

1: MANAGEMENT AND MOTIVATION: AN ANALYSIS OF PRODUCTIVITY IN EDUCATION AND THE W

educational productivity in Ondo state and whether the teachers are properly managed by the state teaching service commission and Ministry of Education. Two research questions and a hypothesis.

Download image The data underlying the figure. Additionally, Figure F shows higher median wages in states with strong labor unions: Not surprisingly, the share of corporate revenue that is paid in wages rather than distributed in profits has declined significantly Jacobson and Occhino Unions now represent a much smaller share of the workforce than they did in the decades immediately following World War II and so are not the force that they were for creating middle-class jobs for large numbers of workers with a high school education or less. Education as smart economic development policy Does the correlation between education and earnings necessarily mean that states can strengthen their economies in the long run by adopting policies that increase the number of well-educated workers? Increasing educational attainment can be achieved by a variety of policies and programs, including those that increase access to postsecondary education by restraining tuition growth or increasing financial aid, reduce high-school drop-out rates, move people without high school degrees through GED and associate degree programs, increase the quality of K education to improve success of high school graduates in postsecondary education, and offer preschool programs that lead to long-term improvements in educational outcomes. An evaluation of the effectiveness of alternative education strategies is beyond the scope of this report. But there is evidence that state expenditures on primary and secondary education improve school performance and raise state per capita income. For example, investments in school facilities led to improvements in student test scores Cellini, Ferreira, and Rothstein And over a year period, states that improved their position relative to other states on real per-capita education spending improved their relative position in real per-capita income, and the direction of causality was from education spending to income Bensi, Black, and Dowd Also, the long-term benefits of early childhood education programs have been well documented Lynch This may seem counterintuitive since education is a large share of state-financed expenditure—typically over half if including postsecondary education and state aid to K school systems. The majority of students graduating from state schools will remain in the state over their working lives, and as a result of being better trained, will have better jobs. This means they will earn more and stay employed at a higher rate, paying more income and sales taxes and relying less on state assistance programs. This means that scholarships or other programs that lead more students to higher education can more than pay for themselves, even if a third of the graduates leave the state French and Fisher The overall returns from investments in early childhood education mean that such investments will generally pay for themselves Lynch States would do well if they focused their resources on their historic role as the guarantors of high quality education for all, while broadening the scope of that role to include universal preschool and other early childhood education programs, and beginning to view high quality postsecondary education and training as the standard for all students. In most states that would mean reversing recent cuts to, and even elimination of, publicly funded preschool, 5 and declines in public investments in postsecondary education. From 1990 to 2000, real funding per student at public colleges and universities declined 26 percent, and the share of state personal income going to higher education fell 30 percent, while tuition at four-year institutions more than doubled and at community colleges rose 71 percent Quinterno Instead of improving access to higher education in response to the needs of a changing economy, most states have restricted it. Conclusion Ultimately, the wealth of a society can increase only if the economy becomes more productive. A more productive economy can support both higher wages and higher profits, as well as shorter work weeks and a higher quality of life. So the question of how to increase productivity needs to be at the center of any debate about state economic development. As this paper shows, moving jobs from one state to another state does nothing to increase productivity. Rather, productivity rises with investments in infrastructure and workers, with investments in education that raise educational achievement providing a major boost. Thus, investing in education is a core contribution states can make to the well-being of their residents and the national economy overall. At the same time, increasing productivity does not by itself guarantee that the resulting economic gains will be broadly

