |
| Percent Pell                    | 26.0% | 27.1% | 1.1%   |
| Percent African American        | 2.5%  | 2.9%  | 0.4%   |
| Percent Hispanic                | 9.0%  | 10.1% | 1.1%   |
| **Two-year colleges**           |       |       |        |
| Undergraduate FTE               | 2,793 | 3,100 | 11.0%  |
| Total completions               | 623   | 846   | 35.7%  |
| Total expenditures (1000s)      | $22,990 | $22,753 | -1.0% |
| Percent Pell                    | 41.0% | 46.7% | 5.7%   |
| Percent African American        | 4.5%  | 5.2%  | 0.7%   |
| Percent Hispanic                | 16.6% | 17.7% | 1.1%   |
across all four comparison groups, we could more confidently draw conclusions. Tables 3 and 4 summarize our results, with each arrow representing the direction of the effects and the number of comparison groups in which we found these effects. For example, Table 3 shows that the “low income enrollment” declined more among Colorado’s two-year colleges when compared with community colleges from all four comparison groups [i.e., four down arrows]. However, “low income enrollment” increased when comparing Colorado four-year colleges against neighboring states [i.e., one up arrow].

Impacts on Access
The results of our access analyses are displayed in Table 3. Community colleges were impacted negatively to a greater extent than four-year institutions. However, access for Hispanic students declined in both sectors after the introduction of COF.

Low-Income Enrollment
Community colleges enroll a high share of low-income students, with 44 percent of their students receiving federal grant aid. After the policy took effect, however, low-income enrollments declined significantly in this sector relative to comparison groups (between 10 and 20 percent). Among four-year institutions, access in Colorado increased when compared with neighbor states, but otherwise, no statistically significant effects were observed.

Table 3: Statistically significant access findings and the number of times they were observed*

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<th>Four-year colleges</th>
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*0=minimum, 4=maximum; ↑=enrollment increased relative to comparison groups, ↓=enrollment decreased relative to comparison groups

African American and Hispanic Enrollment
During the period of our analysis, approximately 3 percent of undergraduates attending Colorado’s public four-year colleges were African American and 10 percent were Hispanic; this is a smaller percentage than in most of the comparison groups. A similar pattern is found in the two-year sector, where African American and Hispanic students accounted for 4.9 and 17.2 percent of students, respectively.

After the introduction of the COF, African American enrollment declined by 9.6 percent more at Colorado four-year colleges than at public four-year colleges in other WICHE states. There were no statistically significant effects among the other comparison groups. At the same time, African American enrollment in community colleges increased by about 10 to 12 percent more in Colorado than in other WICHE and TEL states. We suspect there was a shift in where African American students enrolled after COF: they may have moved away from the higher cost four-year sector into the lower cost two-year sector. However, we interpret this finding with caution since significant effects were not found across all four comparison groups.

For Hispanic students, it is clear that COF negatively affected access at both two-year and four-year colleges. Across all models, the number of Hispanic students attending public four-year colleges dropped (by 14 to 18 percent) more in Colorado than in all four comparison groups.
Focusing on the community college sector, enrollments dropped at even larger magnitudes (14 to 22 percent). That these findings are robust across all four comparison groups gives us a high degree of confidence in concluding that COF disproportionately reduced access for Hispanic students in both sectors of higher education.

**Impacts on Efficiency**

Observed efficiency gains were mainly concentrated among community colleges, as shown in Table 4.

**Cost Per Full-time Equivalent Student**

The cost of delivering education at Colorado’s four-year and two-year colleges was lower than in the comparison groups even before COF. Prior to COF, average education and related (E&R) expenditures for every community college full-time equivalent student (FTE) was approximately $9,100; after COF, it declined to approximately $8,400. This increase in efficiency was greater than in all four comparison groups.

However, expenditures grew at much a faster rate in Colorado’s four-year colleges, and enrollment levels did not keep up with rising costs. As a result, the cost per FTE stayed relatively flat within this sector: cost per FTE was approximately $11,770 prior to COF and $11,790 after the policy took effect. When compared with neighbor states, Colorado’s four-year colleges showed greater gains in efficiency, but among the other comparison groups there were no statistically significant effects.

