

Measuring College Learning in Economics

Sam Allgood

University of Nebraska—Lincoln

Amanda Bayer

Swarthmore College

This contribution presents a framework of essential learning outcomes and a vision for the future of assessment for undergraduate-level education in economics. The framework includes a set of essential concepts (individual decision making, markets and other interactions, the aggregate economy, and the role of government and other institutions) and essential competencies (apply the scientific process to economic phenomena, analyze and evaluate behavior and outcomes using economic concepts and models, use quantitative approaches in economics, think critically about economic methods and their application, and communicate economic ideas in diverse collaborations). With regard to assessment, the authors argue that future assessments should go beyond measuring content mastery and should include open-ended tasks that allow students to demonstrate higher order skills, such as formulating questions, interpreting data, and constructing and deconstructing arguments.

Introduction

Economics is one of the social sciences, along with sociology, history, political science, and other disciplines. The field is often divided between macroeconomics (i.e., the study of the economy as a whole) and microeconomics (i.e., the study of individual choice or within single markets of the economy). Micro- and macroeconomics provide the foundation for almost all other areas of inquiry in economics, which involve topics as diverse as recessions, currency exchange rates, famines, terrorism, environmental protection, and the allocation of household chores. Economics makes heavy use of formal mathematical models and statistical analysis to understand the economy and human behavior. Economists are known to work with other social scientists and psychologists because of the overlap in these fields.¹

Economic inquiry is based on the scientific method. Economists build formal models to explain observed phenomena. These models provide testable hypotheses and data are collected to test these hypotheses. This process is as essential to economics as the specific content that economics covers. A student with a thorough education in economics will have the ability to apply this process in developing insights and formulating solutions in their professional and personal lives.

A person with a strong education in economics will have the skills to explain the world around them as it is, and the ability to form predictions about what the future holds. At a basic level, this enables her not only to understand why the Federal Reserve

¹ Economics is also unusual on college campuses because some departments are housed in colleges of arts and sciences and some are housed in business colleges. A third of all economics departments are housed in business schools only or in both arts and science and business.

Bank would raise interest rates as the economy exits a recession but also to form an expectation about what the Fed will do with interest rates in the future. This same person will not only know what adverse selection is but will also be able to explain why the Affordable Care Act mandates participation. Thus, economics plays an important role in providing an informed electorate. Moreover, economic education can improve the decisions an individual makes that directly affect her own life circumstances, for example, paying off credit cards monthly (Allgood, Bosshardt, van der Klaauw, and Watts 2011).

Almost 30,000 students per year receive a bachelor's degree in economics (Allgood, Siegfried, and Walstad 2015). This is fewer than in some of the other social sciences but more than in other quantitative disciplines such as math and physics. The number of economics majors is only about a tenth of the number of business majors, but it is incorrect to think about the impact of economics on the postsecondary curriculum by counting majors. The study of economics typically begins with two introductory courses, with over a million students per year enrolled. In addition, business students are often required or elect to take several additional economics courses. Thus, even students whose major is not economics take up to five or more courses before they graduate. The selection of students, however, is not representative of the broader student population. The economics profession, at the undergraduate level and continuing up through faculty ranks, includes disproportionately few women and members of historically underrepresented racial and ethnic minority groups, relative both to the overall population and to other academic disciplines including most STEM—science, technology, engineering, and math—fields (Bayer and Rouse, forthcoming).

A small but committed group of economists have taken economic education seriously for decades. Almost thirty years ago, W. Lee Hansen (1986) wrote of the need to think of education

outcomes that go beyond simple knowledge of content, and he articulated a set of proficiencies for the economics major. Although the stated objectives of the largest association of economists, the American Economic Association (AEA), focus on support of research and do not include mention of education, the AEA does have a standing Committee on Economic Education. For the last five years, with a substantial subsidy from the AEA, the committee has organized a conference devoted solely to economic education. The field of economic education has had the peer-reviewed *Journal of Economic Education* since 1969, and three lengthy review articles have been written on scholarly work in economic education (Allgood, Siegfried, and Walstad 2015; Becker 1997; Siegfried and Fels 1979).

That said, there is room for improvement in how economists approach teaching and assessment. The voluminous literature that exists on economic education belies the fact that many economists have no training in teaching, learning, and assessment and many have no experience when taking their first jobs. Additionally, once in those jobs, economists are reluctant to allocate their scarce time to improving their teaching. Economics as taught in most classrooms is increasingly unrelated both to best practices as documented by education research and to economics itself as actually practiced by economists (Colander 2005; Watts and Schaur 2011). Increased attention to teaching and learning in economics would improve outcomes for all students, and particularly for women, students of color, and members of other groups underrepresented in economics (Bayer 2011).

Our hope is to provide a document that will motivate a broad range of economists to think about the outcomes they desire from the classes they teach and how they assess student learning in those classes. Building on prior work in the discipline as well as over two years of discussion with a panel of leading experts in economics education that was convened as part of the Measuring College Learning (MCL) project, we offer a framework for

designing productive and inclusive curricula and for developing assessment tools that can be used to assess learning in individual courses and in the economics major.²

Specifically, in this paper, we outline a method that instructors and departments can use to develop learning outcomes in economics, and we use this method to articulate a set of representative learning outcomes for undergraduate students of economics. We start by defining four essential concepts, broadly defined, in economics: individual decision making; markets and other interactions; the aggregate economy; and the role of government and institutions. We then identify five essential competencies: ability to apply the scientific process to economic phenomena; ability to analyze and evaluate behavior and outcomes using economic concepts and models; ability to use quantitative approaches in economics; ability to think critically about economic methods and their application; and ability to communicate economic ideas in diverse collaborations. The scope and refinement of the concepts may vary from course to course, but the competencies identified here are essential to an effective undergraduate economics curriculum.

Ultimately, we construct a set of representative learning outcomes in economics by intersecting concepts with competencies; the set is not exhaustive but offers an array of specific learning outcomes we could expect students of economics to achieve. These outcomes are a natural by-product obtained when placing the competencies in the context of the specific content of economics curricula. For example, if the ability to apply the scientific process is a core competency and individual decision making is a content area, then developing a hypothesis to explain an observed behavior would be a representative learning outcome.

² Although it would be ideal to craft learning outcomes, pedagogy, and assessment together, the issue of pedagogy is beyond the scope of this paper.

Our approach is easily adapted across courses and departments, thus providing a framework by which any instructor, department, or assessment creator can create a set of learning outcomes. The concepts admit study of a broad range of subject matter and methods, whereas the competencies require the educator or assessor to express learning outcomes in terms of what the student can do, not simply what she knows.

By constructing this framework for learning outcomes, we hope to encourage economic educators to be more intentional about their teaching. A reexamination of our role as teachers can help all students and especially those who have less prior exposure to, and social identification with, our field. We need to change our habit of trying to download a set of knowledge to students with the aim of getting them to know or understand but instead to equip students to do—to explain, analyze, predict, ask, and create. The reframing is sometimes subtle; for example, instead of saying that a student should know what free-riding behavior is, a better learning objective would ask the student to use a model of strategic behavior to explain free-riding behavior. The effect is to put focus on higher order cognitive skills beyond memorization and simple acquisition of content knowledge. Creating learning outcomes in this fashion will not only guide the economic educator about what to teach but will also inform decisions of how to teach and how to assess.

Overview of Prior Efforts to Articulate and Assess Learning Outcomes in Economics

Numerous groups have articulated learning outcomes in economics. Many, but not all, of these efforts were for the purpose of developing assessment instruments. In this section, we discuss these prior efforts, contrasting those that focus on content with

those that focus on competencies or skills. The dichotomy is not perfect, since some groups consider both content and competencies, but the breakdown provides a useful way of organizing these projects. Furthermore, our construction of learning outcomes makes use of this dichotomy, so it is helpful to view past efforts through this lens. Most of the assessment tools and standards described here are well known to the relatively small number of economists who work in the area of economic education or who are responsible for assessment at their institutions. However, the typical economist is probably not aware of them. Indeed most professors likely teach their courses without thinking explicitly about learning objectives. Thus, one of the tasks of the MCL project is to educate the profession on both past assessment efforts and the current project.