shared. At the national level, productivity and wages grew hand in hand from the end of World War II until the early s Mishel et al. But since then, wages have largely stagnated while productivity has continued to rise. From to productivity increased The vast majority of the gains from productivity were captured by those at the very top. While national policies will have to play the major role in creating a national economy in which economic growth leads to incomes rising across the income spectrum, there are measures that states can take to strengthen the ability of working people to participate fully in the gains from economic growth. These include restoring state minimum wages to the real level that prevailed in the late s, aggressively addressing problems of wage theft and employee misclassification, adopting higher wage standards in economic development programs, and other measures. But most importantly, states can build a strong foundation for economic success and shared prosperity by investing in strategies that make their people more productive, chief among them education. Providing expanded access to high quality education and related supportsâ€”particularly for those young people who today lack such accessâ€”will not only expand economic opportunity for those individuals, but will also likely do more to strengthen the overall state economy than anything else a state government can do. About the Authors Noah Berger is president of the Massachusetts Budget and Policy Center, an independent research organization that analyzes state budget and tax policies, as well as economic issues that affect low- and moderate-income people in Massachusetts. Prior to joining the center, Berger served as counsel and policy director for the Massachusetts Senate Committee on Ways and Means from to and as policy director for Massachusetts Senate President Tom Birmingham from to Berger graduated from Harvard College and has a J. Peter Fisher is the research director at the Iowa Policy Project. Fisher is a national expert on public finance and has served as a consultant to the Iowa Department of Economic Development, the State of Ohio, and the Iowa Business Council. His reports are regularly published in State Tax Notes and refereed journals. His most recent book is Grading Places: He has authored or co-authored the majority of Iowa Fiscal Partnership reports and guest opinions on state tax policy. Fisher has a Ph. An economy has reached full-employment when any further increases in aggregate demand would fail to reduce the unemployment rate. The Employment Act of called for the federal government to maintain full employment, and fiscal and monetary policy in the ensuing postwar period was used to attain that goal while keeping inflation low. In more recent decades, concern with inflation has often taken precedence over unemployment in Federal Reserve monetary policy, and the effectiveness of fiscal policy to stimulate the economy has been challenged by those who would shrink government at all costs. In , for example, the correlation between state union coverage and state median wage was. Union coverage by state and year comes from the Current Population Survey and can be found at unionstats. In , expenditures for education accounted for 36 percent of total state government expenditure in the United States, but 56 percent of state own-source revenue U. Per pupil spending on preschool programs has been on the decline for a decade Barnett et al. References Aten, Bettina H. Figueroa, and Troy M. Bureau of Economic Analysis, August. The State of Preschool National Institute for Early Education Research. University of Wisconsin, 15â€” Schweitzer, and Scott Shane. Evidence from Real State Panel Data. National Income and Product Accounts. Survey conducted by the Bureau of the Census for the Bureau of Labor Statistics [machine-readable microdata file]. Current Population Survey basic monthly microdata. Labor Productivity and Costs program. Local Area Unemployment Statistics. Evidence from a Dynamic Regression Discontinuity Design. Economic Costs of Early Childhood Poverty. Corporate Taxes and State Economic Growth. The Iowa Policy Project. Competition Among American States and Cities. Upjohn Institute for Employment Research, p. Education Pays in Iowa: University of Michigan Press. Haveman, Robert, and Barbara Wolfe. A Review of Methods and Findings. Hirsch, Barry, and David Macpherson. Union Membership and Coverage Database. Lochner, Lance, and Enrico Moretti. Enriching Children, Enriching the Nation: Public Investment in High-Quality Prekindergarten. Center on Budget and Policy Priorities. A Reply to the Tax Foundation. The State of Working America, 12th Edition. An Economic Policy Institute book. The Great Cost Shift: Annual Survey of State Government Finances. Nonmarket Outcomes of Schooling. University of Wisconsin, Institute for Research on Poverty, discussion paper no.

2: A Well-Educated Workforce Is Key to State Prosperity | Economic Policy Institute

Previous research on educational productivity has decomposed the variance in student test scores into school and class www.enganchecubano.com this paper, we extend this work to include differences attributable to teachers as well as to schools and classes. Using data drawn from the National Educational.

