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Community Colleges and Pathways to the Labor Market

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Highlights

- Many community college students do not complete any credentials, or earn credentials with low labor market value, which leads to significant default rates despite quite moderate debts.
- Many students at community colleges, especially those from disadvantaged backgrounds, are plagued by weak academic preparation and financial pressures to work full time, as well as too little information about their own academic skills and what the labor market rewards.
- Outcomes among community college students are also limited by too few institutional resources, and likely by too few incentives to respond to the labor market and too little guidance for students as well.
- More resources for community colleges in general, as well as a limited number of specific community college support or job training programs, have strong positive impacts on student and worker outcomes, although many others remain untested or unproven.

Executive Summary

Students attending community college generally complete degrees and certificates at low rates, while the labor market rewards for those completing credentials (and not attaining bachelor's degrees later) are mixed. Those not completing credentials with value also tend to have high default rates on their student debts, although the latter are modest in size.

These relative weak outcomes for community college students reflect their own characteristics as well as those of the institutions they attend. Since community colleges are open-access institutions, many students enroll with weak academic preparation from their K–12 years and are not college ready. Data show that financial stresses requiring students to work while enrolled, sometimes full time, limit their early momentum and progress toward completion. Many students also choose pathways based on very little information and guidance about their own chances of success and ultimate labor market rewards; they also switch pathways frequently, which can also

limit progress towards credential attainment.¹ The community colleges themselves clearly suffer from too few resources per student (especially compared to their four-year public counterparts), while likely facing too few incentives to meet labor market needs and providing too little structure and guidance to their students.

Specific programs and practices designed to improve student outcomes at community colleges have been found to generate strong positive impacts, and more institutional resources generally improve student outcomes. For instance, a few well-known programs, like Accelerated Studies in Associate Programs (ASAP), show strong impacts on completion rates, while other reforms in developmental education or “nudges” show smaller impacts. In addition, sector-based job training programs and apprenticeships with classes at community colleges show quite large impacts on later earnings. But many other interventions designed to improve the outcomes of community college students, such as guided pathways or outcome-based funding, have gone untested. Little is known about how to fund and scale even those programs that have been found to be successful.

What Are the Issues?

Students at community colleges have mixed success rates at best. Nationally, only about one third of these students complete degrees—either an associate, a bachelor’s, or both—after 6 years. In some states, particularly those with relatively low-income students, completion rates are considerably lower.² When including certificates among these credentials, national completion rates are only about 38% (The Century Foundation, 2019).

Even when students complete these credentials, the labor market rewards they earn are mixed.³ Associate in science (AS) or applied science (AAS) degrees generate much greater rewards than terminal degrees in liberal arts (AA); some of the latter, like those in liberal studies or general studies, generate almost no labor market reward compared with having only a high school diploma (Backes et al., 2015; Jepsen et al., 2014; Stevens et al., 2018). Associate degrees in health care or various technical fields generally are well rewarded, as are many certificates in these fields. But many other certificates, especially those gained quickly, generate low rewards as well.

In addition, while students generate relatively low debt loads in community college compared with those in the for-profit institutions or in bachelor’s or graduate degree programs, relatively high default rates occur among these students, especially those who have borrowed to pay tuition

¹ Holzer and Xu (2019) defined pathways as desired credentials and fields of study, as well as a set of choices made along the way and outcomes deriving from them, such as how many credits students attempt and then pass each term, how often they switch fields, the extent to which they accumulate credits within their chosen fields, and overall grade point average (GPA).

² For example, 6-year degree completion rates in the state of Kentucky are just 22%.

³ Of course, many students choose their fields of study not to maximize future earnings, but because they like studying those subjects or they are interested in fields (like early childhood education) despite their low earnings potential. Some students enroll in one or two specific community college courses with no intention of ever completing degrees or certificates.

but not completed a credential with value (Holzer & Baum, 2017).⁴ Thus, determining the causes of low completion rates and choices of fields with little market value, and identifying effective program or policy changes to address these issues, would likely enable us to address all three sets of problems.

What We Know about Causes of and Remedies for Weak Community College Outcomes

Rigorous empirical research indicates that both student and institutional characteristics contribute to low completion rates and mixed labor market rewards for students in public two-year institutions (Holzer & Baum, 2017).