Most of the earlier efforts to define learning outcomes are content centered, producing lists of concepts that should be covered in an economics curriculum. The Voluntary National Content Standards, first published by the Council for Economic Education in 1997 and updated most recently in 2010, lists twenty content standards for microeconomics and macroeconomics that should be taught to students in kindergarten through high school (Siegfried et al. 2010). The writing committee for the Standards includes eight academic economists as content specialists. The list of concepts includes core ideas, such as scarcity, as well as those that may receive less attention, such as entrepreneurship. According to the accompanying documents, the Standards hope to be more than a catalog of content: “As students observe the reasoning process used by economists and practice it themselves, they will acquire analytical skills they can apply to emerging economic issues unforeseen at the time these standards were written” (v). Despite this aim, the Standards present “fundamental economic ideas and concepts” without explicit identification of or reference to competencies such as analytical or communication skills. The Standards

have become a widely used tool for curriculum development and assessment at the precollege level.³

The College Board's Advanced Placement (AP) program is designed to provide high school students with college-level curricula and assessments.⁴ Introduced in 1989, the AP exams in economics can certify that a student has mastered college-level material through rigorous coursework in high school, and many colleges and universities grant course credit and placement to students with high scores. As such, the content of the typical introductory college-level economics course determines the content of the AP Microeconomics and Macroeconomics courses and exams, and thus the current course descriptions include lengthy lists of topics. However, AP economics courses and assessments are in the midst of a major redesign and are making the shift from a content orientation to a competency-based design. After careful surveying of and consultation with economics faculty in higher education, the College Board is refocusing its courses and assessments to reflect current best practices in college-level learning and putting more emphasis on critical thinking, inquiry, reasoning, and communication skills. Currently, each AP exam is two-thirds multiple choice and one-third free response. The exam is required for those wishing to obtain AP course credit; unlike most college-level assessments, the teacher cannot select or create his or her own exam.

³ Another program that attempts to assess precollege learning, the National Assessment of Education Progress, evaluates the economic knowledge of high school seniors and identifies three cognitive skills: knowing, applying, and reasoning (<https://nces.ed.gov/nationsreportcard/economics/whatmeasure.aspx>). Due to our focus on college learning, we do not discuss this important work here.

⁴ For more details, consult the AP Microeconomics and Macroeconomics course home pages (http://apcentral.collegeboard.com/apc/public/courses/teachers_corner/2121.html; http://apcentral.collegeboard.com/apc/public/courses/teachers_corner/2120.html).

The Test of Understanding of College Economics (TUCE) is designed for the assessment of college students at the introductory undergraduate level, but it is not intended for accreditation or certification.⁵ Items on the multiple-choice exam are placed into cognitive areas (recognition and understanding, explicit application, implicit application), but the main focus is on content areas in introductory microeconomics (the basic economic problem, markets and price determination, theories of the firm, factor markets, role of government in a market economy, international economics) and introductory macroeconomics (measuring aggregate economic performance, aggregate supply and aggregate demand, money and financial markets, monetary and fiscal policies, policy debates, international economics). Each content area comes with examples of the material covered. For instance, markets and price determination includes determinants of supply and demand, utility, elasticity, and price ceilings and floors. The TUCE has a multiple-choice format, with thirty items in macroeconomics and thirty in microeconomics. It was first developed about forty-five years ago and has since gone through multiple revisions, most recently in 2005.⁶ The TUCE provides a nationally normed data set against which students may be compared. Since its development, the exam has become a key tool in empirical research on economic education, used as a pre- and posttest in measuring differences in learning across different treatments.

The stated purpose of the Major Field Test in Economics (MFT), as first developed by the Educational Testing Service in 1989, is to assess “mastery of concepts, principles and knowledge by senior-level undergraduates” (Educational Testing Service 2014). It aims to test economic knowledge more comprehensively,

⁵ For more information, see Walstad, Watts, and Rebeck (2007).

⁶ This project was funded by the Council for Economic Education. For more information, see Walstad et al. (2007) or Walstad and Rebeck (2008).

beyond the micro–macro dichotomy, than is true of the AP exam or the TUCE, because it is intended for assessing students at the end their undergraduate education. The MFT places items into five content areas—introductory concepts, microeconomics, macroeconomics, statistics and econometrics, and quantitative analysis—identifying a set of introductory concepts such as scarcity and opportunity cost common to all economics and including statistics and data analysis as a distinct content area. Quantitative analysis is not assessed through a separate category of items but is involved in at least a quarter of the items across the other content areas. As ETS’s description of the MFT asserts, “In addition to factual knowledge, the test evaluates students’ abilities to analyze and solve problems, understand relationships and interpret material” (Educational Testing Service 2014, 1). The exam has ninety multiple-choice questions, and, like the TUCE, the MFT provides normalized data against which student scores can be compared. Some departments use the MFT when required to provide assessment data for accreditation.

Some other initiatives that define learning outcomes in economics explicitly emphasize skills or competencies over content. W. Lee Hansen’s “Expected Proficiencies for Undergraduate Economics Majors,” first published in 1986 and updated in 2001, is one of the earliest efforts to go beyond content knowledge in identifying learning outcomes in economics. As he states, “The proficiencies approach focuses on what graduating majors can do with the knowledge and skills they acquire in the major” (Hansen 2001, 231). Hansen identifies six expected proficiencies: access existing knowledge; display command of existing knowledge; interpret existing knowledge; interpret and manipulate economic data; apply existing knowledge; and create new knowledge. Subject or content knowledge is not ignored but is not seen as the only desired learning outcome, understanding that a good education should provide proficiencies or abilities that go beyond the specific content learned in school. Hansen’s proficiencies are

sometimes used to inform the development of curriculum and assessment tools.

It is worth noting that the majority of economists support the idea of proficiency-based education. In a survey of more than 202 economics departments, Myers, Nelson, and Stratton (2011) found that over half of the programs agreed with the first five Hansen proficiencies. Respondents put critical thinking as the most important competency, and oral communication was third.

The OECD's Assessment of Higher Education Learning Outcomes (AHELO) directly acknowledges the distinction between subject knowledge and the general human capital developed from a quality education and seeks to assess generic skills, such as critical thinking, and discipline-specific skills in economics and engineering. AHELO assesses the learning outcomes of bachelor's degree recipients and is "intended as a tool for institutional improvement" (OECD 2009, 11). The writing committee for the economics assessment included faculty from over a dozen countries. To guide the design of an internationally relevant economics assessment, the committee produced a list of "agreed learning outcomes," which are somewhat similar, as they note, to Hansen's proficiencies: subject knowledge and understanding, subject knowledge and its applications, effective use of relevant data and quantitative methods, effective communication, and acquisition of independent learning skills. Subject knowledge and understanding is explained not as a list of topics but as a more general set of criteria such as a "consistent and coherent command of the principles of both micro and macroeconomics" and the "ability to articulate critical features and shortcomings in a model or method of analysis" (OECD 2009, 25). The experts on the AHELO project identify four additional skills that should be assessed for economics: abstraction; analysis, deduction, and induction; quantification and design; and framing. The AHELO exam uses multiple-choice items (67 percent) and short and long constructed response items (33 percent). AHELO is unique in that it is designed for international use (OECD 2012a).

To date, the exam has been used once in a feasibility study involving seventeen countries and almost 250 institutions (OECD 2012b).

The economists developing the AHELO learning outcomes relied heavily on benchmarks created in the United Kingdom by the Quality Assurance Agency (QAA), an independent body established to monitor and advise institutions of higher education on standards and quality.⁷ QAA subject benchmark statements “describe what gives a discipline its coherence and identity, and define what can be expected of a graduate in terms of the abilities and skills needed to develop understanding or competence in the subject They are intended to assist those involved in programme design, delivery and review and may also be of interest to prospective students and employers” (QAA n.d.). The QAA benchmark statement for economics, first created in 2000 by economists from a number of schools in the United Kingdom, presents a lengthy, three-part definition of the nature and context of economics: it identifies economic content, places the discipline in context relative to other social science and related fields, and lists the competencies (such as abstraction) that are seen as integral to economics (QAA 2007). The authors then identify nine aims for those obtaining a degree in economics, which go beyond content knowledge and reflect general competencies such as “to develop in students, through the study of economics, a range of generic skills that will be of value in employment and self-employment” (QAA 2007, 2). The QAA benchmark identifies three elements that allow those with an education in economics to apply their decision-making skills

⁷The Australian Government has also commissioned the development of economics learning standards for Australian higher education in response to the Tertiary Education Quality and Standards Agency Act of 2011. These standards build off and look similar to QAA and AHELO.

beyond their education: numeracy, subject-specific skills (similar to those listed for the AHELO project), and a framework for decision making. The latter identifies eight key concepts in economics: opportunity cost; incentives; equilibrium, disequilibrium and stability; strategic thinking; expectations and surprises; the relevance of marginal considerations; the possible gains from voluntary exchange; and systems and dynamics.