The talents of students and teachers vary, as do their levels of preparedness and effectiveness in teaching and learning. At community colleges, for example, the student mix and to some extent instructor qualifications are typically quite unlike those for four-year research universities. In the composition of a student body, the following characteristics are widely acknowledged to affect educational outcomes and thus, the relationship between inputs and outputs: Economic inequality and mix of low-income and minority students. College preparedness affects the efficiency with which graduates can be produced. The link between academic preparation and performance in college is extremely strong Astin, ; Horn and Kojaku, ; Martinez and Klopott, Student interaction affects both higher education outputs and inputs, and is difficult to measure. If the performance of a less prepared student is raised by being surrounded by better prepared students, this enhances learning and is part of the value of the higher education experience. If the measure of interest is graduation rates, lower levels of student preparation will likely translate into lower productivity. See Immerwahr et al. See, for example, Sampson The complexity introduced by coproduction should be taken into account when developing productivity models. Notice, however, that issues of coproduction arise in the handling of input heterogeneity, and that there is no suggestion that student time should be priced into the productivity formula. Page 41 Share Cite Suggested Citation: Improving Measurement of Productivity in Higher Education. The National Academies Press. At the simplest level, college faculty can be categorized into two groups: Tenure-track faculty are involved in teaching, research, and public service, with time allocation to each dependent on the type of institution they are associated with. At research universities, some time is obviously directed toward research, while at community colleges efforts are concentrated almost exclusively on teaching courses. Adjunct nontenure track faculty at all types of institutions are assigned to teach specific courses and may not have a long-term affiliation with an institution. In the current economic downturn, with universities facing budget cuts, the utilization of adjunct faculty has become increasingly prominent. In the section on inputs, below, and again in Chapter 5 , we return to the topic of variable student and instructor quality, and its implications for productivity measurement. On the output side, the mix of degrees by level and subject varies across institutions. These differences affect both the production process and the labor market value of graduates. Institutions serve diverse student communities and pursue very different missions. Some of these outputs are inherently more expensive to produce than others. This heterogeneity means that production functions for institutions with different output mixes will display different characteristics. Adjusting for the distribution of degrees requires data on the course-taking patterns of majors in different fields. The cost of a degree in chemistry, for example, depends on the number of math classes, laboratory classes, and general studies classes that such majors must take and the average cost of each type of class. Regression analyses using data at the state level have been used to produce estimates of the cost of degrees in different majors. According to data from the American Federation of Teachers, in the mids, adjunctsâ€”both part-timers and full-timers not on a tenure trackâ€”represented just over 40 percent of professors; 30 years later, they accounted for nearly 70 percent of professors at colleges and universities, both public and private see http: Page 42 Share Cite Suggested Citation: Data on degrees may not be robust enough for regression analysis, but they ought to be sufficient for this approach based on an assumed set of coefficients. In our data recommendations in Chapter 6 , we advise that credit-hour data for productivity analyses be collected in a way that follows students in order to better control for differences in degree level and field. This manner of collecting data, discussed in Chapter 4 , will be a big step forward in productivity and cost analysis. The problem of heterogeneity can be at least partially addressed by cross-classifying institutions that enroll different kinds of students and offer various degree levels and subjects. One cell in the classification might be chemistry Ph. While measuring the relation between inputs and outputs for each cell separately would

significantly limit variations in the educational production function, and also would help control for differences due to the joint production of research and public service, it would not eliminate the problem. Students also frequently change majors. Such a multi-fold classification is most likely impractical for any kind of nationally based productivity measure. Two strategies exist for overcoming this problem. First, certain cells could be combined in the cross-classification by aggregating to the campus level and then creating categories for the standard institutional type classifications used elsewhere in higher education. In addition to reducing the number of cells, aggregation to the campus level subsumes course-level issues that occur, for example, when engineering majors enroll in English courses. While compiling data at the campus level introduces a significant degree of approximation, this is no worse than would likely occur in many if not most industries elsewhere in the economy. Individual institutions can and should analyze productivity at the level of degree and subject, just as manufacturers should analyze productivity at the level of individual production processes.

Page 43 Share Cite Suggested Citation: This might entail tracking the number of degrees and credits separately by level and subject for each institutional category. Cross-classification is carried as far as practical and then formulas are constructed to control for the variation in key remaining variables. The two approaches are analogous to poverty measures that combine cross classification and formulaic adjustment to allow for differences in wealth, in-kind benefits, or cost of living differences. The baseline model described in Chapter 4 employs both of these strategies. Additionally, not all of the benefits of an educated citizenry accrue to those paying for education. Such characteristics make these factors difficult to measure and, as a result, they are often ignored in productivity analyses. In this sense, higher education and education in general is analogous to activities in other areas, such as health care, home production, and volunteerism. Much of this social value is intangible and highly variable; for example, social capital creation attributable to higher education may be greater at residential colleges and universities than at commuter colleges due to peer effects. These kinds of nonmarket quality dimensions are no doubt important parts of the production function, although they cannot yet be measured well. The policy implication is that the fullest possible accounting of higher education should be pursued if it is to be used for prioritizing public spending. Intuitively, this is because educated labor is mobile and can move to where the jobs are. Because of mobility, some social benefits of higher education accrue to the nation as a whole, not just to individual states. This may create an incentive for states to underinvest in their public higher education systems.