Regarding student characteristics, many students enter community colleges with weak academic preparation. In one study of community college students in Kentucky, over half of entering students were judged to be “not academically ready” in terms of reading and English, while approximately three fourths were considered “not ready” in math (Holzer & Xu, 2019). This finding is not necessarily surprising because community colleges are open access in most states to virtually anyone with a high school diploma or general equivalence degree (GED), which ensures low preparation among at least some who enroll. But it puts a premium on community colleges to be ready to address the academic deficiencies some of their students are likely to have.

Most states require nonready students to enroll in developmental (remedial) education, and some states require students to pass English or Algebra I tests as prerequisites for taking courses for credit. These developmental courses generally are ineffective at improving credit accumulation or completion, and in some cases even do harm (Clotfelter et al., 2015; Long, 2014; Scott-Clayton, 2017). Some states have begun to reform developmental education – through reforms of assessment and placement practices (such as those adopted in North Carolina, Virginia and Florida), accelerating remedial coursework (such as co-requisites, paired courses, and compressed remediation sequence), increasing relevance by tailoring to student interests and programs of study (such as Carnegie Foundation’s Math Pathways), and improved instruction (such as Carnegie’s “productive persistence” philosophy; Bailey & Jaggars, 2016). Other states retain their outmoded models.

Community college students often face pressure to earn income to support their families, especially among the roughly half of community college students who are nontraditional or independent adult students (Holzer & Baum, 2017). Students working full time and taking courses part time have difficulty gaining sufficient momentum in their course-taking and credit accumulation to achieve high completion rates (Holzer & Xu, 2019; Tinto, 2012).

⁴ Default rates among community college students are countercyclical and range from about 13% in strong labor markets to about 25% during the Great Recession.

Finally, many community college students, especially those from low-income or minority families, as well as those who are first-generation college students more generally, have little knowledge or social capital regarding what it takes to be successful in college (Holzer & Baum, 2017). Their choices of programs of study (or pathways as defined above by Holzer and Xu) do not always reflect their abilities or what the labor market rewards. For instance, Holzer and Xu (2019) showed that men enroll in health care programs much less frequently than women, despite their high rates of successful completion and the strong labor market value of such credentials. Students deemed not ready academically have much greater success rates in certificate than associate's degree programs, but choose certificate programs only a bit more frequently than do students deemed academically ready.

Holzer and Xu (2019) also showed that course-taking can be haphazard with frequent switching across fields. Of course, some field-switching should be expected and can even be helpful to students, as they gain more information and experience regarding what classes they like and which they are good at. But too much switching also prevents students from accumulating the credits they need within fields to complete required courses for credentials.

Descriptive evidence suggests that some of the haphazard nature of student course-taking and field selection seems to reflect not only a lack of social capital among students but also a lack of guidance provided by community colleges and their relatively unstructured nature (Rosenbaum et al., 2006; Scott-Clayton, 2011). The lack of guidance, in turn, at least partly reflects the limited general resources available to these institutions (The Century Foundation, 2019). Community colleges generally get much lower subsidies per full-time equivalent students from their states than do 4-year colleges, including those that are not research (or PhD-granting) institutions. Furthermore, students there have greater needs for supports, given their relatively greater concentrations of those from disadvantaged families that we noted above. Resources matter—Deming and Walters (2017) clearly showed the positive impacts of greater resources on credit attainment and credential completion at both 2-year and 4-year schools.

Descriptive evidence also suggests that low completion and labor market outcomes likely reflect a lack of direct incentives that community colleges face to meeting labor market demand. Since they get the same tuition and state subsidies regardless of whether students finish credentials or earn much afterward, community colleges have little incentive to expand teaching capacity in high-demand fields like health care and STEM, especially since instructor and equipment costs tend to be higher in these fields (Holzer, 2018). Even within these institutions, the inability of departments that are popular and heavily demanded by students to keep much of the revenue they generate further weakens incentives and the abilities of popular departments to expand their offerings (Fethke & Policano, 2014).