**Cost Per Completion**

Average cost per college completion declined in Colorado community colleges post-COF, and significant effects were observed in all four comparison groups. Depending on the comparison group, costs declined between $5,000 and 9,000 more in Colorado than in the comparison groups. In the four-year sector, the policy reduced the cost per completion by approximately $2,400 when compared with neighbor and non-TEL states.

**Completions Per 100 FTE**

Prior to COF, Colorado colleges produced an average of 23 and 27 completions per 100 undergraduate FTEs in the four-year and two-year sectors, respectively. Our analysis estimates that after adopting COF, these rates significantly increased for community colleges (2 to 3 more completions per FTE) more than in all four of the comparison groups, while there was no significant impact on four-year college completions across the comparison groups.

**Implications and Discussion**

Colorado’s effort to introduce market-based reforms into state higher education policy is not unique. States are continuously experimenting with financial reforms (e.g., performance funding, 

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*0=minimum, 4=maximum; ↓=lower costs relative to comparison groups; ↑=more completions relative to comparison groups
enterprise status, etc.) that assume market forces will improve education efficiency and access. Our study contributes to a growing body of literature documenting how these market-based reforms often yield undesirable and unanticipated educational outcomes.

Three of our study’s findings are of particular concern.

- **Though Hispanic students represent the fastest-growing demographic group in Colorado, their representation in both four-year and two-year colleges has declined since COF.** Latino students are more likely than other students to not only pay for their own education, but also to contribute to family finances (Cejda & Stick, 2008; Fuligni & Witkow, 2004). Prior research shows that financial resource availability plays a large role in shaping access for Latino students (Davis-Kean, Mendoza, & Susperreguy, 2012; Sanchez et al., 2010), so the decline in the voucher’s purchasing power over time may be particularly problematic. In addition, a confusing and cumbersome opt-in requirement places additional burdens on these students on their path to college.

- **Enrollment of low-income students in community colleges has declined since COF without corresponding increase in low-income enrollments at four-year institutions.** Community colleges have emerged as a primary access point for many low-income students, who have been priced out of the four-year sector, to enter higher education. Our data show that fewer low-income students are enrolling in Colorado community colleges post-COF, which suggests an important college access point is closing for these students. As with Hispanic students, we suspect the cumbersome application process and declining purchasing power of the voucher are the leading reasons for this finding.

- **COF increased cost efficiency at community colleges, where these institutions now are “doing more with less.”** Community colleges did not increase their expenditures after COF; rather, they simply enrolled more students. It is worrisome to find that the state’s efficiencies were primarily isolated in the sector that had the fewest resources to begin with. Resources matter for improving student success, particularly among community colleges and other institutions serving traditionally under-represented students.

If the state’s main goal was to help postsecondary institutions circumvent the tax and expenditure limits imposed by the 1992 Taxpayer Bill of Rights, COF can be viewed as a successful policy. But to what end?

Though it increased efficiency at community colleges, the design and implementation of the policy appears to have reduced access for Hispanics and low-income students. As prior research suggests these students require additional resources and support to graduate (e.g., Bowen, Bok, & Loury, 1998; Engle & O’Brien, 2007), the observed changes in efficiency may be at least in part a function of community colleges enrolling fewer students who face significant barriers to completion.

Additional work is needed to understand the full effects of COF. Nevertheless, our results suggest the model has had undesirable and unanticipated consequences. We advise caution to other states considering the voucher model or other unproven market-based reforms to higher education.
Resources


The Wisconsin Center for the Advancement of Postsecondary Education (WISCAPE) promotes the creation and sharing of ideas for addressing Wisconsin’s postsecondary education challenges. The production and dissemination of publications are a major part of this effort.

WISCAPE Policy Briefs are succinct analyses that provide policymakers, practitioners, and others with knowledge and recommendations based on the latest research and best practices in the field.

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