Page 44 Share Cite Suggested Citation: Financial aid and other forms of cross-subsidization provide mechanisms to increase enrollment. They assess the contribution of education to human capital based on lifetime earning streams of graduates. Without additional assumptions, however, such a measure cannot be related back to a specific educational episode. The focus on outcomes may also subsume the role of education as a sorting mechanism to distinguish individuals of differing abilities, potentially overstating the contribution of education alone. However, the kind of sophisticated data and analysis that would be required for accurate and sensitive quality measurement is very much in the long-term research phase. Nonetheless, it is important to conceptualize what is needed in order to make progress in the future. Many sectors of the economy are characterized by wide variety of quality in outputs. Computers vary in processing speed, reliability and data storage capacities; luxury cars are built to higher standards than economy models; and the local hardware store may have superior customer service relative to superstores. Quality also changes over time—computers become faster, cars become safer, and power tools more powerful. What is unique about higher education is the lack of generally accepted measures of quality change or variation. And indeed, consumers may not be aware of the measures that do exist. This reinforces the conclusion of the previous section: Many aspects of measuring quality change have been explored for other difficult-to-measure service sectors and progress has been made. That approach rules out the possibility of productivity change.

Page 45 Share Cite Suggested Citation: Methods for addressing some of the more generic issues. Inputs Quality variations exist for nearly the full range of higher education inputs: For comparing institutions, additional adjustments may be made to reflect variation in the student population characteristics such as full-time or part-time status, type of degrees pursued, and preparation levels, as well as the differing missions of institutions. Institutions with a high percentage of remedial or disadvantaged students need longer time-horizons to bring students to a given level of competency. They are often further burdened by smaller

endowments, lower subsidies, and fewer support resources, all of which can lengthen time to degree for their students. Students select into institutions with different missions, according to their objectives. Institutional mission and character of student body should be considered when interpreting graduation rates, cost statistics, or productivity measures as part of a policy analysis. This is important because the extent to which students devote effort to educationally purposeful activities is a critical element in the learning process. However, engagement statistics require careful interpretation because “beyond student attributes” they may also reflect actions by an institution and its faculty. For example, effective educational approaches or inspiring teachers can sometimes induce less well-prepared or -motivated students to achieve at higher levels. Page 46

Share Cite Suggested Citation: Lessons for measuring the former can possibly be gleaned from the latter. Nearly all the complications making productivity measurement difficult can be found in both sectors: In both cases, additional outputs beyond degrees and treatments are produced. Product categories exhibit a wide variety “different kinds of degrees and different kinds of treatments are produced. Some of the products have more value than others, depending on how value is calculated. For example, an engineering degree may generate more income than a philosophy degree, and cardiovascular surgery produces greater health benefits in terms of quality-adjusted life years, for instance than does cosmetic surgery. Outcomes vary substantially such that some students or patients enjoy more successful outcomes than others. Some students get a great education and find worthwhile employment while others do not; some patients recover fully, while others die. Some students are better prepared and therefore enter college with a higher chance of graduation. Some patients are more fit than others and therefore have a greater probability of successful outcomes from medical treatment. Institutional missions also vary. Institutions of higher education range from small locally oriented colleges to large universities with national and international influence. While NSSE does include a few questions related to social engagement e.

3: Walberg's theory of educational productivity

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Import into RefWorks 1. Introduction Education as a system entangles various input components, instrumental input, environmental input, process and output. As a system, various components are referred to each other related in a process of education management that conducted in school or the other education institution. Result in a process of education management will be related to formula by the way of processing input becomes expected output. Result like this can be considered as a productivity that conceptually contains efficiency meaning and effectivity. Productivity problem in education management entangle all education dimensions either output or input, and that is not only limited to quantitative size but also qualitative size. Sabrina W, M Lutz in <http://> In consequence, in system of usage education, various resources efficiently and effectively remain to be reckoned to produce an expected productivity. Education productivity usually defined as the dependability between input education expense that must be paid and output student ability or the objectives of other. In productivity measurement, there must be measured either its output or input. Relation between output and this input is usually expressed in ratio or index. To reach expected organization productivity, then main aspect that must be concerned in managerial activity at one particular organization will be with reference to planning, organizing, leadership leading , and controlling. As discussed earlier, managerial activity has been elaborated frequently entangle management resources at education institution. Human as the important resources in education have positive relation, for example between human and education productivity. This explanation emphasizes that the successfulness index of education institution will be determined by the way of processing input becomes output. Productivity can be limited at amount size and performance quality by considering resources utilization. At the common article, Allan Thomas The three of function are referred in linear to determine school productivity in high level or low level. This means considering factors related to human resource like headmaster role as the education leader is logical consideration. For productivity of education system, needed graduation data as the output from system referred that proportionate with the main input that is student that enters education system. This internal assessment of efficiency coefficient expresses productivity measurement with partial approach that calculate average index of total number academic year that must be given to produce a graduation by the average index of total number the academic year that experienced by a student since the first grade in education system divides by the proportion of graduation. Internal efficiency coefficient number shows the efficient level of an education process at one particular system of education level that obtained by assessment the current of student, which is by reviewing input and output. According to Siagian The activity is considered as efficient if the input that used in certain activity management is smaller than the result obtained. On the other hand, F. To determine internal efficiency level in course of education as the index of education management successfulness used movement current from students that enter and exit. That Tool is named analysis diagram cohort. According to meaning he said, cohort means group or follower. In education term, S. Analysis cohort follows current from a group of student that enter class I in year in common and growth from all education processes. In student current referred will be known a success student group go ups class, repeat class, break school, pass and move school. To compile cohort student at one particular education institution needed new student data class I, student per class, student that go up class, break school and repeat per class, and a success student passes. There are some assumption bases for compiles analysis cohort: If after repeat two-time, still not go up class or pass, then assumed exit; and c at any given level, student numbers that repeat, that go up class, and broken school are counted either from those in go up class or pass directly or from them that ever delayed. By assessment of student current from an education system will be obtained internal efficiency coefficient that express successfulness of index an institute in passes a student since entered in class I. According to Sitepu and Mukhlis Dasuki First, grad proportion from system that enter since class I that