While the completion rates and subsequent earnings of community college student can be disappointing, they compare quite favorably to those at for-profit institutions that provide many of the same sub-BA credentials (Cellini et al., 2017). The for-profit schools costs much more and often encourage low-income students to take out large loans that generate substantial debt. When these students fail to complete credentials, their rates of default are often higher than those observed in community colleges (Holzer & Baum, 2017). Some experimental evidence indicates

that employers value the same credentials somewhat less when they are gained at for-profit rather than community colleges (Deming et al., 2014).

Programs and Policies That Improve Community College Outcomes

Given the evidence of weak outcomes among community college students, as well as of their student and institutional causes, what evidence is there on programs and policies to address deficiencies and improve completion and labor market outcomes among community college students?

As noted earlier, Deming and Walters (2017) provide the clearest evidence to date that providing resources to community colleges, which in turn enables them to provide more teaching capacity in high-demand fields and more support services for their students, improves credit attainment and completion there. Indeed, the marginal dollar spent on such services has much more positive impacts than that spent on reducing tuition, raising questions about the wisdom of expensive programs to make community college free to all students.⁵

Besides resources, we have some clear evidence of other successful programmatic efforts at community colleges. The best-known example is ASAP, which began at the City University of New York (CUNY) and is now being evaluated in a few community colleges in Ohio. Consistent with calls for a more comprehensive approach—based on theory and evidence that the benefits of isolated reforms that focus on one segment of a student’s experience will fade quickly (Bailey & Jaggars, 2016), ASAP provides a range of services and supports (including tutoring, guidance, and a range of financial supports) to academically nonready students, as long as they are willing to attend full time. At CUNY, ASAP improved degree completion rates by 10 percentage points as much as 6 years later (Gupta, 2017). Its costs are moderately high—approximately \$14,000 per student in New York—although the models in Ohio are less costly than that.

Other programs that focus on more specific supports have been evaluated. One program that raised associate degree attainment by providing only case management services and is less costly than ASAP is Stay the Course, which was piloted and evaluated at a community college in Texas (Evans et al., 2018). Evaluations of developmental education reform have found some positive effects, especially when they are accelerated or taught in the context of real labor force information and training (Bettinger et al., 2013; Long, 2014; Scott-Clayton, 2017).⁶ Summer

⁵ Free community college might generate other problems as well. If students can go to community college for free for 2 years while they need to pay tuition to do the same at 4-year institutions, there will likely be large numbers of students who leave the latter to attend the former, with the hope of transferring later. Their outcomes will be weaker because we know that students starting at community colleges have lower rates of BA/BS completion than those who start at 4-year institutions (Backes, 2017). Given the capacity constraints in high-demand fields at the community colleges, the influx of middle-class students will almost certainly squeeze out students who are going to these colleges regardless and who really need to attend the classes offered in their fields.

⁶ For instance, Integrated Basic Education in Skills Training (I-BEST) has generated positive effects on credits attained in Washington state community colleges (Wacher et al., 2012), although it has not been rigorously evaluated. More positive evidence on accelerated remediation appears in Jaggars et al. (2015), Hodara and Jaggars, (2014), Edgecombe et al. (2015), and Logue et al. (2016), who provided evidence from a randomized controlled trial (RCT) on co-requisite developmental classes. A current RCT is underway in a study by Rand-AIR on co-requisite remediation in Texas.

bridge programs might work more effectively for the hardest to serve.⁷ Another effort called Opening Doors (Scrivener & Coghlan, 2017) evaluated a set of interventions that included financial aid enhancements and other support services, and these showed some modest impacts on credit and degree attainment.

A number of other programs focus more on labor market skills and on partnerships between employers and training providers to prepare disadvantaged workers for well-paying jobs (Maguire et al., 2010). These sector-based training models tailor the training to exactly what employers seek, thus assuring stronger alignment between trainees and jobs (or, in the parlance of economists, labor supply and demand) than has been the case in traditional training programs that are independent of employers. These partnerships are generally found in sectors like health care, advanced manufacturing, and information technology where sub-BA credentials are well-compensated and where employers have some difficulty attracting and retaining skilled technical employees on their own (National Academies of Science, 2017).