Overall, the four widely available assessment tools (AP, TUCE, MFT, and AHELO) differ from each other, but each has some elements that align with the goals of the MCL project. The TUCE and MFT are multiple-choice-only tests, a format that has advantages but that is more commonly used to assess content mastery and less suited for assessing competencies. Both exams provide outlines of content knowledge reflecting what has been taught in economics for much of the last forty years; however, neither exam reflects the growing emphasis given to statistics, game theory, and behavioral economics. The redesign of the AP exam and the recently designed AHELO are based more on competencies, and this reflects the direction in which the MCL project would like to move assessment. Understanding the process by which both exams were developed and understanding why the exams are written as they are can provide important insights when it is time to develop an assessment tool based on the essential concepts and competencies developed in this paper. Unfortunately, the AP exam is designed for assessing achievement at the introductory college level, which is not sufficient for the purposes outlined here. AHELO is designed to measure outcomes at the degree level, but the fact that it is designed for international use limits the ability for using it to measure gains in U.S. colleges and universities.

After reviewing the existing tools, we believe there is still a need for assessment instruments that allow professors, departments, and institutions to assess more effectively the level of, or the gain in, learning by college students in economics. Our emphasis on essential competencies is not meant to imply that content is

unimportant. It is still important for students to know what does and does not go into the measurement of gross domestic product (GDP), unemployment, and inflation. By defining outcomes as the product of concepts and competencies, as we do later in this paper, we hope to emphasize the importance of what students can do with the knowledge they obtain in school.

Last, we must note the role of textbooks in determining what is taught in economics, especially at the introductory level. Instructors are always able to develop their own material for students, but busy professors are inclined to teach the content found in their text. Some of the more popular textbooks are decades old, and their basic content has not changed much over time. In fact, the textbooks are remarkably similar, both to each other and to Samuelson's classic economics textbook, first published in 1948. Although an analysis is beyond the scope of this paper, any discussion about what students should know or be able to do will have to consider how to move beyond the material in existing textbooks.

Methods

The goal of the economics strand of the Measuring College Learning project has been to create a rigorous but flexible framework that many different economics professors in many different settings can use to define student learning outcomes. This section briefly summarizes the methods we used to compile such a framework.

To inform this effort, the MCL project assembled a group of twelve economists actively involved in the area of economic education, either in curriculum development or in research on the efficacy of different teaching methods. The economists represented a variety of colleges and universities, and many were involved in the initial development or revisions of the efforts described in the preceding section. Four participated in the last revision of the TUCE, three were on the writing committee of the Voluntary National

Content Standards, one participated on the AHELO committee, and one is involved in the redesign of the AP economics curriculum and exam. This group provided invaluable insights into the discussions and the issues faced by previous groups.⁸

After examining these prior efforts, the MCL Economics faculty panel decided to build an original approach from the ground up. To capture the spirit of inquiry and practical problem solving that motivates the practice of economics, we constructed a set of competencies that we believe all students trained in economics should be able to employ. We then checked our set against the lists provided by Hansen's proficiencies, AHELO, and the updated AP curriculum. The Standards and the TUCE offered a good starting point for a listing of content, but for the purposes of the MCL we wanted to distill economics to a small number of essential concepts and to make space for newer and more sophisticated concepts and methods. We wanted students to display an array of competencies rather than knowledge in many content areas that might simply reflect a student's ability to remember facts.

We also consulted sources outside our discipline to construct our list of competencies. In particular, we found it productive to consider learning outcomes developed in other disciplines. Biologists have done a great job developing insights and evidence on the goals, outcomes, and practice of biology education. It was helpful to review the concepts and competencies presented in

⁸The members of the MCL Economics faculty panel were Sam Allgood (University of Nebraska, Lincoln), Amanda Bayer (Swarthmore College), Stephen Buckles (Vanderbilt University), Charles Clotfelter (Duke University), Melissa Famulari (University of California, San Diego), Rae Jean Goodman (United States Naval Academy), Mark Maier (Glendale Community College), KimMarie McGoldrick (University of Richmond), John Siegfried (Vanderbilt University), William Walstad (University of Nebraska, Lincoln), and Michael Watts (Purdue University).

Vision and Change in Undergraduate Biology Education: A Call to Action (AAAS 2011) as we developed our own distillation of economics.

But our list, of course, also derived from considerable reflection on our own discipline and on how economists do their work outside the classroom. We decided we can best educate our students by sharing how we as economists learn about the world. Thus, we considered how economists operate, not just what we know but how we come to know what we know. We aimed to be intentional about teaching our methods, and our methods for improving our methods, to our students.

Economics is a dynamic and contested discipline in which there are multiple logical viewpoints that evolve as new evidence is uncovered. Most introductory economics classes use similar textbooks, for better or for worse, but there is growing heterogeneity as game theory, behavioral economics, and other topics are increasingly emphasized. Some faculty and departments also use and teach heterodox approaches such as institutional, feminist, ecological, and Marxian economics. To construct a learning outcomes framework that allows teachers and students to use and integrate multiple approaches in economics, we considered the work of William Perry, who described cognitive development as a process starting from a simplistic view of knowledge as right answers known to authorities and proceeding to increasingly more sophisticated attitudes toward knowledge (Perry 1981). We believe the essential concepts and competencies of economics, as we have defined them, can be studied and developed in many different ways in many different classrooms.

Building on these resources and more, we develop our recommended learning outcomes for students in introductory economics and for economics majors. We merge the content and the competencies considered by others with our own observations and insights to construct a rigorous but flexible framework for a

well-designed education in economics. We choose a competency-centered approach but do not neglect the content that distinguishes economics from other disciplines. The end product is an original set of representative learning outcomes in economics, illustrating an array of specific learning outcomes we expect students of economics to achieve.

Essential Concepts and Competencies for the Economics Major

Undergraduate economics education helps students develop potent discipline-specific competencies while working with discipline-specific concepts in core and elective courses. This section presents our vision of a quality education in economics. In an original approach, it defines both concepts and competencies that are essential to an undergraduate economics curriculum and intersects those to provide representative learning outcomes. We start by presenting four essential economic concepts, representing four broad categories of economic content. Next, we state five core competencies we expect economics students to develop. Ultimately, we intersect the competencies with the content areas to illustrate learning outcomes, which is how students majoring in economics can demonstrate their achievement in our discipline.

Essential Concepts

To define our four essential concepts in economics, we divide economic content into four very broad categories: individual decision making; markets and other interactions; the aggregate economy; and the role of government and institutions. Some of the concepts cut across both macroeconomics and microeconomics, such as the role of government and institutions, whereas others are more specific to one branch or the other.

Concept 1: Individual Decision Making

Individuals, households, firms, communities, countries, and other agents make decisions about how to use the resources they control, which affects their well-being and the welfare of others.

Decision making is the cornerstone of economic analysis. Introductory-level students (commonly known in the discipline as principles students) may be introduced to rational agents making decisions at the margin, strategic thinking, and aspects of behavioral economics. As students advance they learn how to model time, uncertainty, and other aspects of behavior not accounted for in the simple abstracts used at the principles level. This understanding extends to macroeconomics where explanations of price rigidities are based on explanations of how individuals respond to price changes.

Concept 2: Markets and Other Interactions

Agents interact through markets and other mechanisms, which help to determine the production, consumption, and distribution of goods and services.

Both macro- and microeconomics are less the study of individuals in isolation and more the study of agents interacting with each other. Economists study this interaction at the market (e.g., monopoly) and economy levels (e.g., aggregate demand–aggregate supply) but also have tools like models of comparative advantage and game theory to examine a wide range of interactions, such as those that occur within households or between countries. As one would expect, the tools become more numerous and more sophisticated as students progress through their classes.

Concept 3: The Aggregate Economy

Individual decisions and interactions combine to form aggregate outcomes for an economy, which are described, predicted, and assessed in macroeconomic analyses.

Measuring the macroeconomy, explaining the causes of changes in these aggregate measures, and predicting future aggregate outcomes is the purview of macroeconomics. Course work in macroeconomics helps students understand the determinants of national income and well-being through systematic examination of business cycles and long-run economic growth. It also provides insight into the distribution of incomes and welfare within and across nations. Macroeconomic classes often include international economics as part of open-economy models.

Concept 4: Role of Government and Other Institutions

Governments and other organizations and institutions can regulate or influence economic activity in ways that affect the distribution of resources, individual well-being, and social welfare.