obtained by comparing to input amount and output from an education system. Education can be told efficient if grad proportion that produced an education institution reaches number 1. With other word, growing come near number 1, then growing efficient education system is referred. On the contrary, getting smaller from number one means growing inefficient. Secondly, the average of school year amount that experienced student that enter start class I. In determining the average of school year amount that experienced student that enter since class I, assumed that every student experience of a one year teaching in referred until cohort in class I average accepts a one year teaching and year next only that go up just class that accept a one year teaching. Third, the average of school year amount that must given to produce a grad are counted start enter class I. Calculation of the average of school year required just for will produce a grad starts class I got by compare to the average of school year amount that experienced student that will enter will start class I with grad proportion. Number repeats class and will break school will lengthen time required just for will produce a grad are counted start class I. Education System will be becoming not efficient if happened number repeats class and break high school. That is education productivity is index or coefficient that show successfulness of education system in passing student. With managerial activity a variety of forms that conducted by headmaster of work culture form with quality. Various managerial activities for example can be conducted by perceive work behavior, instruct it becomes preeminent performance, and bait return immediately to assessment result conducted. This means headmaster as the commander being responsible in empowerment various existing resources in system of education management to reach expected education productivity. From various descriptions that already can be explained that grad coefficient 1, 00 will be able to produced if headmaster executes its leadership function effectively. That is, managerial activity like planning, management and observation to various resources that conducted by headmaster in education management must conducted continuously, intertwined in synergy and have the character of well-balanced. Efficiency Aspect is one of the main attentions in education management that caused limited resources situation. Existing sources must maximum empowerment to reach target education. From the other side that realized that to solve education problems is needed alocation limited sources is referred as efficiently. Aspect of evaluation effectivity at how far can planned goals be reached. Effectivity can be seen from alumna amount, alumna quality or achievement a success reached by. Efficiency Aspect is one of main attention in education management that caused limited resources situation. Existing sources must maximum empowerment to reach education target. Despitely realized that to solve education problems is needed alocation limited sources is referred as efficiently. Come into question productivity actually entangles all education dimensions either out put or input that not only limited to quantitative but primary size is size qualitative. Attention to productivity started since human starts think a matter of better as the effort form to repair a condition of industry business and economy. Much experts that develop various of definitions about productivity with elementary formula its that productivity is ratio between output with input. Robbins and Judge In general productivity according to Muchdarsyah Furthermore, Muchdarsyah told that productivity is interacts integrated in compatible from three essential factors, namely: In the eyes of Gilmore, there is dependability between productivity and creativity. Thus one productive one who is one who haves creativity. Emphasis of organization productivity tries connection between input and output. That means, productivity improvement not only seen from amount facet, but also from quality facet. Productivity according to Drucker Inputs have the shape of labour, equipments, and finance is needed to produce output. The objectives of productivity can be specified in a few areas, covering methods of activity, machine progress and equipments, and improvement of personnel efficiency. Washnis in article Hadari Nawawi Efficiency depicts levels of human sources, fund and nature required just for labour certain result, whereas effectiveness depicts effect of result quality laboured. Explained by Hadari, productivity that measured from efficiency depict accuracy the usage of method or the working of and available tool, until volume and work load can be finished in accordance with involving time. Results that obtained have the character of inestimable nonmaterial with money, until productivity shall only be depicted pass by personnel efficiency in executing its duty. This Productivity usual applied in environment of activity organization that its volume and work load in form of service to society. There is three symptoms that depict productivity, that is: Internal Productivity is goals attainment hits a matter of must produced the output that