Indeed, estimates of the impact of the training on subsequent earnings of workers, noted in Maguire et al. (2010) and in Schaberg (2017), are strongly positive, although the training providers were not community colleges in these cases. In contrast, community colleges are the training providers in a few recently evaluated training programs: Project Quest in San Antonio (Elliott & Roder, 2019) and the Valley Initiative for Development and Advancement (VIDA), a sector-based training program in the Rio Grande Valley (Ralston et al., 2017). Interestingly, the Quest evaluation generated strong impacts 9 years after the training started, which helps to relieve the fear that sector-based training is too specific to a given industry to generate persistent long-term impacts on workers.

Closely related to sector-based training is the notion of career pathways for community college students (Fein, 2014). In this model, students earn sequences of smaller credentials like certificates that ultimately can stack to an associate's or even a bachelor's degree. They often intersperse these efforts with labor market participation in these fields to enjoy the financial fruits of their efforts quickly. These pathways often begin with some developmental classes for low-achieving adults, as in Accelerated Opportunity in a number of states. Several such programs are currently being evaluated by the Office of Program Research and Evaluation at the Department of Health and Human Services, as part of its Pathways for Advancing Careers and Education (PACE) program.⁸

Finally, we note that apprenticeships have become another popular way of generating training for disadvantaged students and workers that is linked even more strongly to a specific employer and sector (Lerman, 2018). Evaluations of apprenticeship have not been based on random assignment

⁷ For instance, the LaGuardia Bridge program (Martin & Broadus, 2013) prepared students for the GED exam by remediating their skills within the context of labor market information on health care and other fields of study; it has small but significant positive effects on pass rates for the GED exam and in community college enrollments. The CUNY Start model is another example of such a program. Chingos et al. (2017) provide evidence on an RCT on low-cost online summer math programs.

⁸ The PACE evaluations at the U.S. Department of Health and Human Services cover a range of career pathway programs like I-BEST, VIDA, and Year Up for youth.

techniques and are therefore not as rigorous, but they suggest strong impacts on later earnings nonetheless (Hollenbeck and Huang, 2016; Reed, 2012). Of course, not all apprenticeships are linked to community college instruction, but classroom training at community colleges, along with a certificate or associate's degree, are parts of apprenticeship programs in a number of cases and likely generate more portable skills and credentials across jobs than those based only on on-the-job instruction (Lerman, 2010).

What We Don't Know about Community College Pathways

The body of evidence reviewed above regarding community college challenges and potential remedies is impressive, yet much remains unknown.

For instance, rigorous tests of some hypotheses about the causes of low completion and weak employment outcomes—especially regarding social capital among students or incentives and lack of structure in institutions—does not yet exist, which prevents us from embracing these notions with complete confidence.⁹ Among the more rigorous and data-driven studies, much has been done on state-level administrative data, so we often do not know the extent to which these findings generalize to community colleges in all states (except when we have studies in multiple states that generate similar findings, which has been true of the studies on labor market returns to sub-BA credentials). Since community college governance and regulation can vary a great deal across states, this particular gap in our full knowledge can be an important one.

Rigorous evidence on the remedies to weak community college outcomes discussed above is also somewhat limited. For instance, the guided pathways notion developed by Bailey et al. (2015) to address the lack of guidance and structure for students at community college has become popular in many circles but remains completely untested to date.

Another popular approach is the use of outcome-based funding (OBF) of higher education (Deming & Figlio, 2016; Dougherty and Reddy, 2017). Over 30 states now use some version of this to allocate funding to higher education institutions (National Conference of State Legislatures, 2019), which is based on the idea that such funding will strengthen incentives to raise completion and respond to the labor market (if subsequent earnings are included among the institutional outcomes that are measured and rewarded). Although the notion has some appeal (Holzer, 2018), there can be potentially large unintended consequences of implementing OBF.

For example, institutions might “cream-skim” in admissions, reducing their populations of risky students to improve their measured outcomes, or they might lower their standards for credential completion to improve those estimates. In theory, these problems can be addressed by carefully controlling for student characteristics when evaluating outcomes, and with efforts to measure school “value added” to what students achieve. In reality, this can be difficult to do, especially

⁹ On the other hand, Moss et al. (2014) show that developmental education students benefit from having a higher proportion of other developmental students in college-level English courses. The Opening Doors and ASAP evaluations also showed some positive effects of structured “learning communities” with their peers. This runs counter to the theory that lagging students may benefit from more challenging courses or those taken with more advanced peers.

transparently. To prevent some of these problems, institutions can be given more credit in their formulas when they enroll more minority or disadvantaged students, and especially for these student outcomes (Cielinski & Pham, 2015), although “cream-skimming” can still occur within these populations.