Resource and output allocation in most modern economies occurs through markets and government and the interaction of these two. In introductory and advanced courses, students learn how to use the tools of economics to evaluate allocations and to suggest policies that can improve economic outcomes, understanding how individuals and markets respond to government and monetary policy. Furthermore, numerous institutions beyond markets and governments also determine these allocations; students should gain the capacity to understand the roles that institutions such as households, schools, unions, and social norms play in determining economic outcomes.

Essential Competencies

The mainstays of our framework are the competencies we wish to develop in our students. Technological change demands a renewed and explicit focus on developing competencies through higher education. We must teach students how to organize, evaluate, and build from the information at their fingertips. Our job is no longer, if it ever was, to present content for students to memorize. Just as the authors of the Voluntary National Content Standards want students to acquire “skills they can apply to emerging economic issues unforeseen at the time these standards were written” (Siegfried et al. 2010, v), we, too, want to embed such a capacity in students. We believe the best way to achieve this objective is to center learning outcomes on explicit statements of the competencies we expect them to acquire.

Two features of these competencies are worth noting in advance. First, the competencies may not appear to be unique to economics, but we stipulate discipline-specific manifestations. Many fields apply the scientific process, for example, but economists often employ distinctive methods of observation, data collection, and analysis. Second, the competencies may not appear to be mutually exclusive, but we explain how they are distinct.

Competency 1: Apply the Scientific Process to Economic Phenomena

Students should know how to ask an economic question, gather information and resources, form an explanatory hypothesis, collect data that can be used to test the hypothesis, analyze the data, draw conclusions, and suggest future research.

Most fundamentally, we want our students to acquire habits and capabilities that allow them to nurture and develop their understanding of the world long after they leave our care. Economics students should be curious, observing the world and asking productive questions, and then organizing their observations into

hypotheses and testing those hypotheses against careful examination of the evidence. Demonstration of this competency requires a student to possess the spirit and methods of economic inquiry, desiring to learn about the world and integrating skills acquired through the other core competencies to achieve that goal.

Competency 2: Analyze and Evaluate Behavior and Outcomes Using Economic Concepts and Models

Students should be able to use economic concepts and models to predict or explain behavior and outcomes in novel settings; evaluate choices made by firms, individuals, or groups, and suggest allocations that may help them better achieve their objectives; and evaluate economy-wide allocations using the concepts of efficiency and equity and suggest government policies to improve social welfare.

Economics uses deliberate simplifications to think through complex situations. By exposing students to economic theory, we give them specific analytical tools while also expanding their capacities for abstraction and problem solving. We require students to be able to use economic concepts and models in both positive and normative analyses, thereby explaining, predicting, evaluating, and proposing choices, allocations, and policies. This competency, often practiced and demonstrated in idealized situations, is necessary but not sufficient to describe economists' work or our expectations for students. As social scientists, economists use model-based reasoning in combination with the other competencies identified here to study actual human relations and to improve living conditions locally and globally.

Competency 3: Use Quantitative Approaches in Economics

Students should be able to work with mathematical formalizations of economic models (e.g., graphs, equations) and perform mathematical operations (e.g., basic

calculus); confront any observed correlation knowing it is not evidence of causation and explain why; explain the design and results of laboratory and field experiments (i.e., randomized controlled trials); and explain the conduct, results, and limitations of basic econometrics (e.g., hypothesis testing, interpreting ordinary least squares estimates, omitted variable, included variable, selection biases).

Economics uses quantitative analysis and mathematical reasoning. We want students to be able to access, interpret, and manipulate economic data and to have knowledge of the primary methods of gathering and assessing evidence in economic investigations. (We will assume our students come to us with fundamental quantitative skills, such as the ability to perform basic calculations without a calculator and understanding concepts such as mean, median, and variance.) In addition to developing comfort in working with numerical data and statistics, we expect students to be competent in representing and analyzing economic behaviors and systems with graphs and mathematical equations.

Competency 4: Think Critically about Economic Methods and Their Application

Students should be able to explain economic models as deliberate simplifications of reality that economists create to think through complex, nondeterministic behaviors; identify the assumptions and limitations of each model and their potential impacts; select and connect economic models to real economic conditions; explain economic data as useful but imperfect recordings of empirical realities; explain the strengths and limitations of economic data and statistical analyses; and think creatively and combine or synthesize existing economic ideas in original ways.

Economics provides a powerful set of tools to analyze human behavior and outcomes. Students need to develop the ability to select appropriate models to conduct analysis of a given situation. They must evaluate how well models and collected data capture relevant features of the setting being analyzed and identify ways an analysis might be improved. Given that economic research is varied, imperfect, and developed and applied in social contexts, students need to explore how theories, assumptions, and research topics can reflect the experiences and values of practitioners, including themselves, and to learn to think about issues from various perspectives. Overall, this core competency requires students to evaluate, think critically, and make connections between the economics they learn and the real world.

Competency 5: Communicate Economic Ideas in Diverse Collaborations

Students should be able to demonstrate fluency in economic terminology and graphical tools; demonstrate knowledge of major economic institutions and familiarity with magnitudes of common economic statistics; explain economic reasoning and methods to economists and to noneconomists; integrate economic insights with those from other disciplines in multidisciplinary examinations of individuals and societies; and use training to discuss economic issues and policies in ways that promote mutual understanding and inquiry.

Economists must be able to communicate with each other, with policymakers, and with the general public. We expect our students to be able to explain economic concepts and analyses using the terminology and tools of our discipline, including writing clear and concise text, drawing graphs to present an analysis, and using data and statistics to communicate and support a thesis. Communication also requires an ability to listen to others, and we expect our

students to glean information and insights from others' explanations whether or not they use the language of economists.

Even though they are intrinsically intertwined, these five competencies identify five distinct sets of abilities. For example, a student could hypothesize the impact on unemployment of a higher minimum wage without reference to an economic model and then use simple statistics, such as means, to analyze data to test the prediction, thus employing the scientific method (Competency 1) without using economic models or quantitative methods (Competencies 2 and 3). Alternatively, a student could use a model of supply and demand (Competency 2) to explain how a higher minimum wage may increase quantity supplied and decrease quantity demanded without empirical observation or statistical analysis (Competencies 1 and 3). As a final example, a student could display all three of the first competencies without being aware of the strong assumptions that go into creating the competitive environment and how this impacts the conclusions of the model (Competency 4). Thus, each of these competencies addresses a unique aspect of what an economist does.

Students majoring in economics acquire a quality education by developing these five essential competencies while studying the four essential concepts. To illustrate the kinds of assessable learning outcomes we would expect to see as a result, we can generate representative learning outcomes by intersecting discipline-specific competencies with discipline-specific concepts. Table 3.1 (which begins on page 112) summarizes these concepts and competencies, with concepts in the rows, competencies in the columns, and representative learning outcomes in the cells that intersect competencies with concepts. Students majoring in economics should be able to demonstrate these, or similar, learning outcomes. Although economics is too broad and contested to provide a comprehensive set

of learning outcomes, we present those we consider representative of a successful education in economics. The outcomes on our list are neither necessary nor sufficient, but they do require students to display an array of key competencies and understand core concepts of the discipline. They are examples of the sorts of things successful students can do with their economic knowledge and skills.