planned during a given time period. For example a high school is told productive if a number of pupils that have learnt for 3 year, without will question will that grad enter College by employment. External Productivity is mounts utilization or reached result an organization especially in employment environment or society group that need it. In other word, external productivity is measured from facet good for or not reached result in society. Whereas individual productivity and group shows productivity stemmed from personnel ability in individual in working and ability in group. With concerned about reached result by an institute will how institute existence is referred can give a maximum service at customer that have the character of internal and also external. Service that have the character of internal is a process how utilization that happened from various of available resources and can be prepared at pertinent institute, whereas service that have the character of external express how institute are referred can give satisfaction to its customer. Education in the context of school is a formal institution that viewed as a system which utilize various component or education resources to the maximum level. This means, the result that released by an education institution either quantity or quality depends on the way of processing input becomes output. Headmaster as the leader in formal education institution will also determine the perfection on processing input becomes output. As explained earlier in concept of Sutermeister, that productivity of an organization is influenced by two fundamental variables, that are sources and technology that used in job; and also working manifestation of personnel. From this two fundamental variables emerge some prescriptive variables determinant to productivity. Determinants to productivity referring to sources that used and technology that exploited is: Related to determinant technology, can be related to usage of various education technologies that viewed as development, applying and systems assessment, technique and tool to repair and improve learning process. Whereas productivity determinants that have the shape of execution or materialization of employee activity that for example can be seen from personnel work behavior, that is by see whether duties that have been formulated can be executed by existing personnel in an education institution; cognate ability, that is cover personnel of domination have the shape of broadness, deepness and concepts clarity required just for its getting tasks done and responsibility; motivation, that is a complicated process referring to psychological process that express interaction between attitude, need, perception and decision that happened at someone it-self; and individual needs, that is accomplishment of someone need that will influence institute productivity as a whole. Beside fourth determinant in productivity like has been elaborated former, there is five other determinants that elaborated following. Determinants is referred as activities in and outside job, that is intensity and type of individual activity that need attention in improving institute productivity; organization structure, that is school institute as the formal organization have organization structure that depict employment relation in and between all personnel that exist in school; policy in personnel administration; salary level, and incentive that is one of factor of motivation impeller and communication, that is information channel for fluency of organization duty execution. In education, Bidwell Concept from an education product is connected especially between inputs of an institute bases a theory of economy product. Input Change into education output predicted in a statistic equation, that is:

4: CiteSeerX "A multivariate analysis of educational productivity in urban Georgia high schools

(4) = + + Z + (2) This is a standard random effects model in which there are N groups (say schools) with T student observations per school (NT total observations) and which can be.

It can be difficult to establish opportunity cost wages when students are subsidized. For example, during periods or in places characterized by high unemployment, a federal Pell grant is a good substitute for a job. For our purposes, we acknowledge that unpaid student time is a relevant input to the production function though Babcock and Marks, , find students are studying less. Nonetheless, little would be gained for policy purposes by including it in productivity measures. As discussed below, we therefore believe the best approach is to allocate inputs among output categories using a more aggregate approach. While there has been debate about whether student effort should be treated as an input or an output, the emergent field of service science moots the question by recognizing that the process of consuming any service including education requires the recipient to interact with the provider during the production process and not only after the process has been completed as in the production of goods. As applied to higher education, it means student effort is both an input and an output. This is consistent with the view that a primary objective of a university is to encourage strong engagement of students in their own education. Equally fundamental, institutions of higher education service a highly diverse student population, and many institutions and programs within those institutions have devoted great effort to sorting students by ability. In the absence of information about the aptitude levels of incoming students, comparing outcomes across institutions and programs may not provide a useful indication of performance. Improving Measurement of Productivity in Higher Education. The National Academies Press. Thus, the contribution of capital to production is best measured as a service or rental flow the cost of using it for one period and not by its purchase price. Because many forms of capital cannot be rented for a single production period, the rental or service price must be imputed. This is done by assuming that a unit of capital must earn enough to cover its depreciation and a real rate of return comparable to similar investments. These rental rates are comparable to a wage rate and can be used in the same way to aggregate across different types of capital services and as a measure of capital income in aggregating the various inputs to production. The role of capital in the measurement of productivity in higher education is virtually identical to that for a profit-making enterprise. Assets are either purchased in markets or valued in a fashion similar to that in the for-profit sector. Thus, the standard measurement of capital services should be appropriate for higher education. The education sector may exhibit a particular emphasis on information and communications capital because of the potential to use such tools to redesign the education process and by doing so to achieve significant productivity gains. The more significant problem at the industry level is that there is very little information on the purchases and use of capital in higher education. The sector is exempt from the economic census of the U. Census Bureau, which is the primary source of information for other industries. However, the Internal Revenue Service Form returns filed by nonprofit organizations do contain substantial financial information for these organizations, including data on capital expenditures and depreciation. Energy, Materials, and Other Purchased Inputs Productivity measures require information on intermediate inputs either as one of the inputs to the calculation of multi-factor productivity or as a building block in the measurement of value added. In some measures, energy, materials, and services are identified separately. Such a disaggregation is particularly useful in the calculation of meaningful price indexes for purchased materials. Page 29 Share Cite Suggested Citation: Lack of relevant information on purchased inputs continues to be a major shortfall for estimating productivity in higher education. This kind of data is particularly important for analyses attempting to control for the effects of the outsourcing of some service activities. As with capital, the primary problem in measuring the role of purchased inputs in higher education is the lack of a consistent reporting system. The information is known at the level of individual institutions, but there is no system for collecting and aggregating the data at the national level for the purpose of establishing performance norms. Instructional and Noninstructional Elements of the Higher Education Production Function For the purposes of this report, it is essential to distinguish inputs and outputs along functional lines. In particular, an effort should