Evidence to date that OBF can improve outcomes remains limited; if anything, some evidence suggests that institutions might be steering students away from more difficult programs of study to improve numbers (Dougherty and Reddy, 2017). More research must be done on OBF before we can suggest it with any confidence as a remedy for incentive problems in community colleges.

Regarding training programs, some like career pathways have generated too little general evidence to date for us to have confidence in its broader usefulness, although a few efforts (like VIDA noted above) have generated positive impacts. In cases where we have relatively rigorous evidence, as in sector-based training, we do not yet know how to replicate the successful models we have uncovered or how to scale them. Indeed, most states report large numbers of sector-based partnerships but with relatively few students in each of them. Since these programs (and also apprenticeship) seems to work best for those with at least moderately strong basic skills and work experience, how to serve the hardest-to-employ students remains a mystery.

Training for high-demand fields in the labor market is a difficult and risky undertaking. Programs that take years to build can become somewhat irrelevant if employers do not engage in these efforts, or if future automation eliminates the demand in such fields. The extent to which this might happen, and how to create nimble programs in the face of such uncertainty, is unknown.

Policy Levers and Policy-Making Challenges

There are ample opportunities in the policy sphere to influence the choices of both students and institutions and, in doing so, to hopefully improve the outcomes of community college students in terms of credential completion and subsequent earnings.

For instance, the Workforce Opportunity and Innovation Act (WIOA), which is run by the U.S. Department of Labor through its state and local workforce boards, encourages the creation of sector partnerships and career pathways; it was reauthorized in 2014 and continues to be effective, although its funding levels are relatively low.¹⁰

Perhaps more importantly, the federal Higher Education Act (HEA), through which all financial aid to higher education students (in Title IV) and institutions passes, is now up for reauthorization. HEA reauthorization creates important opportunities for strengthening guidance and other supports for disadvantaged students, as well as the institutions that serve them (Holzer, 2019). Within HEA, decisions on the minimal numbers of student credits and hours that qualify a

¹⁰ WIOA distributes approximately \$8 billion to state and local workforce boards to fund a range of training programs for disadvantaged adults and youth as well as dislocated workers, while also funding adult basic education, American Job Centers (formerly known as One-Stop shops), and other programs or entities.

course for financial aid eligibility, and whether noncredit programs might be eligible under some circumstances, are important as well.¹¹

Federal regulation can also be important. For instance, gainful employment rules limit the extent to which students at for-profit schools (and in occupational programs in the nonprofits) can take on higher student debt ratios. Always controversial, such rules constitute important protections of students at for-profit institutions that appear quite necessary in light of the high prices they charge and relatively weak student outcomes they generate (Cellini et al., op. cit.).

In addition, a set of competitive grants, like the Trade Adjustment Assistance Community College and Career Training grants to community colleges and state or local governments during the Obama Administration, can be used to build partnerships and training capacity at community colleges, while also evaluating these efforts to see what works cost-effectively.

Of course, since most funding of higher-education institutions occurs at the state level, there is much that can be done here as well. How funding is distributed across and within institutions—including but not limited to OBF—can have important effects on outcomes, as noted earlier. Regulations and governance of such institutions that determine programs offered and course curricula, as well as remediation—no doubt have important effects too.¹²

Institutional governance matters as well and often determines whether the community colleges have sufficient flexibility to respond to their local and regional labor markets. The extent to which states make available data on student performance and outcomes at particular institutions can help students make more informed choices about which colleges to attend and which programs to enroll in.¹³

In all of these efforts, rigorous research and evaluation of policies and programs implemented remains critical to our understanding of what works at making pathways for students more successful.

¹¹ Currently, certificate courses must take at least 15 weeks or 600 hours in order to qualify for Title IV financial aid programs in HEA. Both Republicans and Democrats in Congress have proposed reducing these requirements to raise student access to Pell Grants and other forms of aid.