Table 3.1 Matrix of Essential Concepts and Competencies in Economics (Part 1 of 5)

<p>General Description of the Competency</p>	<p>Essential Competency 1. Apply the Scientific Process to Economic Phenomena</p> <p>Students should know how to:</p> <ul style="list-style-type: none"> • Ask an economic question • Gather information and resources • Form an explanatory hypothesis • Collect data that can be used to test the hypothesis • Analyze the data • Draw conclusions and suggest future research 	<p>Essential Competency 2. Analyze and Evaluate Behavior and Outcomes Using Economic Concepts and Models</p> <p>Students should be able to use economic concepts and models to:</p> <ul style="list-style-type: none"> • Predict or explain behavior and outcomes in novel settings • Evaluate choices made by firms, individuals, or groups, and suggest allocations that may help them better achieve their objectives • Evaluate economy-wide allocations using the concepts of efficiency and equity, and suggest government policies to improve social welfare 	<p>Essential Competency 3. Use Quantitative Approaches in Economics</p> <p>Students should be able to:</p> <ul style="list-style-type: none"> • Work with mathematical formalizations of economic models (e.g., graphs, equations) and perform mathematical operations (e.g., basic calculus) • Confront any observed correlation knowing it is not evidence of causation and explain why • Explain the design and results of laboratory and field experiments (i.e., randomized controlled trials) 	<p>Essential Competency 4. Think Critically about Economic Methods and Their Application</p> <p>Students should be able to:</p> <ul style="list-style-type: none"> • Explain economic models as deliberate simplifications of reality that economists create to think through complex, nondeterministic behaviors • Identify the assumptions and limitations of each model and their potential impacts • Select and connect economic models to real economic conditions 	<p>Essential Competency 5. Communicate Economic Ideas in Diverse Collaborations</p> <p><i>Students should be able to:</i></p> <ul style="list-style-type: none"> • Demonstrate fluency in economic terminology and graphical tools • Demonstrate knowledge of major economic institutions and familiarity with magnitudes of common economic statistics • Explain economic reasoning and methods to economists and to non-economists • Integrate economic insights with those
---	---	---	---	---	--

		<ul style="list-style-type: none"> • Explain the conduct, results, and limitations of basic econometrics (e.g., hypothesis testing, interpreting ordinary least squares estimates, omitted variable, included variable, and selection biases) 	<ul style="list-style-type: none"> • Explain economic data as useful but imperfect recordings of empirical realities • Explain the strengths and limitations of economic data and statistical analyses • Think creatively and combine or synthesize existing economic ideas in original ways 	<p>from other disciplines in multidisciplinary examinations of individuals and societies</p> <ul style="list-style-type: none"> • Use training to discuss economic issues and policies in ways that promote mutual understanding and inquiry
--	--	--	---	---

Table 3.1 Matrix of Essential Concepts and Competencies in Economics (Part 2 of 5)

<p>Essential Concept 1. Individual Decision Making</p>	<p>Learning outcomes include:</p> <ul style="list-style-type: none"> • Explain how economists have used the scientific process to expand understanding of individual decision making, and identify the main methods and findings in the field of behavioral economics (e.g., experiments on status quo bias and fairness preferences) • Develop a hypothesis to explain observed behavior, identifying what model or models are appropriate for analyzing the behavior, and design an appropriate experiment to test the hypothesis 	<p>Essential Competency 2. Analyze and Evaluate Behavior and Outcomes Using Economic Concepts and Models</p> <p>Learning outcomes include:</p> <ul style="list-style-type: none"> • Use the concepts of opportunity cost and sunk cost to analyze and make decisions • Use marginal analysis to make and defend allocation decisions • Use marginal analysis to analyze and predict the choices of individuals, firms, and other decision makers • Explain the strengths, and limits of, cost-benefit analysis 	<p>Essential Competency 3. Use Quantitative Approaches in Economics</p> <p>Learning outcomes include:</p> <ul style="list-style-type: none"> • Explain that accounting profit is not economic profit and other applications of opportunity cost • Explain the relationships between total, average, marginal, and fixed costs (and revenue and product) with tables, graphs, and words • Compute and use elasticities, present discounted value, expected value, and conditional probabilities (Bayesian updating) 	<p>Essential Competency 4. Think Critically about Economic Methods and Their Application</p> <p>Learning outcomes include:</p> <ul style="list-style-type: none"> • Explain how consumer choices are constrained and influenced by forces other than budgets and inborn preferences (e.g., health, social norms, networks, discrimination, and credit constraints) • Use, and explain the limitations of, labor-leisure models to explain observed time allocation decisions; compare to analyses using models of market goods versus nonmarket time 	<p>Essential Competency 5. Communicate Economic Ideas in Diverse Collaborations</p> <p>Learning outcomes include:</p> <ul style="list-style-type: none"> • Read and explain popular press writings on how individuals respond to changes in incentives (e.g., going to college and the returns to education) • Read and explain (the less technical sections of) papers from economics journals that investigate consumer choice
---	---	---	--	---	---

	<ul style="list-style-type: none"> Analyze consumer and producer choice using indifference curves and isoquants Identify behaviors that are not explained well by rational models (e.g., risk aversion versus loss aversion), and incorporate deviations from rational decision making into choice models Use calculus to find the profit-maximizing quantity for a monopolist and for a Cournot duopolist 	<ul style="list-style-type: none"> Compute and use information about distributions of continuous random variables (e.g., mean, s.d., probability density and cumulative distribution functions, and uniform and normal distributions) 	<ul style="list-style-type: none"> Analyze how choices (e.g., occupation) help explain differences in income and what factors might explain those choices Explain how the rational choice model provides the foundation to the conclusion that voluntary exchange is mutually beneficial Identify potential unintended consequences of individual decision making under various policies or conditions
--	---	--	---

Table 3.1 Matrix of Essential Concepts and Competencies in Economics (Part 3 of 5)

<p>Essential Concept 2. Markets and Other Interactions</p>	<p>Essential Competency 1. Apply the Scientific Process to Economic Phenomena</p> <p>Learning outcomes include:</p> <ul style="list-style-type: none"> • Explain how economists use the scientific process to explore the effects of changes in factors affecting demand and supply • Identify how economists use assumptions to reflect and focus on different market structures (e.g., price taker versus price setter) • Explain why it is difficult empirically to isolate the effects of a particular factor or structure to provide evidence of its effects 	<p>Essential Competency 2. Analyze and Evaluate Behavior and Outcomes Using Economic Concepts and Models</p> <p>Learning outcomes include:</p> <ul style="list-style-type: none"> • Apply the theory of comparative advantage to situations faced by individuals and countries • Analyze perfectly competitive markets using the model of supply and demand • Analyze markets involving monopoly, negative and positive externalities, public goods, or asymmetric information • Evaluate allocations using specific concepts of efficiency (Pareto and Kaldor-Hicks) and equity (Utilitarian, Rawlsian, Entitlement Theory, and the Capability Approach) 	<p>Essential Competency 3. Use Quantitative Approaches in Economics</p> <p>Learning outcomes include:</p> <ul style="list-style-type: none"> • Identify comparative advantage and relate to slopes of production possibilities frontiers • Explain the determinants of exchange rates and use exchange rates to calculate nominal currency values • Identify deviations from purchasing power parity • Solve a simple set of equations to identify an equilibrium 	<p>Essential Competency 4. Think Critically about Economic Methods and Their Application</p> <p>Learning outcomes include:</p> <ul style="list-style-type: none"> • Explain the possible disadvantages of specialization • Using a model of supply and demand, explain and predict prices and quantities in various markets, and identify differences between conditions assumed in the theoretical model and those in the real market • Select and apply models of monopoly, duopoly, externalities, public goods, and asymmetric information to real markets and situations (e.g., environmental pollution) 	<p>Essential Competency 5. Communicate Economic Ideas in Diverse Collaborations</p> <p>Learning outcomes include:</p> <ul style="list-style-type: none"> • Explain concepts in economic terms (e.g., theory of liquidity preference) so that economists understand • Demonstrate deep understanding by explaining technical economic concepts so that a person not trained in economics understands • Integrate economic ideas with information from the medical sciences to evaluate tobacco taxes and regulation
---	---	--	--	---	--

	<ul style="list-style-type: none"> • Explain how differences in economists' methods, evidence, or theories can generate differences in conclusions 	<ul style="list-style-type: none"> • Find the general equilibrium of an economy and distinguish from partial equilibrium analyses • Identify and explain Nash equilibria in simultaneous games and subgame perfect equilibria in sequential games • Describe various types of auctions and the conditions under which they may be used, and explain possible outcomes 	<ul style="list-style-type: none"> • Use graphical analysis to conduct comparative statics of basic economic models 	<ul style="list-style-type: none"> • Identify and use an appropriate market model to analyze a current event or environment (e.g., given data on industry concentration or pricing behavior) • Use models of factor markets to explain differences in earnings and changes in wage inequality • Use economic models of asymmetric information to analyze insurance and healthcare markets 	<ul style="list-style-type: none"> • Discuss, with other students or administrators, the efficiency and equity of the allocation of campus housing
--	---	--	--	--	---

Table 3.1 Matrix of Essential Concepts and Competencies in Economics (Part 4 of 5)