be made to identify the inputs that go into each of the multiple outputs produced by the sector. These inputs can be designated: Instructional, including regular faculty, adjunct faculty, and graduate student instructors. Noninstructional and indirect costs including, for example, administration, athletics, entertainment, student amenities, services, hospital operation, research and development, student housing, transportation, etc. Mixed, including other capital such as instructional facilities, laboratory space and equipment, and IT. The best way to distribute the cost of such inputs across instructional, administrative, and research categories is not often clear. In the model presented in Chapter 4, we attempt to identify all the inputs associated with the instruction function, while recognizing the difficulty of separating instructional and noninstructional costs or inputs. The main concern is to distinguish inputs associated with instruction from those designated for research. As faculty are involved in a range of activities, it is difficult to assign their wages to one category or another. Instructional costs can also vary greatly. On the faculty side, per unit e. At the institutional level, costs can be subject to large-scale activity-based costing studies. Costs can also be disaggregated to the department level. Nevertheless, some way of controlling for these variations will be essential to ameliorate significant distortions and criticisms. For administrative and other purposes, universities typically track inputs along other dimensions, such as by revenue source. For our purposes, the only reason for classifying inputs according to revenue source is to separate the inputs associated with organized research and public service as described in Chapter 4. University accounting systems assign costs to funds. This practice tends to differentiate among payers, but obfuscates productivity unless specific outputs also are assigned to the fund. Differentiating inputs among payers departs from the idea of productivity as an engineering concept relating physical inputs and outputs. Further, not all revenues are fungible; they cannot all be used to increase production of undergraduate degrees Nerlove, Higher education costs may also be identified and categorized according to their source: For some policy purposes it is important to distinguish between trends in tuition and trends in cost per full-time equivalent FTE student. Some analyses dispute the common notion that the cost of higher education is rising faster than consumer prices broadly; rather, the composition of who pays is changing. Even when the total cost of a college education is relatively stable, shifts occur in the proportions paid by different players and what activities the revenues support. McPherson and Shulenburg highlight the important difference between cost and price. In simple economics terms, the cost, or supply schedule, is based on an underlying production function. For example, part-time students may take more courses or repeat courses because of scheduling problems or less efficient sequencing and thus learning Nerlove, Page 31 Share Cite Suggested Citation: The full price of undergraduate education determined by both the demand and supply functions is the sum of tuition charges, campus subsidies, and state subsidies. Affordability and access thus depend on state appropriations as much as they depend on changes in productivity. For example, if an increase in productivity occurs simultaneously with a reduction in state appropriations, price to student tuition may not fall; it may even rise depending on relative magnitudes. In the same vein, it is important to highlight differences between public and private higher education, as has been done by the Delta Cost Project Tuition increases in private higher education invariably are associated with increased expenditures per student. While there are certainly appropriate uses for a variety of measures, there are also dangers of misuse, such as the creation of perverse incentives. For example, if degrees granted per freshman enrolled was used to track performance, then institutions could enroll large numbers of transfer students to improve their standing. Our review of various measures below informs our recommendations for developing new measures and for modifying existing ones. New, improved, and properly applied performance measures will begin filling information gaps and allow multiple stakeholders to better understand performance trends in higher education. The database can be searched by unit of analysis and aggregation level. These are categorized not too differently from our matrix i. Page 32 Share Cite Suggested Citation: Under tightly specified conditions, this would produce the same result as a productivity measure. These conditions, however, are rarely if ever realized. The problem is that simple ratios like cost per student or degree does not take into consideration quality and the multiple outputs produced by higher education institutions. Hence, this approach conveys too little information to be able to attribute productivity differences to differences over time or between institutions in price and quality. Efficiency is improved when cheaper inputs are substituted for more expensive ones without damaging quality