¹² As just one example, Florida decided to eliminate required developmental course-taking a few years ago, based on the data showing its very limited effects on student success. The state of Washington has developed I-BEST and a range of other career pathways, while Kentucky has made all of its certificate programs “stackable” to associate degrees. Exactly where the for-credit line is drawn within certificate programs at particular institutions is an important determinant of exactly who qualifies for federal financial aid and therefore which disadvantaged students can have access to which training programs.

¹³ The Obama Administration used grants for State Longitudinal Data Systems (SLDS) and Workforce Data Quality Initiative (WDQI) to improve the availability and use of such data. But, to date, HEA does not allow states or the federal government to use unit data records on individual students in any way, out of concerns over confidentiality.

References

- Backes, B., & Velez, E. (2015). *Who transfers and where do they go?* CALDER Working Paper.
- Backes, B., Holzer, H., & Velez, E. D. (2015). Is it worth it? Postsecondary attainment and labor market outcomes among disadvantaged students. *IZA Journal of Labor Policy*, 4(1).
- Bailey, T., Jenkins, D., & Jaggars, S. (2015). *Redesigning America's community colleges*. Cambridge MA: Harvard University Press.
- Baily, T., & Jaggars, S. (2016). *When college students start from behind*. New York, NY: The Century Foundation.
- Bettinger, E., Boatman, A., & Long, B. T. (2013). Student supports: Developmental education and other academic programs. *The Future of Children*, 23(1).
- The Century Foundation. (2019). *Restoring the American dream: Providing community colleges with the resources they need*. New York, NY: Author.
- Chingos, M. M., Griffiths, R. J., & Mulhern, C. (2017). Can low-cost online summer math programs improve student preparation for college-level math? Evidence from randomized experiments at three universities. *Journal of Research on Educational Effectiveness*, 10(4), 794–816.
- Cielinski, A., & Pham, D. (2017). *Equity measures in state outcome-based funding*. Washington DC: Center for Law and Social Policy.
- Clotfelter, C., Ladd, H., Muschkin, C., & Vigdor, J. (2015). Developmental education in North Carolina community colleges. *Education Evaluation and Policy Analysis*.
- Deming, D., Yuchtman, N., Abufali, A., Goldin, C., & Katz, L. (2014). The value of postsecondary credentials in the labor market: A field experiment. *American Economic Review*, 106(3).
- Deming, D., & Figlio, D. (2016). Accountability in U.S. education: Applying lessons from K-12 to higher education. *Journal of Economic Perspectives*, 30(3).
- Deming, D., & Walters, C. (2017). *The impact of price and spending subsidies on U.S. postsecondary attainment*. National Bureau of Economic Research Working Paper.
- Dougherty, K., & Reddy, V. (2017). *Performance-based funding for higher education*. New York, NY: Teachers College, Columbia University.
- Edgecombe, N., Jaggars, S. S., Baker, E. D., & Bailey, T. (2013). *Acceleration through a holistic support model: An implementation and outcomes analysis of FastStart@ CCD*. New York, NY: Community College Research Center, Columbia University.