<p>Essential Concept 3. The Aggregate Economy</p>	<p>Essential Competency 1. Apply the Scientific Process to Economic Phenomena</p> <p>Learning outcomes include:</p> <ul style="list-style-type: none"> • Know how to access credible sources of economic statistics • Collect and present data (from sources such as St. Louis FRED and the IMF) • Develop a hypothesis (e.g., approaching recession or growth) based on interpretation of data 	<p>Essential Competency 2. Analyze and Evaluate Behavior and Outcomes Using Economic Concepts and Models</p> <p>Learning outcomes include:</p> <ul style="list-style-type: none"> • Use a country's position on a concave production function to interpret if they are a candidate for a large or small growth rate (Solow) • Analyze simplified economies using the aggregate demand–aggregate supply model • Analyze business cycles using the IS-LM model • Analyze long-run growth using the Solow model 	<p>Essential Competency 3. Use Quantitative Approaches in Economics</p> <p>Learning outcomes include:</p> <ul style="list-style-type: none"> • Interpret and critique key economic statistics (GDP and alternatives, unemployment, inflation, interest rates, poverty rates) • Analyze and interpret data using appropriate statistical methods • Compute and use real and nominal values • Compute inflation from a price index 	<p>Essential Competency 4. Think Critically about Economic Methods and Their Application</p> <p>Learning outcomes include:</p> <ul style="list-style-type: none"> • Analyze the effects of past, present, or possible future events on the macroeconomy • Describe the distribution of income and wealth in the United States in general terms, and use Gini coefficients to compare distributions across time periods and countries • Explain the relationship of financial markets to growth and stability of the aggregate economy, and design government policy to prevent bubbles and crashes 	<p>Essential Competency 5. Communicate Economic Ideas in Diverse Collaborations</p> <p>Learning outcomes include:</p> <ul style="list-style-type: none"> • Read or hear opinions about the macroeconomy and recognize when the opinions are not based on economic theory or evidence • Read views of economists and explain subtle differences and what evidence, methods, or theories generate these differences
--	---	---	---	--	--

		<ul style="list-style-type: none">• Analyze the impact of changes in exchange rates in an open-economy macroeconomic model		<ul style="list-style-type: none">• Explain causes and consequences of secular trends in the extent of nonmarket production	<ul style="list-style-type: none">• Explain what information an economist would like to have to provide a more complete economic analysis of a current issue, such as unemployment or income inequality
--	--	--	--	---	---

Table 3.1 Matrix of Essential Concepts and Competencies in Economics (Part 5 of 5)

Essential Concept 4. Role of Government	Essential Competency 1. Apply the Scientific Process to Economic Phenomena	Essential Competency 2. Analyze and Evaluate Behavior and Outcomes Using Economic Concepts and Models	Essential Competency 3. Use Quantitative Approaches in Economics	Essential Competency 4. Think Critically about Economic Methods and Their Application	Essential Competency 5. Communicate Economic Ideas in Diverse Collaborations
	<p>Learning outcomes include:</p> <ul style="list-style-type: none"> • Explain how economists use the scientific process to explore the effects of policies (e.g., minimum wage policies) • Explain why it is difficult to isolate the effects of a policy empirically to provide evidence of its effects • Analyze how differences in economists' methods, evidence, or theories can generate differences in conclusions 	<p>Learning outcomes include:</p> <ul style="list-style-type: none"> • Propose government policies to improve allocations in the presence of monopolies, externalities, public goods, and asymmetric information • Explain the effects of price controls, taxes, and subsidies in perfect markets and in markets with imperfections • Analyze the effects of fiscal and monetary policies on macro aggregates using the aggregate demand—aggregate supply model • Hypothesize how government policies (e.g., SNAP) impact individual choice 	<p>Learning outcomes include:</p> <ul style="list-style-type: none"> • Compute simple fiscal and monetary policy multipliers • Explain the difference between government deficit and debt and, more generally, between flow and stock variables • Compute, interpret, and explain the difference between marginal and average tax rates, marginal and average benefit, and marginal and average cost 	<p>Learning outcomes include:</p> <ul style="list-style-type: none"> • Analyze the effects of existing government policies to address monopolies, externalities, public goods, and asymmetric information • Explain how government trade policies impact domestic and foreign economies • Connect concepts of adverse selection and moral hazard to recent events in financial markets • Suggest and explain fiscal and monetary policies in light of current economic conditions 	<p>Learning outcomes include:</p> <ul style="list-style-type: none"> • Read and correctly explain portions of the Economic Report of the President • Explain the primary role of the Federal Reserve System • Contribute economic insights on the causes and effects of the evolving role of labor unions in the economy

		<ul style="list-style-type: none">• Explain free-riding behavior using models of strategic behavior• Analyze financial markets using economic models of asymmetric information	<ul style="list-style-type: none">• Compute and explain the rate of return on an investment	<ul style="list-style-type: none">• Explain how financial intermediaries, instruments, and markets have evolved in recent decades, and suggest government policies to adapt to changes in financial markets• Use both rational and behavioral models to propose and analyze government policies (e.g., different policies to encourage saving)	
--	--	---	---	---	--

Essential Concepts and Competencies for the Introductory Course

Faculty goals for the introductory course are both similar to and different than faculty goals for the major. This section provides guidance on how to refine the essential concepts and competencies for majors in economics, as presented in the previous section and in Table 3.1, to guide student learning in an introductory course. Using the concepts and competencies framework, the learning outcomes can easily be adjusted to the level of the students for which they are intended.

First, it is both feasible and desirable for students in introductory economics courses to develop the same five essential competencies, though with more moderate benchmarks. As is standard, we expect introductory economics courses to expose students to both microeconomic and macroeconomic principles while recognizing that they cover different content at a different level of difficulty than more advanced courses do. For instance, introductory courses might use AS–AD (Aggregate Supply – Aggregate Demand) to model the macroeconomy, whereas intermediate courses might use IS–LM (Investment-Saving/Liquidity Preference-Money Supply) to analyze the same situations.

Second, the introductory course should involve a different kind of exposure to quantitative methods in economics. Effort should be focused on building and reinforcing basic quantitative and numerical literacy, helping students connect basic mathematical tools such as solving equations or drawing graphs to the real world situations economists study. The development of quantitative reasoning should be an explicit goal, but, rather than requiring advanced techniques such as calculus or econometrics, instructors should focus on building appreciation, fluency, and confidence in mathematics as used in economics.

Most departments choose to teach statistics and econometrics in one or two separate courses for the major, but introductory courses should nevertheless expose students to the need for and results of

more sophisticated empirical investigation. Most certainly, introductory curricula should include discussion of causation versus correlation and provide a sense of the methods economists use to tell the difference. If students are taught how randomized controlled experiments are designed and how their results are interpreted, they will better understand why other forms of analysis are less able to identify cause–effect relationships.

Third, as we bring what we teach closer to what we do as economists, we must help students be comfortable with uncertainty, helping them progress beyond seeing their task as learning the “right” answers to questions to appreciating economics as a collection of effective but imperfect methods with which to construct an understanding of the world. Economics is an exciting, dynamic, and multifarious field of inquiry, aiming to understand complicated, non-deterministic behaviors and outcomes. To promote the intellectual development of our students, we must introduce them “not only to the orderly certainties of our subject matter but to its unresolved dilemmas” (Perry 1981, 109). We help students develop the competencies they need to navigate a complex world by exposing them to the messiness of doing real economics. It is important to complement study of idealized situations that have clean conclusions with critical analysis of models and evidence, alternative models, and study of current economic experiences and issues.

Two insights about introductory economics courses come from our concepts and competencies approach to constructing learning outcomes. First, students would benefit from an explicit statement of the competencies we wish them to develop through the course; with this explicit focus, instructors could improve the way they design their curriculum and pedagogy, and students would have a better sense of what goals they should be working toward. Second, the breadth of economics makes it impossible to develop a complete list of all possible outcomes, but it also allows for a variety of approaches and subject matter that can appeal to all students, regardless of their background or interests. Once instructors understand education as developing competencies, instead of covering

content, they can choose materials and topics that show students the scope and power of economics. The matrix of competencies and concepts presented in this paper gives structure to the curriculum without limiting an instructor's ability to teach a wide range of models and topics.

Recommendations for Future Assessments

Given that economists and other stakeholders have already devoted a substantial amount of time to developing assessment instruments in economics, any new efforts must be motivated by a desire to do something that is truly different. With this in mind, we make some recommendations that build on yet deviate from what has been done in the past. In this section, we make recommendations regarding the development of a large-scale assessment tool and for the development of a smaller-scale assessment tool that could be used in individual courses or departments. Although we make these recommendations with the understanding that cost is often a binding constraint in the choice of assessment, we are purposefully ambitious with an eye toward future changes in technology and incentives to conduct assessment. In other words, we attempt to describe the contours of the objective function so we know what direction to move in if and when the constraint is relaxed.