proportionately. For example, it has become a common trend for institutions to substitute adjunct instructors for tenure-track faculty. Whether this move toward lower-priced inputs has a proportionately negative impact on output quantity and quality e. In reviewing evidence from the emerging literature, Ehrenberg Without data tying changes in faculty composition to student outcomes, efforts to implement accountability systems will be made with only partial information and will lead to problematic policy conclusions. When a metric as simple as faculty salary divided by the number of students taught is used, many relevant factors are omitted. An instructor teaching large survey courses will always come out ahead of instructors who must teach small upper-level courses or who are using a year to establish a laboratory and apply for grants, as is the case in many scientific disciplines. Page 33 Share Cite Suggested Citation: If costs were the only concern, the obvious solution would be to substitute cheap teachers for expensive ones, to increase class sizes, and to eliminate departments that serve small numbers of students unless they offset their boutique major with a substantial grant-generating enterprise. The implication is that analysts should be concerned about quality when analyzing statistics that purport to measure productivity and efficiency. Different input-output ratios and unit costs at differing quality levels simply are not comparable. Finally, it is important to remember that even valid measures of cost and productivity are designed to answer different questions. A productivity metric, for example, is needed to assess whether changes in production methods are enabling more quality-adjusted output to be generated per quality-adjusted unit of input. Unit cost data cannot answer this question directly, but they are needed for other purposes, such as when legislatures attempt to invest incremental resources in different types of institutions to get the most return in terms of numbers of degrees or graduation rates. This kind of resource-based short-run decision making responds to funding issues and institutional accountability, but addresses productivity only indirectly and inadequately. A critical asymmetry also exists in the way productivity and cost-based measures are constructed. Current period price data can be combined with the physical quantity data to calculate unit costs, but it is impossible to unpack the unit cost data to obtain productivity measures. Other Performance Metrics Many other performance measures have been proposed for higher education. The most prominent of these are graduation rates, completion and enrollment ratios, time to degree, costs per credit or degree, and student-faculty ratios. These kinds of metrics are undeniably useful for certain purposes and if applied correctly. Page 34 Share Cite Suggested Citation: She finds that the former has a smaller impact than the latter.

The Money is in the Gravy The Thracians 700 BC-AD 46 Wonder Book of Mother Goose illustrated by Florence Choate and Elizabeth Curtis. Subtraction of whole numbers Dangerousness and Criminal Justice (Cambridge Studies in Criminology) NORMANDY THE BREAKOUT (Mini-Guides) Women of the West I Physics for clinical oncology Truth about homosexuality The Jungle (Websters French Thesaurus Edition) Epidemiology of the global pandemic Sten H. Vermund and Sheetal Khedkar Barash clinical anesthesia 24th Euromicro 98 Conference Italian living design : three decades of interior decoration, 1960-1990 Mathematicians apology Automatisierung Der Justage Von Drehankerrelais (Ipa-Iao Forschung Und Praxis, Band 183) Criminal Law in Maryland Anton chekhov three sisters Health and medicine essay Linking theory to evidence in international relations Richard K. Herrmann Journal of a residence on a Georgian plantation in 1838-1839 Indian Head Massage in Essence (In Essence) Machine generated contents note: Authors Preface File under popular Linoleum block printing Agyeman Prempehs return from exile, 1924-1931 Emmanuel Akyeampong State of the masses Plant Propagation Concepts and Laboratory Exercises Different schools CONCUR 2005 concurrency theory Short history of astronomy Job 21-37 David J. A. Clines The bedroom : a sacred place Cover Your Tracks Without Changing Your Identity List of architects in lucknow Brian flatt 3 week diet From coach to awakener Electric woodwork Taffy Sinclair, baby Ashley, and me Stepping Outside Your Comfort Zone