- Elliott, M., & Roder, A. (2019). *Nine-year gains: Project Quest's continuing impact*. New York, NY: Economic Mobility Corporation.
- Evans, W., Kearney, M., Perry, B., & Sullivan, J. X. (2018). *Increasing community college completion rates among low-income students: Evidence from a randomized controlled trial evaluation of a case management intervention*. NBER Working Paper.
- Fethke, G., & Policano, A. (2014). *Public no more: A new path to excellence for U.S. public universities*. Stanford, CA: Stanford University Press.
- Fein, D. (2014). *The struggle for coherence in emerging career pathways initiatives in the US*. Working Paper, Abt Associates.
- Gupta, H. (2017). *The power of fully supporting community college students*. New York, NY: MDRC.
- Hodara, M., & Jaggars, S. S. (2014). An examination of the impact of accelerating community college students' progression through developmental education. *The Journal of Higher Education*, 85(2), 246–276.
- Hollenbeck, K., & Huang, W. J. (2016). *Net impact and benefit-cost estimates of the workforce development system in Washington State*. Kalamazoo, MI: W.E. Upjohn Institute for Employment Research.
- Holzer, H. (2018). A race to the top in public higher education to improve employment outcomes of the poor. *RSF Journal of the Social Sciences*.
- Holzer, H. (2019). *Making HEA Work: Reauthorizing the Higher Education Act to Improve Employment and Earnings of the Disadvantaged*. Washington DC: Brookings Institution.
- Holzer, H., & Baum, S. (2017). *Making college work: Pathways to success for disadvantaged students*. Washington, DC: Brookings Institution Press.
- Holzer, H., & Xu, Z. (2019). *Community college pathways for disadvantaged students*. CALDER Working Paper, American Institutes for Research.
- Jaggars, S. S., Hodara, M., Cho, S. W., & Xu, D. (2015). Three accelerated developmental education programs: Features, student outcomes, and implications. *Community College Review*, 43(1), 3–26.
- Jepsen, C., Troske, K., & Coomes, P. (2014). Labor market returns to degrees, diplomas and certificates. *Journal of Labor Economics*, 32(1).
- Lerman, R. (2018). *Building a robust apprenticeship system in the U.S. why and how?* Paper presented at Labor and Employment Relations Association Meeting, Philadelphia, PA.

- Lerman, R. (2010). *Expanding apprenticeship with the help of community colleges*. *Chronicle of Higher Education*, September 9.
- Logue, A. W., Watanabe-Rose, M., & Douglas, D. (2016). Should students assessed as needing remedial mathematics take college-level quantitative courses instead? A randomized controlled trial. *Educational Evaluation and Policy Analysis*, 38(3), 578–598.
- Long, B. T. (2014). Policies to address poverty in America. Hamilton Project. In B. Harris & M. Kearney (Eds.), *Addressing academic barriers to higher education*. Washington, DC: Brookings Institution.
- Maguire, S., et al. (2010). *Tuning into local labor markets*. Philadelphia, PA: PPV.
- Martin, V., & Broadus, J. (2013). *Enhancing GED instruction to prepare students for college and careers*. New York, NY: MDRC.
- Moss, B. G., Kelcey, B., & Showers, N. (2014). Does classroom composition matter? College classrooms as moderators of developmental education effectiveness. *Community College Review*, 42(3), 201–220.
- National Academies of Science. (2017). *Building America's skilled technical workforce*. Washington, DC: Author.
- National Conference of State Legislatures. *Performance Based Funding for Higher Education*. Retrieved from <http://www.ncsl.org/research/fiscal-policy/performance-based-funding-for-higher-education.aspx>
- Ralston, H., et al. (2017). *Valley Initiative for Development and Advancement: Implementation and early impact report*. Abt Associates.
- Reed, D., et al. (2012). *An effectiveness assessment and cost-benefit analysis of registered apprenticeship in ten states*. Washington, DC: Mathematica Policy Research.
- Rosenbaum, J., Dell-Amin, R., & Persons, A. (2006). *After admission: From college access to success*. New York, NY: Russell Sage Foundation.
- Schaberg, K. (2017). *Can sector strategies promote longer-term effects? Three-year impacts from the Work Advance demonstration*. New York, NY: MDRC.
- Scott-Clayton, J. (2011). *The shapeless river: Does a lack of structure inhibit student success at community colleges?* New York, NY: Community College Research Center, Columbia University.
- Scott-Clayton, J. (2017). *Evidence-based reforms in college remediation are gaining steam – and so far living up to the hype*. Washington, DC: Brookings Institution.

- Scrivener, S., & Coghlan, E. (2017). *Opening doors to student success*. Policy Brief. New York, NY: MDRC.
- Stevens, A. H., Kurlaender, M., & Grosz, M. (2018). Career technical education and labor market returns for California community colleges. *Journal of Human Resources*, 54(2).
- Tinto, V. (2012). *Completing college: Rethinking institutional action*. Chicago, IL: University of Chicago Press.
- Wachen, J., Jenkins, D., & Van Noys, M. (2012). *Contextual college transfer strategies for adult basic skills students: Lessons from Washington State's I-BEST Model*. New York, NY: Community College Research Center, Columbia University.