In any discussion or instance of assessment, it is important to be mindful of its dual purposes. Assessment on any scale is so much more than declaring a student, or course, or program a success or failure. Assessment can and should be used formatively, not just summatively. Faculty and departments can learn and make improvements in curricula and pedagogy while writing and reviewing the results of assessments. Likewise, students learn about themselves, the material, and their progress through preparing for, taking, and reviewing the results of assessments. For this reason, self-assessment is a viable and productive option for both large and small classes or departments.

Large-Scale Assessment

Past national and international efforts to assess economics learning at the introductory level or at the level of the major have relied heavily on multiple-choice exams. The four instruments we have discussed (AP, TUCE, MFT, AHELO) are two-thirds multiple choice or all multiple choice. This format is also ubiquitous in the classroom—often a necessity for faculty teaching very large sections of courses. Multiple-choice and true–false items are also useful when an exam covers a large amount of material, as could be the case when assessing learning at the introductory level or for the major itself.

Although multiple-choice exams do provide the greatest ease of assessment, many educators believe that fixed-response items are incapable of testing critical thinking or other deeper learning. In *Vision and Change in Undergraduate Biology Education: A Call to Action*, biologists identify an assessment gradient that looks at the ease of grading versus the “potential for assessment of learning.” Five types of assessments are identified in order of ease of assessment and reverse order of potential for assessing learning: (a) multiple choice and true–false; (b) models, concept maps, quantitative response; (c) short answers; (d) essays, research papers, reports; and (e) and oral interviews (AAAS 2011, Figure 3.2). We will not debate whether this is the correct ordering of these items, but we argue that a large-scale assessment tool based on the principles set out in this document ideally requires some elements of (d).

We use two commonplace expressions to communicate why assessment in economics should rise to the level of essays and reports, requiring economics students to demonstrate competency in all phases of the scientific process including hypothesis formation, model selection, and data analysis. First, “economics is what economists do.”⁹ This definition of economics fits well with the concepts and competencies framework outlined in this document.

⁹This phrase is often attributed to Jacob Viner, but the authors are unaware if there is historical documentation.

This is not to say that we expect all our students to become economists, but the concepts and competencies that economics students gain are certainly useful in a wide range of careers and pursuits. To assess what students have learned, they must demonstrate that they can do economics. Economists do not answer multiple-choice questions. They formulate productive questions, and they convey their analyses in short and long form. They interpret data and construct and deconstruct arguments that explain observed phenomena. Communication is part of this process. An oral communication device is not realistic for large-scale assessment, but written communication is. A person well trained in economics must be able to take information, whether statistical data or written material, and apply the appropriate economic methods to explain the context by which the information is created or the potential implications of this information. This will be difficult to do with any short form of response.

Second, the expression “economics is a way of thinking” is uttered by many professors at the start of their courses. If we accept this claim, then it becomes difficult to assess learning using fixed-response and short-form answers because these formats tell us only what answer the student gets, not *how* they got the answer. For example, a multiple-choice item can cover a very complex problem but a correct response does not tell whether the student used the appropriate economic method to reach the answer. Assessing the student’s thinking process requires that the student demonstrate and explain how they obtain the answer. To conduct this sort of assessment, we must allow the student more space and time to express her response.

Whether or not assessment includes some form of fixed response is still open to debate. Recent research suggests that well-written multiple-choice questions can eliminate the effects of guessing (Kubinger and Gottschall 2007) but does not address the concern that multiple-choice questions cannot measure all elements of in-depth understanding of economics (Buckles and Siegfried 2006).

If one wants to assess how students are forming their answers, free response provides the best approach. Whether the response is short or long, free-response items mean the student begins the answer with a clean piece of paper. Free response requires the student to choose the path they take to answer a question, providing the most insight about her competencies.¹⁰

Any disciplinary standard or assessment, even within our framework, requires decisions about which topics to include and which to exclude. Does one simply base an exam on content found in the department's core (two introductory courses, statistics, and two intermediate courses), or is it necessary that a student demonstrate an understanding of Heckscher-Ohlin or some other field-specific model? Although such decisions must be made while writing test items, ultimately if a student demonstrates a general ability to use economic models appropriately, the competency implies she would be able to use the Heckscher-Ohlin model if adequately introduced to it. If some instructors still wish to assess a learning outcome relating to this model specifically, the large-scale exam would likely have to be modular, allowing instructors to select items addressing specific fields or topics within economics.

More generally, defining a set of relevant content can be difficult in a discipline such as economics, where even the fundamentals can vary over time and across faculty members. For example, existing assessment efforts make little or no reference to behavioral economics, a burgeoning field that incorporates insights and methods from psychology and neuroscience into the study of economic decisions. The field began to develop slowly in the 1970s, gained traction in the 1980s, and has grown greatly in prominence over the past twenty years. Most introductory economics textbooks currently deal with behavioral economics in passing or devote a chapter to it; however, some economists believe that the behav-

¹⁰ See Colander and McGoldrick (2009) for more on the educational value of open-ended, "big think" questions.

ioral approach will eventually supplant the neoclassical model as the dominant paradigm. Similarly, major economic events, such as the financial crisis and recent increases in economic inequality, are leading to changes in both the body of economic knowledge and what is typically taught in undergraduate courses (see, e.g., Caballero 2010). Any newly developed assessment tool will have to decide how to navigate the current and anticipated variety of approaches within the discipline. In our view, our concepts and competencies approach to defining learning outcomes, in tandem with a modular structure for the assessment, is the optimal way to proceed.

Small-Scale Assessment

Within the context of a particular course or department, if one is assessing economic learning by a student's ability to do economics, then this opens the door for better-targeted and additional forms of assessment. Recognizing the formative role of assessment, repeated low-stakes testing can help students develop desired competencies. It may be wise to supplement traditional assessment embedded in the curriculum (exams, homework) with small quizzes, student self-assessment, and daily conversations. Another option is to require students to produce and present original research in a senior paper, for example, with the aim of developing and demonstrating all five essential competencies.

Assessment may also be external to the curriculum (Myers, Nelson, and Stratton 2008). External assessment would be, for example, the use of co-curricular experiences as assessment. Internships and service learning projects provide opportunities for students to develop economic competencies. Advanced students can be hired as peer tutors. Teaching economics is a fundamental way of developing and demonstrating competencies. There are limits of course, but there are also numerous options for faculty who want to go beyond standard methods of assessment.

Some of these nontraditional forms of assessment may be too costly to employ in departments with a large number of majors

relative to the number of faculty. In these cases, faculty should be educated in the various ways that students can be assessed beyond standard homework and exams—many of these methods, including those employing clickers, can be used in large class settings. More importantly, if instructors accept that the relevant assessment involves what the student does, then the process by which the student obtains their answer is of primary importance and the answer itself is secondary (Myers et al. 2008).

Conclusion

We economists have paid far too little attention to our teaching. It is time to change that, and this white paper provides a framework to help. Neither the paper nor the learning outcomes we develop here are designed to provide a specific how-to list for professors and departments. Appropriate learning outcomes will vary across institutions, given differences in student bodies and institutional characteristics. We have tried to provide a framework that is general enough, however, to be used by all.

It is our hope that faculty members and departments will use this framework to construct and redesign courses. We are not implying that departments have not put time and thought into their curriculum. Instead, the approach suggested here may lead many departments to redesign their curriculum in a way that ensures students are receiving the education envisioned for them. Specifically, curriculum development should begin with the identification of competencies, which puts the focus on action words that describe skills or what students can do. Once competencies are identified, courses, course content, teaching methods, and assessments can be developed that enable students to obtain the competencies. This can be thought of as a backward design approach to economics curricula (Wiggins et al. 1998). Relying on lists of content is inefficient and counterproductive, as it encourages memorization. Since we all agree we want students to develop skills, we should specify

competencies explicitly and construct our curriculum and pedagogy around them.

The efficacy of this approach will be enhanced if faculty and departments share competency statements and desired learning outcomes with students. When economists engage in research, they do not typically know the answer to their research question, but they do understand what actions and steps they must take to obtain an answer—they know what to do. In many cases, the answer to the research is less important than the process by which it is created because the research adds to our knowledge if the process is done correctly. The same can be true for student learning and assessment. Just as we are skeptical of research conclusions if we are skeptical of the research methods, we should not have faith that a student has learned if we are unaware of the process by which he or she forms an answer. Sharing competency statements with students from the beginning illuminates the process and enhances their ability to achieve the learning outcomes.

The approach we are recommending will not necessarily be easy at first since faculty and departments will have to rethink how they approach curriculum and pedagogy. As economists, we suspect that this is unlikely to occur at the many institutions where teaching is valued secondarily to research, and especially at large universities where the vast majority of undergraduate students study and learn economics. Administrators and professional associations should change incentives to value and reward attention to teaching. This may have implications for graduate education as well. Even though teaching will be the primary job for most economics faculty, few graduate students in economics currently receive training on developing pedagogy or assessing students.

Our work can help meet demands for assessment. The framework can be used to develop assessments for individual classes and to evaluate learning in the major. Establishing competencies concerning what students can do, versus what they know, provides a direct link to what an assessment item should require of a student.

Although the approach we outline here does not provide a method for evaluating the quality of instruction in the classroom, faculty and programs can credibly demonstrate the quality of the education they offer by developing and publishing careful and coherent course design. The framework presented here encourages faculty to be purposeful in identifying learning outcomes without imposing on them a specific pedagogy or requiring the teaching of specific content, thus preserving academic freedom.

This work adds value to the existing set of efforts to articulate and measure learning outcomes in economics in several ways. First, our framework enhances economists' awareness of the underlying competencies being developed, such as quantitative reasoning, as they teach a particular skill, such as computing real values of variables. Second, it creates a competency-based set of learning outcomes for students in economics, in contrast to the more common content-based orientation and with a set of competencies that are distinct from prior efforts. Third, our approach allows us to define learning outcomes in newly important areas within the discipline, such as behavioral economics, financial markets, and experimental methods, which existing assessments omit. Fourth, the general framework we develop, in which competencies are intersected with specific content areas, accommodates change within the discipline across time or instructors: Using the examples presented here, readers can construct learning outcomes for specific courses they must teach or assess. The focus remains on the core competencies we seek to develop through an education in economics.

References

- Allgood, Sam, William Bosshardt, Wilbert van der Klaauw, and Michael Watts. 2011. "Economics Coursework and Long-Term Behavior and Experiences of College Graduates in Labor Markets and Personal Finance." *Economic Inquiry* 49, no. 3: 771–794.

- Allgood, Sam, John J. Siegfried, and William B. Walstad. 2015. "Research on Teaching Economics to Undergraduates." *Journal of Economic Literature* 53, no. 2: 285–325.
- American Association for the Advancement of Science (AAAS). 2011. *Vision and Change in Undergraduate Biology Education: A Call to Action*. Washington, DC: AAAS Press.
- Bayer, Amanda, 2011. *Diversifying Economic Quality: A Wiki for Instructors and Departments*. The American Economic Association Committee on the Status of Minority Groups in the Economics Profession. <http://www.diversifyingecon.org>.
- Bayer, Amanda, and Cecilia E. Rouse. Forthcoming. "A New Look at Diversity in the Economics Profession." *Journal of Economic Perspectives*.
- Becker, William E. 1997. "Teaching Undergraduate Economics." *Journal of Economic Literature* 35, no. 3: 1347–1373.
- Buckles, Stephen, and John Siegfried. 2006. "Using Multiple-Choice Questions to Evaluate In-Depth Learning of Economics." *Journal of Economic Education* 37, no. 1: 48–57.
- Caballero, Ricardo J. 2010. "Macroeconomics After the Crisis: Time to Deal with the Pretense-of-Knowledge Syndrome." *Journal of Economic Perspectives* 24, no. 4: 85–102.
- Colander, David. 2005. "What Economists Teach and What Economists Do." *Journal of Economic Education* 36, no. 3: 249–260.
- Colander, David, and KimMarie McGoldrick. 2009. "The Teagle Foundation Report: The Economics Major as Part of a Liberal Education." In *Educating Economists*, edited by David Colander and KimMarie McGoldrick, 3–39. Cheltenham, UK: Edward Elgar.
- Educational Testing Service (ETS). 2014. "The Major Field Test in Economics." https://www.ets.org/s/mft/pdf/mft_testdesc_economics_4emf.pdf.
- Hansen, W. Lee. 1986. "What Knowledge Is Most Worth Knowing—for Economics Majors?" *American Economic Review* 76, no. 2: 149–152.
- Hansen, W. Lee. 2001. "Expected Proficiencies for Undergraduate Economics Majors." *Journal of Economics Education* 32, no. 3: 231–242.
- Kubinger, Klaus D., and Christian H. Gottschall. 2007. "Item Difficulty of Multiple Choice Tests Dependent on Different Item Response

- Formats—an Experiment in Fundamental Research on Psychological Assessment.” *Psychology Science* 49, no. 4: 361–374.
- Myers, Steven C., Michael A. Nelson, and Richard W. Stratton. 2008. “Assessing a Proficiency Based Economics Program: Weathering the Perfect Storm while Thriving in a New Environment.” Paper presented at the annual meeting of the American Economic Association, January 4–6. https://www.aeaweb.org/annual_mtg_papers/2008/2008_619.pdf.
- Myers, Steven C., Michael A. Nelson, and Richard W. Stratton. 2011. “Assessment of the Undergraduate Economics Major: A National Survey.” *Journal of Economic Education* 42, no. 2: 195–199.
- Organisation for Economic Co-operation and Development (OECD). 2009. *Tuning-AHELO Conceptual Framework of Expected and Desired Learning Outcomes in Economics*. Paris: OECD Publishing. <http://www.oecd.org/education/skills-beyond-school/43160495.pdf>.
- Organisation for Economic Co-operation and Development (OECD). 2012a. *Economics Assessment Framework: AHELO Feasibility Study*. Paris: OECD Publishing. [http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=edu/imhe/ahelo/gne\(2011\)19/ANN3/FINAL&doclanguage=en](http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=edu/imhe/ahelo/gne(2011)19/ANN3/FINAL&doclanguage=en).
- Organisation for Economic Co-operation and Development (OECD). 2012b. *Testing Student and University Performance Globally: OECD’s AHELO*. Paris: OECD Publishing. <http://www.oecd.org/edu/skills-beyond-school/testingstudentanduniversityperformancegloballyoecdahelo.htm>.
- Organisation for Economic Co-operation and Development (OECD). 2013. *Assessment of Higher Education Learning Outcomes Feasibility Study Report: Executive Summary*. Paris: OECD Publishing. [http://www.oecd.org/edu/skills-beyond-school/AHELO percent20FS percent20Report percent20Volume percent201 percent20Executive percent20Summary.pdf](http://www.oecd.org/edu/skills-beyond-school/AHELO%20FS%20Report%20Volume%201%20Executive%20Summary.pdf).
- Perry, William G., Jr. 1981. “Cognitive and Ethical Growth: The Making of Meaning.” In *The Modern American College*, edited by Arthur W. Chickering, 76-116. San Francisco: Jossey-Bass.
- Quality Assurance Agency for Higher Education (QAA). n.d. “The UK Quality Code for Higher Education: Subject Benchmark

- Statements.” <http://www.qaa.ac.uk/assuring-standards-and-quality/the-quality-code/subject-benchmark-statements>.
- Quality Assurance Agency for Higher Education (QAA). 2007. *Subject Benchmark Statement for Economics*. Gloucester, UK: QAA. <http://www.qaa.ac.uk/Publications/InformationAndGuidance/Documents/economics.pdf>.
- Samuelson, Paul A. 1948. *Economics*. New York: McGraw-Hill.
- Siegfried, John J., and Rendigs Fels. 1979. “Research on Teaching College Economics: A Survey.” *Journal of Economic Literature* 17, no. 3: 923–969.
- Siegfried, John, Alan Krueger, Susan Collins, Robert Frank, Richard MacDonald, KimMarie McGoldrick, John Taylor, and George Vredeveld. 2010. *Voluntary National Content Standards in Economics 2nd edition*. New York: Council for Economic Education. <http://www.councilforeconed.org/wp/wp-content/uploads/2012/03/voluntary-national-content-standards-2010.pdf>.
- Walstad, William B., Michael Watts, and Ken Rebeck. 2007. *The Test of Understanding of College Economics: Examiner’s Manual*. New York: Council for Economic Education.
- Walstad, William B., and Ken Rebeck. 2008. “The Test of Understanding of College Economics.” *American Economic Review* 98, no. 2: 547–551.
- Watts, Michael, and Georg Schaur. 2011. “Teaching and Assessment Methods in Undergraduate Economics: A Fourth National Quinquennial Survey.” *Journal of Economic Education* 42, no. 3: 294–309.
- Wiggins, Grant P., Jay McTighe, Leslie J. Kiernan, and Frank Frost. 1998. *Understanding by Design*. Alexandria, VA: Association for Supervision and Curriculum Development.